Title	A Revision of the Japanse Gall Midges : Diptera : Cecidomyiidae
Author(s)	YUKAWA, Junichi
Citation	Memoirs of the Faculty of Agriculture, Kagoshima University, 8(1): 1-203
Issue Date	1971-03-25
URL	http://hdl.handle.net/10232/3158

A Revision of the Japanese Gall Midges
(Diptera : Cecidomyiidae)

Junichi YUKAWA
(*Entomological Laboratory*)

ABSTRACT

In this paper, 167 named and 17 unnamed species belonging to 68 genera of the Japanese gall midges are included. Sixteen new speices are described and 16 species are recorded, for the first time, from Japan. Adults of 60 species are redescribed, and 8 new combinations and 6 new synonyms are proposed. The biological notes of 20 gall-makers and 4 predators are mentioned, and their larvae and pupae of 9 and 11 species are described, respectively. The rest of the species are listed with some of the important references and the brief notes on their host plant range, gall and distribution. Keys to the Japanese tribes, genera and species for adults are given. The plants, insects and mites attacked by the Japanese gall midges are also listed.

CONTENTS

INTRODUCTION

The family CECIDOMYIIDAE includes a large number of species known as gall midges. Based on the recent estimation (Nijveldt, 1969), approximately 4000 species belonging to about 530 genera have already been described, and new species and genera are continually being recorded. In addition to the abundance in number of species, they exhibit the greatest diversity of habit, many of them are primarily phytophagous or gall makers and some are zoophagous, saprophagous, mycetophagous or inquilinous. Some of the gall making CECIDOMYIIDAE are responsible for serious losses of cultivated plants or forest trees. Another peculiarity of the family is that some of the free-living larvae repeat the paedogenetic cycle, which has been studied very little in Japan. Biochemical or ecological attention has been also directed to the problems of gall producing mechanisms by various authors.

In Japan, since Matsumura (1899) and Sasaki (1901-1902) mentioned the members of the family CECIDOMYIIDAE in their books, various authors have studied the taxonomy and biology of this interesting group of small flies. The historical sketch of the studies during the period between 1901 and 1954 was summarized by Monzen (1955a). Shinji (1944) published a book of galls and gall making insects, in which he recorded 16 new and 38 known species. There are, however, considerable confusions in this book, concerning the scientific name and the Japanese name of the both species and gall. For instance, he used frequently in the explanation of photographs the different name from that used in the description of the species, or sometimes changed the combination without telling any reason. After Monzen (1955a, 1955b) reported 10 new and 16 known species, Inouye (1955, 1959, 1964a) and Uchida & Inouye (1954, 1955) described 10 gall midges (including a new genus) injurious to coniferous trees. Biological or ecological studies for controling them have been carried out by various authors from different points of view. Tsutsui (1956) summarized the results of the investigations on the wheat gall midges. In 1957, Ishihara listed 12 gall midges injurious to cultivated plants in his book. Soy bean pod gall midge has been studied by such authors as A. Naito & Ôsaka (1959) and A. Naito (1964). Alexander (1959) described *Catotricha antennata* based on the specimen collected from Honshu. Koizumi (1962a, 1962b) suggested that it may be neccessary to examine again the habit and systematic position of some of previously reported Japanese gall midges. Non-gall making group of the family have been studied very little in Japan, before Yukawa (1967a, 1967b, 1967c, 1968a) reported 20 species (including a new genus) of tribes MICROMYINI, WINNERTZIINI and ASYNAPTINI from Kyushu. Kovalev (1967) recorded some of the previously described Japanese species in the Far East of the USSR. Recently, Grover & Prasad (1968) described a new predacious gall midge, *Golanudiplosis japonicus*, based on the specimens forwarded from Japan.

The purpose of the present paper is: to clear up the confusion of nomenclature in the Japanese gall midges; to redescribe the previously described species as much as possible, especially, details of male genitalia of gall making group; to add new taxa to the fauna of this country; to establish a classification of the Japanese gall midges in the light of the recent taxonomic studies; to contribute anything to the knowledge of biology or habit of the family; and to point out clearly the problems left in the future.

The author treats 167 named and 17 unnamed species belonging to 68 genera of the Japanese gall midges in this paper. Sixteen new species are described and 16 species are recorded, for the first time, from Japan. Adults of 60 species are redescribed, and 8 new combinations and 6 new synonyms are also proposed. The biological notes of 20 gall-makers and 4 predators are mentioned, and their larvae and pupae of 9 and 11 species are described, respectively. The rest of the species are listed with some of the important references and the brief notes on their host plant range, gall and distribution.

ACKNOWLEDGEMENTS

The author wishes to express his sincere gratitude to Prof. K. Yasumatsu, Prof. Y. Hirashima (Kyushu Univ.), Prof. S. Ito (Univ. of Osaka Pref.), Prof. M. Shibuya and Prof. A. Nagatomi (Kagoshima Univ.) for their continuing guidance and encouragement during the course of this study. The author is very grateful to Dr. R. J. Gagné (U. S. A.), Dr. K. M. Harris (England), Mr. K. Koizumi (Yokohama Plant Prot. Sta.), Dr. O. B. Kovalev, Dr. B. M. Mamajev (USSR), Dr. E. Möhn (W. Germany), Dr. W. C. Nijveldt (Holland), Dr. S. Panelius (Finland), Mr. T. Saigusa and Dr. K. Yano (Kyushu Univ.) for their kind suggestions and helpful discussions. The host plants of gall midges were identified by Prof. S. Hatsushima (Kagoshima Univ.) to whom the author is deeply indebted. The author appreciate the courtesy of Dr. M. Okano (Iwate Univ.) and Dr. C. Watanabe (Hokkaido Univ.) who generously allowed him to examine Monzen's and Matsumura's type specimens respectively, and of Dr. M. Inouye (Hokkaido), Prof. S. Ito (Univ. of Osaka Pref.) and Mr. T. Okadome (Meijo Univ.) in lending the valuable literatures. His hearty thanks are also due to the following persons for their kindness in offering the specimens: Mr. E. F. Drake, Mr. N. Fukuhara, Prof. S. Hatsushima, Mr. S. Hayashi, Prof. Y. Hirashima, Mr. R. Inoue, Dr. H. Kajita, Messrs. K. Kanmiya, K. Kawano, M. Kobayashi, K. Koizumi, Y. Maeta, M. Matsuura, M. Miyahara, Y. Miyatake, A. Mori, Dr. Y. Murakami, Messrs. A. Nakanishi, A. Naito, T. Saigusa, M. Sato, M. Shiga, Dr. Y. Tajima, Messrs. K. Takeno, A. Taketani and A. Tanaka.

MATERIALS AND METHODS

The author examined about 1200 slide-mounted and 1000 alcohol specimens collected from various parts of Japan during the period between 1962 and 1970. The adults of non-gall making group of the family, except predacious species, were mainly collected by net sweeping, partly at light and in Malaise traps. Both mature and immature stages of gall making Cecidomyiidae were obtained by collecting galls and breeding them in the laboratory. As suggested by Barnes (1946a), it is always advisable to wait, if possible, until the larvae are nearly full grown before collecting them. The predacious gall midges were also reared by supplying them with prey. In breeding gall midges, the author adopted almost the same method as described by Barnes (1946a), using a simple breeding cage which consists essentially of a cylindrical glass covered by muslin sewn on to a wooden ring, and either a flower-pot containing soil or a petri-dish with a sheet of moistened filter paper on the bottom. The part of the host plant on which

galls are produced ought to be cut with a stem or a twig of suitable length if possible, and put into a small vase containing very weak burnt alum solution which prevents the plant from withering early. Then it is placed in the breeding cage.

The collected specimens are preserved in 70 to 75 % alcohol. The color, in each case, was recorded, as far as circumstances permit, before the alcohol cauesd fading. For the identification of species and description of new taxa, the materials ought to be mounted on microscope slide. The head, wings and male genitalia were dissected from the body with fine needles before mounting. To observe further details, the male genitalia was cleared by placing in 75 % Lacti-phenol solution for a few days or by being boiled in 5 to 10 % KOH solution for a few minutes. The larval and pupal materials were pricked in 2 parts with a fine needle and cleared by the same method. Then, each specimen was placed into 1 or 2 drops of mounting media, Neoshigaral, on a slide glass, and mounted.

The number of the individual slide was written after the word "Cecid. No." The author changed his old numbering method as shown in "Cecid. No. 92-1" into new consecutive numbers as "Cecid. No. 9201".

The galls were occasionally dissected and the number of larvae or pupae per gall and their developmental stages were recorded.

The drawings were made with the aid of a camera lucida.

The author also examined types of 14 of 24 species described by Monzen. They are hardly identified because most of them have been destroyed and each specimen is glued on a piece of celluloid with unascertained yellowish substance which is not readily dissolved. Accompanying gall materials, however, the author was furnished with useful information. Unfortunately, the author could not find out Shinji's and the rest of Monzen's type specimens.

The holotypes and some paratypes of originally described species in this paper are preserved in the collection of Entomological Laboratory of Kyushu University and the rest of paratypes in Kagoshima University. Monzen's type specimens examined here were transferred from Iwate Uinversity and now tentatively kept in Kagoshima University.

DIAGNOSTIC CHARACTERS AND DESCRIPTIVE METHODS

The color of thorax or abdomen and the color pattern of wing or leg are sometiems useful in classification, if those were recorded before the alcohol caused fading. The author, in this paper, indicates the size of midge by the wing length instead of body length.

The both eyes are usually connected dorsally by the eye bridge which consists of one or more rows of facets, sometimes the facets are absent at the medial or lateral portion of eye bridge. The ocelli are used in classifying the LESTREMIINAE but are absent in all CECIDOMYIINAE. The palpus usually consists of 1 to 4 segments and is provided with microtrichia and short setae, sometimes with scales or sensorial spines. In some genera of PORRICONDYLINAE and ASPHONDYLIIDI, the basal swelling of palpus is distinct, in this case the number of palpal segments is expressed as 1+3 or

1+4. The number and the proportion of palpal segments are used for the specific, or sometimes, the generic distinction.

The antenna is composed of 2 basal segments (scape and pedicel) and 6 to 65 flagellar segments. The scape is subglobular or subconical and usually larger than pedicel, which is, however, enlarged in the genera *Anarete* and *Micromya* of the LESTREMIINAE. The both scape and pedicel are provided with rather short or long setae, the density and distribution of which are also sometimes useful. The number of flagellar segment is sometimes constant for a species, or even for a genus, ranging from 12 to 16, but it is not constant for a species in the most members of ASYNAPTINI, LASIOPTERIDI and OLIGOTROPHIDI. Each flagellar segment consists, essentially, of a cylindrical distal stem and a subcylindrical basal enlargement. The stem is variable in the length; very short or inconspicuous in most of the LASIOPTERIDI and ASPHONDYLIIDI, some of the LESTREMIINAE and the females of some genera of OLIGOTROPHIDI or CECIDOMYIIDI. The basal enlargement is subcylindrical in many species, subglobular or subconical in some of the LESTREMIINAE and binodose in the males of CECIDOMYIIDI. The basal enlargement is also provided with characteristic sensoria ranging from simple sensorial spine to complex circumfila. These characters of the antennal segments are very useful in classification. (Fig. 1. F-H)

The relative length of femur to tibia or second tarsal segment is sometimes used in dividing the species, though it is rather variable with the specimen. The first tarsal segment is longer than the successive segments in the LESTREMIINAE, but is shorter than the second and sometimes provided with an apical protrusion in the PORRICONDYLINAE and CECIDOMYIINAE. The tarsal claw is curved or straight; otherwise simple or provided with 1 or 2 small basal teeth or with minute serration; sometimes subdistally widened. These characters of the tarsal claw and the relative length of empodium to claw are frequently used for the specific or generic distinction.

The wing of the family is usually hyaline with hairs or scales, sometimes mottled. The relative length of wing to its maximum width is described though it is not frequently used. The wing venation is mainly taken into consideration in the classification of the subfamilies and the tribes. (Fig. 1. A-E) The costa ends at tip of R_5 in many cases, but extends well beyond it in some genera of LESTREMIINAE. Sc is usually invisible or sometimes its basal portion is visible. R_1 meets with costa nearly at or before the half way from the wing base to the apex. Rs is present as a cross-vein, forming a distinct angle with r-m or R_5 in the LESTREMIINAE, WINNERTZIINI and certain genera of the CECIDOMYIIDI, in the same direction as R_5 or forming a small angle with R_5 in the PORRICONDYLINI, ASYNAPTINI and DIALLACTINI, and incomplete or absent in the rest of CECICDOMYIINAE and LEPTOSYNINI. R_5 usually meets with costa nearly at or a little before or beyond wing apex, except that it is close to costa and meets with it well before wing apex in the LESTREMIINI and LASIOPTERIDI. M_{1+2} is present and forked in the LESTREMIINI, CATOCHINI and CATOTRICHINI or simple in the MICROMYINI and the related tribes. The distal portion of M_{1+2} is visible in some PORRICONDYLINAE, but is completely absent in the CECIDOMYIINAE and in the rest of PORRICONDYLINAE. M_{3+4} is free from M or Cu, branched from basal portion of M, or connected with Cu and results in forming a fork. In this paper, the author regards the upper branch of the fork as M_{3+4} and the lower one as Cu, which have been considered as Cu_1 and Cu_2 respectively. A little anterior to

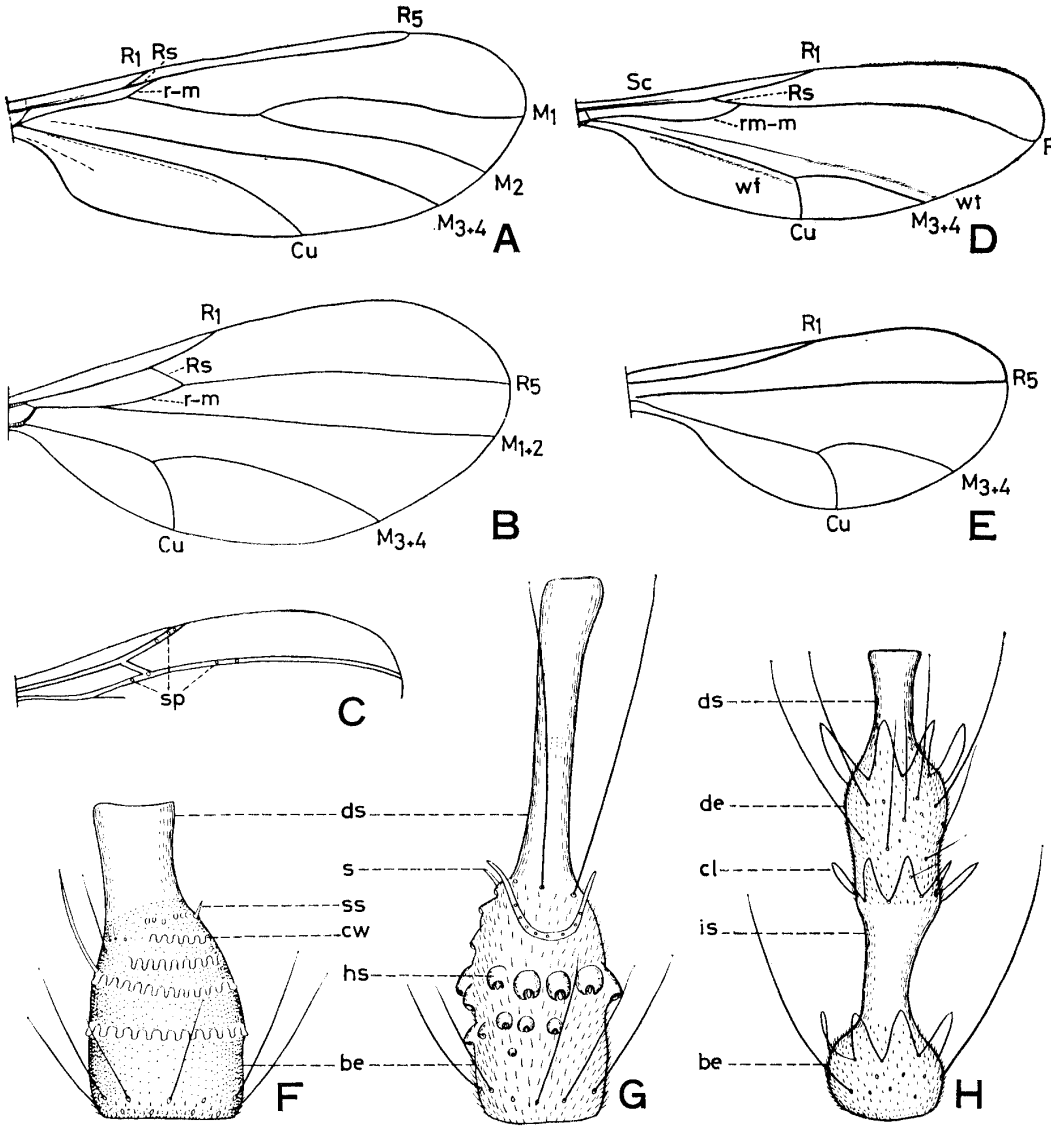

Fig. 1. Wing venation and male flagellar segment.
(A) LESTREMIINAE: *Lestremia cinerea* Macquart, ♂. (B) LESTREMIINAE: *Aprionus rostratus* n. sp., ♂. (C) LESTREMIINAE: *Heterogenella mamajevi* Yukawa, ♂, showing sensory pores. (D) PORRICONDYLINAE: *Claspettomyia serrata* n. sp., ♂. (E) CECIDOMYIINAE: *Golanudiplosis japonicus* Grover & Prasad, ♂. (F) LESTREMIINAE: *Heterogenella mamajevi* Yukawa, ♂. (G) PORRICONDYLINAE: *Winnertzia hikosanensis* Yukawa, ♂. (H) CECIDOMYIINAE: *Orseolia miscanthi* Shinji, ♂. *be*, basal enlargement; *cl*, circumfilar loop; *cw*, crenulate whorl; *de*, distal enlargement; *ds*, distal stem; *hs*, horse-shoe shaped socket; *is*, intermediate stem; *s*, sensoria; *ss*, sensorial spine; *sp*, sensorial pore; *wf*, wing fold.

the fork, sometimes, there is a vein-like suture, which is not M_{3+4} but a distinct wing fold. Cu is more or less distinctly curved. Another wing fold, which has been known as PCu, is sometimes present and runs parallel to Cu. True PCu is visible in some genera of LSTREMIINAE. The number and position of sensory pore on R_1, R_5 and r-m are sometimes useful in classifying the genera of LESTREMIINAE.

The male genitalia is one of the most useful characters for classifying the species, genera and tribes. (Fig. 2). The ninth tergite or epandrium is more or less readily recognized by the presence of distinct distal margin in the LESTREMIINAE and many of PORRICONDYLINAE, though it is variously modified. The distal margin of epandrium is indistinct and connected with cerci without any distinction in most of the members of CECIDOMYIINAE. The cerci is usually setose and bilobed. It has been known as upper lamella, superior plate or tenth tergite. Under the cerci, the structure known as lower lamella, inferior plate or tenth sternite is present. When the structure is situated just below the anus and not connected proximally with the root of gonocoxite, it is termed as subanal plate. When the structure is distinctly connected proximally

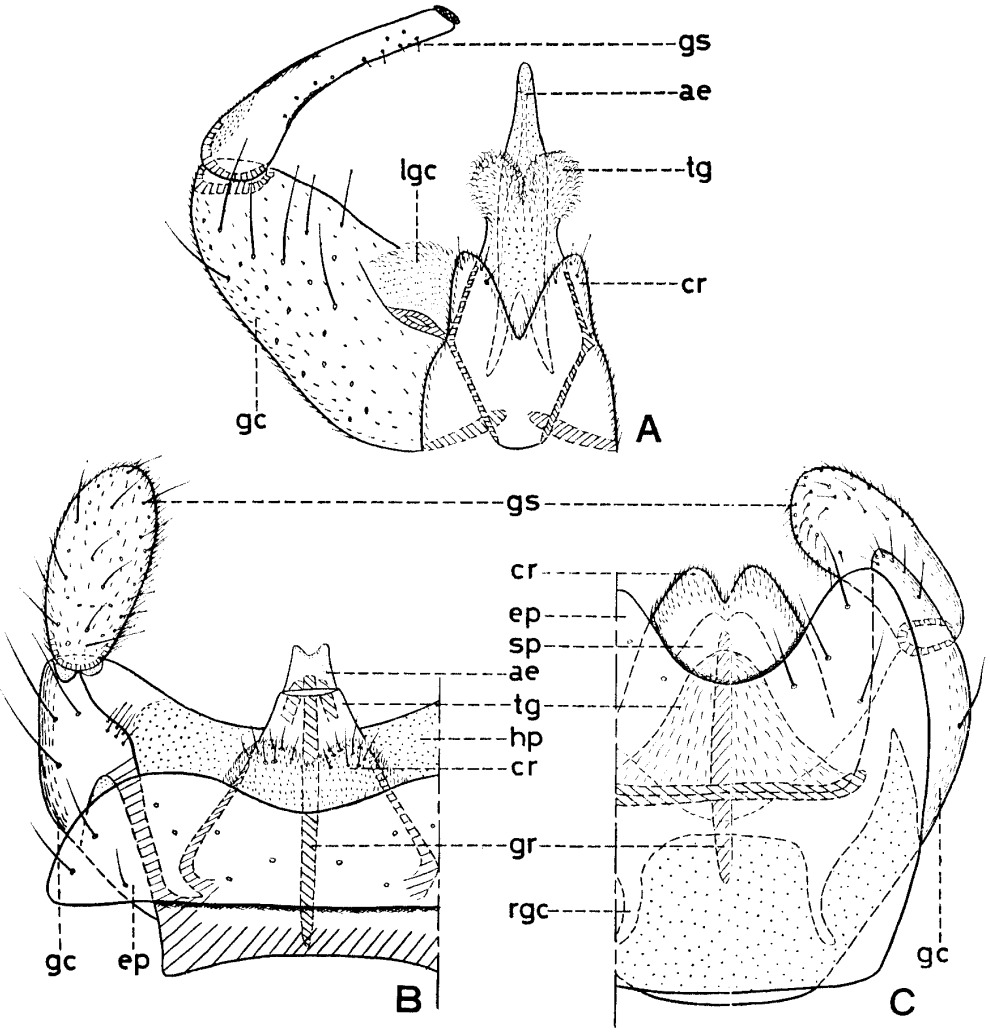

Fig. 2. Male genitalia.
(A) CECIDOMYIINAE: *Aphidoletes aphidimyza* (Rondani). (B) LESTREMIINAE: *Cordylomyia excavata* Yukawa. (C) PORRICONDYLINAE: *Kronomyia concava* (Yukawa).
ae, aedeagus; *cr*, cerci; *ep* epandrium; *gc*, gonocoxite; *gr*, genital rod; *gs*, gonostylus; *hp*, hypandrium; *lgc*, lobe of gonocoxite; *rgc*, root of gonocoxite; *sp*, subanal plate; *tg*, tegmen.

with the root of gonocoxite, it ought to be considered as tegmen. The subanal plate is bilobed or entire, usually does not exceed the cerci in length. The structure which can be seen in the members of the LASIOPTERIDI and OLIGOTROPHIDI may be regarded as subanal plate, while that in the majority of the ASPHONDYLIIDI and CECIDOMYIIDI is considered to be tegmen. Exceptionally the author termed the structure as "lower lamella" in the members of some genera, because he could not readily confirm the connection with the root of gonocoxite. Both subanal plate and tegmen are visible in the CATOCHINI, LESTREMIINI and PORRICONDYLINAE, but the subanal plate is absent in the MICROMYINI except some of the members of the genus *Aprionus*. The gonostylus or disticlasper is variable in shape, with or without apical claw or spine. The gonocoxite or basiclasper is also variable in shape, some are developed dorso- or ventro-distally into a setose lobe, or provided with a distinct lobe on medial or basal portion of inner side. The both gonocoxites are ventrally divided, or united narrowly or broadly. Broadly united ventral portion of the both gonocoxites is termed as ninth sternite, ventral plate or hypandrium, which is membranous or weakly sclerotized, sometimes emarginated on distal margin or provided with a pair of projections. The roots of gonocoxites are distinctly or weakly sclerotized; long or short, and connected by the sclerotized or membranous transvers bridge. The roots and the bridge are posteriorly connected with the tegmen, which forms a sheath above the aedeagus and the genital rod. The tegmen is more or less distinctly visible in its contors in many of LESTREMIINAE, PORRICONDYLINAE, ASPHONDYLIIDI and CECIDOMYIIDI, or invisible in the rest. The tegmen is variable in shape, frequently strongly sclerotized basally, laterally or distally, and sometimes provided with various kinds of processes. The aedeagus is usually membranous, sometimes modified distally. The genital rod is present in most of the members of LESTREMIINAE and PORRICONDYLINAE, and it is variable in length, usually straight, sometimes transformed basally or distally.

The ovipositor is also useful in classification. It is completely or partly retracted in the body, in some genera, it is transformed into a sclerotized and aciculate structure. Ovipositor bears, if not aciculate, a pair of suboval or subtriangular terminal lobes which are usually clothed with setae and microtrichia. The number and shape of sclerotized spermathecae are used in separating certain genera of LESTREMIINAE and PORRICONDYLINAE.

The author follows Möhn (1955, 1961) in the description of immature stages. (Fig. 3) The following larval characters are very useful in classifying the genera : the number and position of papillae; the presence or absence of setae; the presence or absence of sternal spatula and, if present, the form of the spatula; and the arrangement of transvers rows of spines. The terminal papillae are used in separating species.

The following pupal characters are also taken into consideration : the length and shape of apical spine; the length of seta on apical papilla; the presence or absence and the number of upper and lower frontal spines; the number of lower and lateral facilal papillae; the length of prothoracic horn; the length, number and position of stigmata on abdominal segments; and the arrangement of transvers rows of spines on dorsal surface of abdominal segments.

In the description of galls, the author divided them into flower galls, fruit galls, bud galls, leaf galls, stem galls, root galls and so on depending upon their position on the

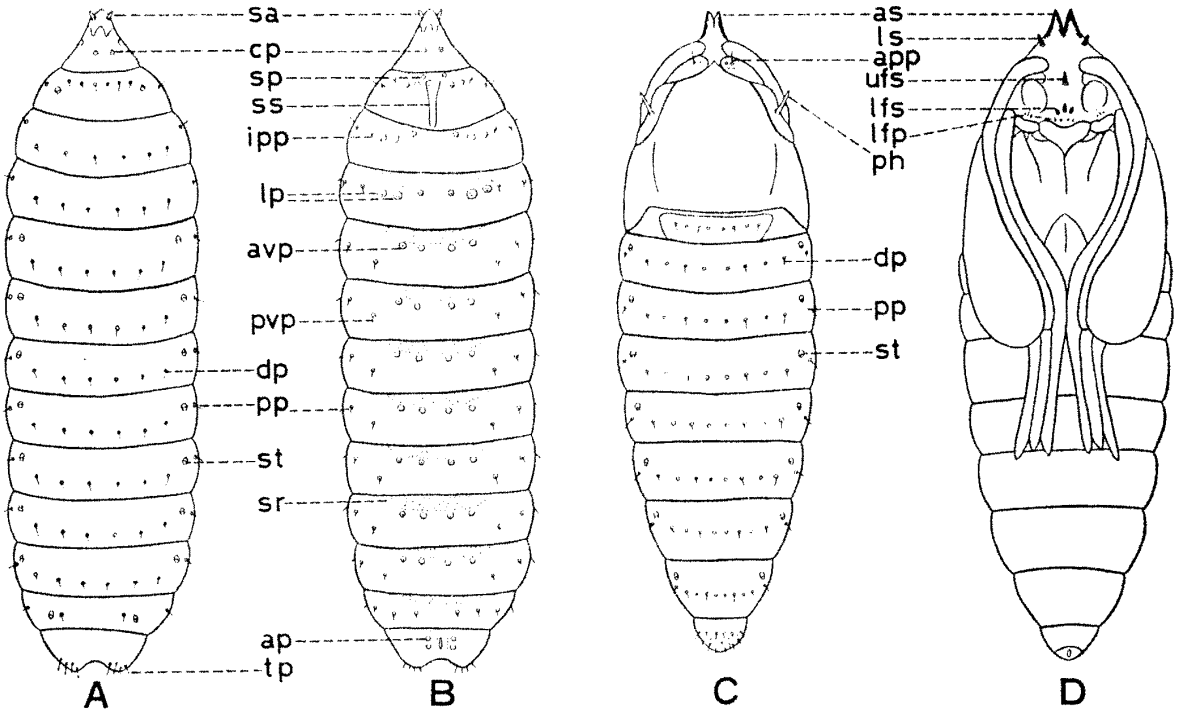

Fig. 3. Generalized larva and pupa.
(A) larva, dorsal view. (B) larva, ventral view. (C) pupa, dorsal view. (D) pupa, ventral view.
ap, anal papillae; *app*, apical papillae; *as*, apical spine; *avp*, anterior ventral papillae; *cp*, cervical papillae; *dp*, dorsal papillae; *ipp*, inner pleural papillae; *lfp*, lower and lateral facial papillae; *lfs*, lower frontal spine; *lp*, lateral papillae; *ls*, lateral spine; *ph*, prothoracic horn; *pp*, pleural papillae; *pvp*, posterior ventral papillae; *sa*, second antennal segment; *sp*, sternal papillae; *sr*, spinule rows; *ss*, sternal spatula; *st*, stigma; *tp*, terminal papillae; *ufs*, upper frontal spine. (Möhn, 1955, 1961).

plants. The number of larvae per gall is roughly expressed in the word "mono-, oligo- or polythalamus".

SYSTEMATICS

SUBDIVISION OF THE FAMILY

In classifying the Japanese gall midges into subfamilies and supertribes, the author adopted the following effective key which was recently proposed by Harris (1966).

1. First tarsal segment longer than second ..... LESTREMIINAE
– First tarsal segment distinctly shorter than second.....2
2. R_5 close to R_1 and joining the costa well before the wing apex..... LASIOPTERIDI
– R_5 well separated from R_1 and joining the costa near the wing apex 3
3. Antennal segments elongate, cylindrical, with short necks; circumfila usually tortuous in the male, characteristic reduction of the terminal segments in the female ..... ASPHONDYLIIDI

– Antennal segments usually with distinct prolongation of the neck at least in the male, no characteristic reduction of the terminal antennal segments in the female, and male sensoria hardly ever tortuous 4
4. Cross-vein (Rs) present, basal section of third vein (r-m+M) often sinuous or curved; antennal sensoria relatively simple ..... PORRICONDYLINAE
– Cross-vein (Rs) absent or, if present, relatively short and indistinct and generally associated with binodose male antennal segments with long, looped circumfila....5
5. R_5 generally joining the costa at or shortly after the wing apex. Antennal segments of male usually binodose and with 2 or 3 sets of long, looped circumfila ....CECIDOMYIIDI
– R_5 generally joining the costa at or slightly before the wing apex. Antennal segments of male never binodose; circumfila simple ..... OLIGOTROPHIDI

SUBFAMILY LESTREMIINAE

Key to Japanese tribes

1. M_{1+2} simple; M_{3+4} forming a fork with Cu ..... Micromyini
– M_{1+2} forked; M_{3+4} not forming a fork with Cu 2
2. Rs distinctly longer than r-m; M_{3+4} arising from M..... Catotrichini
– Both Rs and r-m short, subequal in length, M_{3+4} free from M 3
3. Ocelli 3; medial fork shorter than stem ..... Catochini
– Ocelli 2 or none; medial fork longer than stem..... Lestremiini

Tribe CATOTRICHINI Edwards

Catotrichini Edwards, 1938b; Pritchard, 1948; Pritchard, 1958.

Catotrichiariae Mani, 1946.

The tribe Catotrichini contains only 1 genus and is characterized in the following respects: ocellus 3; R_5 meeting with costa beyond apex of wing; Sc distinct; Rs rather long; M_{1+2} forked; M_{3+4} arising from M rather than free.

Genus **Catotricha** Edwards

Catotricha Edwards, 1938b; Pritchard, 1948; Pritchard, 1958.

The characters of this genus were adequately described by Edwards (1938b); antenna with 2+14 segments; each flagellar segment having an elongated basal enlargement and a cylindrical distal stem which has several setae subdistally, without sensoria; empodium shorter than claw; epandrium large, bilobed; gonostylus with a basal projection, without apical tooth; tegmen ending in 2 points.

The following 2 Japanese species are included in the genus. Because Alexander's species are not known to the author, they are only listed below.

Catotricha nipponensis (Alexander)

Catocha nipponensis Alexander, 1924.

Catotricha nipponensis (Alexander) : Edwards, 1938b.
Distribution : Japan (Honshu).

Catotricha antennata Alexander

Catotricha antennata Alexander, 1959.
Distribution : Japan (Honshu).

Tribe CATOCHINI Edwards

Catochini Edwards, 1938b ; Pritchard, 1948 ; Pritchard, 1958 ; Pritchard, 1960.
Catochariae Mani, 1946.

This tribe differs from Catotrichini by having Rs rather short, medial fork distinctly shorter than its stem and M_{3+4} free from M. Several genera are included in this tribe, but only 1 of them is known in Japan.

Genus **Catocha** Haliday

Catocha Haliday, 1833 ; Macquart, 1835 ; Westwood, 1840 ; Walker, 1856 ; Schiner, 1864 ; Winnertz, 1870 ; van der Wulp, 1877 ; Skuse, 1889 ; Kieffer, 1898 ; Kieffer, 1900 ; Felt, 1908 ; Enderlein, 1911a ; Felt, 1911b ; Felt, 1913a ; Kieffer, 1913f ; Edwards, 1929 ; Mani, 1934 ; Edwards, 1938b ; Pritchard, 1947 ; Pritchard, 1958 ; Pritchard, 1960 ; Mamajev, 1969.
Mimosciara Rondani, 1840 ; Rondani, 1846 ; Bigot, 1854 ; Kieffer, 1900 ; Coquillett, 1910 ; Edwards, 1929.
Furcinerva Rondani, 1846 ; Bigot, 1854 ; Kieffer, 1900 ; Coquillett, 1910.
Macrostyla Winnertz, 1846 ; Bigot, 1854.
Molobraea H. Loew, 1850 ; Bigot, 1854.
Molobraea (*Molobraea*) H. Loew, 1850.
Molobraea (*Catocha*) H. Loew, 1850.
Yposatoea Rondani, 1856 ; Coquillett, 1910.

This genus is characterized in the following respects : eye bridge 2 to 3 facets wide ; male antenna with 2+14 segments, female with 2+8 ; flagellar segment with digitate sensoria ; R_5 meeting with costa near apex of wing and costa extending well beyond junction ; epandrium rather broad ; gonostylus with a group of strong setae subapically ; tegmen distally with 2 groups of short, but strong spines.

Catocha latipes Haliday

(Fig. 4 : A)

Catocha latipes Haliday, 1833 ; Macquart, 1835 ; Walker, 1856 ; Schiner, 1864 ; Winnertz, 1870 ; van der Wulp, 1877 ; Theobald, 1892 ; Kieffer, 1898 ; Kieffer, 1913f ; Edwards, 1938b ; Mamajev, 1969.
Catocha kiefferi Strobl, 1909 ; Kieffer, 1913f.
Macrostyla latipes Winnertz, 1846.

Catocha crassitarsis van der Wulp, 1874; van der Wulp, 1877; Kieffer, 1898; Kieffer, 1913f.
Catocha muscicola Kieffer, 1900; Kieffer, 1913f.
Mimosciara molobrina Rondani, 1840; Rondani, 1846.
Lestremia molobrina (Rondani): Kieffer, 1913f.

Male: Wing length 1.8 to 2.6 mm. Eye bridge 2 to 3 facets wide medially. Palpus consisting of 4 segments, about 3/4 as long as height of head, sparsely with short sensorial spines which are fewer or absent on distal 2 to 3 segments; first palpal segment shortest; second and third subequal in length, each a little longer than first; fourth about 1.5 times as long as first. Antenna with 2+14 segments; scape about 1.8 times as long as pedicel, with some rather long setae ventrally; pedicel a little shorter than wide; each flagellar segment, except terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem; basal enlargement with some short bristles basally, a complete whorl of long bristles medially and an incomplete one ventro-distally; basal enlargement also with some simple or digitate sensorial spines distally; fifth flagellar segment with a basal enlargement about 1.6 times as long as wide, stem about 1.2 times as long as basal enlargement; terminal flagellar segment subconical, 1.4 to 2.1 times as long as maximum width, with 2 complete whorls of rather long bristles. All legs with tibia nearly as long as femur, about 2 times as long as first tarsal segment; claw bent nearly at right angle, with minute serration on inner side; empodium nearly as long as claw (rarely 1/3 as long as claw). Wing 2.3 to 2.5 tiems as long as wide; sensory pore 2 or 3 on R_1, 1 or 2 on basal portion of R_5, 4 or more irregularly on distal half of R_5. Genitalia: epandrium rather large, shallowly emarginated on distal margin; cerci and subanal plate bilobed; gonostylus with a group of fine teeth distally; hypandrium with a deep emargination; root of gonocoxite about 3/5 as long as distance separating both roots; tegmen sclerotized on caudo-lateral margin, distally with 2 groups of sclerotized, forked spines; aedeagus membranous, with pigmented points; genital rod simple, about 2/3 as long as gonocoxite.

Female: Wing length 1.9 to 3.1 mm, 2.4 to 2.6 times as long as wide. Antenna with 2+8 segments; each flagellar segment, except terminal one, usually with 4 digitate sensoria; basal enlargement of fifth flagellar segment 2.0 to 2.5 times as long as wide and 1.4 to 1.7 times as long as distal stem; terminal flagellar segment subconical, 2.1 to 3.2 times as long as maximum width. Second to fourth tarsal segments of fore leg distinctly thickened, with dense short stiff setae which are arranged in 2 parallel stripes running through the whole length of the 3 segments. Spermathecae 2, rounded, 0.06 to 0.08 mm in diameter; terminal lobe of ovipositor elliptical, with many short setae. Otherwise almost as in male.

Specimens examined: 2 ♂♂ (on slide), 1 ♂ (in alcohol), Shiga-Heights, Nagano-Pref., Honshu, 20. V. 1968, J. Yukawa leg. Cecid. No. 110101-2; 1 ♂, 1 ♀ (on slide), Mt. Mizugaki, Yamanashi-Pref., Honshu, 24. V. 1968, J. Yukawa leg. Cecid. No. 115801; 1 ♂ (on slide), Marunuma, Tone, Gunma-Pref., Honshu, 2. VI. 1968, J. Yukawa leg. Cecid. No. 125501; 1 ♀ (on slide), Mt. Hayachine, Iwate-Pref., Honshu, 27. V. 1968, J. Yukawa leg. Cecid. No. 119101; 1 ♂ (on slide), Bizan, Tokushima-City, Shikoku, 2. IV. 1969, A. Mori leg. Cecid. No. 150101; 1 ♂, 2 ♀♀ (on slide), 4 ♀♀ (in alcohol), Mt. Hiko, Fukuoka-Pref., Kyushu, 3-4. XI. 1969, K. Kanmiya & K. Takeno leg. (Malaise trap), Ceicd.

No. 144701, 145301-2; 1 ♀ (on slide), 3 ♀♀ (in alcohol), ibid., 18-19. XI. 1968, K. Kanmiya & K. Takeno leg. (Malaise trap), Cecid. No. 160501 ; 1 ♂ (on slide), ibid., 3. IV. 1969, K. Kanmiya & K. Takeno leg. (Malaise trap), Cecid. No. 164901.

Distribution : Japan (Honshu, Shikoku, Kyushu), Europe, Formosa, N. America (if identical with *C. slossonae*).

Remakrs : The genus includes 2 closely related species, *C. latipes* and *C. slossonae* Felt (1908), of which the latter may prove to be a synonym of the former, as suggested by Pritchard (1948). The Japanese specimens examined agree well with the figures and redescription of *C. latipes* by Edwards (1938b), that is easily recognized by the distinct shape of male genitalia.

The following 2 Japanese species were previously recorded from Japan and they are only listed below because their type specimens and original descriptions are not known to the author, though it is rather difficult to consider that 3 allied species of the genus *Catocha* are distributed in Japan.

Catocha fagi Shinji : Shinji, 1938j.

Catocha kirii Shinji : Shinji, 1938j.

Tribe LESTREMIINI Kieffer

Lestremides Kieffer, 1898.
Lestremiariae Kieffer, 1900 ; Kieffer, 1913f.
Lestremiinariae Felt, 1908; Felt, 1913a ; Felt, 1918 ; Felt, 1925 ; Felt, 1929 ; Mani, 1934; Mani, 1946.
Lestreminariae Felt, 1911b.
Lestremiini Enderlein, 1911a ; Enderlein, 1912 ; Edwards, 1938b ; Pritchard, 1951 ; Pritchard, 1958 ; Hardy, 1960 ; Grover, 1963 ; Mamajev, 1964a.
Lestremiinae Enderlein, 1936.

The tribe LESTREMIINI is characterized as follows : ocellus 2 or lacking ; costa meeting with R_5 well before tip of wing ; M_{1+2} forked ; medial fork longer than stem ; M_{3+4} free, not arising from M, not forming a fork with Cu ; female without sclerotized spermatheca.

Edwards (1938b) mentioned that *Lestremia* (including *Anaretella*) and *Anarete* have 2 sensory pores on R_1, 1 on junction of Rs and r-m, 1 on basal portion of R_5, and 3 on distal portion of R_5. These arrangement of sensory pores are rather different in the Japanese specimens : 1 sensory pore either on basal portion of R_5 or junction of Rs and r-m absent in *Lestremia* ; sensory pore on basal portion of R_5 moved to near middle of R_5 in *Anaretella* ; *Anarete* has 3 or 4 sensory pores on distal portion of R_5.

Key to Japanese genera and species (males)

1. Antennal flagellum with 6 to 10 segments, without distinct stem or whorl of long bristles ..... *Anarete* sp.
- Antennal flagellum with 14 segments, with a distal stem and 1 or 2 whorls of long bristles 2
2. Sensory processes on flagellar segment not digitate ..... *Lestremia* 3

– Sensory processes digitate on basal several flagellar segments ..... *Anaretella*...4
3. Gonostylus ending in a single point ..... *L. leucophaea* (Meigen)
– Gonostylus ending in 2 points ..... *L. cinerea* Macquart
4. Gonocoxite with a setose lobe on inner side..... *A. spiraeina* (Felt)
– Gonocoxite without setose lobe on inner side ..... *A. defecta* (Winnertz)

Genus **Lestremia** Macquart

Lestremia Macquart, 1826 ; Meigen, 1830 ; Macquart, 1834 ; Westwood, 1840 ; Walker, 1856 ; Schiner, 1864 ; Winnertz, 1870 ; van der Wulp, 1877 ; Skuse, 1889 ; Kieffer, 1898 ; Kieffer, 1900 ; Felt, 1908 ; Enderlein, 1911a ; Felt, 1911b ; Felt, 1913a ; Kieffer, 1913f ; Edwards, 1929 ; Mani, 1934 ; Edwards, 1938b ; Pritchard, 1951 ; Pritchard, 1958 ; Hardy, 1960 ; Mamajev, 1969.
Lestremia (*Cecidogona*) H. Loew, 1844 ; Winnertz, 1870.
Cecidogona H. Loew : Walker, 1856 ; H. Loew, 1862 ; Skuse, 1889 ; Kieffer, 1900.

The genus *Lestremia* is characterized in the following respects : male antenna with 2 +14 segments, female with 2+9 ; each flagellar segment with 2 whorls of long bristles and some simple, rather short sensorial spines ; gonostylus ; ending in 1 or 2 points ; root of gonocoxite directed inwardly ; tegmen distally very narrow.

Previously 3 species of the genus *Lestremia* were reported from Japan, but their type specimens may be lost.

Lestremia iwatensis (Monzen, 1936) is newly synonymized by *Lestremia cinerea* Macquart (1826), as mentioned below.

Koizumi (1962a) considered that *Lestremia osmanthus* Monzen (1937) possibly belongs to the family Sciaridae, based on the description and accompanying figures by Monzen : female antenna with 2+14 segments ; tibia with an apical spur ; R_5 well separated from costa, and meeting with it near apex of wing ; M arising from near base of wing ; medial fork nearly as long as stem. This species ought to be excluded from the members of the genus *Lestremia*.

Lestremia yasukunii Shinji (1944) is hardly identified owing to the insufficient description which probably represents the characters of the female. The description of the species is summarized and translated as follows : eye bridge ? ; palpus with over 4 ? segments ; first palpal segment nearly as long as wide ; second about 2 times as long as first ; third a little longer and narrower than second ; succeeding segments ? shorter than third ; antenna with 52 (may be misprint of 12 ?) segments ; each flagellar segment with a basal enlargement about 2 times as long as wide, stem shorter than 1/2 length of basal enlargement ; twelfth segment subglobular ; wing venation agrees with that of *Lestremia* ; first tarsal segment longer than 1/2 length of tibia, shorter than second and third tarsal segments (taken together ?) ; claw without serration ; empodium shorter than claw ; lamella ? black, divided into 2 parts ; wing length about 2.8 mm.

The following 2 well known species of the genus *Lestremia* are distributed in Japan and redescribed with the collecting data.

Lestremia cinerea Macquart

(Fig. 4: D-G)

Lestremia cinerea Macquart, 1826; Macquart, 1834; Zetterstedt, 1851; Walker, 1856; Kieffer, 1898; Kieffer, 1913f; Edwards, 1929; Edwards, 1938b; Pritchard, 1951; Pritchard, 1958; Hardy, 1960; Gagné, 1968; Mamajev, 1969.
Lestremia fusca Meigen, 1830; Kieffer, 1913f; Edwards, 1929; Edwards, 1938b.
Lestremia fusca? Meigen: Winnertz, 1870.
Catocha sylvestris Felt, 1907; Kieffer, 1913f.
Lestremia sylvestris (Felt): Felt, 1908; Felt, 1913a.
Lestremia kansensis Felt, 1908; Felt, 1913a; Kieffer, 1913f.
Lestremia fraconiae Felt, 1908; Felt, 1913a; Kieffer, 1913f.
Lestremia dyari Felt 1908; Felt, 1913a; Kieffer, 1913f.
Zygoneura fenestrata Malloch, 1914; Frison, 1927; Edwards, 1938b.
Lestremia floridana Felt, 1915a.
Lestremia garretti Felt, 1926.
Catocha iwatensis Monzen, 1936; Shinji, 1938j; Shinji, 1948. New synonymy.
Lestremia iwatensis (Monzen): Monzen, 1955a.

Male: Wing length 2.0 to 2.4 mm. Eye bridge 2 to 4 facets wide medially. Palpus consisting of 4 segments, a little longer than height of head, with rather short setae sparsely; first palpal segment shortest, about 2 times as long as wide, a little broader than distal 3 segments, with many short sensorial spines on distal half; second 1.8, third 2.3 to 2.5 and fourth 2.8 to 3.0 times as long as first; distal 3 segments without sensorial spines. Antenna with 2+14 segments; scape subconical, basally narrower, nearly as long as distal width, about 2 times as long as pedicel, with a few long setae ventrally; pedicel subcylindrical, about 2/3 as long as wide, with a few rather short setae ventrally; each flagellar segment, execpt terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem; basal enlargement with some rather short bristles basally, a complete whorl of long bristles medially, an incomplete whorl of long bristles ventro-distally, and rather long bristles distally; basal enlargement also with many rather short and a few very short, simple sensorial spines on distal half; interrupted portion of distal whorl getting narrower and number of sensorial spines decrease to distal flagellar segments; first flagellar segment with slightly elongated basal enlargement; fifth flagellar segment with a basal enlargement 1.2 times as long as wide, stem about 1.2 times as long as basal enlargement; terminal flagellar segment conical, 2.1 to 2.5 times as long as basal width, with 2 complete whorls of long bristles, without sensorial spines. Leg: first tarsal segment of all legs distinctly shorter than femur or tibia; fore and middle legs with first tarsal segment 6.5 to 6.8, second 2.8 to 3.0, third 1.9 to 2.1 and fourth 1.3 to 1.5 times as long as fifth; hind leg with first tarsal segment about 8.0, second 3.5 to 3.7, third 2.4 to 2.6 and fourth 1.5 to 1.6 times as long as fifth; claws of all legs bent nearly at right angle, with minute serration on inner side; empodium about 1/3 as long as claw. Wing 2.5 to 2.7 times as long as wide; Sc indistinct on distal half; sensory pores 2 on R_1, 1 on junction of Rs and r-m or on basal portion of R_5, 3 on distal portion of R_5 (2 on upper surface, 1 on lower and sometimes additional 1 on upper surface). Genitalia: epandrium rather bluntly pointed at apex, with dorsal setae; cerci bilobed; bilobed portion rather acutely pointed on outer edge, with rather

long setae distally ; subanal plate divided into a pair of rather slender, densely pubescent lobes extending on each side of tegmen; gonostylus weakly curved, basally a little broader, about 5 times as long as basal width, ending in 2 points, of which outer one is shorter than inner one; gonocoxite rather long; root of gonocoxite bent inwardly, pointed; tegmen very narrow distally; genital rod, simple, rather long, about 2/3 as long as gonocoxite.

Female: unrecorded from Japan.

Specimens examined: 1 ♂ (on slide), Asso, Nishimuro, Wakayama-Pref., Honshu, 23.

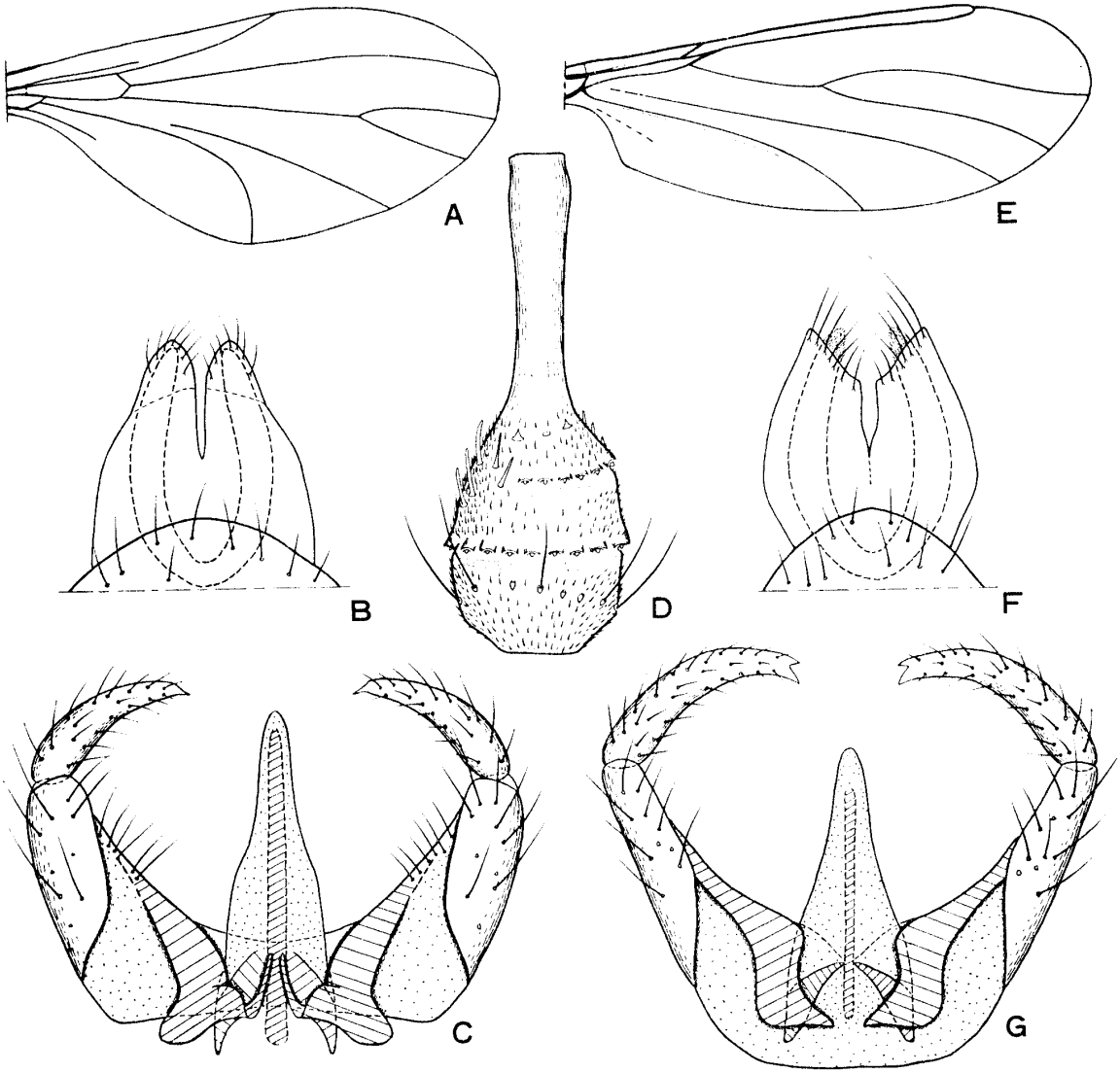

Fig. 4. *Catocha* and *Lestremia*

(A) wing, ♂ : *Catocha latipes* Haliday. (B) epandrium, cerci and subanal plate : *Lestremia leucophaea* (Meigen). (C) male genitalia, dorsal view (epandrium, cerci and subanal plate removed) : ditto. (D) fifth flagellar segment, ♂ : *Lestremia cinerea* Macquart. (E) wing, ♂ : ditto. (F) epandrium, cerci and subanal plate : ditto. (G) male genitalia, dorsal view (epandrium, cerci and subanal plate removed) : ditto.

III. 1965, J. Yukawa leg. Cecid. No. 1401; 1 ♂ (on slide), Nogouchi, Fukuoka-Pref., Kyushu, 11. V. 1965, J. Yukawa leg. Cecid. No. 3802; 1 ♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 2. V. 1965, J. Yukawa leg. Cecid. No. 9601; 1 ♂ (on slide), Hakozaki, Fukuoka-City, Kyushu, 12. III. 1966, J. Yukawa leg. Cecid. No. 18703; 1 ♂ (on slide), ibid., 22. III. 1966, J. Yukawa leg. Cecid. No. 21809; 6 ♂♂ (on slide), Miyakonojô-City, Miyazaki-Pref., Kyushu, 11. IV. 1966, E. F. Drake leg. Cecid. No. 20701-4, 21401-2; 2 ♂♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 5. XI. 1966, J. Yukawa leg. Cecid. No. 50601-2; 2 ♂♂ (on slide), Yuyama, Kumamoto-Pref., Kyushu, 10. V. 1967, J. Yukawa leg. Cecid. No. 62601-2; 1 ♂ (on slide), Yunono, Mt. Kirishima, Kagoshima-Pref., Kyushu, 26. IX. 1967, J. Yukawa leg. Cecid. No. 77601; 1 ♂ (on slide), Nukabira, Tokachi, 13. VI. 1967, T. Saigusa leg. Cecid. No. 77601; 4 ♂♂ (on slide), Kaminokawa, Hioki, Kagoshima-Pref., Kyushu, 2. XII. 1967, J. Yukawa leg. Cecid. No. 84904-7; 2 ♂♂ (on slide), Uearata, Kagoshima-City, Kyushu, 12. I. 1968, J. Yukawa leg. Cecid. No. 86201-2; 2 ♂♂ (on slide), Shiroyama, Tokushima-City, Shikoku, 27. III. 1969, A. Mori leg. Cecid. No. 14901-2; 2 ♂♂ (on slide), Engyôji, Kôchi-City, Shikoku, 9. V. 1969, J. Yukawa leg. Cecid. No. 154001-2.

Distrirbution : Japan (Hokkaido, Honshu, Shikoku, Kyushu), Europe, Hawaii, N. America, S. America (Chile).

Remarks: This species is characterized and distinguished from the other members of the genus by having lobes of cerci rather acutely pointed on outer edge and gonostylus ending in 2 points. *L. cinerea* is wide-spread over the world and the detailed characters of the species have been described by Edwards (1929, 1938b), Pritchard (1951) and Hardy (1960).

Though *Lestremia iwatensis* (Monzen, 1936) was insufficiently described, it should be considered that the species is identical with *L. cinerea* due to apical 2 points of gonostylus in the original description and accompanying figure.

Lestremia leucophaea (Meigen)

(Fig. 4: B-C)

Sciara leucophaea Meigen, 1818.
Lestremia leucophaea (Meigen) : Macquart, 1834; Winnertz, 1870; Kieffer, 1913f; Edwards, 1928; Edwards, 1929; Edwards, 1938b; Pritchard, 1951; Pritchard, 1958; Hardy, 1960; Mamajev, 1969.
Catocha sambuci Felt, 1907; Kieffer, 1913f.
Lestremia sambuci (Felt) : Felt, 1908; Felt, 1913a.
Lestremia setosa Felt, 1908; Felt, 1913a; Kieffer, 1913f.
Lestremia occidentalia Felt, 1926.

Male: Wing length 2.1 to 3.2 mm. Eye bridge 2 to 4 facets wide medially. Palpus consisting of 4 segments, 1.4 to 1.5 times as long as height of head, with rather short setae sparsely; first segment shortest, about 2 times as long as wide, with many short sensorial spines on distal half; second 1.3 to 1.7, third 2.2 to 2.6 and fourth 1.8 to 2.1 times as long as first; fourth distinctly shorter than third; distal 3 segments without sensorial spines. Antenna with 2+14 segments; scape subconical, basally narrower, nearly as long as distal width, about 2 times as long as pedicel, with a few long setae

ventrally; pedicel subcylindrical, about 2/3 as long as wide, with a few rather short setae ventrally; each flagellar segment, except terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem; basal enlargement with some rather short bristles basally, a complete whorl of long bristles medially, an incomplete whorl of long bristles ventro-distally, and rather long bristles distally; basal enlargement also with many rather short and a few very short, simple sensorial spines on distal half; interrupted portion of distal whorl getting narrower and number of sensorial spines decreases to distal segment; first flagellar segment with slightly elongated basal enlargement; fifth flagellar segment with a basal enlargement 1.3 times as long as wide, stem 1.1 to 1.3 times as long as basal enlargement; terminal flagellar segment conical, about 2.1 times as long as basal width, with 2 complete whorls of long bristles, without sensorial spines. Leg: fore leg with first tarsal segment a little shorter than femur, distinctly shorter than tibia; middle and hind legs with first tarsal segment distinctly shorter than femur or tibia; fore and middle legs with fourth tarsal segment about 1.7 times as long as fifth; hind leg with fourth tarsal segment about 2 times as long as fifth; claws of all legs bent nearly at right angle, with minute serration on inner side; empodium 1/3 to 2/5 as long as claw. Wing 2.5 to 2.7 times as long as wide; Sc indistinct on distal half; sensory pores 2 on R_1, 1 on basal portion of R_5 or on junction of Rs and r-m, 3 on distal portion of R_5 (2 on upper surface, 1 on the lower). Genitalia: epandrium rather broadly rounded at apex, with dorsal setae; cerci bilobed; lobed portion rounded apically; subanal plate divided into a pair of rather slender, densely pubescent lobes extending on each side of tegmen; gonostylus weakly curved, basally a little broader, about 4 times as long as basal width, ending in a single point; root of gonocoxite bent inwardly, pointed and recurved upwards distally; tegmen narrower distally; genital rod simple, longer than gonocoxite.

Female: unrecorded from Japan.

Specimens examined: 5 ♂♂ (on slide), Asso, Nishimuro, Wakayama-Pref., Honshu, 23. III. 1965, J. Yukawa leg. Cecid. No. 1402-6; 4 ♂♂ (on slide), Mt. Wakasugi, Fukuoka-Pref., Kyushu, 8. V. 1965, J. Yukawa leg. Cecid. No. 5703-7; 7 ♂♂ (on slide), Hakozaki, Fukuoka-City, Kyushu, 12. III. 1966, J. Yukawa leg. Cecid. No. 18602-3, 18701-2, 18802-4; 4 ♂♂ (on slide), Miyakonojô-City, Miyazaki-Pref., Kyushu, 11. IV. 1966, E. F. Drake leg. Cecid. No. 20705-7, 21403; 8 ♂♂ (on slide), Hakozaki, Fukuoka-City, Kyushu, 22. III. 1966, J. Yukawa leg. Cecid. No. 21801-8; 1 ♂ (on slide), Hirao, Fukuoka-City, Kyushu, 1. V. 1966, J. Yukawa leg. Cecid. No. 24401; 1 ♂ (on slide), Miyanoura, Yaku-I., Kagoshima-Pref., Kyushu, 11. IV. 1967, J. Yukawa leg. Cecid. No. 59001; 1 ♂ (on slide), Toyotomi, Sôya, Hokkaido, 29. VI. 1967, T. Saigusa leg. Cecid. No. 81401; 1 ♂ (on slide), Bizan, Tokushima-City, Shikoku, 2. IV. 1969, A. Mori leg. Cecid. No. 150102; 1 ♂ (on slide), Omogokei, Ehime-Pref., Shikoku, 12. V. 1969, J. Yukawa leg. Cecid. No. 156201.

Distribution : Japan (Hokkaido, Honshu, Shikoku, Kyushu), Europe, Hawaii, N. America, possibly New Zealand and Australia (Edwards, 1928).

Remarks: This species is distinguished from *L. cinerea* by having lobes of cerci rounded apically and gonostylus ending in 1 point. Fourth tarsal segment and femur of fore leg are relatively shorter than those of *cinerea* in the Japanese specimens. This is the first record of the species from Japan.

Genus **Anaretella** Enderlein

Anaretella Enderlein, 1911c; Enderlein, 1936; Pritchard, 1951; Pritchard, 1958; Mamajev, 1964a; Mamajev, 1969.
Lestremia (*Anaretella*) Enderlein: Edwards, 1929; Edwards, 1938b.
Neptunimyia, Felt, 1912b; Felt, 1913a; Kieffer, 1913f.
Plocimas Enderlein, 1936.

The genus *Anaretella* is characterized in the following respects: male antenna with 2+14 segments, female with 2+9; each flagellar segment with 2 well developed whorls of long bristles medially and a pair of digitate sensoria distally on basal 5 to 7 segments; root of gonocoxite directed anteriorly; tegmen broad. The following 2 well known species of this genus are distributed in Japan.

Anaretella defecta (Winnertz)

(Fig. 5: A-D)

Lestremia defecta Winnertz, 1870; Kieffer, 1898; Kieffer, 1913f.
Anaretella defecta (Winnertz): Enderlein, 1911a; Enderlein, 1936; Pritchard, 1951; Pritchard, 1958; Mamajev, 1969.
Lestremia (*Anaretella*) *defecta* Winnertz: Edwards, 1929; Edwards, 1938b.
Campylomyza acerifolia Felt, 1907; Kieffer, 1913f.
Lestremia acerifolia (Felt): Felt, 1908; Felt, 1913a.
Lestremia pini Felt, 1907; Felt, 1913a; Kieffer, 1913f.
Neptunimyia tridens Felt, 1912b; Felt, 1913a; Kieffer, 1913f.
Neptunimyia bromleyi Barnes, 1928a.

Male: Wing length 1.6 to 2.5 mm. Eye bridge 2 to 3 facets wide medialy. Palpus consisting of 4 segments, about 1.3 times as long as height of head, with rather short setae sparsely; first palpal segment shortest, about 2.3 times as long as wide, with many short sensorial spines on distal half; second 1.5 to 1.7, third and fourth (subequal in length) each 2.2 to 2.5 times as long as first; distal 3 segments without sensorial spines. Antenna with 2+14 segments; scape subglobular, nearly as long as wide, 1.7 to 2 times as long as pedicel, with several, rather long setae ventrally; pedicel subcylindrical, about 2/3 as long as wide, with a few, rather short setae ventrally; each flagellar segment, except terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem; basal enlargement with some rather short bristles basally, 2 complete whorls of long bristles medially (of which distal one is incomplete on basal 5 to 7 segments), and an incomplete whorl of long bristles ventro-distally; basal enlargement also with a pair of digitate sensoria distally on basal 5 to 7 flagellar segments; each sensoria with 3 to 7 irregular branches; first flagellar segment with a slightly elongated basal enlargement; fifth flagellar segment with a basal enlargement 1.1 to 1.3 times as long as wide, stem 2/3 or nearly as long as basal enlargement; terminal flagellar segment conical, 1.7 to 2.2 times as long as basal width, with 2 complete whorls of rather long bristles, without sensoria. Leg: first tarsal segments of all legs distinctly shorter than femur or tibia; fore and middle legs with fourth tarsal segment about 1.3 times as long as fifth; hind leg with fourth tarsal segment 1.6 to 1.8 times as long as fifth; claws of

all legs bent nearly at right angle, with minute serration on inner side; empodium about 1/3 as long as claw. Wing 2.3 to 2.4 times as long as wide; Sc only basally visible; sensory pore 2 on R_1, 1 on basal portion of R_5 or on junction of Rs and r-m, 1 on medial (not near base of R_5 in the Japanese specimens) and 3 on distal portion of R_5 (2 on upper surface, 1 on the lower). Genitalia: epandrium with rather indistinct distal margin; cerci moderately bilobed, with rather short setae distally; subanal plate not bilobed; gonostylus weakly curved distally, ending in 2 small, inconspicuous points, slightly broader basally, about 4.1 times as long as basal width, with rather long setae; gonocoxite rather broad without distinct setose lobe on inner side; tegmen with a pair of small projection dorso-distally; genital rod simple, about 1/2 as long as gonocoxite.

Female: unrecorded from Japan.

Specimens examined: 1 ♂ (on slide), Ôdomari, Kagoshima-Pref., Kyushu, 24. IV. 1965, J. Yukawa leg. Ceicd. No. 3401; 1 ♂ (on slide), Mt. Wakasugi, Fukuoka-Pref., Kyushu, 8. V. 1965, J. Yukawa leg. Cecid. No. 5702; 1 ♂ (on slide), Mt. Kôra, Kurume-City, Kyushu, 4. V. 1965, J. Yukawa leg. Cecid. No. 7202; 1 ♂ (on slide), Hakozaki, Fukuoka-City, Kyushu, 22. III. 1965, J. Yukawa leg. Cecid. No. 21601; 1 ♂ (on slide), Mt. Gozaisho, Mie-Pref., Honshu, 18. X. 1966, J. Yukawa leg. Cecid. No. 42201; 1 ♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 31. X. 1966, J. Yukawa leg. Cecid. No. 48001; 1 ♂ (on slide), ibid., 5. XI. 1966, J. Yukawa leg. Cecid. No. 50702; 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 1. XI. 1966, J. Yukawa leg. Cecid. No. 48901; 4 ♂♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 1. IV. 1967, J. Yukawa leg. Cecid. No. 56501-4; 1 ♂ (on slide), Miyanoura, Yaku-I., Kagoshima-Pref., Kyushu, 10. IV. 1967, J. Yukawa leg. Cecid. No. 58001; 1 ♂ (on slide), Berabonai, Ashoro, Tokachi, Hokkaido, 16. VI. 1967, T. Saigusa leg. Cecid. No. 77901; 4 ♂♂ (on slide), Akizuki, Wakayama-City, Honshu, 31. X. 1967, J. Yukawa leg. Cecid. No. 82805-8; 1 ♂ (on slide), Shiroyama, Tokushima-City, Shikoku, 27. IV. 1969, A. Mori leg. Cecid. No. 149003.

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu), Europe, N. America.

Remarks: This species is characterized by the combination of the following characters: gonostylus ending in 2 inconspicuous points; gonocoxite without setose lobe on inner side; tegmen with a pair of small projections dorso-distally. This is the first record of the species from Japan.

Anaretella spiraeina (Felt)

(Fig. 5: E)

Catocha spiraeina Felt, 1907; Kieffer, 1913f.
Lestremia spiraeina (Felt): Felt, 1908; Felt, 1913a.
Anaretella spiraeina (Felt): Pritchard, 1951; Pritchard, 1958.
Lestremia (*Anaretella*) *strobli* Edwards, 1938b.

Male: Wing length 1.8 to 2.5 mm. Eye bridge 2 to 3 facets wide medially. Palpus consisting of 4 segments, about 1.3 times as long as height of head, with rather short setae sparsely; first palpal segment shortest, about 2 times as long as wide, with many short sensorial spines on distal half; second 1.8 to 2.0, third and fourth each 2.4 to 2.7 times as long as first; distal 3 segments without sensorial spines. Antenna with 2+14 segments; scape subglobular, slightly shorter than wide, about 1.5 times as long as pedi-

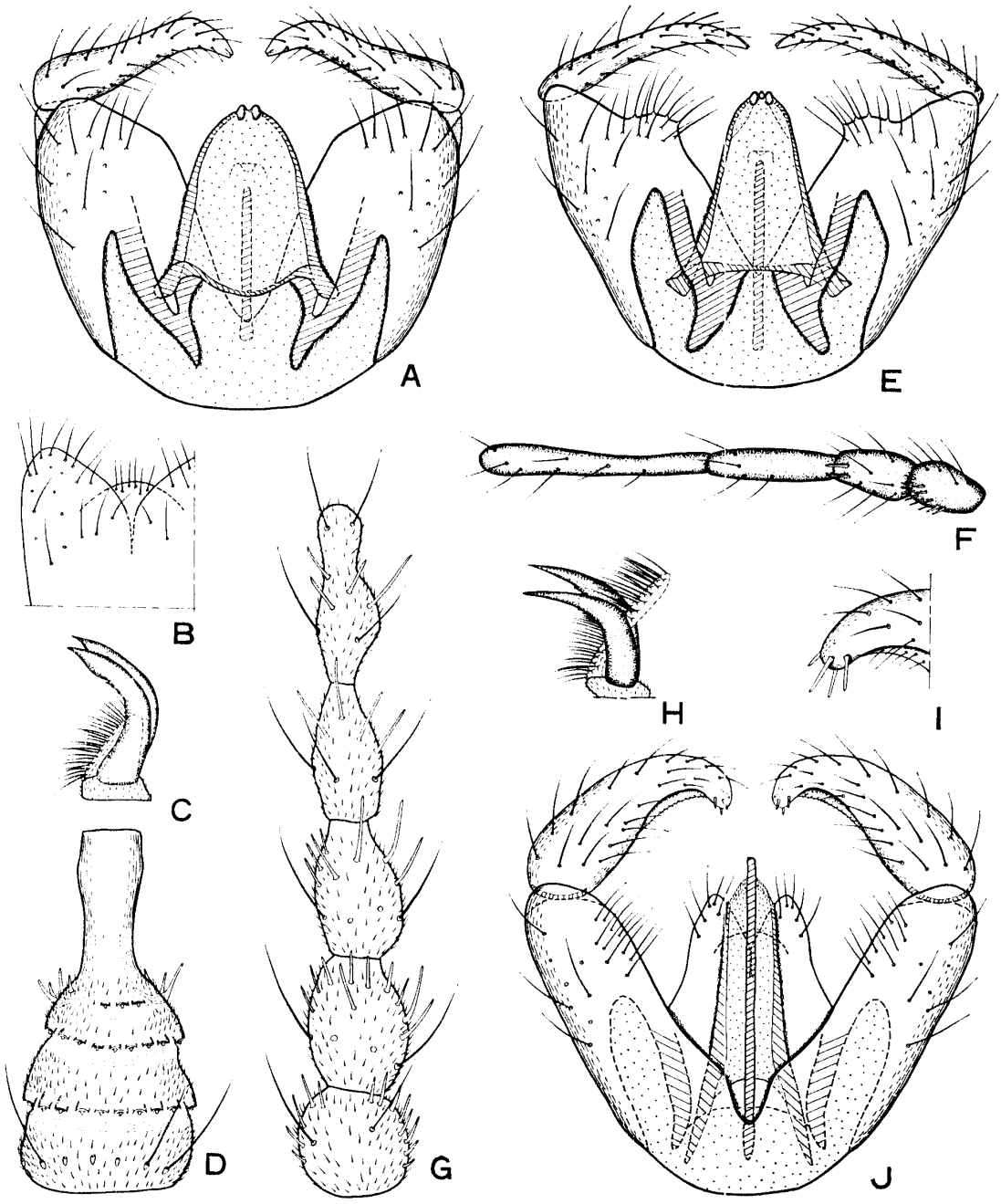

Fig. 5. *Anaretella* and *Anarete*.
(A) male genitalia, dorsal view (cerci and subanal plate removed): *Anaretella defecta* (Winnertz). (B) cerci and subanal plate: ditto. (C) claw and empodium, ♂: ditto. (D) fifth flagellar segment, ♂: ditto. (E) male genitalia, dorsal view (cerci and subanal plate removed): *Anaretella spiraeina* (Felt). (F) palpus, ♂: *Anarete* sp. (G) terminal 5 flagellar segments, ♂: ditto. (H) claw and empodium, ♂: ditto. (I) apical portion of gonostylus: ditto. (J) male genitalia, ventral view: ditto.

cel, with several, rather long setae ventrally; pedicel subcylindrical, about 2/3 as long as wide, with a few, rather short setae ventrally; each flagellar segment, except terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem; basal enlargement with some rather short bristles basally, 2 complete whorls of long bristles medially (of which distal one is incomplete on basal 5 to 7 segments), and an incomplete whorl of long bristles ventro-distally; basal enlargement also with a pair of digitate sensoria distally on basal 5 to 7 flagellar segments; each sensoria with 3 to 7 irregular branches; first flagellar segment with a slightly elongated basal enlargement; fifth flagellar segment a little longer than wide, stem nearly as long as basal enlargement; terminal flagellar segment conical, with 2 complete whorls of long bristles, without sensoria. Leg: first tarsal segments of all legs distinctly shorter than femur or tibia; fore and middle legs with fourth tarsal segment about 1.3 times as long as fifth; hind leg with fourth tarsal segment 1.3 to 1.6 times as long as fifth; claws of all legs bent nearly at right angle, with minute serration on inner side; empodium about 1/3 as long as claw. Wing 2.3 to 2.4 times as long as wide; Sc only basally visible; sensory pore 2 on R_1, 1 on basal portion of R_5 or junction of Rs and r-m, 1 on medial portion of R_5 (not near base of R_5 in the Japanese specimens), 3 on distal portion of R_5 (2 on upper surface, 1 on the lower). Genitalia: epandrium with rather indistinct distal margin; cerci moderately bilobed, with rather short setae distally; subanal plate not bilobed; gonostylus weakly curved distally, ending in 2 small, inconspicuous points, slightly broader basally, about 6 times as long as basal width, with rather long setae; gonocoxite rather broad, with a setose lobe on inner side; tegmen with a pair of small projections dorso-distally; genital rod simple, about 1/2 as long as gonocoxite.

Female: unknown.

Specimens examined: 1 ♂ (on slide), Asso, Nishimuro, Wakayama-Pref., Honshu, 23. III. 1965, J. Yukawa leg. Cecid. No. 1301; 1 ♂ (on slide), Mt. Kôra, Kurume-City, Kyushu, 4. V. 1965, J. Yukawa leg. Cecid. No. 7201; 2♂♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 15. V. 1965, J. Yukawa leg. Cceid. No. 12601-2; 2♂♂ (on slide), Hakozaki, Fukuoka-City, Kyushu, 12. III. 1966, J. Yukawa leg. Cecid. No. 18704-5; 1 ♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 5. XI. 1966, J. Yukawa leg. Cecid. No. 50701; 1 ♂ (on slide), ibid., 28. III. 1967, J. Yukawa leg. Cecid. No. 55301; 2♂♂ (on slide), Kamiwashippu, Asyoro, Hokkaido, 19. VI. 1967, T. Saigusa leg. Cecid. No. 78501-2.

Distribution: Japan (Hokkaido, Honshu, Kyushu), Europe, Formosa, N. America.

Remarks: This species is very closely related to *Anaretella defecta* (Winnertz, 1870), but is distinguished from it by having gonocoxite with a setose lobe on inner side. This is the first record of the species from Japan.

Genus **Anarete** Haliday

Anarete Haliday, 1833; Macquart, 1835; Westwood, 1840; H. Loew, 1845; Walker, 1856; Schiner, 1864; Osten Sacken, 1893; Kieffer, 1900; Kieffer, 1906; Enderlein, 1911a; Enderlein, 1911b; Edwards, 1928; Edwards, 1929; Edwards, 1938b; Pritchard, 1951; Pritchard, 1958; Hardy, 1960; Mamajev, 1964a; Mamajev, 1969.

Monobreae (*Anarete*) H. Loew, 1850.

Anarete (*Pseudanarete*) Kieffer, 1906.
Microcerate Felt, 1908; Felt, 1911b; Felt, 1913a; Kieffer, 1913f; Edwards, 1928; Mani, 1934.
Limnopneumella Enderlein, 1911a.
Limnopneuma Enderlein, 1911a.

The genus *Anarete* is characterized as follows: male antenna with 2+6 to 2+10 segments, female with 2+8 to 2+9, lacking distinct stem and whorl of long bristles on flagellum; pedicel somewhat enlarged; gonostylus and gonocoxite rather slender; basal part of tegmen extending anteriorly.

Anarete sp.

(Fig. 5: F-J)

Male: Wing length about 1.9 mm. Eye bridge 2 facets wide medially. Palpus consisting of 4 segments, a little shorter than height of head, with rather short setae sparsely, getting slightly narrower to distal segments; first palpal segment shortest, about 1.7 times as long as wide, with many short sensorial spines on distal half; second nearly as long as first, with 2 short sensorial spines distally; third about 1.5, fourth 2.8 times as long as first, these 2 segments without sensorial spines. Antenna with 2+6 segments; scape subglobular, with a few, rather short setae ventrally; pedicel enlarged, globular, about 1.2 times as long as scape in diameter; each flagellar segment sparsely with rather long bristles basally and medially, and without distinct stem; first and second flagellar segments subglobular; third slightly elongated, about 1.4 times as long as wide; first 3 segments with many, short, simple sensorial spines on distal half; sensorial spines getting longer but their number decreases to distal segments; fourth and fifth segments rather elongated, about 1.6 and 1.8 times as long as wide respectively, both with rather long sensorial spines sparsely; terminal segment constricted in middle, about 3 times as long as medial width, with a few, rather long sensorial spines. Leg: hind leg with first tarsal segment nearly 1/2 as long as tibia; fifth tarsal segment about 1.5 times as long as fourth; claws of all legs with minute serration on inner side, bent nearly at right angle; empodium well developed, nearly as long as claw, distally very broader. Wing about 2.5 times as long as wide; Sc basally visible; sensory pore 2 on R_1, 1 on junction of Rs and r-m, 1 on basal portion of R_5, 4 on distal portion of R_5 (3 on upper surface, 1 on the lower). Genitalia: epandrium with indistinct distal margin; cerci moderately bilobed, with rather short setae distally; subanal plate not bilobed; gonostylus weakly curved, basaly a little broader, about 3 times as long as basal width, with 4 short spines apically; gonocoxite rather slender, about 3.3 times as long as wide, narrowly united ventrally; root of gonocoxite short, about 1/5 as long as distance separating both roots; tegmen rather narrow, basally more strongly sclerotized, extending anteriorly, with microtrichia on distal membranous portion; genital rod simple, slightly shorter than gonocoxite.

Female: unknown.

Specimen examined: 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 3. VI. 1965, J. Yukawa leg. Cecid. No. 14201.

Distribution: Japan (Kyushu).

Remarks: This species resembles *Anarete jonnsoni* (Felt, 1908) and *Anarete felti* Pritchard (1951), but differs from them by having second palpal segment with 2 distinct sensorial spines and gonostylus with 4 short spines apically. This species was, however, left unnamed owing to the insufficient number of the specimen examined.

Tribe MICROMYINI Rondani

Micromyna Rondani, 1856.
Campylomyzides Kieffer, 1898.
Campylomyzariae Kieffer, 1900; Felt, 1908; Felt, 1911b; Felt, 1913a; Kieffer, 1913f; Felt, 1925; Felt, 1929; Mani, 1934; Mani, 1946.
Campylomyzini Enderlein, 1911a; Enderlein, 1912; Edwards, 1938b.
Campylomyzinae Enderlein, 1912; Enderlein, 1936.
Campylomyzidae Enderlein, 1936.
Termitomastidae Silvestri, 1901; Silvestri, 1903.
Termitomastinae Silvestri: Speiser, 1906; Brues & Melander, 1932; Mani, 1946.
Micromyini Pritchard, 1947; Pritchard, 1958; Mamajev, 1963a; Yukawa, 1967a.

The tribe Micromyini is distinguished from the other known tribes of the subfamily Lestremiinae and characterized in the following respects: ocellus 3; costa meeting with R_5 near apex of wing; M_{1+2} smple; M_{3+4} forming a fork with Cu; both roots of gonocoxite usually united and forming a loop; female with 1 or 2 spermathecae.

Key to Japanese genera (males)
(mainly based on Pritchard, 1947)

1. Costa ending at or a little beyond tip of R_5; basal enlargement of flagellar segment subglobular ..... *Peromyia* Kieffer
- Costa extending well beyond tip of R_5; basal enlargement of flagellar segment usually subcylindrical (not cylindrical in some genera) 2
2. R_1 at least 3 times the length of Rs; sensory pore present on basal portion of R_5, none on r-m; empodium as long as claw and broad 3
- R_1 not over 2 times the length of Rs, or if longer then empodium absent; sensory pore present on r-m, none on basal portion of R_5; empodium narrow, often short or rudimentary 4
3. Flagellum with small, plate-like sensory processes distally on proximal segments; tegmen divided medio-distally and there provided with dorsal processes ..... *Campylomyza* Meigen
- Flagellum with only sensory spines distally; tegmen not divided and without medio-dorsal processes ..... *Cordylomyia* Felt
4. Basal enlargement of flagellum subcylindrical, usually with one or more crenulate whorls of long bristles and a cylindrical distal stem 5
- Basal enlargement of flagellum not subcylindrical, without crenulate whorl, with or without distal stem 9
5. Tegmen usually with one or more opposing pairs of spines; gonocoxite very long, narrowly united proximo-ventrally ..... *Aprionus* Kieffer
- Tegmen without paired spines; gonocoxite not long 6

6. Genital rod long and not modified distally 7
- Genital rod short or indistinct, sometimes modified into a pair of long, divergent processes distally; gonostylus without apical spine.....8
7. Eye bridge not over 4 to 5 facets wide ..... *Monardia* Kieffer
- Eye bridge about 6 facets wide ..... *Trichopteromyia* Williston
8. Genital rod with basal portion very short, distally forming a pair of long, divergent processes which are usually lightly pigmented; upper wall of subanal cavity without pair of lobes ..... *Bryomyia* Kieffer
- Genital rod very short or indistinct, not developed into a pair of divergent processes distally; upper wall of subanal cavity with a pair of lobes which are clothed with short spines directed downward ..... *Heterogenella* Mamajev
9. Pedicel enlarged; flagellum with 7 to 9 slender segments, without distinct distal stem ..... *Micromya* Rondani
- Pedicel not enlarged; flagellum with a subglobular basal enlargement, a cylindrical distal stem and 4 very long sensory spines..... *Anodontoceras* Yukawa

Genus **Peromyia** Kieffer

Joannisia Kieffer, 1894c; Kieffer, 1894d; Kieffer, 1895a; Kieffer, 1898; Coquillett, 1910; Enderlein, 1911a; Felt, 1911b; Felt, 1913a; Kieffer, 1913f; Edwards, 1938b.
Peromyia Kieffer, 1894c; Kieffer, 1894d; Kieffer, 1895a; Kieffer, 1898; Enderlein, 1911a; Felt, 1911b; Felt, 1913a; Kieffer, 1913f; Mani, 1934; Edwards, 1938b; Pritchard, 1947; Pritchard, 1958; Mamajev, 1963a; Yukawa, 1967a; Mamajev, 1969.
Camptoza Enderlein, 1936.

The genus *Peromyia* is characterized as follows: costa ending at or a little beyond tip of R_5 and not reaching well beyond tip of R_5; sensory pore none on r-m; eye bridge 2 to 4 facets wide; male antenna with 2+12 segments, female with 2+8 to 2+10 segments; flagellar segment of both sexes with a subglobular basal enlargement and a cylindrical distal stem; basal enlargement of male flagellum sometimes darkened on basal half, with 1 or 2 whorls of sensorial spines medially or subdistally (sometimes basally), without crenulate whorl; sensorial spine of female flagellum sometimes digitate; empodium nearly as long as claw; epandrium usually interrupted medially, forming a pair of narrow crescent-shaped stripes; hypandrium more or less well emarginated; tegmen slipper-shaped; genital rod usually absent; spermatheca 2 or absent.

At present, 7 species mentioned below are recognized in Japan.

Key to Japanese species (males)

1. Gonostylus distally with a spine or not rounded.....2
- Gonostylus distally rounded, without spine 5
2. Gonocoxite with a pubescent projection ventro-distally ..... *fungicola* (Kieffer)
- Gonocoxite without pubescent projection ventro-distally..... 3
3. Distal spine of gonostylus rounded apically..... *prominens* Yukawa
- Distal spine of gonostylus not rounded apically 4
4. Tegmen rounded on distal margin; genital rod invisible ..... *photophila* (Felt)
- Tegmen truncate distally; distal portion of genital rod visible.....*truncata* Yukawa

5. Gonostylus with a large lobe proximo-ventrally ..... *lobata* n. sp.
– Gonostylus suboval, without lobe 6
6. Gonocoxite greatly produced into a sickle-like projection dorso-distally ..... *albicornis* (Meigen)
– Gonocoxite produced into a small lobe dorso-distally ..... *ovalis* (Edwards)

Peromyia fungicola (Kieffer)

Joannisia fungicola Kieffer, 1901 ; Kieffer, 1913f ; Edwards, 1938b.
Peromyia fungicola (Kieffer) : Mamajev, 1963a ; Mamajev, 1969.
Peromyia brevispina Yukawa, 1967a. New synonymy.

Male : Wing length 0.8 to 1.3 mm. Eye bridge 2 to 3 facets wide medially and laterally. Palpus consisting of 4 segments ; second and third subequal in length ; fourth nearly as long as or a little longer than second or third. Antenna with 2+12 segments ; basal enlargement of flagellar segment darkened and with long narrow scales and rather long bristles densely on basal half, a little beyond middle with a whorl of long sensorial spines ; fifth flagellar segment with a stem about 1.3 times as long as basal enlargement ; terminal segment constricted in middle. Claw rather slender, bent nearly at right angle ; empodum 2/3 to 4/5 as long as claw. Wing 2.1 to 2.3 times as long as wide ; costa ending at tip of R_5 ; R_1 2.0 to 2.4 times as long as Rs ; sensory pore 3 on R_1, 1 on junction of Rs and r-m, 1 on basal portion of R_5. Genitalia : epandrium interrupted medially, forming a pair of modified crescent-shaped stripes, of which outer margin bent nearly at right angle ; cerci widely and rather weakly bilobed, incised medially by a small V-shaped emargination on distal margin ; gonostylus suboval shaped, with a short or sometimes rather long apical spine ; gonocoxite with a pubescent projection ventro-distally ; root of gonocoxite rather narrowly united ; hypandrium largely and deeply emarginated ; tegmen slipper-shaped ; genital rod absent.

Female : unrecorded from Japan.

Specimens examined : 2 ♂♂ (on slide), Mt. Hiko, Fukuoka-Pref., Kyushu, 24. V. 1965, J. Yukawa leg. Cecid. No. 10404, 10302 ; 1 ♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 5. XI. 1966, J. Yukawa leg. Cecid. No. 52601 ; 2 ♂♂ (on slide), Saioto, Geihoku, Hiroshima-Pref., Honshu, 4. VI. 1967, J. Yukawa leg. Cecid. No. 73601-2.

Distribution : Japan (Honshu, Kyushu), Europe.

Remarks : This species differs from the other members of the genus by the following characters of male genitalia : epandrium bent nearly at right angle on outer margin ; gonostylus with an apical spine ; gonocoxite with a pubescent projection ventro-distally ; hypandrium largely and deeply emarginated. *Peromyia brevispina* Yukawa (1967a) is newly synonymized with this species because some Japanese specimens with longer fourth palpal segment and longer apical spine of gonostylus were obtained, so that the differences between the two species appeared to be in the range of individual variation.

Peromyia prominens Yukawa

Peromyia prominens Yukawa, 1967a.

Male : Wing length 1.0 mm. Eye bridge 2 to 3 facets wide medially, 3 to 4 facets wide

laterally. Palpus consisting of 4 segments; second and third segments subequal in length; fourth usually a little longer than second or third. Antenna with 2+12 segments; basal enlargement of flagellar segment darker on basal half, with a whorl of long sensorial spines a little beyond middle; fifth flagellar segment with a stem about 1.4 times as long as basal enlargement. Claw rather slender, bent nearly at right angle; empodium about 4/5 as long as claw. Wing about 2.2 times as long as wide; costa ending slightly beyond tip of R_5; R_1 2.5 times as long as Rs; sensory pore 3 on R_1, 1 on junction of Rs and r-m, 1 on basal portion of R_5. Genitalia: epandrium very narrow, interrupted medially, forming a pair of crescent-shaped stripes; cerci slightly and rather widely bilobed, incised medially by a very small V-shaped emargination on distal margin; gonostylus rather small, with a distal projection which is bare and rounded apically; gonocoxite broadly united below; hypandrium with a widely U-shaped, but rather shallow emargination on distal margin; tegmen slipper-shaped; genital rod visible only on its tip.

Female: unknown.

Specimen examined: 1 ♂ (on slide), Fukuoka-City, Kyushu, 2. V. 1965, J. Yukawa leg. Cecid. No. 9201 (Holotype).

Distribution: Japan (Honshu, Kyushu).

Remarks: This species is similar to *Peromyia cornuta* (Edwards, 1938b) in the shape of tegmen and to *Peromyia palstris* (Kieffer, 1895a) in the shape of apical projection of gonostylus.

Peromyia photophila (Felt)

Campylomyza photophila Felt, 1907.
Joannisia photophila (Felt): Felt, 1908; Felt, 1913a.
Peromyia photophila (Felt): Pritchard, 1947; Pritchard, 1958; Yukawa, 1967a; Mamajev, 1969.
Campylomyza carolinae Felt, 1907.
Joannisia carolinae (Felt): Felt, 1908; Felt, 1913a.
Joannisia flavoscuta Felt, 1908; Felt, 1913a.
Joannisia flavopedalis Felt 1908; Felt, 1913a.
Joannisia pennsylvanica Felt, 1911a; Felt, 1913a.
Joanniisa nodosa Edwards, 1938b.

Male: Wing length 0.8 to 1.1 mm. Eye bridge 2 to 3 facets wide medially and laterally. Palpus consisting of 4 segments; second and third subequal in length; fourth nearly as long as or a little shorter and smaller than second or third. Antenna with 2+12 segments; basal enlargement of flagellar segment not darkened on basal half, with some rather long sensorial spines subdistally and a whorl of rather long sensorial spines basally; fifth flagellar segment with a stem 1.0 to 1.3 times as long as basal enlargement. Claw bent nearly at right angle; empodium about 4/5 as long as claw. Wing about 2.1 times as long as wide; costa ending at or slightly beyond tip of R_5; R_1 1.8 to 2.4 times as long as Rs; sensory pore 3 on R_1, 1 on junction of Rs and r-m, 1 on basal portion of R_5. Genitalia: epandrium narrow, interrupted medially, forming a pair of crescent-shaped stripes; cerci moderately developed; gonostylus flattened distally and

attenuated to a bare beak-like spine apically; gonocoxite rather broadly united below ; hypandrium with a widely U-shaped emargination ; tegmen of slipper-shape, rounded on distal margin ; genital rod absent.

Female : unrecorded from Japan.

Specimens examined : 1 ♂ (on slide), Mt. Wakasugi, Fukuoka-Pref., Kyushu, 8. V. 1965, J. Yukawa leg. Cecid. No. 4801 ; 2 ♂♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 3. VI. 1965, J. Yukawa leg. Cecid. No. 13701, 7 ; 1 ♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kuyshu, 3. VI. 1966, J. Yukawa leg. Cecid. No. 35701 ; 2 ♂♂ (on slide), Mt. Hiko, Fukuoka-Pref., Kyushu, 21. IX. 1966, J. Yukawa leg. Cecid. No. 39901-2 ; 2 ♂♂ (on slide), Miyanoura, Yaku-I., Kagoshima-Pref., Kyushu, 10. IV. 1967, J. Yukawa leg. Cecid. No. 57906, 9 ; 5 ♂♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 11. V. 1967, J. Yukawa leg. Cecid. No. 63907-11 ; 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 19. V. 1967, J. Yukawa leg. Cecid. No. 68002 ; 2 ♂♂ (on silde), Kyûsuikyô, Mt. Kujû, Oita-Pref., Kyushu, 28. V. 1967, J. Yukawa leg. Cecid. No. 69417-18 ; 6 ♂♂ (on slide), Mt. Garyû, Geihoku, Hiroshima-Pref., Honshu, 3. VI. 1967, J. Yukawa leg. Cecid. No. 72004-7, 72010-11 ; 1 ♂ (on slide), Mt. Daisen, Tottori-Pref., Honshu, 6. VI. 1967, J. Yukawa leg. Cecid. No. 75302.

Distribution : Japan (Honshu, Kyushu), Europe, N. America.

Remarks : This species differs from the other members of the genus by the distinct shapes of gonostylus and tegmen.

Peromyia truncata Yukawa

Peromyia truncata Yukawa, 1967c.

Male : Wing length 0.7 to 0.9 mm. Eye bridge 2 to 3 facets wide medially and laterally. Palpus consisting of 4 segments ; these 4 segments subequal in length. Antenna with 2+12 segments ; basal enlargement of flagellar segment not darkened on basal half, with some rather long sensorial spines subdistally and a whorl of rather long sensorial spines basally ; fifth flagellar segment with a stem about 1.2 times as long as basal enlargement. Empodium about 4/5 as long as claw. Wing about 2 times as long as wide ; sensory pore 3 on R_1, 1 on junction of Rs and r-m, 1 on basal portion of R_5. Genitalia : epandrium very narrow, interrupted medially, forming a pair of crescent-shaped stripes ; gonostylus flattened distally ; gonocoxite broadly united below ; tegmen distally truncate ; distal portion of genital rod present.

Female : unknown.

Specimens examined : 3 ♂♂ (on slide), Mt. Hiko, Fukuoka-Pref., Kyushu, 25. VI. 1966, J. Yukawa leg. Cecid. No. 36901-3 (Holotype and Paratypes) ; 3 ♂♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 16. V. 1966, J. Yukawa leg. Cecid. No. 32401-3.

Distribution : Japan (Kyushu).

Remarks : This species is similar to *P. photophila*, but differs from it by the tegmen truncate distally and the presence of distal part of genital rod.

Peromyia lobata Yukawa new species

(Fig. 6 : A)

Male : Wing length 1.1 to 1.5 mm. Eye bridge 2 to 3 facets wide medially and laterally. Palpus consisting of 4 segments ; first segment subglobular ; second and third with short sensorial spines rather sparsely, subequal in length ; fourth a little longer than second or third. Antenna with 2+12 segments (terminal 1 or 2 segments broken); basal enlargement of flagellar segment not darkened on basal half, medially with a whorl of rather long sensorial spines which are sparsely distributed, subdistally with a whorl of long sensorial spines which are rather densely, but on ventral surface irregularly distributed ; fifth flagellar segment with a stem about 1.5 times as long as basal enlargement. Claw bent nearly at right angle ; empodium 4/5 as long as claw. Wing 2.2 to 2.5 times as long as wide ; costa ending at tip of R_5 ; R_1 rather long, 2.9 to 3.7 times as long as Rs ; sensory pore 3 on R_1, 1 on junction of Rs and r-m, 1 on basal portion of R_5. Genitalia : epandrium narrow, interrupted medially, forming a pair of crescent-shaped stripes ; cerci well developed ; gonostylus stout, with a large lobe proximo-ventrally ; hypandrium incised with a large U-shaped emargination on distal margin ; tegmen slipper-shaped ; aedeagus strongly sclerotized, very narrower on distal half.

Female : unknown.

Holotype : ♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 5. XI. 1966, J. Yukawa leg. Cecid. No. 52501. Paratypes : 1 ♂ (on slide), ibid., Cecid. No. 52502 ; 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 1. XI. 1966, J. Yukawa leg. Cecid. No. 46501 ; 1 ♂ (on slide), Mt. Mizugaki, Yamanashi-Pref., Honshu, 13. X. 1967, J. Yukawa leg. Cecid. No. 82202 ; 1 ♂ (on slide), Serio, Kyoto-Pref., Honshu, 20. X. 1967, J. Yukawa leg. Cecid. No. 84408.

Distribution : Japan (Honshu, Kyushu).

Remarks : This species is easily distinguished from the other known species of the genus by the distinct structures of gonostylus and aedeagus.

Peromyia albicornis (Meigen)

(Fig. 6 : B)

Campylomyza albicornis Meigen, 1830 ; Kieffer, 1913f.
Joannisia albicornis (Meigen) : Edwards, 1938b.
Peromyia albicornis (Meigen) : Mamajev, 1969.

Male : Wing length about 1.1 mm. Eye bridge 2 to 3 facets wide medially and laterally. Palpus consisting of 4 segments, each with sensorial spines rather densely; first segment subglobular ; second and third subequal in length ; fourth nearly as long as second or third. Antenna with 2+12 segments ; scape larger than pedicel, both with rather long ventral setae densely and dorsal setae sparsely ; basal enlargement of flagellar segment unicolor, with a whorl of rather long sensorial spines on subdistal portion, and another whorl on basal portion ; fifth flagellar segment with a stem nearly as long as basal enlargement. Claw bent nearly at right angle ; empodium about 4/5

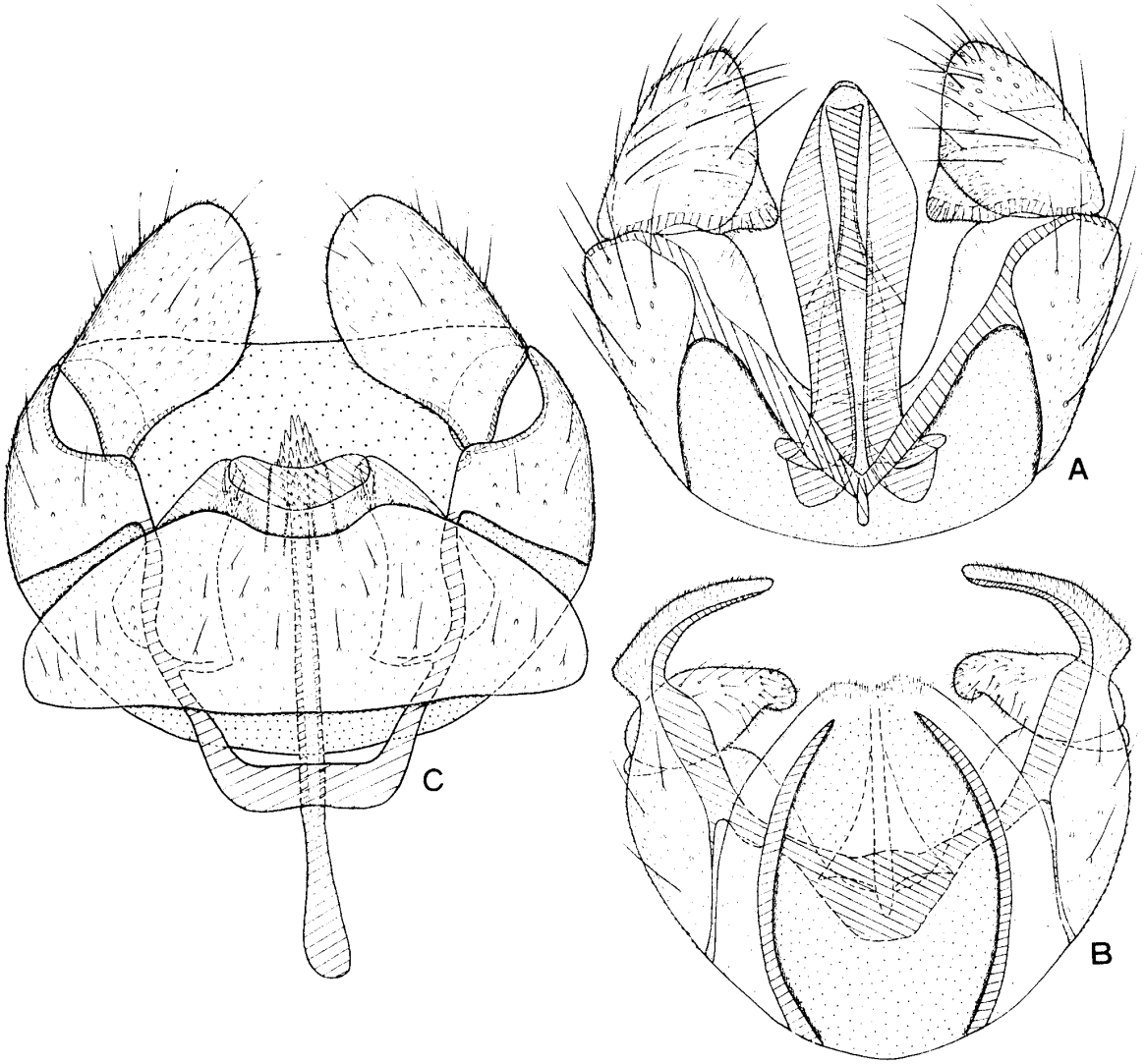

Fig. 6. *Peromyia* and *Cordylomyia*
(A) male genitalia, dorsal view (epandrium and cerci removed) : *Peromyia lobata* n. sp. (B) male genitalia, dorsal view : *Peromyia albicornis* (Meigen). (C) male genitalia, dorsal view : *Cordylomyia spinifera* n. sp.

as long as claw. Wing about 2 times as long as wide ; costa ending slightly beyond tip of R_5 ; R_1 about 2.2 times as long as Rs ; sensory pore 3 on R_1, 1 on junction of Rs and r-m, 1 on basal portion of R_5. Genitalia : epandrium interrupted medially, forming a pair of very narrow, crescent-shaped stripes ; cerci well developed ; gonostylus without apical spine ; gonocoxite greatly produced into a sickle-like, pubescent projection dorso-distally ; hypandrium incised with a large, U-shaped emargination on distal margin ; details of tegmen invisible.

Female : unknown.

Specimen examined : 1 ♂ (on slide), Kaminokawa, Hioki, Kagoshima-Pref., Kyushu, 2. XII. 1967, J. Yukawa leg. Cecid. No. 85301.

Distribution : Japan (Kyushu), Europe.

Remarks : This species is easily recognized by having a distinct shape of gonocoxite. A Japanese specimen examined agreed well with the description and figure by Edwards (1938), though the head could not be compared with that of type which lacks head.

Peromyia ovalis (Edwards)

Joannisia ovalis Edwards, 1938b.

Peromyia ovalis (Edwards) : Pritchard, 1947 ; Pritchard, 1958 ; Mamajev, 1963a ; Mamajev, 1969.

Male : Wing length 0.9 to 1.2 mm. Eye bridge 2 to 3 facets wide medially and laterally. Palpus consisting of 3 segments ; segments usually decreasing successively in size (sometimes third segment narrower, but a little longer than second). Antenna with 2+12 segments ; basal enlargement of flagellar segment not darkened on basal half, medially with a whorl of rather long sensorial spines which are distributed sparsely, subdistally with a whorl of long sensorial spines which are rather densely, but on ventral surface irregularly distributed ; first flagellar segment with an additional whorl basally ; fifth segment with a stem about 1.3 times as long as basal enlargement. Claw bent nearly at right angle ; empodium about 4/5 as long as claw. Wing about 2.2 times as long as wide ; costa ending at or a little beyond tip of R_5 ; R_1 2.4 to 3.0 times as long as Rs ; sensory pore 3 on R_1, 1 on junction of Rs and r-m, 1 on basal portion of R_5. Genitalia : epandrium narrow, interrupted medially forming a pair of crescent-shaped stripes ; cerci well developed ; gonostylus large, distally broader, without apical spine ; gonocoxite broadly united below, with a rather small lobe dorso-distally ; hypandrium widely but shallowly emarginated ; tegmen rather elongated slipper-shaped, distally rounded in various degree or sometimes subtruncate.

Female : unrecorded from Japan.

Specimens examined : 1 ♂ (on slide), Mt. Gozaisyo, Mie-Pref., Honshu, 18. X. 1966, J. Yukawa leg. Cecid. No. 43001 ; 1 ♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 31. X. 1966, J. Yukawa leg. Cecid. No. 46801 ; 1 ♂ (on slide), ibid., 5. XI. 1966, J. Yukawa leg. Cecid. No. 52603 ; 1 ♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 1. IV. 1967, J. Yukawa leg. Cecid. No. 56804 ; 2 ♂♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 11. V. 1967, J. Yukawa leg. Cecid. No. 63908-9 ; 1 ♂ (on slide), Mt. Daisen, Tottori-Pref., Honshu, 6. VI. 1967, J. Yukawa leg. Cecid. No. 75301.

Distribution : Japan (Honshu, Kyushu), Europe, N. America.

Remarks : The author identified the Japanese specimens as *Promyia ovalis* (Edwards, 1938b), though it is very similar to *Peromyia ramosa* (Edwards, 1938b), the structure of male genitalia agrees well with that of *ovalis* figured by Edwards (1938b) : a lobe present on dorso-distal portion of gonocoxite ; tegmen distally subtruncate or rounded in various degree which depends on the condition of the material on the slide glass.

Genus **Campylomyza** Meigen

Campylomyza Meigen, 1818 ; Meigen, 1830 ; Macquart, 1834 ; Westwood, 1840 ; H. Loew,

1850 ; Zetterstedt, 1850 ; Walker, 1856 ; Schiner, 1846 ; Winnertz, 1870 ; van der Wulp, 1877 ; Skuse, 1889 ; Kieffer, 1895a ; Kieffer, 1898 ; Kieffer, 1900 ; Felt, 1908 ; Enderlein, 1911a ; Felt, 1911b ; Felt, 1913a ; Kieffer, 1913f ; Edwards, 1938a ; Edwards, 1938b ; Pritchard, 1947 ; Pritchard, 1958 ; Mamajev, 1963a ; Mamajev, 1969.

Neurolyga Rondani, 1840 ; Rondani, 1846 ; Rondani, 1856 ; Kieffer, 1900.

Prionota Kieffer, 1894c.

Prionella Kieffer, 1894d.

Prionellus Kieffer, 1895a; Kieffer, 1898 ; Enderlein, 1911a ; Felt, 1911b ; Felt, 1913a ; Kieffer, 1913f ; Edwards, 1938a.

Amblyspatha Kieffer, 1913b ; Kieffer, 1913f ; Edwards, 1938a.

Cylophora Kieffer, 1913b ; Kieffer, 1913f ; Edwards, 1938a.

The genus *Campylomyza* is characterized in the following respects : eye bridge divided laterally ; male antenna with 2+12 segments ; female with 2 + 10 to 2 + 12 ; male flagellar segment with 2 or 1 complete crenulate whorls of long bristles, 1 or 2 incomplete ones and a pair of small plate- or blade-like sensoria; female flagellum with sensorial collar ; costa extending well beyond tip of R_5 ; R_1 at least 3 times as long as R_s; sensory pore present on R_5, none on r-m ; sclerotized portion of epandrium being a narrow strip; gonocoxite usually rather narrowly united below ; tegmen divided into 2 parts ; genital rod enlarged and modified distally ; female with 1 spermatheca.

Based on the examination of the Japanese specimens, 3 or more species of this genus may be distributed in Japan. *Campylomyza pinetorum* (Edwards, 1938b) is readily recognized and redescribed below, but identification of the rest of them are deferred until the further specimens and information are obtained.

Edwards (1938b) considered that the genus *Urosema* Kieffer (1913f) is probably a synonym of *Campylomyza*, but the genus *Urosema* is not definitely recognized yet. A Japanese species, *Urosema mori* Sasaki (1931), injurious to mulberry, can not be also identified.

Campylomyza pinetorum (Edwards)

Cordylomyia pinetorum Edwards, 1938b.

Campylomyza pinetorum (Edwards) : Mamajev, 1963a ; Mamajev, 1969.

Male : Wing length 1.5 to 1.8 mm. Eye bridge widely divided laterally. Palpus consisting of 4 segments, with scattered setae ; first segment subglobular, with many small sensorial spines ; second segment about 2 times as long as wide, a little longer than first ; third a little longer than second ; fourth about 1.4 times as long as second. Antenna with 2+12 segments ; scape and pedicel with rather many setae ventrally ; scape a little larger than pedicel ; each flagellar segment, except terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem; basal enlargement with a whorl of rather long bristles basally, 2 complete crenulate whorls of long bristles medially and 2 incomplete ones on distal half ; basal enlargement also with some sensorial spines and 2 or more blade-like sensoria distally ; fifth flagellar segment with a basal enlargement about 1.2 times as long as wide, stem about 2/3 as long as basal enlargement ; terminal segment conical, about 1.4 times as long as basal width. Leg with

femur nearly as long as tibia ; claw with minute serration on inner side, bent nearly at right angle ; empodium well developed, nearly as long as claw. Wing about 2 times as long as wide ; R_1 4 to 5 times as long as Rs ; sensory pore 3 on R_1, 1 on junction of Rs and r-m, 3 on R_5 (1 basally, 1 medially, 1 subdistally). Genitalia : epandrium rather broad medially, narrower laterally ; cerci with numerous short, stiff setae ; gonostylus subglobular, with stout setae densely on inner side ; gonocoxite rather narrowly united below ; tegmen divided into 2 parts ; genital rod modified distally, capped by membranous portion apically.

Female : unrecorded from Japan.

Specimens examined : 1 ♂ (on slide), Shôtoshibetsu, Asyoro, Hokkaido, 17. VI. 1967, T. Saigusa leg. Cecid. No. 78101 ; 1 ♂ (on slide), Akan, Kushiro, Hokkaido, 30. VI. 1967, T. Saigusa leg. Cecid. No. 78701 ; 1 ♂ (on slide), Mt. Rausu, 900-1100 m, Shiretoko, Nemuro, Hokkaido, 22. VI. 1967, T. Saigusa leg. Cecid. No. 80901 ; 4 ♂♂ (on slide), Toyotomi, Sôya, Hokkaido, 29. VI. 1967, T. Saigusa leg. Cecid. No. 81201-4.

Distribution : Japan (Hokkaido), Europe.

Remarks : This species is characterized by having male flagellum with blade-like sensoria, cerci with many stiff setae and gonostylus with stout setae densely on inner side. This is the first record of the species from Japan.

Genus **Cordylomyia** Felt

Cordylomyia Felt, 1911b ; Felt, 1913a ; Kieffer, 1913f ; Edwards, 1938b ; Pritchard, 1947 ; Pritchard, 1958 ; Mamajev, 1963a ; Yukawa, 1967a ; Mamajev, 1969.
Prosaprionus Kieffer, 1913b ; Kieffer, 1913f.

The genus *Cordylomyia* differs from *Campylomyza* in the following respects : eye bridge usually divided, but sometimes division incomplete ; male flagellar segment with 1 complete crenulate whorl of long bristles, 1 or 2 incomplete ones and sensory spines instead of a pair of small plate-like sensoria ; M_{3+4} and Cu forming more acute angle ; male genitalia with broader epandrium ; gonocoxite more broadly united ventrally ; female flagellar segment without sensorial collar.

Cordylomyia excavata Yukawa

(Fig. 2 : B)

Cordylomyia excavata Yukawa, 1967a.

Male : Wing length 1.2 to 1.6 mm. Eye bridge 1 to 2 facets wide at narrowest part. Palpus consisting of 4 segments ; first segment subglobular ; fourth about 1.5 times as long as second or third. Antenna greyish brown, 2+12 segments ; scape and pedicel with some ventral setae ; scape a little larger than pedicel ; each flagellar segment, except terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem ; basal enlargement with a whorl of long bristles basally, a complete crenulate whorl of long bristles medially and 2 incomplete ones on distal half ; basal enlargement also with rather short sensorial spines distally ; fifth flagellar segment with a basal enlargement about 2 times as long as wide, stem about 3/4 as long as basal enlargement ; terminal flagellar segment conical. Leg with femur nearly as long as tibia, claw

bent nearly at right angle, with 2 to 3 minute serration on inner side ; empodium well developed, about 3/4 as long as claw. Wing 2.0 to 2.2 times as long as wide ; R_1 3 to 4 times as long as Rs ; 3 sensory pores on R_1, 1 on junction of Rs and r-m or sometimes on Rs, 1 on basal portion of R_5, 2 on medial portion of R_5. Genitalia : epandrium broad, moderately concave at middle of distal margin ; cerci well developed ; gonostylus about 2 times as long as wide, distally broader and rounded, without apical spine ; gonocoxite broadly united ventrally ; hypandrium shallowly and evenly concave on distal margin ; roots of gonocoxite rather broadly united basally; tegmen laterally and proximally rather narrowly sclerotized, distally truncate, membranous on distal margin ; genital rod long, distally with a pair of short ducts on both sides, apically capped by a membranous portion which is provided with a pair of angulations distally (this membranous portion may be a distal part of aedeagus though it was first described as that of tegmen in the original description of the species).

Female : unknown.

Specimens examined : 2 ♂♂ (on slide), Mt. Kôra, Kurume-City, Kyushu, 16. V. 1965, J. Yukawa leg. Cecid. No. 8901-2 (Holotype and Paratype) ; 1 ♂ (on slide), Mt. Hiko, Fukuoka-Pref., Kyushu, 24. V. 1965, J. Yukawa leg. Cecid. No. 10403 (Paratype) ; 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 3. X. 1965, J. Yukawa leg. Cecid. No. 17202 ; 1 ♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 9. V. 1966, J. Yukawa leg. Cecid. No. 30301 ; 2 ♂♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 24. X. 1966, J. Yukawa leg. Cecid. No. 43501-2 ; 6 ♂♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 31. X. 1966, J. Yukawa leg. Cecid. No. 47001-6 ; 1 ♂ (on slide), Onoaida, Yaku-I., Kagoshima-Pref., Kyushu, 12. IV. 1967, J. Yukawa leg. Cecid. No. 59301 ; 3♂♂ (on slide), Iriki-Pass, Kagoshima-Pref., Kyushu, 17. IV. 1967, J. Yukawa leg. Cecid. No. 60501-3 ; 6 ♂♂ (on slide), Iso, Kagoshima-City, Kyushu, 18. IV. 1967, J. Yukawa leg. Cecid. No. 62001-6 ; 4 ♂♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 11. V. 1967, J. Yukawa leg. Cecid. No. 65101-4 ; 1 ♂ (on slide), Mt. Garyû, Geihoku, Hiroshima-Pref., Honshu, 3. VI. 1967, J. Yukawa leg. Cecid. No. 71402.

Distribution : Japan (Honshu, Kyushu).

Remarks : This species is characterized and distinguished from *Cordylomyia truncata* (Felt, 1912a) and *Cordylomyia hammi* Edwards (1938b) by the combination of the following characters : eye bridge at least 1 to 2 facets wide at narrowest part ; tegmen laterally and proximally sclerotized, but distally membranous and not forming a sclerotized arch ; caudo-lateral angle of tegmen without laterally projecting spines or teeth; genital rod apically capped by a membranous portion which is provided with a pair of angulations distally ; hypandrium shallowly and evenly concave.

Cordylomyia spinifera Yukawa new species

(Fig. 6 : C)

Male : Wing length 1.6 to 1.9 mm. Eye bridge divided laterally. Palpus rather short, consisting of 4 segments, with scattered setae ; first palpal segment subglobular, with many short sensorial spines, nearly as long as or slightly shorter than second or third ; second and third segments subequal in length, each about 2 times as long as wide ; fourth 1.2 to 1.5 times as long as second or third. Antenna with 2+12 segments ; scape and

pedicel with some ventral setae ; scape a little longer than pedicel ; each flagellar segment, except terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem ; basal enlargement with a whorl of long bristles basally, a complete crenulate whorl of long bristles medially and 2 incomplete ones on distal half (distal few segments sometimes with 2 complete and 1 incomplete ones) ; basal enlargement also with rather short sensorial spines distally ; some of sensorial spines digitate on basal few flagellar segments ; fifth flagellar segment with a basal enlargement about 1.3 times as long as wide, stem nearly as long as basal enlargement ; terminal segment conical, about 1.4 times as long as basal width. Leg with femur nearly as long as tibia ; fifth tarsal segment a little shorter than fourth ; claw bent nearly at right angle, with minute serration on inner side ; empodium well developed, about 3/4 as long as claw. Wing about 2.1 times as long as wide ; R_1 about 5 times as long as Rs ; sensory pore 3 on R_1, 1 on Rs or sometimes on junction of Rs and r-m, 3 on R_5 (1 basally, 1 medially, 1 subdistally). Genitalia : epandrium broad, moderately concave at middle of distal margin ; cerci moderately bilobed ; gonostylus oval, about 1.5 times as long as medial width, without apical spine ; gonocoxite very broadly united ventrally ; hypandrium with nearly straight distal margin ; roots of gonocoxite rather broadly united basally ; tegmen laterally and proximally very broadly sclerotized, distally forming a rather broadly sclerotized arch ; genital rod very long, distally with a pair of short ducts on both sides, apically capped by many spinous projections.

Female : unknown.

Holotype : ♂ (on slide), Serio, Kyoto-Pref., Honshu, 20. X. 1967, J. Yukawa leg. Cecid. No. 84401. Paratypes : 3 ♂♂ (on slide), ibid. Cecid. No. 84402-4.

Distribution : Japan (Honshu).

Remarks : This species is closely related to a "variety" of *Cordylomyia hammi* Edwards (1938b). According to the figures by Edwards, the "variety" may be distinguished from *hammi* by the apical state of genital rod : in the "variety" genital rod apically capped by many spinous projections as in this species, but in *hammi* genital rod capped by membranous angulated projection as in *Cordylomyia excavata* Yukawa (1967a). This new species is separable from the "variety" (if not identical) by having tegmen distally with more broadly sclerotized arch and basal few flagellar segments with some digitate sensoria. This species also differs from *Cordylomyia truncata* (Felt, 1912a) by having tegmen without laterally projecting spines or teeth on caudo-lateral angle.

Genus **Aprionus** Kieffer

Apriona Kieffer, 1894c. (preocc. Chevoralat, 1852).
Aprionus Kieffer, 1894d ; Kieffer, 1895a ; Kieffer, 1898 ; Enderlein, 1911a ; Felt, 1911b ; Felt, 1913a ; Kieffer, 1913f ; Edwards, 1938b ; Pritchard, 1947 ; Pritchard, 1958 ; Mamajev, 1963 ; Yukawa, 1967a ; Mamajev, 1969.

Aprionus is characterized in the following respects : eye bridge 2 to 6 facets wide at narrowest part ; palpus consisting of 3 to 4 segment ; male antenna with 2+12 segments, with sensorial spines ; female antenna with 2+11 or more, sensoria various in number and shape ; empodium rudimentary or short, not over 1/2 as long as claw ;

sensory pore present on r-m ; epandrium rather broad, rectangular or arch-shaped ; subanal plate sometimes present ; gonostylus rather small, with or without apical spine ; gonocoxite usually united proximo-ventrally by a narrow, ribbon-like loop ; tegmen usually with opposing pairs of spines laterally ; genital rod absent ; female with 1 spermatheca.

Key to Japanese species (males)

1. Gonostylus with an apical spine 2
- Gonostylus without apical spine 5
2. Gonocoxite produced ventro-distally into a triangular lobe ..... *interruptus* Yukawa
- Gonocoxite not produced ventro-distally into a lobe..... 3
3. Tegmen with only 1 opposing pair of long spines ..... *rostratus* n. sp.
- Tegmen with more than 1 opposing pairs of spines 4
4. Tegmen usnally with 3 opposing pairs of spines ..... *similis* Mamajev
- Tegmen usually with 9 opposing pairs of spines ..... *spiniger* Kieffer
5. Tegmen with a pair of sclerotized trunks which are divided into numerous small spines distally ..... *multispinosus* n. sp.
- Tegmen slender, without any spine ..... *longitegminis* Yukawa

Aprionus interruptus Yukawa

Aprionus interruptus Yukawa, 1967a.

Male : Wing length 1.2 to 1.7 mm. Eye bridge 4 to 6 facets wide at narrowest part. Palpus consisting of 4 segments. Antenna with 2+12 segments ; each flagellar segment, except terminal one, flask-shaped, with 1 complete crenulate whorl of long bristles medially, 3 or 4 incomplete ones and some sensorial spines on distal half of basal enlargement. Claw with minute serration ; empodium rudimentary, represented by only hairs. Wing 1.7 to 2.1 times as long as wide ; R_1 about 2 times as long as Rs ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 1 (rarely 2) on medial to subdistal portion of R_5. Genitalia : epandrium moderately rectangular, with setae dorsally ; cerci weakly developed ; gonostylus with a long, beak-like spine apicaly ; gonocoxite produced ventro-distally into a sharp triangular point ; ribbon-like loop interrupted or indistinct ventro-medially and interrupted portion usually recurved upward ; tegmen with 3 (rarely 4) opposing pairs of long spines.

Female : unknown.

Specimens examined : 4 ♂♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 15. V. 1965, J. Yukawa leg. Cecid. No. 11801-2, 11701-2 (Holotype and Paratypes) ; 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 3. VI. 1965, J. Yukawa leg. Cecid. No. 13801 (Paratype) ; 1 ♂ (on slide), Mt. Hiko, Fukuoka-Pref., Kyushu, 25. VI. 1965, J. Yukawa leg. Cecid. No. 37001 (Paratype) ; 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 26. V. 1966, J. Yukawa leg. Cecid. No. 33301 ; 2 ♂♂ (on slide), ibid. 20. IX. 1966, J. Yukawa leg. Cecid. No. 39202-3 ; 4 ♂♂ (on slide), Usa, Oita-Pref., Kyushu, 27. IX. 1966, J. Yukawa leg. Cecid. No. 41501-4 ; 4 ♂♂ (on slide), Miyanoura, Yaku-I., Kagoshima-Pref., Kyushu, 11. IV. 1967, J. Yukawa leg. Cecid. No. 58601-4 ; 1 ♂ (on slide), Onoaida, Yaku-I., Kagoshima-Pref., Kyushu, 12. IV. 1967, J. Yukawa leg. Cecid. No.

59201 ; 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 19. V. 1967, J. Yukawa leg. Cecid. No. 67604 ; 3 ♂♂ (on slide), Mt. Garyû, Geihoku, Hiroshima-Pref., Honshu, 3. VI. 1967, J. Yukawa leg. Cecid. No. 71801-3.

Distribution : Japan (Honshu, Kyushu).

Remarks : This species is similar to *Aprionus acutus* Edwards (1938b), but is distinguished from it by the following characters of the male genitalia : gonostylus with a distinct, strong beak-like apical spine (not tapering to a sharp point) ; tegmen with, at least, 3 pairs of rather long spines.

Aprionus rostratus Yukawa new species

(Fig. 1 : B, Fig. 7 : A)

Male : Wing length 1.4 to 1.9 mm. Eye bridge 6 to 7 facets wide medially, 5 to 6 facets wide laterally. Palpus consisting of 4 segments, with rather narrow scales ; first segment subglobular, with short sensorial spines densely ; second and third subequal in length and both with short sensorial spines rather sparsely ; fourth 1.4 to 1.8 times as long as third. Antenna with 2+12 segments ; scape larger than pedicel ; each flagellar segment, except terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem ; basal enlargement with a whorl of rather long bristles basally, 1 complete crenulate whorl of long bristles medially and 3 or 4 incomplete ones on distal half (distal several segments with 2 complete and 2 incomplete ones) ; basal enlargement also with some rather long sensorial spines distally, of which 1 or 2 are usually digitate ; fifth flagellar segment with a basal enlargement about 1.1 times as long as wide, stem nearly as long as basal enlargement ; terminal segment with a few rather short sensorial spines subdistally and 5 or 6 minute spines apically. Tibia covered densely with narrow, long scales, nearly as long as femur; claw bent nearly at right angle, with minute serration on inner side ; empodium rudimentary. Wing about 2.2 times as long as wide ; R_1 about 2.2 times as long as Rs ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 1 on medial portion of R_5. Genitalia : epandrium moderately broad, with dorsal setae ; cerci rather weakly developed ; gonostylus dorso-distally with a strong spine, ventro-distally with a pubescent projection ; gonocoxite united ventrally by a narrow loop which is indistinct medially ; tegmen with a pair of very strong spines which converge and cross distally.

Female : unknown.

Holotype : ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 5. V. 1966, J. Yukawa leg. Ceeid. No. 26001. Paratypes : 1 ♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 12. V. 1967, J. Yukawa leg. Cecid. No. 66802 ; 1 ♂ (on slide), Kyûsuikyô, Mt. Kujû, Oita-Pref., Kyushu, 28. V. 1967, J. Yukawa leg. Cecid. No. 69002.

Distribution : Japan (Kyushu).

Remarks : This species is similar to *Aprionus bispinosus* Edwards (1938b), but differs from it by the strucuture of gonostylus which has only one apical spine dorso-distally and a broader pubescent projection ventro-distally. Gonostylus of *bispinosus* with 2 long divergent bare spines and a pubescent thumb-like process.

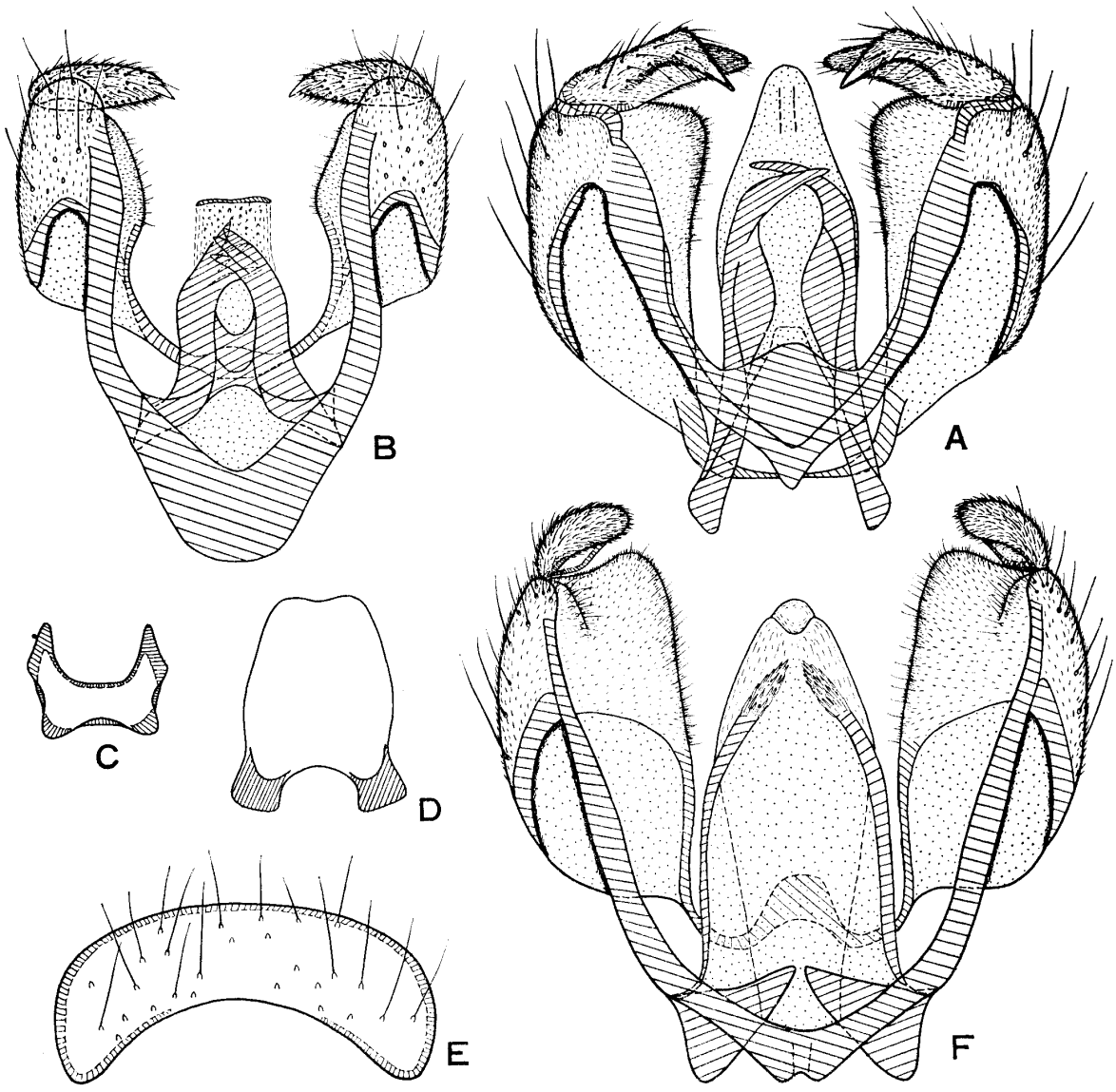

Fig. 7. *Aprionus*

(A) male genitalia, dorsal view (epandrium and cerci removed): *Aprionus rostratus* n. sp. (B) male genitalia, dorsal view (epandrium, cerci and subanal plate removed): *Aprionus similis* Mamajev. (C) subanal plate: ditto. (D) subanal plate: *Aprionus multispinosus* n. sp. (E) epandrium: ditto. (F) male genitalia, dorsal view (epandrium, cerci and subanal plate removed): ditto.

Aprionus similis Mamajev

(Fig. 7 : B-C)

Aprionus similis Mamajev, 1963; Mamajev, 1969.

Male : Wing length 1.4 to 1.7 mm. Eye bridge 3 to 4 facets wide medially and laterally. Palpus consisting of 4 segments, with rather long, narrow scales; first subglobular, with short sensorial spines densely ; second and third subequal in length ; fourth a

little longer than second or third. Antenna with 2+12 segments ; scape larger than pedicel ; each flagellar segment, except terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem ; basal enlargement with a whorl of long bristles basally, 1 complete crenulate whorl of long bristles medially and 3 incomplete ones on distal half (distal few segments with 2 complete and 2 incomplete ones) ; basal enlargement also with some rather long sensorial spines distally ; fifth flagellar segment with a basal enlargement about 1.2 times as long as wide, stem a little shorter than basal enlargement ; terminal flagellar segment subconical, about 1.6 times as long as basal width, with 3 minute apical spines. Tibia covered densely with narrow, long scales, nearly as long as femur ; claw bent nearly at right angle, with minute serration on inner side ; empodium rudimentary. Wing about 2.2 times as long as wide; R_1 2.3 to 2.7 times as long as Rs ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 1 on medial portion of R_5. Genitalia : epandrium rather broad, of arched-shape ; cerci hidden under epandrium ; subanal plate present ; gonostylus tapering, with a short but rather stout apical spine ; root of gonocoxite very broadly united proximally ; ribbon-like loop distinct medially ; tegmen weakly sclerotized on distal margin, usually with 3 opposing pairs of rather short spines (sometimes with an additional pair of spines distally).

Female : unknown.

Specimens examined : 10 ♂♂ (on slide), 30 ♂♂ (in alcohol), Mt. Tachibana, Fukuoka-Pref., Kyushu, 28. III. 1967, J. Yukawa leg. Cecid. No. 56201-10. (These specimens were collected when they were swarming at a height of about 50 cm under the shadow of comphor trees).

Distribution : Japan (Kyushu), Europe.

Remarks : This species was identified as *A. similis* by Mamajev (personal comm., 1969) and is distinguished from *Aprionus insignis* Mamajev (1963a) in the following respects : epandrium distinctly arched ; subanal plate present ; gonostylus without basal lobe ; tegmen with 3 pairs of stout spines (that of *insignis* with 2 pairs of spines in the figure).

Aprionus spiniger Kieffer

Apriona spiniger Kieffer, 1894c.
Aprionus spiniger Kieffer, 1895a ; Kieffer, 1898 ; Kieffer, 1913f ; Edwards, 1938b ; Mamajev, 1969.
Aprionus subanalis Yukawa, 1967a. New synoymy.

Male : Wing length 1.0 to 1.4 mm. Eye bridge 3 facets wide medially and laterally. Palpus consisting of 4 segments. Antenna with 2+12 segments ; each flagellar segment, except terminal one, flask-shaped, with 1 complete crenulate whorl of long bristles medially, 3 incomplete ones and some sensorial spines on distal half of basal enlargement. Claw with minute serration ; empodium very short, at most 1/3 as long as claw or represented by only hairs. Wing about 2 times as long as wide ; R_1 2 times as long as Rs ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 1 on medial to subdistal portion of R_5. Genitalia : epandrium rather narrow, arch-shaped ; cerci weakly developed ; subanal plate present, of which distal margin is folded inwardly and lamel-

late ; gonostylus with a small apical spine ; root of gonocoxite rather broadly united ; tegmen distally arch-shaped and sclerotized, with 9 opposing pairs of rather short, stout spines.

Female : unrecorded from Japan.

Specimens examined : 2 ♂♂ (on slide), Mt. Kôra, Kurume-City, Kyushu, 16. V. 1965, J. Yukawa leg. Cecid. No. 8503, 8701 ; 1 ♂ (on slide), Iriki-Pass, Kagoshima-Pref., Kyushu, 17. IV. 1967, J. Yukawa leg. Cecid. No. 60301 ; 1 ♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 11. V. 1967, J. Yukawa leg. Cecid. No. 66702 ; 5 ♂♂ (on slide), Mt. Garyû, Geihoku, Hiroshima-Pref., Honshu, 3. VI. 1967, J. Yukawa leg. Cecid. No. 71301-2, 71304-6 ; 1 ♂ (on slide), Saioto, Geihoku, Hiroshima-Pref., Honshu, 4. VI. 1967, J. Yukawa leg. Cecid. No. 73501 ; 1 ♂ (on slide), Yunono, Mt. Kirishima, Kagoshima-Pref., Kyushu, 26. IX. 1967, J. Yukawa leg. Cecid. No. 76601.

Distribution : Japan (Honshu, Kyushu), Europe.

Remarks : *Aprionus subanalis* Yukawa (1967a) is newly synonymized with this species, because it has been informed to the author by Mamajev (personal comm., 1969) that the tegmen of *A. spiniger*, which was figured by Edwards (1938b), includes 2 parts : subanal plate and true distal portion of tegmen.

Aprionus multispinosus Yukawa new species

(Fig. 7 : D-F)

Male : Wing length 1.5 to 1.9 mm. Eye bridge 4 to 5 facets wide medially, 3 to 4 facets wide laterally. Palpus consisting of 4 segments ; first segment subglobular, with minute sensorial spines ; second and third subequal in length ; fourth a little longer than second or third. Antenna with 2+12 segments ; scape larger than pedicel ; each flagellar segment, except terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem ; basal enlargement with 1 complete crenulate whorl of long bristles medially, 3 incomplete ones on distal half and some sensorial spines distally ; fifth flagellar segment with a basal enlargement about 1.3 times as long as wide, stem about 3/4 as long as basal enlargement ; terminal flagellar segment subconical, about 1.7 times as long as basal width, with 4 or more minute apical spines. Tibia and femur subequal in length ; claw bent nearly at right angle ; empodium represented by only hairs. Wing about 2.1 times as long as wide ; R_1 1.9 to 2.4 times as long as Rs ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 1 on subdistal portion of R_5. Genitalia : epandrium moderately broad, rectangular as a whole ; cerci rather weakly developed ; subanal plate present, basally sclerotized ; gonostylus small, distally narrower, apically rounded, without any apical spine, clothed with short setae densely ; ribbon-like loop medially rather indistinct but broader ; tegmen laterally with a pair of sclerotized trunks which are divided into numerous small spines distally ; membranous aedeagus opened dorso-distally.

Female : unknown.

Holotype : ♂ (on slide), Iriki-Pass, Kagoshima-Pref., Kyushu, 17. IV. 1967, J. Yukawa leg. Cecid. No. 60201. Paratypes : 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 5. V. 1966, J. Yukawa leg. Cecid. No. 25701 ; 1 ♂ (on slide), Mt. Tachibana Fukuoka-Pref., Kyushu, 28. III. 1967, J. Yukawa leg. Cecid. No. 55701 ; 13 ♂♂ (on slide),

same data as Holotype, Cecid. No. 60202-14 ; 3 ♂♂ (on slide), Iso, Kagoshima-City, Kyushu, 18. IV. 1967, J. Yukawa leg. Cecid. No. 617010, 16, 19 ; 1 ♂ (on slide), Mt. Upepesanke, Tokachi, Hokkaido, 20. VII. 1967, T. Saigusa leg. Cecid. No. 80401.

Distribution : Japan (Hokkaido, Kyushu).

Remarks : This species is similar to *A. barbatus* Mamajev (1963a), but is distinguished from it by the structure of gonostylus : small in size, narrower distally, rounded apically, without any apical spine, clothed with short setae densely, not divided into 2 parts as in *barbatus*. Lateral trunk of tegmen much longer than that of *barbatus* (Mamajev, personal comm., 1969).

Aprionus longitegminis Yukawa

Aprionus longitegminis Yukawa, 1967c.

Male : Wing length about 1.2 mm. Eye bridge 3 to 4 facets wide medially. Palpus consisting of 3 segments ; third segment constricted in middle (third and fourth seem to be fused together). Antenna with 2+12 segments ; each flagellar segments, except terminal one, flask-shaped, with 1 complete crenulate whorl of long bristles medially, 3 incomplete ones on distal half of basal enlargement (distal several segments with 2 complete and 2 incomplete ones) and 4 rather long sensorial spines distally. Claw bent nearly at right angle ; empodium nearly as long as claw. Wing about 1.7 times as long as wide ; R_1 2.2 times as long as Rs ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 1 on medial portion of R_5. Genitalia : epandrium moderately rectangular ; gonostylus a little broader distally, rounded apically, without any apical spine ; gonocoxite rather broadly united below by membranous portion ; tegmen long, very narrow, strongly sclerotized, without opposing pairs of spines.

Female : unknown.

Specimen examined : 1 ♂ (on slide), Mt. Hiko, Fukuoka-Pref., Kyushu, 24. V. 1965, J. Yukawa leg. Cecid. No. 10104 (Holotype).

Distribution : Japan (Kyushu).

Remarks : This species is characterized by a strongly sclerotized, slender tegmen which is not provided with tegminal spines, and distally broader gonostylus without any apical spine.

Genus **Monardia** Kieffer

Monardia Kieffer, 1895a ; Kieffer, 1898 ; Enderlein, 1911a ; Felt, 1911b ; Felt, 1913a ; Kieffer, 1913f ; Edwards, 1938b ; Pritchard, 1947 ; Pritchard, 1958 ; Mamajev, 1963a ; Yukawa, 1967a ; Mamajev, 1969.
Pezomyia Kieffer, 1913e ; Kieffer, 1913f ; Edwards, 1938b.

Monardia includes a number of heterogeneous species which are characterized as follows : eye bridge 2 to 5 facets wide ; palpus consisting of 3 to 4 segments ; number of antennal segment usually 2+12 in the male, varying in the female ; flagellar segment with sensoria which are various in shape : disk-like, plate-like or bristly ; degree of development of empodium variable ; sensory pore present on r-m ; epandrium rather

narrow ; gonostylus with or without apical spine ; hypandrium usually more or less well emarginated on distal margin ; tegmen of shield-shape ; genital rod present ; spermatheca 1 or 2.

The generic diagnosis mentioned above is based on the proposal by Mamajev (1963a) who revised the genus *Monardia* and suggested to subdivide it into 4 subgenera : *Monardia*, *Pezomyia*, *Polyardis* and *Xylopriona* (=*Tetraxyphus*).

The 2 known species are newly added to the Japanese members of the genus *Monardia* which includes 2 previously recorded species.

Key to Japanese species (males)

1. Palpus consisting of 4 segments 2
- Palpus consisting of 3 segments ; empodium nearly as long as claw ..... *toxicodendri* (Felt)
2. Empodium about 1/2 as long as claw ; gonostylus with a rather small apical spine ..... *monotheca* Edwards
- Empodium rudimentary ; gonostylus with a rather long apical spine ..... *yasumatsui* Yukawa

Monardia antennata (Winnertz)

Campylomyza antennata Winnertz, 1870.
Xylopriona antennata (Winnertz) : Kieffer, 1913f.
Monardia antennata (Winnertz) : Edwards, 1938b ; Pritchard, 1947 ; Pritchard, 1958 ; Yukawa, 1967a.
Tetraxyphus antennatus (Winnertz) : Mamajev, 1969.

Female : Wing length 2.4 to 2.6 mm. Eye bridge 3 to 4 facets wide. Palpus consisting of 4 segments. Antenna with 2+ over 35 segments ; each flagellar segment with 4 sensoria in the form of broad plate arising from several small pores. Claw with minute serration ; empodium rudimentary. Wing about 1.8 times as long as wide ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 1 on medial portion of R_{5}.

Male : unrecorded from Japan.

Specimen examined : 1 ♀ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 3. X. 1965, J. Yukawa leg. Cecid. No. 17302.

Distribution : Japan (Kyushu), Europe, N. America.

Remarks : The female is characterized by having rudimentary empodium and flagellum with 4 plate-like sensoria which are arising from several small pores.

Monardia toxicodendri (Felt)

Campylomyza toxicodendri Felt, 1907 ; Felt, 1908.
Monardia toxicodendron (misspeling for *toxicodendri*) (Felt) : Felt, 1913a.
Xylopriona toxicodendri (Felt) : Pritchard, 1947.
Tetraxyphus toxicodendri (Felt) : Pritchard, 1958 ; Mamajev, 1969.
Monardia (*Xylopriona*) *toxicodendri* (Felt) : Mamajev, 1963a.

Campylomyza gilletti Felt, 1908.
Monardia alexanderi Felt, 1913a.
Monardia modesta Felt, 1913b.
Monardia illinoiensis Felt, 1935.
Monardia nigricans Edwards, 1938b.

Male : Wing length 0.7 mm. Eye bridge 2 to 3 facets wide at narrowest part. Palpus consisting of 3 segments ; third a little longer than second. Antenna with 2+12 segment ; flagellar segment, except terminal two, flask-shaped, with 1 complete crenulate whorl of long bristles, 1 or sometimes 2 incomplete ones and 3 or 4 short-stemmed disk-like sensoria which are arising from a single large pore respectively ; penultimate segment sometimes without stem. Serration of claw indistinct ; empodium nearly as long as claw. Wing rather broad, about 1.7 times as long as wide ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 1 on medial portion of R_5. Genitalia : epandrium rather narrow, weakly arched ; gonostylus with long, stout apical spine ; hypandrium with deep emargination on distal margin ; tegmen shield-shaped ; genital rod rather long.

Female : unrecorded from Japan.

Specimen examined : 1♂ (on slide), Yachiyo, Obihiro-City. Hokk a ido, 29. VII. 1967, T. Saigusa leg. Cecid. No. 80601.

Distribution : Japan (Hokkaido), Europe, N. America.

Remarks : This species is characterized by having gonostylus with a long, stout apical spine, palpus with 3 segments and empodium nearly as long as claw. This is the first record of the species from Japan.

Monardia monotheca Edwards

Monardia monotheca Edwards, 1938b.
Polyardis monotheca (Edwards) : Pritchard, 1947.
Monardia (Polyardis) monotheca Edwards : Mamajev, 1963a.
Tetraxyphus monotheca (Edwards) : Mamajev, 1969.

Male : Wing length 1.0 to 1.5 mm. Eye bridge 2 to 3 facets wide at narrowest part. Palpus consisting of 4 segments ; second, third and fourth subequal in length (sometimes third and fourth fused together). Antenna with 2+12 segments ; each flagellar segment, except terminal one, flask-shaped, with 1 complete crenulate whorl of long bristles, 2 incomplete ones and 2 to 4 sensoria which are getting fewer in number, smaller in size ; these sensoria in the form of short-stemmed discs which are arising from a single large pore respectively, and each with a curved pointed projection ; terminal 2 or 3 flagellar segments without sensoria. Claw with inconspicuous minute serration ; empodium distinct, about 1/2 as long as claw. Wing about 2.1 times as long as wide ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 1 on medial portion of R_5. Genitalia : epandrium narrow, arched ; cerci well developed ; gonostylus with a rather small apical spine ; hypandrium moderately concave on distal margin ; tegmen shield-shaped ; genital rod long.

Female : unrecorded from Japan.

Specimens examined : 1 ♂ (on slide), Mt. Kôra, Kurume-City, Fukuoka-Pref., Kyushu, 16. V. 1965, J. Yukawa leg. Cecid. No. 8801 ; 2 ♂♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 31. X. 1966, J. Yukawa leg. Cecid. No. 47401-2 ; 1 ♂ (on slide), ibid. 5. XI. 1966, J. Yukawa leg. Cecid. No. 53407 ; 4 ♂♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 1. IV. 1967, J. Yukawa leg. Cecid. No. 56901-4 ; 1 ♂ (on slide), Iso, Kagoshima-City, Kyushu, 18. IV. 1967, J. Yukawa leg. Cecid. No. 62105.

Distribution : Japan (Kyushu), Europe, N. America.

Remarks : This species is distinguished from the related species by the combination of the following characters : palpus consisting of 4 segments ; empodium distinct ; flagellar segment with sensoria in the form of short-stemmed discs and each sensoria with a curved pointed projection. This is the first record of the species from Japan.

Monardia yasumatsui Yukawa

Monardia yasumatsui Yukawa, 1967a.

Male : Wing length about 2.0 mm. Eye bridge 2 to 4 facets wide. Palpus consisting of 4 segments. Antenna with 2+12 segments ; each flagellar segment, except terminal one, flask-shaped, with 1 complete crenulate whorl of long bristles, 2 or 3 incomplete ones and 3 or 4 short-stemmed disk-like sensoria which are arising from a single large pore respectively. Claw with inconspicuous small serration ; empodium rudimentary. Wing 1.8 to 2.0 times as long as wide ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 1 or 2 on distal portion of R_5. Genitalia : usual *Monardia* type ; epandrium rather narrow, weakly arched ; cerci well developed ; gonostylus with a beak-like strong spine apically ; hypandrium deeply concave on distal margin ; tegmen shield-shaped ; genital rod long.

Female : unknown.

Specimens examined : 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 3. VI. 1965, J. Yukawa leg. Cecid. No. 14003 (Holotype) ; 1 ♂ (on slide), ibid. 5. V. 1966, J. Yukawa leg. Cecid. No. 25801 ; 1 ♂ (on slide), ibid. 26. V. 1966, J. Yukawa leg. Cecid. No. 33302.

Distribution : Japan (Kyushu).

Remarks : This species resembles *Monardia ulmaria* Edwards (1938b), but differs from it by having palpus with 4 segments and each flagellar segment, except terminal one, with 3 or 4 disk-like sensoria.

Genus **Trichopteromyia** Williston

Trichopteromyia Williston, 1896 ; Kieffer, 1901 ; Felt, 1911b ; Felt, 1913a ; Kieffer, 1913f ; Edwards, 1938b ; Pritchard, 1947 ; Pritchard, 1958 ; Mamajev, 1963a ; Yukawa, 1967a ; Mamajev, 1969.

Projoannisia Kieffer, 1912 ; Kieffer, 1913f.

Trichopteromyia is closely related to *Monardia*, but eye bridge of the former is very broad, about 6 facets wide. Palpus usually consisting of 3 segments ; empodium rudimentary or short ; costa extending well beyond tip of R_5 and reaching nearly at tip of

M_{1+2} ; sensory pore present on r-m ; gonostylus with an apical spine ; tegmen shield-shaped ; genital rod present. Female with 2 rather small, retort-shaped spermathecae. Only 1 species was previously recorded from Japan.

Trichopteromyia japonica Yukawa

Trichopteromyia japonica Yukawa, 1967a.

Male : Wing length about 1.3 mm. Eye bridge 6 facets wide medially. Palpus consisting of 3 segments ; first palpal segment subglobular, with scattered scales ; third 2 times as long as second ; second and third with scattered, narrow scales. Antenna with 2+12 segments ; pedicel subglobular, a little smaller than scape ; each flagellar segment, except terminal one, with a basal enlargement and a distal stem ; basal enlargement with 1 complete crenulate whorl of long bristles medially, 2 incomplete ones on distal half ; basal enlargement also with 2 or more short stout and long curved sensorial spines distally in addition to 1 lanceolate sensoria. Leg with femur nearly as long as tibia ; tarsus with rather broad scales ; claw bent at right angle ; empodium rudimentary, with only hairs. Wing about 1.8 times as long as wide ; R_1 2 times as long as Rs ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, sometimes 2 on medial portion of R_5. Genitalia : epandrium rather narrow, proximal margin arched ; cerci moderately developed ; gonostylus about 1.5 times as long as wide, with a small spine apically ; gonocoxite broadly united ventrally ; tegmen of shield-shape ; genital rod long.

Female : unknown.

Specimens examined : 2 ♂♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 3. X. 1965, J. Yukawa leg. Cecid. No. 17101-2 (Holotype and Paratype).

Distribution : Japan (Kyushu).

Remarks : This species is distinguished from *Trichopteromyia modesta* Williston (1896) by having broader epandrium and is also much smaller than the latter in size. Gonocoxite of this species is more broadly united ventrally and not deeply emarginated on distal margin of hypandrium as in *Trichopteromyia magnifica* Mamajev (1963a).

Genus **Bryomyia** Kieffer

Bryomyia Kieffer, 1895a ; Kieffer, 1898 ; Enderlein, 1911a ; Felt, 1911b ; Felt, 1913a ; Kieffer, 1913f ; Edwards, 1938b ; Pritchard, 1947 ; Pritchard, 1958 ; Mamajev, 1963a ; Mamajev, 1969.

This genus is characterized as follows : eye bridge 2 to 4 facets wide ; palpus usually consisting of 4 segments ; male antenna with 2 + 12 segments, female with 2 + 8 ; female flagellum with 2 sensoria ; empodium either long or rudimentary ; costa extending well beyond tip of R_5 ; sensory pore present on r-m ; epandrium well developed, usually bilobed ; gonostylus without any apical spine ; tegmen almost membranous ; genital rod developed into a pair of long strips or loops.

The following 2 known species are newly recorded from Japan.

Bryomyia bergrothi Kieffer

Bryomyia bergrothi Kieffer, 1895a ; Kieffer, 1898 ; Kieffer, 1913f ; Edwards, 1938b ; Mamajev, 1969.

Male : Wing length 1.2 to 1.7 mm. Eye bridge 2 to 3 facets wide. Palpus consisting of 4 segments. Antenna with 2+12 segments ; each flagellar segment with 1 or 2 complete crenulate whorls of long bristles and 2 or 3 incomplete ones. Claw with minute serration ; empodium usually rudimentary (sometimes 1/2 as long as claw). Wing 2.0 to 2.4 times as long as wide ; R_1 2.3 to 3.0 times as long as Rs ; sensory pore 3 on R_1 (rarely additional 1 on basal portion of R_1), 1 on r-m, 1 on junction of Rs and r-m, 2 on medial portion of R_5. Genitalia : epandrium forming a rather narrow arch, narrower medially, slightly lobed caudo-laterally (not so distinct as shown by Edwards) ; cerci well developed, hidden under epandrium ; gonostylus suboval, broader distally ; hypandrium rather deeply incised below by U-shaped emargination ; tegmen almost membranous distally ; genital rod basally distinct, distally rather indistinct and developed into a pair of long processes.

Female : unrecorded from Japan.

Specimens examined : 1 ♂ (on slide), Hirao, Fukuoka-City, Kyushu, 17. IV. 1965, J. Yukawa leg. Cecid. No. 1201 ; 1 ♂ (on slide), Mt. Wakasugi, Fukuoka-Pref., Kyushu, 8. V. 1965, J. Yukawa leg. Cecid. No. 5101 ; 2 ♂♂ (on slide), Usa, Oita-Pref., Kyushu, 27. IX. 1966, J. Yukawa leg. Cecid. No. 41201-2 ; 8 ♂♂ (on slide), Mt. Gozaisho, Mie-Pref., Honshu, 18. X. 1966, J. Yukawa leg. Cecid. No. 42801-8 ; 1 ♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 31. X. 1966, J. Yukawa leg. Cecid. No. 53601-2; 1 ♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 1. IV. 1967, J. Yukawa leg. Cecid. No. 56803 ; 2 ♂♂ (on slide), Miyanoura, Yaku-I., Kagoshima-Pref., Kyushu, 10. IV. 1967, J. Yukawa leg. Cecid. No. 577010, 58802 ; 1 ♂ (on slide), Iriki-Pass, Kagoshima-Pref., Kyushu, 17. IV. 1967, J. Yukawa leg. Cecid. No. 602016 ; 6 ♂♂ (on slide), Iso, Kagoshima-City, Kyushu, 18. IV. 1967, J. Yukawa leg. Cecid. No. 62201-6 ; 2 ♂♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 12. V. 1967, J. Yukawa leg. Cecid. No. 66401-2 ; 1 ♂ (on slide), Kyûsuikyô, Mt. Kujû, Oita-Pref., Kyushu, 28. V. 1967, J. Yukawa leg. Cecid. No. 69004 ; 10 ♂♂ (on slide), Yukomanbetsu, Kamikawa, Hokkaido, 11. VI. 1967. T. Saigusa leg. Cecid. No. 81601-10 ; 1 ♂ (on slide), ibid. 26. VI. 1967, T. Saigusa leg. Cecid. No. 79001 ; 1 ♂ (on slide), Berabonai, Asyoro, Hokkaido, 16. VI. 1967, T. Saigusa leg. Cecid. No. 77801 ; 1 ♂ (on slide), Kaminokawa, Hioki, Kagoshima-Pref., Kyushu, 2. XII. 1967, J. Yukawa leg. Cecid. No. 85401.

The following specimens examined have distinct empodium : 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 5. V. 1966, J. Yukawa leg. Cecid. No. 25901; 2 ♂♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 12. V. 1967, J. Yukawa leg. Cecid. No. 64404-5 ; 3 ♂♂ (on slide), Saioto, Geihoku, Hiroshima-Pref., Honshu, 4. VI. 1967, J. Yukawa leg. Cecid. No. 73301-3.

Distribution : Japan (Hokkaido, Honshu, Kyushu), Europe, N. America.

Remarks : According to Edwards (1938b), this species is similar to *Bryomyia apsectra* Edwards (1938b), but differs from it in the following respects : empodium distinct, R_1 about 2 times as long as Rs, epandrium not divided in middle. The Japanese speci-

mens examined are very similar to *B. bergrothi* rather than to *B. apsectra* in the structure of male genitalia, especially by having undivided epandrium though over 85 % of them without distinct empodium. Relative length of R_1 to Rs varies with individual in the Japanese specimens.

Bryomyia gibbosa (Felt)

Campylomyza gibbosa Felt, 1907 ; Felt, 1908 Felt, 1913a.
Bryomyia gibbosa (Felt) : Pritchard, 1947 ; Pritchard, 1958.
Campylomyza cerasi Felt, 1907 ; Felt, 1908 ; Felt, 1913a.
Neptunimyia flavida Felt, 1919.

Male : Wing length 1.5 to 1.7 mm. Eye bridge 3 to 4 facets wide at narrowest part. Palpus consisting of 4 segments. Antenna with 2+12 segments ; each flagellar segment with 1 or 2 complete crenulate whorls of long bristles and 2 or 3 incomplete ones. Claw with minute serration ; empodium narrow and short, at most 1/3 as long as claw, or represented by only hairs. Wing about 2.1 times as long as Rs ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 2 on medial portion of R_5. Genitalia : epandrium with a pair of large lobes distally ; cerci well developed ; gonostylus suboval, broader distally ; gonocoxite broadly united below ; hypandrium distally with a pair of setose lobes ; tegmen almost membranous distally, basally with a deep, median emargination ; genital rod divided from its base into a pair of long processes.

Female : unrecorded from Japan.

Specimens examined : 2 ♂♂ (on slide), Mt. Daisen, Tottori-Pref., Honshu, 6. VI. 1967, J. Yukawa leg. Cecid. No. 7501-2 ; 2 ♂♂ (on slide), Nukabira, Tokachi, Hokkaido, 13. VI. 1967, T. Saigusa leg. Cecid. No. 77501-4.

Distribution : Japan (Hokkaido, Honshu), N. America.

Remarks : The specimens examined agree well with the description and figures of *B. gibbosa* and *Bryomyia trifida* Edwards (1938b). As suggested by Pritchard (1947) and Mamajev (1963a), the European species, *B. trifida* is probably identical with *B. gibbosa*.

Genus **Heterogenella** Mamajev

Heterogenella Mamajev, 1963a ; Yukawa, 1967b ; Mamajev, 1969.

This genus is closely related to the genus *Bryomyia* Kieffer (1895a), but may be distinguished from it by the structure of male genitalia : upper wall of subanal cavity with a pair of lobes which are clothed with short spines directed downward, so that from a dorsal view it seems that tegmen has a pair of bunches of short spines on both sides ; genital rod usually not distinctly developed into a pair of strips or loops distally. This genus also differs from *Skuharaviana* Mamajev (1963a) by having flagellar segment with more slender basal enlargement which is provided with some crenulate whorls of long bristles.

Heterogenella mamajevi Yukawa (1967c) was first described based on a single male. As the further specimens and morphological informations of the species were obtained, the author redescribes it below. Another new species and some unnamed species are also described.

Key to Japanese species (males)

1. Epandrium medially with a longitudinal suture ..... *linearis* n. sp.
– Epandrium without longitudinal suture 2
2. Gonocoxite ventro-distally produced into a setose lobe 3
– Gonocoxite ventro-distally not produced into a setose lobe..... 4
3. Hypandrium deeply incised by a V-shaped emargination ..... *mamajevi* Yukawa
– Hypandrium incised by an U-shaped emarginatiion ..... sp. A
4. Empodium over 1/2 the length of claw ..... sp. B
– Empodium short, not over 1/2 the length of claw ..... sp. C

Heterogenella mamajevi Yukawa

(Fig. 1 : C, F, Fig. 8 : A B)

Heterogenella mamajevi Yukawa, 1967b.

Male : Wing length 1.3 to 1.6 mm. Eye bridge 2 to 4 facets wide medially, 4 to 5 facets wide laterally. Palpus consisting of 4 segments, with scattered setae and rather long, narrow scales ; first segment subglobular, with many short sensorial spines ; second a little shorter than third ; third usually a little shorter than fourth, but sometimes slightly longer than or nearly as long as fourth. Antenna with 2+12 segments ; scape larger than pedicel, ventrally with long setae ; pedicel with long, narrow scales and setae ventrally ; each flagellar segment, except terminal one, with a subcylindrical basal enlargement and a cylindrical distal stem ; basal enlargement with a whorl of rather long bristles basally, 1 complete crenulate whorl of long bristles medially and 3 incomplete ones on distal half (2 complete and 2 incomplete ones on distal several flagellar segments) ; basal enlargement also with some short and rather long sensorial spines distally, of which 1 or 2 are usually digitate on basal several flagellar segments ; fifth flagellar segment with a basal enlargement about 1.3 times as long as wide, stem 2/3 to 4/5 as long as basal enlargement ; terminal segment subconical, about 1.7 times as long as basal width, with 3 complete and 1 incomplete crenulate whorls. Leg with femur nearly as long as tibia ; tibia with rather narrow scales ; claw bent nearly at right angle, with minute serration on inner side ; empodium a little shorter than claw. Wing 1.8 to 2 times as long as wide ; R_1 2 to 2.3 times as long as Rs ; sensory pore 3 on R_1, 1 (rarely 2) on r-m, 1 on junction of Rs and r-m, 2 (rarely 1) on medial portion of R_5. Genitalia : epandrium broadly emarginated on distal margin, caudo-laterally strongly produced into a setose lobe ; cerci bilobed, usually hidden under epandrium ; gonostylus without any distal spine, not distinctly widened apically, with dorsal flange ; hypandrium deeply incised by a V-shaped emargination ; inner angle of gonocoxite ventro-distally largely produced into a setose lobe ; upper wall of subanal cavity with a pair of setose lobes ; tegmen weakly sclerotized and parallel sided, membranous and narrower distally ; aedeagus membranous ; distal part of genital rod weakly pigmented. (In the Holotype, distal part of epandrium and cerci are folded downward, so that caudo-lateral lobe was first described as cerci and true cerci was described as one of two pairs of lobes on upper wall of subanal cavity).

Female : unknown.

Specimens examined : 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu. 3. VI. 1965, J. Yukawa leg. Cecid. No. 14001 (Holotype) ; 1 ♂ (on slide), ibid. 19. V. 1967, J. Yukawa leg. Cecid. No. 67601 ; 1 ♂ (on slide), Usa, Oita-Pref., Kyushu. 27. IX. 1966,

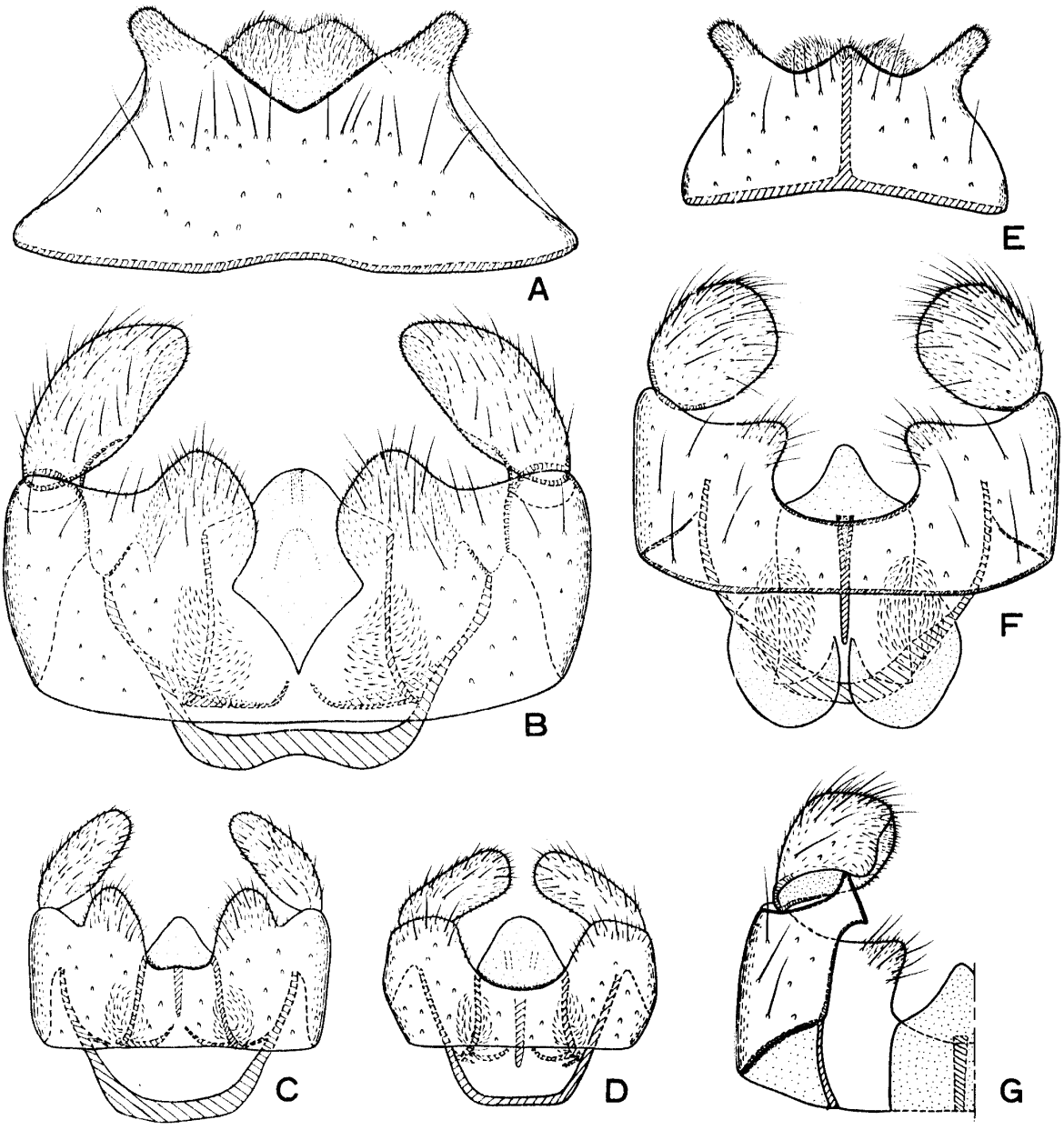

Fig. 8. *Heterogenella*

(A) epandrium and cerci : *Heterogenella mamajevi* Yukawa. (B) male genitalia, ventral view (epandrium and cerci removed) : ditto. (C) male genitalia, ventral view (epandrium and cerci removed) : *Heterogenella* sp. A. (D) male genitalia, ventral view (epandrium and cerci removed) : *Heterogenella* sp. B. (E) epandrium and cerci : *Heterogenella linearis* n. sp. (F) male genitalia, ventral view (epandrium and cerci removed) : ditto. (G) male genitalia, dorsal view (epandrium and cerci removed) : ditto.

J. Yukawa leg. Cecid. No. 41401 ; 18 ♂♂ (on slide), Iso, Kagoshima-City, Kyushu. 18. IV. 1967, J. Yukawa leg. Cecid. No. 61701-18.

Distribution : Japan (Kyushu).

Remarks : This species differs from *Heterogenella hybrida* Mamajev (1963a) by having palpus consisting of 4 segments and gonostylus not distinctly widened apically. This species is also similar to *Bryomyia cambrica* Edwards (1938b) which was first described based on a single male from England and subsequently redescribed by Pritchard (1947) based on the American specimens. *H. mamajevi* is, however, distinguished from it in the following respects : empodium well developed, a little shorter than claw ; tegmen rather different in shape ; genital rod not distinctly developed into 2 parts distally. Presence of 3 sensory pores on R_5 and scape with dorsal setae may be the remarkable characters of this species.

Heterogenella sp. A

(Fig. 8 : C)

Five males from Western part of Honshu are very similar to *H. mamajevi*, which is distributed in Kyushu, in the most respects, except the following points : much smaller in size, wing length 0.9 to 1.1 mm ; hypandrium incised by an U-shaped emargination in sp. A, while by a V-shaped one in *mamajevi* ; genital rod distinct basally rather than distally.

Specimens examined : 3 ♂♂ (on slide), Mt. Garyû, Geihoku, Hiroshima-Pref., Honshu, 3. VI. 1967, J. Yukawa leg. Cecid. No. 71406, 71501, 71601 ; 2 ♂♂ (on slide), Mt. Daisen, Tottori-Pref., Honshu, 6. VI. 1967, J. Yukawa leg. Cecid. No. 75101-2.

Distribution : Japan (Honshu).

Heterogenella sp. B

(Fig. 8 : D)

Several males from various parts of Japan are also related to *H. mamajevi*, but differ from it by having U-shaped emargination on distal margin of hypandrium as in *Heterogenella* sp. A. Further, this species is separable from the above mentioned 2 species by having gonocoxite ventrally without distinct lobe on inner angle. Wing length 0.9 mm.

Specimens examined : 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 1. XI. 1966, J. Yukawa leg. Cecid. No. 49601 ; 1 ♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 5. XI. 1966, J. Yukawa leg. Cecid. No. 53801 ; 1 ♂ (on slide), Miyanoura, Yaku-I., Kagoshima-Pref., Kyushu, 11. IV. 1967, J. Yukawa leg. Cecid. No. 58701 ; 2 ♂♂ (on slide), Iso, Kagoshima-City, Kyushu, 18. IV. 1967, J. Yukawa leg. Cecid. No. 62102, 8 : 1 ♂ (on slide), Saioto, Geihoku, Hiroshima-Pref., Honshu, 3. VI. 1967, J. Yukawa leg. Cecid. No. 71502.

Distribution : Japan (Honshu, Kyushu).

Heterogenella sp. C

Two males from Mt. Ichifusa, Kyushu are almost identical with *Heterogenella* sp. B except that sp. C has short empodium. Wing length 0.9 to 1.1 mm.

Specimens examined : 2 ♂♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 3. VI.

1966, J. Yukawa leg. Cecid. No. 35301-2.

Distribution : Japan (Kyushu).

Because it is uncertain that the differences discussed above are adequately valuable to separate these 3 species from *H. mamajevi* or from each other, they are left unnamed until further informations are obtained.

Heterogenella linearis Yukawa new species

(Fig. 8 : E-G)

Male : Wing length about 1.1 mm. Eye bridge 2 to 4 facets wide medially, 4 to 5 facets wide laterally. Palpus consisting of 4 segments, with scattered setae and rather long, narrow scales ; first segment subglobular, with many short sensorial spines ; second a little longer than first ; third slightly longer than second ; fourth about 1.6 times as long as third. Antenna with 2+12 segments ; scape larger than pedicel, with some ventral setae but without medio-dorsal setae ; basal enlargement of each flagellar segment with 1 complete and 2 incomplete crenulate whorls of long bristles ; basal enlargement also with some, rather long sensorial spines distally ; fifth flagellar segment with a basal enlargement about 1.3 times as long as wide, stem about 3/5 as long as basal enlargement ; penultimate segment without stem ; terminal segment suboval, about 1.3 times as long as medial width. Leg with femur nearly as long as tibia ; tibia with rather narrow scales ; claw bent nearly at right angle, minute serration obscure ; empodium about 2/3 as long as claw. Wing nearly 2 times as long as wide ; R_1 about 2.2 times as long as Rs ; sensory pore 3 on R_1, 1 on junction of Rs and r-m, 1 on r-m, 2 on medial portion of R_5. Genitalia : epandrium caudo-laterally produced into a setose lobe, medially with a longitudinal, pigmented suture of which distal end produced into a small lobe ; gonostylus with dorsal flange, without any distal spine ; hypandrium rather widely and deeply incised by an U-shaped emargination ; inner angle of gonocoxite dorso-distally produced into angulation, ventro-distally rather weakly produced into a setose lobe ; upper wall of subanal cavity with a pair of setose lobes ; tegmen almost membranous, basally rounded, genital rod rather distinct.

Female : unknown.

Holotype : ♂ (on slide), Mt. Daisen, Tottori-Pref., Honshu, 6. VI. 1967, J. Yukawa leg. Cecid. No. 75201. Paratypes : 1 ♂ (on slide), Saioto, Geihoku, Hiroshima-Pref., Honshu, 4. VI. 1967, J. Yukawa leg. Cecid. No. 73301 ; 1 ♂ (on slide), same data as Holotype. Cecid. No. 75202 ; 1 ♂ (on slide), Nukabira, Fujikawa, Tokachi, Hokkaido, 17. VII. 1967, T. Saigusa leg. Cecid. No. 80202.

Distribution : Japan (Hokkaido, Honshu).

Remarks : This species is distinguished from *H. mamajevi* Yukawa (1967b) in the following respects : scape without medio-dorsal setae ; epandrium medially with a longitudinal, pigmented suture of which distal end is produced into a small lobe ; gonocoxite ventrally with a large U-shaped emargination.

Genus **Micromya** Rondani

Micromya Rondani, 1840 ; Rondani, 1856 ; Pritchard, 1947 ; Pritchard, 1958.

Micromyia Rondani, 1844 ; Winnertz, 1870 ; van der Wulp, 1877 ; Kieffer, 1895a ; Kieffer, 1900 ; Enderlein, 1911a ; Felt, 1911b ; Felt, 1913a ; Kieffer, 1913f ; Edwards, 1938b ; Mamajev, 1963a ; Yukawa, 1967a ; Mamajev, 1969.

The members of this genus are characterized in the following respects : eye bridge 1 to 3 facets wide ; palpus consisting of 3 segments ; antenna short, with 2+17 to 2+9 segments ; pedicel globular, enlarged ; flagellar segment without stem in male ; female flagellum sessile, with sensorial collar ; empodium narrow, but nearly as long as claw ; costa extending well beyond tip of R_5 ; R_1 nearly as long as Rs ; sensory pore present on r-m ; gonostylus with or without apical spine ; tegmen slipper- or shield-shaped ; genital rod present or absent. One species is known to occur in Japan.

Micromya kyushuensis Yukawa

Micromyia kyushuensis Yukawa, 1967a.

Male : Wing length 0.9 to 1.3 mm. Eye bridge 1 to 4 facets wide at narrowest part. Palpus consisting of 3 segments ; first palpal segment subglobular, with rather long, narrow scales sparsely ; second and third narrow, with scattered setae ; second 1.2 (1.0 to 1.5) times as long as first, about 1.3 (1.1 to 1.5) times as long as third. Antenna greyish brown, with 2+8 segments ; pedicel subglobular, enlarged, about 2 times as large as scape, with scattered setae ventrally ; first flagellar segment a little elongated ; second rather broad ; fifth about 1.7 times as long as widest part ; terminal 4 segments more slender than proximal 4 segments ; terminal segment elongated, with a constriction medially (sometimes separated into 2 segments, in this case, antenna with 2+9 segments) ; each flagellar segment, except terminal one, basally with a whorl of rather long bristles, medially with some, rather long bristles. Leg with femur a little longer than tibia ; tarsus with rather short, broad scales ; claw simple, without subapical enlargement, bent at right angle ; empodium long, narrow, about 4/5 as long as claw. Wing rather broad, about 1.5 times as long as wide ; Sc rudimentary ; R_1 nearly as long as Rs ; 3 sensory pores on R_1, 1 or sometimes 2 on r-m, 1 on junction of Rs and r-m, 1 on medial portion of R_5 ; fork of M_{3+4} and Cu forming a nearly right angle. Genitalia : epandrium moderately rectangular ; cerci well developed ; gonostylus oval, with an apical spine ; gonocoxite broadly united ventrally, but hypandrium with a V-shaped emargination on distal margin ; genital rod rather long.

Female : unknown.

Specimens examined : 3 ♂♂ (on slide), Ôdomari, Kagoshima-Pref., Kyushu, 24. IV. 1965, J. Yukawa leg. Cecid. No. 3001-3 (Holotype and Paratypes) ; 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 13. VII. 1966, J. Yukawa leg. Cecid. No. 38001 ; 13 ♂♂ (on slide), Usa, Oita-Pref., Kyushu, 27. IX. 1966, J. Yukawa leg. Cecid. No. 40901-13 ; 2 ♂♂ (on slide), Iso, Kagoshima-City, Kyushu, 18. IV. 1967, J. Yukawa leg. Cecid. No. 61801-2 ; 1 ♂ (on slide), 11 ♂♂ (in alcohol), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 12. V. 1967, J. Yukawa leg. Cecid. No. 66101 ; 2 ♂♂ (on slide), Kyûsuikyô, Mt. Kujû, Oita-Pref., Kyushu, 28. V. 1967, J. Yukawa leg. Cecid. No. 69101-2 ; 2 ♂♂ (on slide), 1 ♂ (in alcohol), Mt. Tachibana, Fukuoka-Pref., Kyushu, 30. V. 1967, J. Yukawa leg. Cecid. No. 70801-2 ; 1 ♂ (on slide), Ogahara, Geihoku, Hiroshima-Pref., Honshu, 3. VI. 1967, J. Yukawa leg. Cecid. No. 72501 ; 13 ♂♂ (on slide), Mt. Daisen, Tottori-

Pref., Honshu, 6. VI. 1967, J. Yukawa leg. Cecid. No. 74801-13 ; 2 ♂♂ (on slide), Nukabira, Tokachi, Hokkaido, 13. VI. 1967, T. Saigusa leg. Cecid. No. 77502-3 ; 1 ♂ (on slide), Aizankei, Kamikawa, Hokkaido, 9. VII. 1967, T. Saigusa leg. Cecid. No. 79602 ; 1 ♂ (on slide), Mt. Yokokura, Kochi-Pref., Shikoku, 10. V. 1969, J. Yukawa leg. Cecid. No. 155601.

Distribution : Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks : This species is similar to an Indian species, *Micromya championi* Grover (1962), but differs from it by the proportion of the length of palpus : in *championi* second palpal segment about 1.5 times as long as first and 2 times as long as third, but in *kyushuensis* second 1.2 times as long as first and 1.3 times as long as third. This species is also distinguished from *Micromya lucorm* Rondani (1840) and *Micromya mana* Pritchard (1947) by having gonostylus with a small apical spine, and from *Micromya orientalis* Grover (1962) by the number and shape of the male flagellar segments.

Genus **Anodontoceras** Yukawa

Anodontoceras Yukawa, 1967a.

This genus is distinguished from the other members of the tribe by the combination of the following characters : each flagellar segment, except terminal one, with a subglobular basal enlargement and a cylindrical distal stem as in *Peromyia*, but stem inserted in basal portion of next segment ; basal enlargement distally with 4 very long sensorial spines which are recurved abruptly at near its base, without crenulate whorl of long bristles ; empodium shorter than claw ; costa extending well beyond tip of R_5 and reaching nearly at tip of M_{1+2} ; sensory pore present on r-m ; gonostylus having many tubercules distally, from which a short spine is arising; gonocoxite very small ; tegmen shield-shaped ; genital rod present. Female is unknown. Only 1 species is included in this genus.

Anodontoceras saigusai Yukawa

Anodontoceras saigusai Yukawa, 1967a.

Male : Wing length 1.0 to 1.3 mm. Eye bridge with 3 facets wide at narrowest part. Palpus consisting of 3 segments, about 1.7 times as long as height of head ; first palpal segment subglobular, with moderate size scales and many, short, inconspicuous sensorial spines ; second 1.4, third 1.8 times as long as first ; third narrower than basal 2 segments. Antenna with 2+12 segments ; pedicel subglobular, a little smaller than scape ; both with many setae ventrally ; each flagellar segment, except terminal one, with a smooth long, distal stem and a subglobular basal enlargement of which basal half is darker than distal half ; basal enlargement basally with irregular whorls of long bristles and distally with 4 very long sensorial spines which are curved abruptly at near its basal part ; stem of first to fourth flagellar segments nearly as long as basal enlargement ; that of fifth to tenth about 1.1 to 1.3 times as long as basal enlargement ; stem of eleventh shorter and narrower than the others ; terminal flagellar segment with a rather small basal enlargement and a tapering distal stem which is provided with 3

minute spines apically. Leg with scales densely ; femur nearly as long as tibia ; fifth tarsal segment a little longer than fourth ; claw bent at right angle ; empodium short, about 1/3 as long as claw. Wing about 2 times as long as wide ; R_1 about 1.5 times as long as Rs ; sensory pore 3 on R_1, 1 on r-m, 1 on junction of Rs and r-m, 1 on medial portion of R_5 (sometimes none). Genitalia : epandrium narrow rectangular ; cerci well developed ; gonostylus not smoothly rounded, having many tubercules distally, from which a short spine is arising respectively ; gonocoxite broadly separated, without sclerotized hypandrium ; tegmen shield-shaped.

Female : unknown.

Specimens examined : 6 ♂♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 5. X. 1965, J. Yukawa et T. Saigusa leg. Cecid. No. 17401, 3, 5 (Holotype and Paratypes), 17404, 6, 7 ; 1 ♂ (on slide), ibid. 5. V. 1965, J. Yukawa leg. Cecid. No. 2001 ; 3 ♂♂ (on slide), ibid. 5. V. 1966, J. Yukawa leg. Cecid. No. 26702-4 ; 3 ♂♂ (on slide), ibid. 26. V. 1966, J. Yukawa leg. Cecid. No. 33101-3 ; 15 ♂♂ (on slide), Miyanoura, Yaku-I., Kagoshima-Pref., Kyushu, 10. IV. 1967, J. Yukawa leg. Cecid. No. 57701-9, 57802-7.

Distribution : Japan (Kyushu).

SUBFAMILY PORRICONDYLINAE

Key to Japanese tribes (males)

1. Rs forming a distinct angle with R_5 ; sensoria on flagellar segment not ring-shaped ..... Winnertziini
- Rs in the same direction as R_5 or forming a very small angle with R_5 ; sensoria on flagellar segment ring-shaped 2
2. Number of flagellar segments not constant for a species, usually more than 14 ..... Asynaptini
- Number of flagellar segments constant for a species, not over 14 ... Porricondylini

Tribe WINNERTZIINI Panelius

Winnertziini Panelius, 1965.
Winnertziina Mamajev, 1966.

This tribe is characterized as follows (after Panelius, 1965) : male antenna with 2+11 or 2+12 segments ; flagellar segment with U, C, Y-shaped, star-shaped or hair-like sensoria ; wing rather broad ; Rs forming a distinct angle with R_5 ; rm-m straight, in the same direction as R_5 ; M_{3+4} free from Cu ; epandrium with distinct margin ; tegmen basally well sclerotized, only medially connected with transverse bridge.

Key to Japanese genera and species (males)

1. Flagellar segment with U, C, Y-shaped or simple longitudinal sensoria ..... *Winnertzia* ... 2
- Flagellar segment with sensorial spines ..... *Kronomyia concava* (Yukawa)
2. Fifth flagellar segment with a basal enlargement shorter than distal stem .....

..... *W. hikosanensis* Yukawa

- Fifth flagellar segment with a basal enlargement longer than distal stem .....
..... *W. calciequina* Felt

Genus **Winnertzia** Rondani

Asinapta (*Winnertzia*) Rondani, 1860.

Asynapta (*Winnertzia*) Rondani : Schiner, 1864 ; Theobald, 1892.

Winnertzia Rondani : van der Wulp, 1877 ; Kieffer, 1894a ; Kieffer, 1894e ; Kieffer, 1895d ; Kieffer, 1895e ; Kieffer, 1896a ; Kieffer, 1898 ; Kieffer, 1900 ; Meunier, 1901 ; Kertész, 1902 ; Meunier, 1902 ; Kertész, 1903 ; Collin, 1904 ; Meunier, 1904 ; Felt, 1908 ; Williston, 1908 ; Coquillett, 1910 ; Felt, 1911b ; Kieffer, 1913f ; Felt, 1915b ; Bagnall & Harrison, 1918 ; Felt, 1918 ; Felt, 1925 ; Rübsaamen & Hedicke, 1926 ; Felt, 1929 ; Curran, 1934 ; Mani, 1934 ; Enderlein, 1936 ; Mani, 1946 ; Pritchard, 1953 ; Möhn, 1955 ; Rao, 1955 ; Felt, 1958 ; Mamajev, 1962 ; Mamajev, 1963b ; Mamajev, 1964b ; Mamajev, 1964c ; Panelius, 1965 ; Mamajev, 1966 ; Mamajev, 1969.

Clinorhiza Kieffer, 1894e ; Kieffer, 1895c ; Kieffer, 1896.

Winnertziola Kieffer, 1913a ; Kieffer, 1913f ; Rübsaamen & Hedicke, 1926 ; Enderlein, 1936.

This genus is characterized as follows : male antenna with 2+10 to 2+12 segments ; flagellar segment a pair of U, C, Y-shaped, or simple longitudinal sensoria, of which distal ends are free from surface of flagellar segment ; eye bridge 2 to 5 facets wide medially ; palpus usually consisting of 1+4 segments ; claw simple or bifid ; empodium present or absent ; gonostylus with a distal claw of fine teeth ; gonocoxite root rather long ; transverse bridge distinct ; tegmen usually well sclerotized basally ; genital rod rather long.

Winnertzia hikosanensis Yukawa

(Fig. 1 : G)

Winnertzia hikosanensis Yukawa, 1967c.

Male : Wing length 1.5 to 2.0 mm. Eye bridge 2 to 3 facets wide medially. Palpus consisting of 1+4 segments, a little longer than height of head ; first segment shortest ; second and third 2.5 to 3.0, fourth about 4 times as long as first. Antenna with 2+12 segments ; scape about 1.5 times as long as pedicel, with a few setae dorsally and ventrally ; pedicel a little shorter than wide, a few setae dorsally and ventrally ; basal enlargement of flagellar segment basally with rather short bristles, medially with long bristles which are arising from irregularly distributed horse-shoe shaped sockets, on distal half with a pair of U-shaped sensoria, distally with some long bristles ; fifth flagellar segment with a basal enlargement 1.5 to 1.8 times as long as wide, stem about 1.3 times as long as basal enlargement ; terminal flagellar segment elongated conical, about 2.6 times as long as basal width, without sensoria. Fore and hind legs with femur, tibia and second tarsal segment successively longer ; middle leg with second tarsal segment nearly as long as or slightly longer than tibia, much longer than femur ; first tarsal segment without distinct projection distally ; claw bifid ; empodium rudimentary. Wing

2 to 2.5 times as long as wide ; sensory pore 3 on R_1 (1 medially, 2 distally), 3 on R_5 (1 basally, 1 medially, 1 distally). Genitalia : epandrium with a nearly straight distal margin ; cerci bilobed ; subanal plate not bilobed ; gonostylus with a distal claw composed of many fine teeth ; root of gonocoxite nearly as long as distnce separating both roots ; transverse bridge distinct ; hypandrium with deep, widely V-shaped emargination ; tegmen distally truncate, sclerotized laterally ; aedeagus membranous ; genital rod simple, a little longer than gonocoxite.

Female : unknown.

Specimens examined : 2 ♂♂ (on slide), Mt. Hiko, Fukuoka-Pref., Kyushu, 21. IX. 1966, J. Yukawa leg. Cecid. No. 39601-2 (Holotype and Paratype) ; 1 ♂ (on slide), Mt. Wakasugi, Fukuoka-Pref., Kyushu, 25. IV. 1966, J. Yukawa leg. Cecid. No. 22601.

Distribution : Japan (Kyushu).

Remarks : This species resembles *Winnertzia betulicola* Mamajev (1963b), but differs from it by having tegmen sclerotized on both sides and stem of flagellar segment longer than basal enlargement.

Winnertzia calciequina Felt

Winnertzia calciequina Felt, 1907 ; Felt, 1908 ; Kieffer, 1913f ; Felt, 1915b ; Felt, 1958 ; Panelius, 1965 ; Yukawa, 1967c.
Winnertzia pectinata Felt, 1911a ; Kieffer, 1913f ; Felt, 1915b ; Barnes, 1951 ; Felt, 1958.
Winnertzia aceris Felt, 1913c ; Felt, 1915b ; Barnes, 1951 ; Felt, 1958.

Male : Wing length 1.6 to 2.0 mm. Eye bridge 3 to 4 facets wide medially. Palpus consisting of 1+4 segments, nearly as long as or slightly longer than height of head. Antenna with 2+12 segments ; scape about 1.5 times as long as pedicel ; pedicel 1.3 times as long as wide ; basal enlargement of flagellar segment basally with rather short bristles, medially with some long bristles which are arising from irregularly distributed horseshoe shaped sockets, on distal half with a pair of U-shaped or sometimes Y-shaped sensoria, distally with some rather long bristles ; fifth flagellar segment with a basal enlargement 1.5 times as long as wide, stem about 0.7 times as long as basal enlargement ; terminal segment subconical 1.9 to 2.4 times as long as basal width, with or without sensoria. Fore and middle legs with femur, tibia and second tarsal segment successively longer or subequal in length, fourth tarsal segment about 2 times as long as fifth ; hind leg with femur a little longer than tibia, second tarsal segment much longer than femur, fourth about 2.2 times as long as fifth ; first tarsal segment with a very small distal projection ; claw bifid ; empodium rudimentary. Wing 2.2 to 2.6 times as long as wide ; sensory pore 3 on R_1 (1 medially, 2 distally), 3 on R_5 (1 basally, 1 medially, 1 distally). Genitalia : epandrium emarginated distally ; cerci bilobed ; subanal plate not bilobed ; gonostylus with a distal claw composed of many fine teeth ; root of gonocoxite nearly as long as distance separating both roots ; transverse bridge distinct ; hypandrium with deep, widely U-shaped emargination ; tegmen basally sclerotized, distally membranous ; aedeagus membranous ; genital rod simple, as long as gonocoxite.

Female : unrecorded from Japan.

Specimens examined : 2 ♂♂ (on slide), Mt. Hiko, Fukuoka-Pref., Kyushu, 24. V. 1965,

J. Yukawa leg. Cecid. No. 10701-2 ; 1 ♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 9. V. 1966, J. Yukawa leg. Cecid. No. 28901 ; 1 ♂ (on slide), Iso, Kagoshima-City, Kyushu, 18. IV. 1967, J. Yukawa leg. Cecid. No. 61101.

Distribution : Japan (Kyushu), Europe, N. America.

Remarks : This species is characterized by the combination of the following characters : antenna with 2+12 segments ; claw bifid ; empodium rudimentary ; epandrium emarginated on distal margin. The Japanese species examined agree well with the redescription by Panelius (1965).

Genus **Kronomyia** Felt

Kronomyia Felt, 1911a; Kieffer, 1913f; Felt, 1929; Felt, 1958; Mamajev, 1966; Mamajev, 1969.
Trichoxylomyia Mamajev, 1964c.

This genus is similar to *Winnertzia* in the most respects, but distinguished from it by having male flagellar segment with sensorial spines instead of 2 distinct sensoria.

Kronomyia concava (Yukawa) new combination

(Fig. 2 : C)

Trichoxylomyia concava Yukawa, 1967c.

Male : Wing length about 1.1 mm. Eye bridge 5 facets wide medially. Palpus consisting of 1+4 segments, shorter than height of head. Antenna with 2+11 segments ; scape longer than pedicel, with ventral setae ; pedicel a little shorter than wide, with ventral and lateral setae ; basal enlargement of flagellar segment basally with rather long bristles, medially with long bristles which are arising from irregularly distributed horse-shoe shaped sockts, subdistally with 2 sensorial spines, distally with some long bristles ; fifth flagellar segment with a basal enlargement ; terminal segment subconical, about 2.4 times as long as basal width, with 1 or 2 incospicuously short sensorial spines. Fore leg with tibia much longer than femur and slightly shorter than second tarsal segment, fourth tarsal segment about 1.4 times as long as fifth ; middle leg with tibia a little longer than femur and as long as second tarsal segment, fourth about 1.2 times as long as fifth ; hind leg with tibia slightly shorter than femur and much shorter than second tarsal segment, fourth about 1.6 times as long as fifth ; first tarsal segments of all legs with a short spine distally ; claw bifid ; empodium rudimentary. Wing abont 2 times as long as wide ; sensory pore 3 on R_1 (1 medially, 2 distally), 3 on R_5 (1 basally, 1 medially, 1 distally). Genitalia : epandrium with distal margin deeply emarginated ; cerci well developed ; subanal plate weakly bilobed ; gonostylus without any apical spine ; gonocoxite produced dorso-distally into a triangular lobe ; root of gonocoxite nearly as long as distance separating both roots ; transverse bridge distinct ; hypandrium with a deep, widely V-shaped emargination ; tegmen basally sclerotized, distally membranous ; genital rod simple, shorter than gonocoxite.

Female : unknown.

Specimen examined : 1 ♂ (on slide), Mt. Hiko, Fukuoka-Pref., Kyushu, 16. VII. 1966, J. Yukawa leg. Cecid. No. 38501 (Holotype).

Distribution : Japan (Kyushu).

Remarks : This species differs from *Kronomyia ovalis* (Mamajev, 1964c) by the following points : Palpus consisting of 1+4 segments ; flagellar segment with 2 sensorial spines instead of irregularly distributed short blunt spines ; distal margin of epandrium emarginated deeply ; genital rod apically simple. Since the genus *Trichoxylomyia* was synonymized with the genus *Kronomyia*, this species is also combined with the latter.

Tribe ASYNAPTINI Rübsaamen & Hedicke

Asynaptini Rübsaamen & Hedicke, 1926 ; Enderlein, 1936 ; Panelius, 1965.
Asynaptina Mamajev, 1966.

Asynaptini is characterized as follows (after Panelius, 1965) : male antenna with variable number of segments, usually more than 2+14 segments ; scape distinctly narrower basally ; sensoria of male flagellar segment ring-shaped ; Rs in the same direction as R_5, or Rs forming a very small angle with R_5 ; rm-m straight or curved.

Asynapta yomogicola Matsumura (1931) was previously described from Japan. According to the description and accompanying figures, this species is a gall maker on *Artemisia* and ought to be combined with the genus *Diathronomyia*. Since this species is excluded from the members of the genus *Asynapta*, any Japanese species of the genus not recorded yet. The following 3 species of the genus *Camptomyia* are distributed in Japan and redescribed.

Genus **Camptomyia** Kieffer

Camptomyia Kieffer, 1894a ; Kieffer, 1894e ; Kieffer, 1895d ; Kieffer, 1896a ; Kieffer, 1898 ; Kertész, 1902 ; Meunier, 1902 ; Kertész, 1903 ; Meunier, 1904 ; Felt, 1911b ; Kieffer, 1913f ; Felt, 1915b ; Felt, 1918 ; Felt, 1925 ; Senior-White, 1928 ; Felt, 1929 ; Mani, 1934 ; Enderlein, 1936 ; Mani, 1946 ; Möhn, 1955 ; Rao, 1955 ; Felt, 1958 ; Skuhravá & Skuhravý, 1960 ; Mamajev, 1961a ; Mamajev, 1962 ; Mamajev, 1964c ; Panelius, 1965 ; Yukawa, 1968a ; Mamajev, 1969.
Cecidophila Rübsaamen, 1915b ; Felt, 1918 ; Felt, 1925 ; Felt, 1929.

This genus is characterized and distinguished from 3 other known genera of the tribe ASYNAPTINI by having wing with rm-m strongly S-curved, Cu forming a fork with M_{3+4}, scape with numerous medial setae and tegmen without ventral structure.

Key to Japanese species (males)

1. Genitalia with hooks of tegmen long, distally broadened and crossing ; genital rod basally simple ..... *spinifera* Mamajev
– Genitalia with hooks of tegmen rather short, distally not crossing ; genital rod basally T-shaped 2
2. Empodium rudimentary ; epandrium with a V-shaped emargination ..... *shibuyai* Yukawa

- Empodium about 2/3 as long as claw ; epnadrium with a pyri-form emargination ... . *breviradicis* Yukawa

Camptomyia spinifera Mamajev

Camptomyia (*Procamptomyia*) *spinifera* Mamajev, 1961a.
Camptomyia spinifera Mamajev : Panelius, 1965 ; Yukawa, 1968a ; Mamajev, 1969.

Male : Wing length 4.0 mm. Eye bridge 14 to 15 facets wide medially. Palpus consisting of 1+4 segments, about 1.2 times as long as height of head ; fourth segment a little longer than third. Antenna with 2+25 segments ; basal enlargement of flagellar segment as in the 2 other Japanese species ; fifth flagellar segment with a basal enlargement about 1.4 times as long as wide, stem nearly as long as basal enlargement ; terminal segment subconical, 2.2 to 2.7 times as long as basal width, without ring-shaped sensoria. Fore leg with tibia slightly shorter than femur and slightly longer than second tarsal segment, fourth tarsal segment about 2.3 times as long as fifth ; middle leg with tibia much shorter than femur or second tarsal segment, fourth about 2.6 times as long as fifth ; hind leg with tibia much shorter than femur and nearly as long as second tarsal segment, fourth about 2.7 times as long as fifth ; claw bifid ; empodium rudimentary. Wing about 2.7 times as long as wide ; sensory pore 2 on distal portion of R_1, 1 on Rs, 2 on distal portion of R_5. Genitalia : epandrium with a deep, narrow emargination ; cerci and subanal plate well bilobed ; gonostylus rather long, more than 3 times as long as wide, distally narrower, with a claw apically ; root of gonocoxite nearly as long as distance separating both roots ; transverse bridge sclerotized ; hypandrium with an U-shaped emargination ; tegmen laterally with a pair of sclerotized hooks which are broadened and cross distally ; aedeagus not sclerotized ; genital rod simple, slightly longer than gonocoxite.

Female : unrecorded from Japan.

Specimen examined : 1 ♂ (on slide), Iriki-Pass, Kagoshima-Pref., Kyushu, 17. IV. 1967, J. Yukawa leg. Cecid. No. 59901.

Distribution : Japan (Kyushu), Europe.

Remarks : This species is characterized by having empodium rudimentary, epandrium with a deep emargination, gonostylus with an apical claw, hooks of tegmen distally broadened and crossing and genital rod basally simple.

Camptomyia shibuyai Yukawa

Camptomyia shibuyai Yukawa, 1968a.

Male : Wing length 4.6 mm. Eye bridge 12 to 13 facets wide medially. Palpus consisting of 1+4 segments, nearly as long as height of head ; first segment shortest ; second 1.7, third 2.4, fourth 2.7 times as long as first. Antenna with 2+30 segments ; scape basally narrower, about 1.2 times as long as distal width, 2.5 times as long as pedicel, with numerous short setae medio-distally ; pedicel subcylindrical, a little shorter than wide, with several setae ; basal enlargement of flagellar segment basally with rather short bristles, medially with a ring-shaped sensoria and long bristles which are arising from irregularly distributed horse-shoe shaped sockets, distally with some rather long bristles

which are nearly as long as distal stem ; first flagellar segment with a rather elongated basal enlargement ; fifth flagellar segment with a basal enlargement about 1.1 times as long as wide, stem nearly as long as basal enlargement ; terminal flagellar segment subconical, with basal bristles longer than distal ones, with an incomplete, interrupted ring-shaped sensoria of which ends are curved upward. Fore leg with tibia slightly shorter than femur and nearly as long as second tarsal segment, fourth tarsal segment about 2.4 times as long as fifth ; middle and hind legs with tibia shorter than femur or second tarsal segment, fourth 2.0 to 2.2 times as long as fifth ; claw bifid ; empodium rudimentary. Wing about 2.6 times as long as wide ; M_{1+2} only distally visible ; sensory pore 2 on distal portion of R_1, 1 on junction of Rs and rm-m, 2 on distal portion of R_5. Genitalia : epandrium with a distinct V-shaped emargination on distal margin ; cerci and subanal plate moderately bilobed ; gonostylus rather large, about 2.1 times as long as wide, apically with a claw of several small teeth ; gonocoxite broad, slightly produced into a lobe medio-distally ; root of gonocoxite rather short, about 1/2 as long as distance separating both roots ; hypandrium with a deep, U-shaped emargination ; tegmen laterally with a pair of simple, sclerotized hooks which slightly converge distally; aedeagus laterally sclerotized ; genital rod about 1/2 as long as gonocoxite, basally T-shaped.

Female : unknown.

Specimen examined : 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 3. X. 1965, J. Yukawa leg. Cecid. No. 16201 (Holotype).

Distribution : Japan (Kyushu).

Remarks : This species resembles *Camptomyia flavicinerea* Panelius (1965), but differs from it in the following respects : much larger in size ; eye bridge with 12 to 13 facets wide ; sensoria present on terminal flagellar segment ; gonostylus apically with several small claws instead of a group of strong setae ; gonocoxite slightly produced medio-distally ; root of gonocoxite 1/2 as long as distance separating both roots ; genital rod also 1/2 as long as gonocoxite. This species is also distinguished from the other members of the genus by the combination of emarginated epandrium, basally T-shaped genital rod and rudimentary empodium.

Camptomyia breviradicis Yukawa

Camptomyia breviradicis Yukawa, 1968a.

Male : Wing length about 3.0 mm. Eye bridge 14 to 15 facets wide medially. Palpus consisting of 1+4 segments, about 1.3 times as long as height of head ; first and second segments subequal in length ; third 1.8, fourth 2.7 times as long as first or second. Antenna with 2+23 segments ; scape conical, basally narrower, about 1.3 times as long as distal width, 2.5 times as long as pedicel, with numerous short setae medio-distally ; pedicel subcylindrical, a little shorter than wide, with several setae ; basal enlargement of flagellar segment basally with rather short bristles, medially with a ring-shaped sensoria and long bristles which are arising from irregularly distributed horse-shoe shaped sockets, distally with some long bristles which are a little longer than distal stem ; first flagellar segment with a rather elongated basal enlargement ; fifth flagellar segment with a basal enlargement about 1.3 times as long as wide, stem 1.1 times as long as basal enlargement. Fore leg with tibia a little shorter than femur ; hind leg with tibia much shorter than femur or second tarsal segment, fourth tarsal segment about 2.7 times as

long as fifth ; claw bifid ; empodium about 2/3 as long as claw. Wing about 2.7 times as long as wide ; M_{1+2} only distally visible ; sensory pore 2 on distal portion of R_1, 1 on Rs, 2 on distal portion of R_5. Genitalia : epandrium with a deep, pyri-form emargination on distal margin and a small triangular projection laterally ; emarginated portion of epandrium sclerotized ; cerci and subanal plate moderately bilobed ; gonostylus with a group of short spines apically ; root of gonocoxite very short, about 1/5 as long as distance separating both roots ; transverse bridge distinct ; hypandrium with a deep, U-shaped emargination ; emarginated portion with a small projection medially ; tegmen distally rounded and membranous, laterally with a pair of long, sclerotized hooks which are bent nearly at right angle and distally parallel ; aedeagus laterally narrowly sclerotized ; genital rod about 1/2 as long as gonocoxite, with a large T-shaped base which is broader than distance separating both roots of gonocoxites.

Female : unknown.

Specimen examined : 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 26. V. 1966, J. Yukawa leg. Cecid. No. 33701 (Holotype).

Distribution : Japan (Kyushu).

Remarks : This species resembles *Camptomyia populicola* Mamajev (1961a) and *C. salicicola* Mamajev (1961a), but differs from them in the following respects : eye bridge with 14 to 15 facets wide ; fifth flagellar segment with a stem 1.1 times as long as basal enlargement ; epandrium with a sclerotized, deep pyri-form emargination ; root of gonocoxite very short ; hook of tegmen rather long, bent nearly at right angle. This species is also distinguished from *Camptomyia dentata* Felt (1919) by having fourth palpal segment distinctly longer than third and this species is much larger than *C. dentata* in size. Further, this species differs from *Camptomyia calcarata* Mamajev (1964c) by having very short root of gonocoxite and gonostylus apically with a group of short spines instead of distinct claw.

Tribe PORRICONDYLINI Kieffer

Porricondylini Kieffer, 1913f (Porricondylariae) ; Rübsaamen & Hedicke, 1926 ; Enderlein, 1936 ; Skuhravá & Skuhravý, 1960 ; Panelius, 1965.
Holoneurini Enderlein, 1936 ; Skuhravá & Skuhravý, 1960.

Antenna with the number of segments usually constant within the species, not more than 2+14 ; basal enlargement of flagellar segment, except terminal one, with rather short bristles basally, long bristles which are arsing from horse-shoe shaped sockets on distal half and some long bristles distally which are nearly as long as distal stem ; basal enlargement also with a ring-shaped sensoria on all or at least basal 7 flagellar segments ; first flagellar segment with a rather elongated basal enlargement ; terminal flagellar segment subconical or elongated conical, with rather short bristles basally and long bristles which are arising from irregularly distributed horse-shoe shaped sockets on distal half ; claw simple, bifid or sometimes trifid ; empodium long, short or rudimentary ; costa meeting with R_5 beyond tip of wing ; Rs forming a very small angle with or in the same direction as R_5 ; M_{1+2} absent or only distally visible ; Cu free from or forming a fork with M_{3+4} ; epandrium without distinct distal margin.

The tribe Porricondylini characterized here comprises 2 subtribes, Porricondylina

Mamajev (1966) and Holoneurina Mamajev (1966). The rest of the genera included in the key by Panelius (1965) may fall into groups, such as Dirhizina, Dicerurina and Bryocryptina by Mamajev (1966), other than Porricondylini in a narrow sense.

Key to Japanese genera (males)
(mainly based on Mamajev, 1966)

1. Cu not forming a fork with M_{3+4} ..... *Holoneurus* Kieffer
- Cu forming a fork with M_{3+4} 2
2. Empodium over 1/3 the length of claw 3
- Empodium rudimentary or very short 4
3. Antenna with 2+14 segments ; distal projection of ventral plate (if any) weakly sclerotized ..... *Porricondyla* Rondani
- Antenna with 2+13 segments ; distal projection of ventral plate well sclerotized ... . *Claspettomyia* Grover
4. Tegmen sclerotized on distal margin ..... *Parepidosis* Kieffer
- Tegmen laterally with 2 pairs of sclerotized hooks which are not fused distally ... . *Monepidosis* Mamajev

Genus **Holoneurus** Kieffer

Holoneura Kieffer, 1894d ; Kieffer, 1894e ; Coquillett, 1910. (preocc. Tetens, 1891).
Holoneurus Kieffer, 1895c ; Kieffer, 1895f ; Kieffer, 1896a ; Kieffer, 1898 ; Rübsaamen, 1899b ; Kertész, 1902 ; Kertész, 1903 ; Felt, 1908 ; Williston, 1908 ; Felt, 1911b ; Kieffer, 1913f ; Felt, 1915b ; Felt, 1918 ; Felt, 1925 ; Felt, 1929 ; Enderlein, 1936 ; Mani, 1946 ; Möhn, 1955 ; Felt, 1958 ; Mamajev, 1964b ; Mamajev, 1964c ; Panelius, 1965 ; Mamajev, 1966 ; Mamajev, 1969.
Coccopsis de Meijere, 1901 ; Kertész, 1903 ; Kieffer, 1913f ; Felt, 1915b ; Felt, 1925 ; Felt, 1929 ; Enderlein, 1936 ; Mani, 1936 ; Möhn, 1955 ; Mamajev, 1964 ; Panelius, 1965.
Cassidoides Mamajev, 1960.

This genus is characterized as follows : male antenna with 2+11 to 2+13 segments ; sensoria on male flagellar segment ring-shaped and undulating ; claw usually bifid, sometimes simple ; empodium short or rudimentary ; Rs in the same direction as R_5 ; Cu not forming a fork with M_{3+4} ; gonostylus with a pectinated claw of short spines ; root of gonocoxite rather long ; transverse bridge indistinct ; hypandrium either emarginated or produced ; tegmen more or less sclerotized laterally, with or without sclerotized distal margin ; genital rod usually simple, various in length.

Holoneurus sp.

(Fig. 9 : B)

Male : Wing length 1.7 to 2.2 mm. Eye bridge 3 to 5 facets wide medially. Palpus consisting of 1+4 segments, nearly as long as or a little shorter than height of head. Antenna with 2+12 segments ; scape longer than pedicel, with a few rather long setae ventrally ; pedicel with a dorsal seta ; ring-shaped sensoria present on all flagellar seg-

ments except terminal one ; most of horse-shoe shaped sockets arranged in a single whorl medially, rest of sockets sparsely and irregularly distributed distally ; fifth flagellar segment with a basal enlargement about 1.5 times as long as wide and a distal stem 1.8 to 2.1 times as long as basal enlargement ; terminal segment subcylindrical, distally a little narrower, about 3 times as long as basal width, with a short apical protrusion, without ring-shaped sensoria. Leg with femur nearly as long as second tarsal segment ; tibia much shorter than femur or second tarsal sement ; first tarsal segment with a distal spine ; fourth tarsal segment about 2 times as long as fifth ; claws of all legs bifid ; empodium very short. Wing 2.5 to 3.1 times as long as wide ; Cu visible only basally ; sensory pore 2 on distal portion of R_1, 1 on basal portion of R_5, 1 on distal half of R_5. Genitalia : epandrium without distinct distal margin ; cerci and subanal plate bilobed ; gonostylus with a pectinated claw of short spines distally ; root of gonocoxite broad ; transverse bridge indistinct ; hypandrium with a pair of long distal projections which are pointed apically and directed inwardly ; tegmen rather broadly sclerotized laterally ; aedeagus invisible ; genital rod simple, a little shorter than gonocoxite.

Female : unrecorded from Japan.

Specimens examined : 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 26. V. 1966, J. Yukawa leg. Cecid. No. 3301 ; 1 ♂ (on slide), Tatara, Fukuoka-City, Kyushu, 30. X. 1966, J. Yukawa leg. Cecid. No. 44201 ; 8 ♂♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 31. X. 1966, J. Yukawa leg. Cecid. No. 44701-8 ; 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 1. XI. 1966, J. Yukawa leg. Cecid. No. 44802.

Distribution : Japan (Kyushu), Europe (if identical with *C. marginata*).

Remarks : Panelius (1965) redescribed *Coccopsis marginata* de Meijere (1901) based on type specimen, except the male genitalia which was based on English specimens. The Japanese specimens examined agree well with the redescription of *marginata*, but

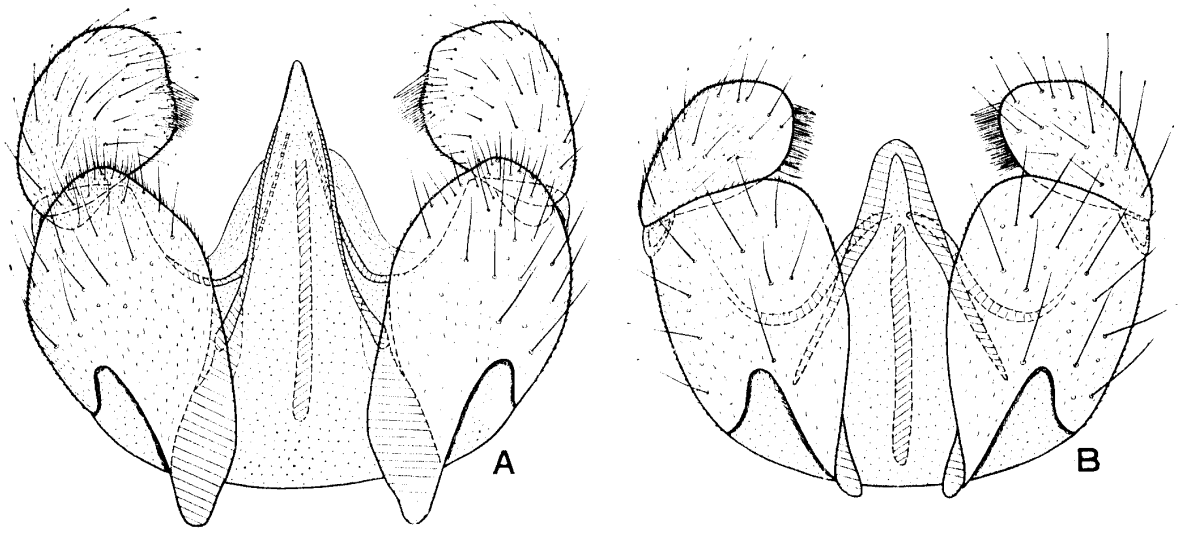

Fig. 9. *Holoneurus*.
(A) male genitalia, dorsal view (cerci and subanal plate removed) : *Holoneurus paneliusi* n. sp. (B) male genitalia, dorsal view (cerci and subanal plate removed) : *Holoneurus* sp.

the structure of male genitalia is rather different. On the other hand, 3 other males of the Japanese specimens have a genitalia very similar to that of the English specimens and also agree well with the brief description of that specimens by Panelius (1965). As Panelius suspected, the English species is possibly different from de Meijere's species, and thus the 2 Japanese species correspond to the European 2. This Japanese species "sp." is very similar to *marginata*, but was left unnamed because the male genitalia could not be compaired with that of type. The identification may be possible when the larvae are obtained in Japan. The 3 other males are described below as a new species.

Holoneurus paneliusi Yukawa new species

(Fig. 9 : A)

Male : Wing length 1.9 to 2.3 mm. Eye bridge 4 to 5 facets wide medially. Palpus consisting of 1+4 segments, nearly as long as height of head ; first palpal segment shortest ; second about 1.4, third 1.6, fourth 2.2 times as long as first. Antenna with 2+13 segments ; scape about 1.3 times as long as pedicel, with a rather long setae ventrally ; pedicel subcylindrical, 3/4 as long as wide, with a dorsal seta ; ring-shaped sensoria present on all flagellar segments except terminal one ; horse-shoe shaped sockets as in the former species, *Holoneurus* sp. ; fifth flagellar segment with a basal enlargement about 1.5 times as long as wide and a distal stem about 1.7 times as long as basal enlargement ; terminal flagellar segment subcylindrical, about 2.2 times as long as maximum width, with a short, pubescent protrusion apically, without ring-shaped sensoria. Tibia shorter than femur ; first tarsal segment with a short spine distally ; fourth tarsal segment 1.7 to 2.0 times as long as fifth ; claws of all legs simple ; empodium very short. Wing 2.6 to 3.2 times as long as wide ; Cu visible on basal half ; sensory pore 2 on distal portion of R_1, 1 on basal portion of R_5, 1 on distal half of R_5. Genitalia : epandrium without distinct distal margin ; cerci and subanal plate bilobed ; gonostylus subglobular, with a pectinated claw of short spines distally ; root of gonocoxite broad ; transverse bridge indistinct ; hypandrium with a pair of long projections distally ; tegmen long, narrowly sclerotized laterally ; aedeagus invisible ; genital rod simple, nearly as long as gonocoxite.

Female : unknown.

Holotype : ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 8. III. 1967, J. Yukawa leg. Cecid. No. 54301. Paratypes : 1 ♂ (on slide), ibid. 3. VI. 1965, J. Yukawa leg. Cecid. No. 14401 ; 1 ♂ (on slide), Kaminokawa, Hioki, Kagoshima-Pref., Kyushu, 2. XII. 1967, J. Yukawa leg. Cecid. No. 85101.

Distribution : Japan (Kyushu), Europe.

Remarks : As mentioned before, this species may correspond to the English species, whose genitalia was described and figured by Panelius (1965), and is distinguished from *Holoneurus* sp. or *H. marginatus* in the following respects : male antenna with 2+13 segments ; tarsal claw simple ; a pair of projection of hypandrium narrowly sclerotized, not directed inwardly ; tegmen narrowly sclerotized laterally.

Genus **Porricondyla** Rondani

Cecidomia (*Porricondyla*) Rondani, 1840.

Porricondyla Rondani : Rondani, 1846 ; H. Loew, 1850 ; Rondani, 1856 ; Rondani, 1860 ; Karsh, 1878 ; Kieffer, 1900 ; Kertész, 1902 ; Kertész, 1903 ; Collin, 1904 ; Felt, 1908 ; Coquillett, 1910 ; Felt, 1911b ; Kieffer, 1913f ; Felt, 1915b ; Bagnall & Harrison, 1918 ; Felt, 1918 ; Felt, 1925 ; Felt, 1929 ; Enderlein, 1936 ; Barnes, 1937 ; Mani, 1946 ; Pritchard, 1953 ; Möhn, 1955 ; Felt, 1958 ; Skuhravá & Skuhravý, 1960 ; Mamajev, 1963c ; Mamajev, 1964b ; Mamajev, 1964c ; Panelius, 1965 ; Mamajev, 1966 ; Mamajev, 1969.

Cecidomyia (*Epidosis*) H. Loew, 1850 ; Winnertz, 1853 ; Walker, 1856 ; Osten-Sacken, 1862 ; Skuse, 1889 ; Skuse, 1890 ; Theobald, 1892 ; Marshall, 1896.

Epidosis H. Loew : H. Loew, 1862 ; Schiner, 1864 ; Bergestamm & P. Löw, 1877 ; van der Wulp, 1877 ; Rübsaamen, 1892 ; Kieffer, 1894a ; Kieffer, 1894e ; Kieffer, 1895c ; Kieffer, 1896a ; Kieffer, 1898 ; Rübsaamen, 1899b ; Meunier, 1902 ; Meunier, 1904 ; Williston, 1908 ; Kieffer, 1913f ; Brunetti, 1920.

Dicroneurus Kieffer 1895f ; Kieffer, 1896a ; Meunier, 1902 ; Kieffer, 1913f ; Felt, 1915b ; Felt, 1918 ; Brunetti, 1920 ; Felt, 1925 ; Senior-White, 1928 ; Felt, 1929 ; Mani, 1934 ; Enderlein, 1936 ; Mani, 1946 ; Möhn, 1955 ; Rao, 1955 ; Mamajev, 1964b ; Mamajev, 1964c.

Epidosis (*Dicroneurus*) Kieffer : Kieffer, 1898 ; Meunier, 1904.

Porricondyla (*Dicroneurus*) Kieffer : Kertész, 1902 ; Kertész, 1903 ; de Meijere, 1906.

Synaptella Kieffer, 1913c ; Kieffer, 1913f ; Felt, 1915b ; Felt, 1918 ; Felt, 1925 ; Felt, 1929 ; Enderlein, 1936 ; Mani, 1946.

Synapthrella Kieffer, 1913c ; Kieffer, 1913f ; Felt, 1915b ; Felt, 1918 ; Felt, 1925 ; Felt, 1929 ; Enderlein, 1936 ; Mani, 1946.

This genus is characterized by the combination of the following characters : male antenna with 2+14 segments ; scape with a few rather long ventral setae ; pedicel with a few rather short dorso-lateral setae, with or without ventro-medial setae ; claw bifid or simple ; empodium as long as claw ; Rs in the same direction as R_5 ; rm-m weakly curved ; Cu forming a fork with M_{3+4} ; hypandrium of male genitalia usually with an emargination and with a pair of projections ; root of gonocoxite long and broad ; transverse bridge sometimes indistinct ; tegmen laterally sclerotized or forming a pair of hooks of various shape.

Porricondyla contains a great number of species which were described mainly from Europe and North America. Though Panelius (1965) revised the European species of the genus, about 20 of them were left unidentified owing to the imperfect informations on the species. On the other hand, Felt (1907-1926) reported many species from North America without detailed descriptions of male genitalia. At present, the following 8 species are recognized in Japan. Five species of them are newly described, but it may be possible that some of them will be synonymized when the unidentified European species and Felt's American species are better known.

A previously described Japanese species, *Porricondyla acanthopanici* Shinji (1944) is hardly identified owing to the insufficient description, but this species may be excluded from the members of the genus because Shinji reported it as a gall maker on snowbell

and did not describe the presence of Rs vein.

Key to Japanese species (males)

1. Tarsal claw simple 2
- Tarsal claw bifid or trifid 5
2. Ring-shaped sensoria present on all flagellar segments ; gonostylus without apical claw or spine 3
- Ring-shaped sensoria absent on distal several flagellar segments ; gonostylus with an apical claw or spine 4
3. Gonocoxite not produced dorso-distally ..... *aurantiaca* Panelius
- Gonocoxite distinctly produced dorso-distally ..... *albimana* (Winnertz)
4. Sclerotized hooks of tegmen distally prolonged and crossed twice ... *decussata* n. sp.
- Sclerotized hooks of tegmen distally directed inwardly, not crossed ..... *gracilipennis* n. sp.
5. Hooks of tegmen distally crossed 6
- Hooks of tegmen distally not crossed 7
6. Much larger in size ; wing 2.6 to 2.9 times as long as wide ; gonostylus with an apical claw of many fine teeth ..... *nigripennis* (Meigen)
- Much smaller in size ; wing slender, about 3.2 times as long as wide ; gonostylus apically with a lamellar claw ..... *lamellata* n. sp.
7. Ring-shaped sensoria absent on distal several flagellar segments ; gonostylus apically with 2 lamellar claws ..... *separata* n. sp.
- Ring-shaped sensoria present on all flagellar segments ; gonostylus apically with 3 or more spines ..... *rotundata* n. sp.

Porricondyla aurantiaca Panelius

Porricondyla aurantiaca Panelius, 1965 ; Mamajev, 1969.

Male : Wing length 2.5 to 3.0 mm. Eye bridge 6 to 7 facets wide medially. Palpus consisting of 1+4 segments. Antenna with 2+14 segments ; pedicel with rather short dorso-lateral and ventro-medial setae ; ring-shaped sensoria present on all flagellar segments ; horse-shoe shaped sockets irregularly distributed ; fifth flagellar segment with a basal enlargement about 1.4 times as long as wide, stem 2.1 to 2.3 times as long as basal enlargement. All legs with tibia shorter than femur or second tarsal segment : claw simple; empodium as long as claw. Wing about 3.1 times as long as wide ; sensory pore 2 on distal portion of R_1, 1 on basal portion of R_5 or on junction of Rs and rm-m (rarely on Rs), 2 on distal half of R_5. Genitalia : epandrium with indistinct distal margin ; cerci and subanal plate bilobed ; gonostylus with a blunt end, without any apical claw or spine ; hypandrium slightly emarginated, without any projection ; root of gonocoxite about 2/3 as long as distance separating both roots ; transverse bridge rather narrow, but distinct ; tegmen laterally forming a pair of sclerotized hooks of which distal end is directed dorso-medially and converged ; aedeagus membranous ; genital rod shorter than gonocoxite.

Female : unknown.

Specimens examined : 1 ♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 31. X. 1966, J. Yukawa leg. Cecid. No. 45002 ; 3 ♂♂ (on slide), ibid. 5. XI. 1966, J. Yukawa leg. Cecid. No. 51303-5 ; 2 ♂♂ (on slide), Serio, Kyoto-Pref., Honshu, 20. X. 1967, J. Yukawa leg. Cecid. No. 84601-2.

Distribution : Japan (Honshu, Kyushu), Europe.

Remarks : This species is characterized by having tarsal claw simple and gonostylus with a blunt end.

Porricondyla albimana (Winnertz)

Cecidomyia (*Epidosis*) *albimana* Winnertz, 1853 ; Walker, 1856.
Epidosis albimana Winnertz : Schiner, 1864 ; Bergenstamm & P. Löw, 1877 ; van der Wulp, 1877.
Porricondyla (*Porricondyla*) *albimana* (Winnertz) : Kertész, 1902 ; Kertész, 1903.
Genus ? *albimana* Winnertz : Collin, 1904.
Porricondyla albimana (Winnertz) : Skuhravá & Skuhravý, 1960 ; Panelius, 1065 ; Mamajev, 1969.
Porricondyla (*Epidosis*) *albimana* Winnertz : Mamajev, 1966.

Male : Wing length 2.7 to 3.9 mm. Eye bridge 8 to 9 facets wide medially. Palpus consisting of 1+4 segments. Antenna with 2+14 segments; ring-shaped sensoria present on all flagellar segments ; horse-shoe shaped sockets irregularly distributed ; fifth flagellar segment with a basal enlargement about 1.6 times as long as wide, stem about 1.8 times as long as basal enlargement. Tarsal claw simple; empodium a little shorter than claw. Wing about 2.9 times as long as wide ; sensory pore 2 or rarely 3 on distal portion of R_1, 1 on basal and 2 on distal half of R_5. Genitalia : epandrium with indistinct distal margin : cerci and subanal plate bilobed ; gonostylus with a blunt end, without any apical claw or spine ; gonocoxite dorso-distally produced into a lobe; root of gonocoxite about 2/3 as long as distance separating both roots ; transverse bridge distinct ; tegmen forming a pair of sclerotized hooks ; aedeagus membranous ; genital rod nearly as long as gonocoxite.

Female : unrecorded from Japan.

Specimens examined : 1 ♂ (on slide), Mt. Wakasugi, Fukuoka-Pref., Kyushu, 8. V. 1965, J. Yukawa leg. Cecid. No. 4402 ; 2 ♂♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 3. X. 1965, J. Yukawa leg. Cecid. No. 16301-2.

Distribution : Japan (Kyushu), Europe.

Remarks : This species is very closely related to *P. aurantiaca*, but distinguished from it by having gonocoxite dorso-distally produced into a lobe.

Porricondyla decussata Yukawa new species

(Fig. 10 : A)

Male : Wing length about 1.9 mm. Eye bridge 3 to 4 facets wide medially. Palpus consisting of 1+4 segments, longer than height of head ; first and second segments subequal in length ; third 1.3 to 1.5, fourth 1.7 to 2.0 times as long as first or second.

Antenna with 2 + 14 segments ; ring-shaped sensoria present on basal 7 flagellar segments ; horse-shoe shaped sockets irregularly distributed ; fifth flagellar segment with a basal enlargement about 1.6 times as long as wide, stem about 1.5 times as long as basal enlargement ; terminal segment subconical, about 1.9 times as long as basal width. All legs with tibia distinctly shorter than femur and nearly as long as or slightly longer than second tarsal segment, fourth tarsal segment 2.1 to 2.4 times as long as fifth ; claws of all legs simple, bent nearly at right angle, without distinct, subdistal enlargement ; empodium nearly as long as claw. Wing rather narrow, about 3.2 times as long as wide ; sensory pore 2 or rarely 1 on distal portion of R_1, 1 or rarely 2 on basal portion of R_5, 2 on distal portion of R_5. Genitalia : epandrium without distinct distal margin ; cerci and subanal plate bilobed ; gonostylus with an apical claw ; gonocoxite broadly united below ; hypandrium rather shallowly emarginated ; root of gonocoxite a little shorter than distance separating both roots ; transverse bridge rather weakly sclerotized ; tegmen laterally forming a pair of strongly sclerotized hooks of which distal end is recurved and crossed twice ; aedeagus membranous ; genital rod simple, nearly as long as gonocoxite.

Female : unknown.

Holotype : ♂ (on slide), Ichibanchô, Wakayama-City, Honshu, 23. X. 1967, J. Yukawa leg. Cecid. No. 83601. Paratype : 1 ♂ (on slide), ibid. Cecid. No. 83602.

Distribution : Japan (Honshu).

Remarks : This species is distinguished from *Porricondyla leacheana* (Walker, 1856) by having eye bridge 3 to 4 facets wide and antenna with ring-shaped sensoria on basal 7 flagellar segments.

Porricondyla gracilipennis Yukawa new species

(Fig. 10 : D)

Male : Wing length 1.8 to 2.1 mm. Eye bridge 3 to 4 facets wide medially. Palpus consisting of 1+4 segments, a little longer than height of head ; first, second and third segments subequal in length ; fourth about 1.3 times as long as third. Antenna with 2+14 segments ; pedicel with rather short dorso-lateral and ventro-medial setae ; ring-shaped sensoria present on basal 7 flagellar segments ; horse-shoe shaped sockets irregularly distributed ; fifth flagellar segment with a basal enlargement 1.6 to 1.8 times as long as wide, stem 1.7 to 2.1 times as long as basal enlargement ; terminal segment subconical, about 2.2 times as long as basal width. Fore leg with tibia nearly as long as or slightly shorter than femur, second tarsal segment a little longer than femur ; middle and hind legs with tibia much shorter than femur and a little shorter than second tarsal segment ; first tarsal segment of all legs with a distinct distal projection ; fourth tarsal segment about 2.2 times as long as fifth ; claw simple ; empodium as long as claw. Wing very narrow, 3.4 to 3.6 times as long as wide ; Cu running rather nearly along posterior margin of wing ; sensory pore 2 on distal portion of R_1, 1 on basal portion of R_5, 2 on distal half of R_5. Genitalia : epandrium with rather indistinct distal margin ; cerci well bilobed ; subanal plate rather weakly bilobed ; gonostylus with an apical claw of several small teeth ; gonocoxite produced into a setose lobe dorso-distally on inner side ; hypandrium with a broad, U-shaped emargination, and a pair

of triangular projections ; root of gonocoxite nearly as long as distance separating both roots ; tegmen narrowly sclerotized laterally, distal end of sclerotized portion directed inwardly ; aedeagus membranous ; genital rod simple, a little longer than gonocoxite.

Female : unknown.

Holotype : ♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 15. V. 1965, J. Yukawa leg. Cecid. No. 13101. Paratypes : 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 3. VI. 1965, J. Yukawa leg. Cecid. No. 14001 ; 1 ♂ (on slide), ibid. 5. V. 1966, J. Yukawa leg. Cecid. No. 27801.

Distribution : Japan (Kyushu).

Remarks : This species is similar to *Porricondyla hypoxantha* Panelius (1965), but differs from it by having eye bridge 3 to 4 facets wide, wing very narrow and hypandrium with a distinct emargination and projections.

Porricondyla nigripennis (Meigen)

Cecidomyia nigripennis Meigen, 1830 ; Bremi, 1847 ; Kertész, 1902 (*Cecidomyia* ?) ; Kertész, 1903 (*Cecidomyia* ?) ; Kieffer, 1913f.
Genus ? *nigripennis* Meigen : Bergenstamm & P. Löw, 1877.
Porricondyla nigripennis (Meigen) : Panelius, 1965 ; Mamajev, 1969.
Cecidomia (*Porricondyla*) *albitarsis* (Meigen) : Rondani, 1840.
Porricondyla albitarsis (Meigen) : Rondani, 1856 ; Karsch, 1878 ; Coquillett, 1910 ; Felt, 1958.
Porricondyla (*Porricondyla*) *albitarsis* (Meigen) : Rondani, 1860.
Cecidomyia (*Epidosis*) *dorsalis* Winnertz, 1853 ; Walker, 1856.
Epidosis dorsalis Winnertz : Schiner, 1864 ; Bergenstamm & P. Löw, 1877 ; van der Wulp, 1877 ; Kieffer, 1894e ; van der Wulp & de Meijere, 1898.
Epidosis (*Epidosis*) *dorsalis* Winnertz : Kieffer, 1898.
Porricondyla (*Porricondyla*) *dorsalis* (Winnertz) : Kertész, 1902 ; Kertész, 1903.
Genus ? *dorsalis* Winnertz : Collin, 1904.
Porricondyla dorsalis (Winnertz) : Kieffer, 1913f ; de Meijere, 1939b.
Cecidomyia (*Epidosis*) *analis* Winnertz, 1853 ; Walker, 1856.
Epidosis analis Winnertz : Schiner, 1864 ; Bergenstamm & P. Löw, 1877 ; van der Wulp, 1877 ; Kieffer, 1894e ; Strobl, 1894 ; van der Wulp & de Meijere, 1898 ; Strobl, 1909.
Epidosis (*Epidosis*) *analis* Winnertz : Kieffer, 1898.
Porricondyla (*Porricondyla*) *analis* (Winnertz) : Kertész, 1902 ; Kertész, 1903.
Genus ? *analis* Winnertz : Collin, 1904.
Porricondyla analis (Winnertz) : Kieffer, 1913f ; de Meijere, 1939b.

Male : Wing length 2.7 to 3.3 mm. Eye bridge 6 to 7 facets wide medially. Palpus consisting of 1+4 segments, about 1.3 times as long as height of head ; first segment shortest ; second about 1.4, third 1.7, fourth 2.7 times as long as first. Antenna with 2+14 segments ; pedicel with rather short dorso-lateral and ventro-medial setae ; ring-shaped sensoria present on all flagellar segments ; horse-shoe shaped sockets irregularly distributed ; fifth flagellar segment with a basal enlargement 1.5 to 1.8 times as long as wide, stem about 1.7 times as long as basal enlargement ; terminal flagellar segment

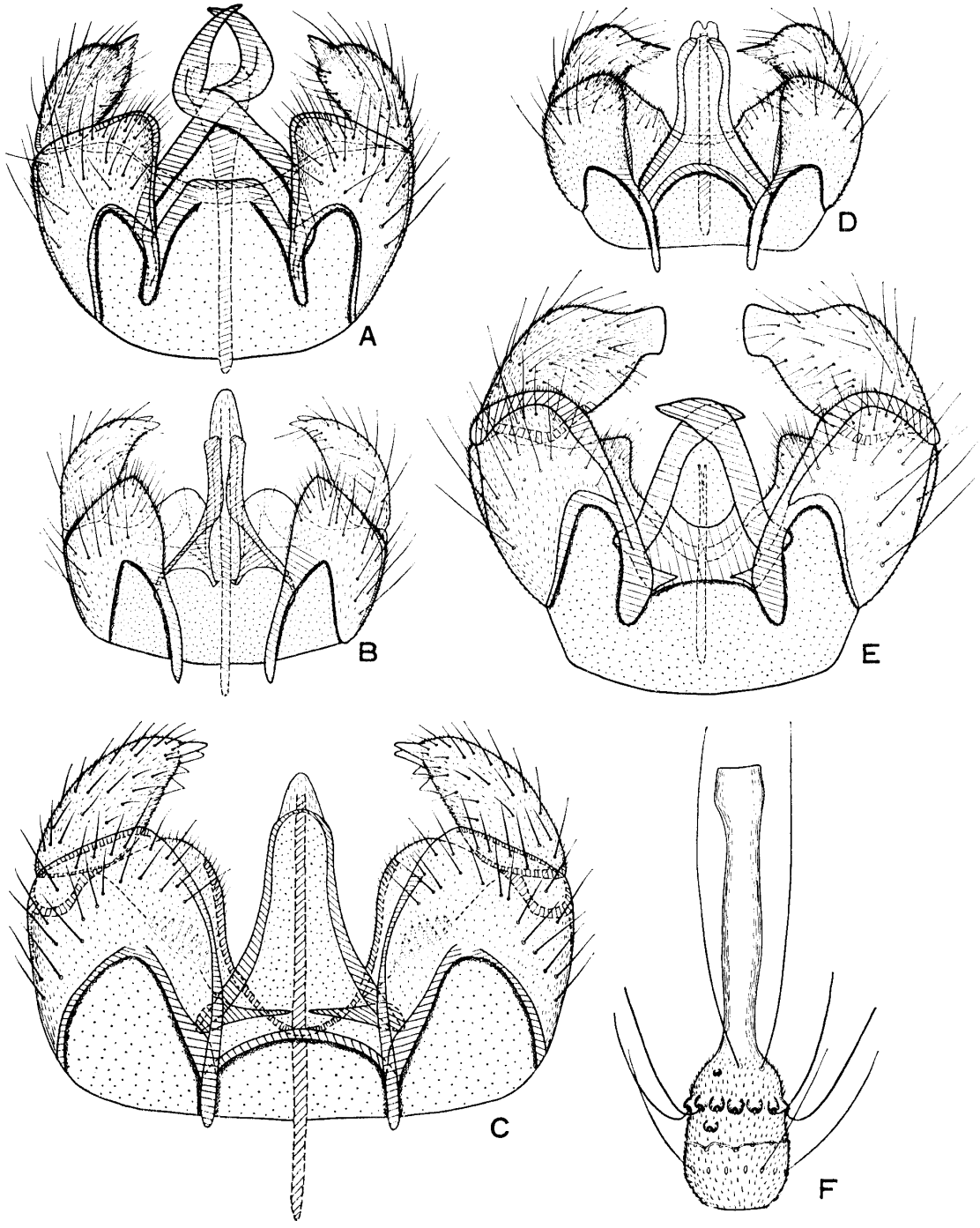

Fig. 10. *Porricondyla*
(A) male genitalia, dorsal view (cerci and subanal plate removed): *Porricondyla decussata* n. sp. (B) male genitalia, dorsal view (cerci and subanal plate removed): *Porricondyla separata* n. sp. (C) male genitalia, dorsal view (cerci and subanal plate removed): *Porricondyla rotundata* n. sp. (D) male genitalia, dorsal view (cerci and subanal plate removed): *Porricondyla gracilipennis* n. sp. (E) male genitalia, dorsal view (cerci and subanal plate removed): *Porricondyla lamellata* n. sp. (F) fifth flagellar segment, ♂: ditto.

rather elongated subconical, 2.8 to 3.0 times as long as basal width. All legs with tibia nearly as long as or a little shorter than femur and much longer than second tarsal segment ; fourth tarsal segment about 2.1 times as long as fifth ; claw bifid ; empodium as long as claw. Wing 2.6 to 2.9 times as long as wide ; sensory pore 2 on distal portion of R_1, 1 on basal portion of R_5, 2 on distal half of R_5. Genitalia : epandrium with indistinct distal margin ; gonostylus distally with a claw of long, fine teeth ; hypandrium with a U-shaped emargination, with a pair of rather narrow projections, of which distal half is a little broader and clothed with minute projections rather densely ; root of gonostylus a little longer than distance separating both roots ; transverse bridge strongly sclerotized, arched ; tegmen laterally forming a pair of strongly sclerotized hooks which are crossed distally ; aedeagus membranous ; genital rod simple, longer than gonocoxite.

Female : unrecorded from Japan.

Specimens examined : 1 ♂ (on slide), Ôdomari, Kagoshima-Pref., Kyushu, 24. IV.1965, J. Yukawa leg. Cecid. No. 2801 ; 2 ♂♂ (on slide), Mt. Tachibana, Fukuoka-Pref., Kyushu, 5. XI. 1966, J. Yukawa leg. Cecid. No. 51101, 2 ; 2 ♂♂ (on slide), ibid. 28. III. 1967, J. Yukawa leg. Cecid. No. 55201, 2.

Distribution : Japan (Kyushu), Europe.

Remarks : This species is characterized by the color pattern on body and the distinct shape of male genitalia : hypandrium with a pair of rather narrow projections ; transverse bridge strongly sclerotized, arched ; hooks of tegmen crossing. The Japanese specimens examined agree with the description and accompanying figures dy Panelius (1965) in the most respects, except that a pair of projections of ventral plate are distally a little broader and clothed with minute projections rather densely. As it is uncertain at present that the Japanese specimens can be distinguished from *nigripennis* only by the state of distal half of the projection, they are tentatively identified with *nigripennis*.

Porricondyla lamellata Yukawa new species

(Fig. 10 : E-F)

Male : Wing length 1.7 to 2.1 mm. Eye bridge 3 to 4 facets wide medially. Palpus consisting of 1+4 segments, about 1.2 times as long as height of head ; first segment shortest ; second about 1.3, third 1.5, fouth 1.7 to 2.0 times as long as first. Antenna with 2+14 segments ; pedicel with a rather short seta dorso-laterally ; ring-shaped sensoria present on basal 11 or 12 flagellar segments ; horse-shoe shaped sockets forming a whorl and some addtional ones irregularly and sparselly distributed ; fifth flagellar segment with a basal enlargement about 1.6 times as long as wide, stem 1.8 to 2.2 times as long as basal enlargement ; terminal flagellar segment subconical, about 2.1 times as long as basal width. Fore leg with tidia nearly as long as femur or second tarsal segment ; middle and hind legs with tibia nearly as long as or slightly shorter than femur, and a little longer than second tarsal segment ; claw bifid ; empodium as long as claw. Wing very narrow about 3.2 times as long as wide ; sensory pore 2 or rarely 1 on distal portion of R_1, 1 on basal portion of R_5, 2 on distal half of R_5. Genitalia : epandrium with indistinct distal margin ; cerci well bilobed ; subanal plate rather shallowly emarginated on distal margin ; gonostylus with a lamellar claw dis-

tally ; hypandrium with a U-shaped emargination, with a pair of large setose lobes ; root of gonocoxite 1/2 to 2/3 as long as distance separating both roots ; transverse bridge weakly sclerotized ; tegmen laterally forming a pair of stout, sclerotized hooks which are crossed distally ; aedeagus membranous ; genital rod simple, slightly shorter than gonocoxite.

Female : unknown.

Holotype : ♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 12. V. 1967, J. Yukawa leg. Cecid. No. 65902. Paratypes : 5 ♂♂ (on slide), ibid. Cecid. No. 65903-7 ; 1 ♂ (on slide), Mt. Wakasugi, Fukuoka-Pref., Kyushu, 25. IV. 1966, J. Yukawa leg. Cecid. No. 22901.

Distribution : Japan (Kyushu).

Remarks : This species resembles *Porricondyla fulvescens* Panelius (1965), but distinguished from it by having eye bridge 3 to 4 facets wide, gonostylus with a lamellar claw and ventral plate with a pair or triangular setose lobes.

Porricondyla separata Yukawa new species

(Fig. 10 : B)

Male : Wing length 1.7 to 2.5 mm. Eye bridge 6 to 8 facets wide medially. Palpus consisting of 1+4 segments, about 1.2 times as long as height of head ; first segment shortest ; second 1.2 to 1.4, third 1.3 to 1.5, fourth 1.8 to 2.4 times as long as first. Antenna with 2+14 segments ; pedicel with rather short dorso-lateral setae and with or without ventro-medial setae ; ring-shaped sensoria present on basal 8 flagellar segments ; horse-shoe shaped sockets irregularly distributed ; fifth flagellar segment with a basal enlargement about 1.7 times as long as wide, stem about 1.8 times as long as basal enlargement ; terminal segment subconical, 2.0 to 2.6 times as long as basal width. Leg with femur, tibia and second tarsal segment subequal in length or successively shorter ; fourth tarsal segment about 2.1 times as long as fifth ; claw bifid ; empodium as long as claw. Wing about 2.8 times as long as wide ; sensory pore 2 on distal portion of R_1, 1 on basal portion of R_5, 2 on distal half of R_5. Genitalia : epandrium without distinct distal margin ; cerci and subanal plate bilobed ; gonostylus apically with 2 lamellar claws ; gonocoxite produced dorso-distally ; hypandrium incised by an U-shaped emargination, with a pair of membranous and rounded projections and a pair of pubescent small lobes ; root of gonocoxite nearly as long as distance separating both roots ; transverse bridge indistinct ; tegmen dorsally divided into 2 parts, laterally and basally well sclerotized ; aedeagus membranous ; genital rod simple, distinctly longer than gonocoxite.

Female : unkuown.

Holotype : ♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 2. V. 1965, J. Yukawa leg. Cecid. No. 9101. Paratypes : 9 ♂♂ (on slide), 13 ♂♂ (in alcohol), ibid. Cecid. No. 9102-10 ; 1 ♂ (on slide), ibid, 15. V. 1965, J. Yukawa leg. Cecid. No. ; 1 ♂ (on slide), ibid. 1. V. 1966, J. Yukawa leg. Cecid. No. 25001 ; 1 ♂ (on slide), Mt. Kôra, Kurume-City, Fukuoka-Pref., Kyushu, 4. V. 1965, J. Yukawa leg. Cecid. No. 7101 ; 1 ♂ (on slide), Kashii, Fukuoka-City, Kyushu, 15. IV. 1966, J. Yukawa leg. Cecid. No. 22001 ; 1 ♂ (on slide), Iso, Kagoshima-City, Kyushu, 18. IV. 1967, J. Yukawa leg. Cecid.

No. 61001 ; 2 ♂♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 5. V. 1966, J. Yukawa leg. Cecid. No. 27701-2 ; 1 ♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 11. V. 1967, J. Yukawa leg. Cecid. No. 63001.

Distribution : Japan (Kyushu).

Remarks : This species is closely related to *Porricondyla fuscostriata* Panelius (1965), but differs from it in the following respects : gonostylus with 2 lamellar claws ; gonocoxite produced dorso-distally ; transverse bridge indistinct ; tegmen completely divided into 2 parts dorsally.

Porricondyla rotundata Yukawa new species

(Fig. 10 : C)

Male : Wing length 2.5 to 3.1 mm. Eye bridge 7 to 8 facets wide medially. Palpus consisting of 1+4 segments, about 1.1 times as long as height of head ; first segment shortest ; second and third subequal in length, 1.1 to 1.4 times as long as first ; fourth about 2.3 times as long as first. Antenna with 2+14 segments ; pedicel with rather short dorso-lateral and ventro-medial setae ; ring-shaped sensoria present on all flagellar segments ; horse-shoe shaped sockets irregularly distributed ; fifth flagellar segment with a basal enlargement 1.7 to 1.9 times as long as wide, stem 1.7 to 2.1 times as long as basal enlargement ; terminal segment elongated conical, 3.0 to 4.1 times as long as basal width. All legs with femur, tibia and second tarsal segment successively shorter, fourth tarsal segment about 2 times as long as fifth ; claw bifid on all legs ; empodium as long as claw. Wing about 2.7 times as long as wide ; sensory pore 2 on distal portion of R_1, 1 or rarely 2 on basal portion of R_5, 2 or sometimes 3 on distal half of R_5. Genitalia : epandrium with rather indistinct distal margin ; cerci and subanal plate bilobed ; gonostylus with 3 or more spines apically ; hypandrium with a U-shaped emargination, with a pair of setose lobes ; root of gonocoxite about 1/2 as long as distance separating both roots ; transverse bridge distinct ; tegmen basally well sclerotized, laterally rather narrowly sclerotized ; distally sclerotized portion of tegmen not divided ; aedeagus membranous ; genital rod simple, a little longer than gonocoxite.

Female : unknown.

Holotype : ♂ (on slide), Mt. Wakasugi, Fukuoka-Pref., Kyushu, 8. V. 1965, J. Yukawa leg. Cecid. No. 4301. Paratypes : 3 ♂♂ (on slide), ibid. Cecid. No. 4302-4 ; 1 ♂ (on slide), ibid. 25. IV. 1966, J. Yukawa leg. Cecid. No. 22701.

Distribution : Japan (Kyushu).

Remarks : This species is characterized by the combination of the following characters : antenna with a ring-shaped sensoria on all flagellar segments ; eye bridge 7 to 8 facets wide ; gonostylus with 3 or more apical spines ; hypandrium with a pair of setose lobes instead of distinct projections ; distally sclerotized portion of tegmen not divided.

Genus **Claspettomyia** Grover

Claspettomyia Grover, 1964 ; Mamajev, 1966 ; Yukawa, 1968b ; Mamajev, 1969.
Pachylabis Panelius, 1965.

This genus is characterized and distinguished from the genus *Porricondyla* in the following respects : male antenna with 2 + 13 segments ; tarsal claw bifid or trifid ; gonostylus broader distally, curved medially ; hypandrium with 1 to 3 pairs of projections, which are more or less well sclerotized ; tegmen laterally forming a pair of hooks, of which end is simple or forked. The following 4 species are newly described from Japan.

Key to Japanese species (males)

1. Hypandrium of male genitalia with 2 pairs of projections ..... *nipponensis* n. sp.
- Hypandrium of male genitalia with a pair of projections 2
2. Projection of hypandrium smooth ..... *tenuiforceps* n. sp.
- Projection of hypandrium toothed 3
3. Eye bridge 7 to 8 facets wide medially ; gonostylus with a rather long, narrow projection apically ..... *serrata* n. sp.
- Eye bridge 1 to 3 facets wide submedially, facet interrupted medially ; gonostylus with 2 apical projections ..... *perlongitegminis* n. sp.

Claspettomyia nipponensis Yukawa new species

(Fig. 11 : A–C)

Male : Wing length 2.7 to 3.4 mm. Eye bridge 10 to 11 facets wide medially. Palpus consisting of 1+4 segments, 1.5 times as long as height of head, with rather long setae ; these 4 segments subequal in width ; first palpal segment shortest ; second 1.3, third 1.5 and fourth 2.5 times as long as first. Antenna greyish brown, with 2+13 segments ; scape about 1.5 times as long as pedicel, with a few rather long setae ventrally ; pedicel subcylindrical, a little shorter than wide, with a few rather short setae dorsally ; ring-shaped sensoria present on all flagellar segments except terminal 1 or rarely 2 ; horse-shoe shaped sockets irregularly distributed ventrally and arranged in a single row dorsally ; fifth flagellar segment with a basal enlargement about 1.5 times as long as wide and with a distal stem about 2.2 times as long as basal enlargement ; terminal flagellar segment strongly elongated subconical, about 3.5 times as long as basal width, without ring-shaped sensoria, apically with a well developed protrusion. Leg dark brown to greyish brown ; fore leg with tibia nearly as long as femur and shorter than second tarsal segment, fourth tarsal segment about 2.6 times as long as fifth ; middle and hind legs with tibia nearly as long as second tarsal segment and a little shorter than femur, fourth about 2.4 times as long as fifth ; claw bifid or rarely trifid ; empodium nearly as long as claw. Wing about 2.6 times as long as wide ; sensory pore 2 on distal portion of R_1, 1 on basal portion of R_5, 2 on distal half of R_5. Genitalia : epandrium with an indistinct distal margin ; cerci and subanal plate bilobed, the latter with rather shallowly emarginated distal margin ; gonostylus curved medially, broader distally, with an apical claw ; gonocoxite dorso-distally with a setose lobe and ventrodistally with a small lobe which is provided with rather long setae ; hypandrium with 2 pairs of projections which are evenly sclerotized ; ventral pair of projections curved downward, about 2 times as long as dorsal pair ; root of gonocoxite rather broad and long, about 3 times as long as distance separating both roots ; transverse bridge strongly sclerotized, situated far distally ; tegmen laterally forming a pair of sclerotized hooks,

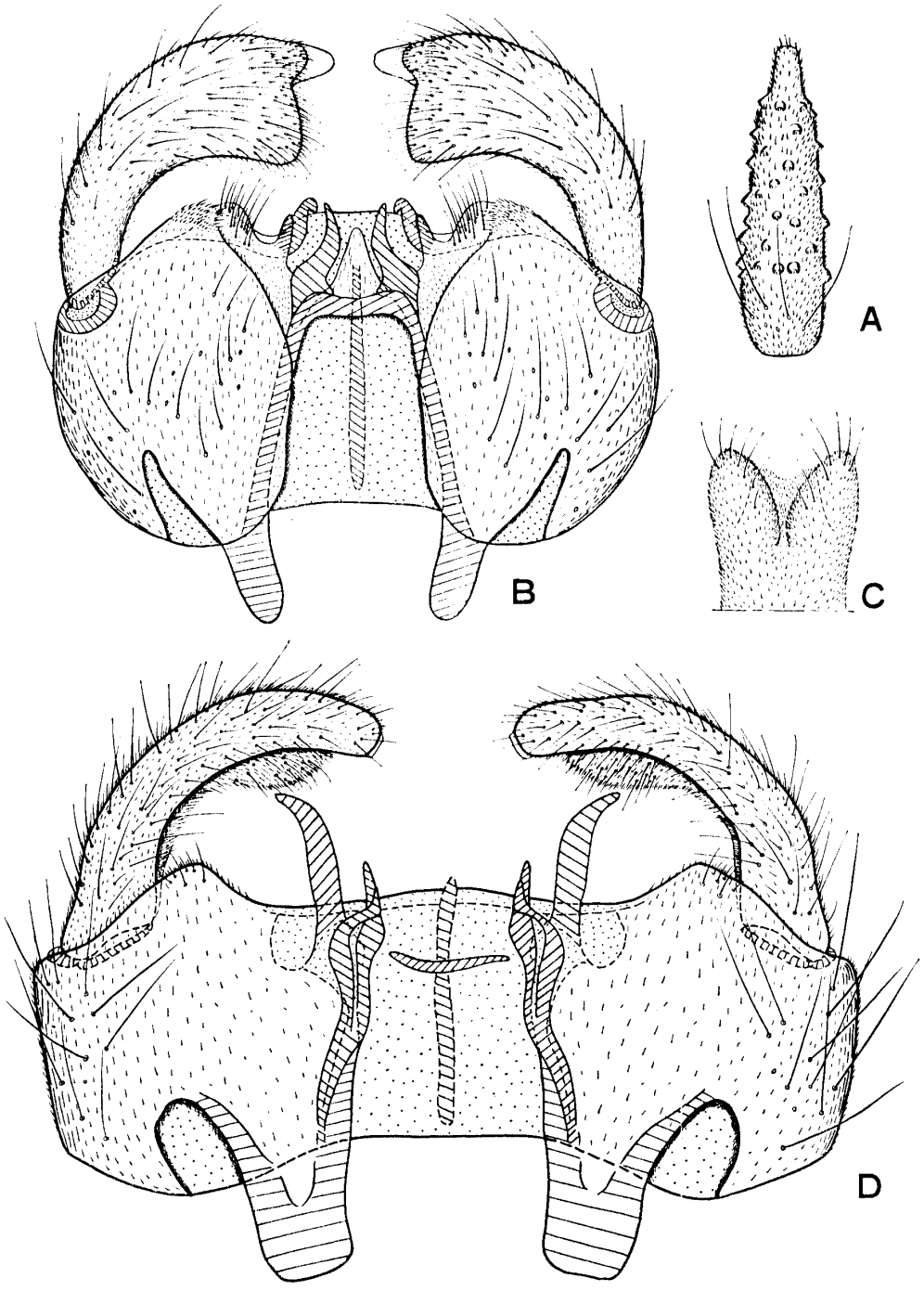

Fig. 11. *Claspettomyia*
(A) terminal flagellar segment, ♂ : *Claspettomyia nipponensis* n. sp. (B) male genitalia, dorsal view (cerci and subanal plate removed) : ditto. (C) cerci and subanal plate : ditto. (D) male genitalia, dorsal view (cerci and subanal plate removed) : *Claspettomyia tenuiforceps* n. sp.

of which distal end is simple, diverging, curved upward ; genital rod simple, about 2/3 as long as gonocoxite, distally narrower and indistinct.

Holotype : ♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 15. V. 1965, J. Yukawa leg. Cecid. No. 13001. Paratypes : 9 ♂♂ (on slide), 12 ♂♂ (in alcohol), ibid. Cecid. No. 13002-10 ; 1 ♂ (on slide), Mt. Wakasugi, Fukuoka-Pref., Kyushu, 8. V. 1965, J. Yukawa leg. Cecid. No. 4403 ; 1 ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 13. VII. 1965, J. Yukawa leg. Cecid. No. 37601 ; 1 ♂ (on slide), Usa, Oita-Pref., Kyushu, 27. IX. 1966, J. Yukawa leg. Cecid. No. 40601 ; 3 ♂♂ (on slide), Kyûsuikyô, Mt. Kujû, Oita-Pref., Kyushu, 28. V. 1967, J. Yukawa leg. Cecid. No. 68301-3 ; 1 ♂ (on slide), Ôdomari, Kagoshima-Pref., Kyushu, 24. IV. 1965, J. Yukawa leg. Cecid. No. 2701 ; 4 ♂♂ (on slide), Miyanoura, Yaku-I., Kagoshima-Pref., Kyushu, 10. IV. 1967, J. Yukawa leg. Cecid. No. 58201-4.

Distribution : Japan (Kyushu).

Remarks : This species is distinguished from *Claspettomyia formosa* (Bremi, 1847), *Claspettomyia montana* (Mamajev & Krivosheina, 1965) and *Claspettomyia orientalis* Yukawa (1968b) by the combination of the following characters : eye bridge 10 to 11 facets wide ; tegmen with a pair of simple hooks ; hypandrium with 2 pairs of projections evenly sclerotized, but ventral pair curved downward and about 2 times as long as dorsal pair.

Claspettomiya tenuiforceps Yukawa new species

(Fig. 11 : D)

Male : Wing length about 3.5 mm. Eye bridge 4 to 5 facets wide medially. Palpus consisting of 1+4 segments, about 1.3 times as long as height of head ; first plapal segment shortest ; second 1.5, third 1.8, fourth 2.5 times as long as first. Antenna with 2+13 segments ; scape about 1.5 times as long as pedicel, with a few rather long setae ventrally ; pedicel about 3/4 as long as wide, with a few rather short setae dorsally ; ring-shaped sensoria present on all flagellar segments ; horse-shoe shaped sockets irregularly distributed ventrally and arranged in a single row dorsally ; fifth flagellar segment with a basal enlargement about 1.7 times as long as wide and a distal stem about 1.8 times as long as basal enlargement; terminal flagellar segment strongly elongated subconical, about 4 times as long as maximum width, with a ring-shaped sensoria and a distinct apical stem-like protrusion. All legs with femur, tibia and second tarsal segment successively shorter, fourth tarsal segment about 2.2 times as long as fifth ; claw trifid or rarely bifid ; empodium as long as claw. Wing about 2.7 times as long as wide ; sensory pore 2 or sometimes 3 on distal portion of R_1, 1 on basal portion of R_5, 2 or rarely 1 on distal half of R_5. Genitalia : epandrium without distinct distal margin ; cerci and subanal plate bilobed ; gonostylus rather narrow, a little broader subdistally, with an inconspicuous claw apically ; gonocoxite ventrodistally with a small setose lobe ; hypandrium without distinct emargination on distal margin, with a pair of smoothly sclerotized, rather long projections which diverge distally ; root of gonocoxite a little shorter than distance separating both roots ; transverse bridge rather narrow and weak ; tegmen laterally forming a pair of rather short, simple, sclerotized hooks ; aedeagus membranous ; genital rod simple, a little shorter than gonocoxite.

Female : unknown.

Holotype : ♂ (on slide), Kuriyagawa, Morioka-City, Honshu, 26. V. 1968, J. Yukawa leg. Cecid. No. 117201. Paratype : 1 ♂ (on slide), ibid. Cecid. No. 117202.

Distribution : Japan (Honshu).

Remarks : This species is similar to *Claspettomyia niveitarsis* (Zetterstedt, 1850), but differs from it by having eye bridge with 4 to 5 facets wide and gonostylus more slender, a little broader subdistally.

Claspettomyia serrata Yukawa new species

(Fig. 12 : A-D)

Male : Wing length 3.1 to 3.9 mm. Eye bridge 7 to 8 facets wide medially. Palpus consisting of 1+4 segments, about 1.4 times as long as height of head ; these 4 segments subequal in width ; first palpal segment shortest ; second 1.2, third 1.4 and fourth 2.2 times as long as first. Antenna dark brown, with 2+13 segments ; scape subglobular, 1.8 times as long as pedicel, with a few rather long setae ventrally ; pedicel subcylindrical, a little shorter than wide, with a few rather short setae dorsally ; ring-shaped sensoria present on all flagellar segments except terminal one ; horse-shoe shaped sockets irregularly distributed ; fifth flagellar segment with a basal enlargement about 1.6 times as long as wide, stem about 2 times as long as basal enlargement ; terminal flagellar segment elongated, subconical, about 3 times as long as maximum width, without distinct apical stem-like protrusion and ring-shaped sensoria. All legs with distal half of third tarsal segment, whole fourth tarsal segment and basal 3/4 of fifth tarsal segment pale brown to white ; other parts of legs dark brown ; fore leg with tibia nearly as long as femur or second tarsal segment, fourth tarsal segment about 2.2 times as long as fifth ; middle and hind legs with tibia a little longer than second tarsal segment and a little shorter than femur, fourh tarsal segment 1.9 to 2.1 times as long as fifth ; claw bifid or rarely trifid ; empodium nearly as long as claw. Wing about 3 times as long as wide ; sensory pore 2 on distal portion of R_1, 1 on basal and 2 on distal half of R_5. Genitalia : epandrium without distinct distal margin ; cerci and subanal plate bilobed ; gonostylus with a rather long, narrow projection apically, of which distal part consists of many fine teeth ; hypandrium with a pair of rather long projetions which are toothed and sclerotized ; root of gonocoxite rather broad and long, about 2.5 times as long as distance separating both roots ; transverse bridge arched, strongly sclerotized, situated far distally ; tegmen laterally forming a pair of sclerotized hooks, of which distal end is converging ; genital rod simple, about 2/3 as long as gonocoxite, distally indistinct.

Female : unknown.

Holotype : ♂ (on slide), Mt. Inunaki, Fukuoka-Pref., Kyushu, 5. V. 1966, J. Yukawa leg. Cecid. No. 27601. Paratypes : 1 ♂ (on slide), ibid. Cecid. No. 27401 ; 1 ♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 11. V. 1967, J. Yukawa leg. Cecid. No. 64701 ; 3 ♂♂ (on slide), 10 ♂♂ (in alcohol), Mt. Kajigamori, Kochi-Pref., Shikoku, 8. V. 1969, J. Yukawa leg. Cecid. No. 153101-3.

Distribution : Japan (Shikoku, Kyushu).

Remarks : This species resembles an unnamed species, *Claspettomyia* sp. described

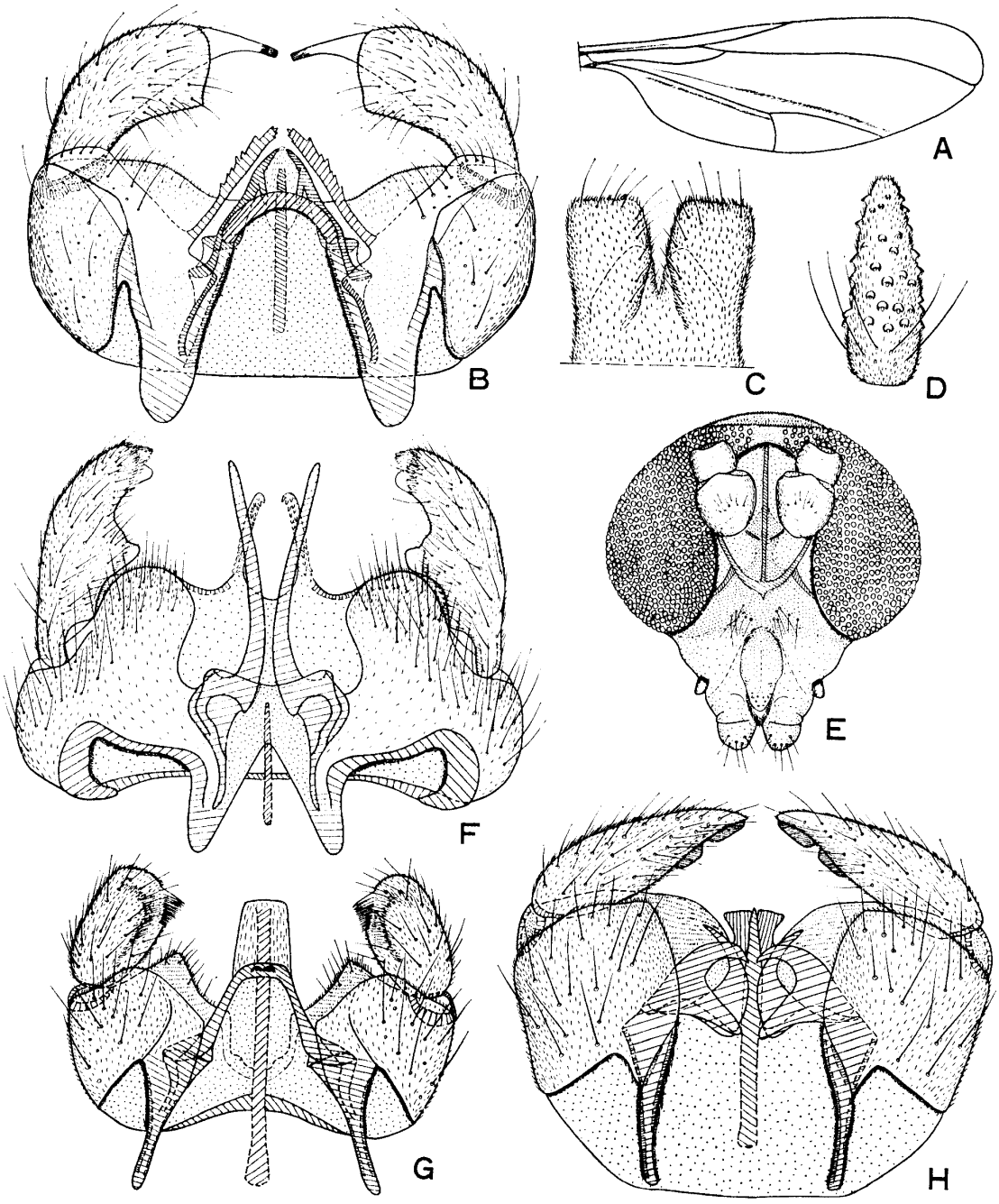

Fig. 12. *Claspettomyia*, *Parepidosis* and *Monepidosis*.
(A) wing, ♂ : *Claspettomyia serrata* n. sp. (B) male genitalia, dorsal view (cerci and subanal plate removed) : ditto. (C) cerci and subanal plate : ditto. (D) terminal flagellar segment, ♂ : ditto. (E) head, ♂ : *Claspettomyia perlongitegminis* n. sp. (F) male genitalia, dorsal view (cerci and subanal plate removed) : ditto. (G) male genitalia, dorsal view (cerci and subanal plate removed) : *Parepidosis ventralis* n. sp. (H) male genitalia, dorsal view (cerci and subanal plate removed) : *Monepidosis pectinata* Mamajev.

by Panelius (1965), but (if not identical) differs from it by having eye bridge with 7 to 8 facets wide, gonostylus with rather long, narrow projection apically and hypandrium with a pair of longer and narrower projections.

Claspettomyia perlongitegminis Yukawa new species

(Fig. 12 : E-F)

Male : Wing length 4.1 to 4.5 mm. Eye bridge 1 to 3 facets wide submedially, facet interrupted medially. Palpus consisting of 1+4 segments, about 1.4 times as long as height of head ; first palpal segment a little shorter than second ; third about 1.5, fourth 2.1 to 2.3 times as long as first. Antenna with 2+13 segments ; scape about 2 times as long as pedicel ; pedicel subcylindrical, about 2/3 as long as wide ; ring-shaped sensoria present on all flagellar segments except terminal one ; horse-shoe shaped sockets irregularly distributed ; fifth flagellar segment with a basal enlargement about 1.3 times as long as wide, stem 1.5 times as long as basal enlargement ; terminal segment elongated subconical, about 2.3 times as long as basal width, without distinct apical protrusion and ring-shaped sensoria. All legs with femur, tibia and second tarsal segment successively shorter, fourth tarsal segment about 1.6 times as long as fifth ; claw bifid and with 1 or 2 additional denticles basally ; empodium as long as claw. Wing 2.6 to 3.0 times as long as wide ; M_{1+2} only distally visible ; sensory pore 2 on distal portion of R_1, 1 or sometimes 2 on basal portion of R_5, 2 on distal half of R_5. Genitalia : epandrium without distinct distal margin ; cerci and subanal plate moderately bilobed ; gonostylus subbasally with a rather large lobe on inner side, and apically with 2 projections, of which upper one consists of many fine teeth and lower one is bare ; hypandrium with a shallow, U-shaped emargination, with a pair of rather long projections which are toothed and strongly sclerotized ; root of gonocoxite rather broad, a little shorter than distance separating both roots ; transverse bridge broadly sclerotized, situated rather proximally ; tegmen laterally forming a pair of very long, simple, sclerotized hooks of which distal end is curved upward ; aedeagus membranous ; genital rod simple, very short.

Female : unknown.

Holotype : ♂ (on slide), Marunuma, Tone, Gunma-Pref., Honshu, 2. VI. 1968, J. Yukawa leg. Cecid. No. 123701. Paratypes : 4 ♂♂ (on slide), 2 ♂♂ (in alcohol), ibid. Cecid. No. 123702-5.

Distribution : Japan (Honshu).

Remarks : This species resembles the former, *C. serrata*, but differs from it as follows : much larger in size ; eye bridge 1 to 3 facets wide submedially, facet interrupted medially ; gonostylus of distinct shape ; transverse bridge broadly sclerotized, situated rather proximally ; tegmen with a pair of very long hooks.

Genus **Parepidosis** Kieffer

Parepidosis Kieffer, 1913a ; Kieffer, 1913f ; Felt, 1915b ; Felt, 1918 ; Felt, 1925 ; Felt, 1929 ; Enderlein, 1936 ; Mani, 1946 ; Möhn, 1955 ; Mamajev, 1964c ; Panelius, 1965 ; Mamajev, 1966 ; Mamajev, 1969.

The genus *Parepidosis* is characterized by the combination of the following characters : male antenna with 2+14 segments ; claw bifid or trifid ; empodium short or rudimentary ; Rs in the same direction as R_5 ; rm-m weakly curved ; M_{1+2} absent ; Cu forming a fork with M_{3+4} ; gonostylus with spines distally ; root of gonocoxite rather long ; transverse bridge indistinct ; hypandrium usually with a deep emargination ; tegmen sclerotized on distal margin ; aedeagus indistinct ; genital rod long.

Parepidosis ventralis Yukawa new species

(Fig. 12 : G)

Male : Wing length 2.0 to 2.4 mm. Eye bridge 5 to 6 facets wide medially. Palpus consisting of 1+4 segments, nearly as long as height of head ; these 4 segments subequal in width ; first segment shortest ; second about 1.2, third 1.5, fourth 1.8 times as long as first. Antenna with 2+14 segments ; scape about 1.5 times as long as pedicel, with a few long setae ventrally ; pedicel subcylindrical, 3/4 as long as wide, with a few rather short setae laterally and medially ; ring-shaped sensoria present on all flagllar segments except terminal one ; horse-shoe shaped sockets irregularly distributed ventrally forming a single row dorsally ; fifth flagellar segment with a basal enlargement about 1.3 times as long as wide, and with a distal stem 1.7 to 1.9 times as long as basal enlargement ; terminal flagellar segment elongated conical, about 2.4 times as long as basal width, without ring-shaped sensoria. Fore leg with tibia nearly as long as femur, second tarsal segment much longer than tibia or femur, fourth tarsal segment about 2.2 times as long as fifth ; middle and hind legs with tibia much shorter than femur, second tarsal segment nearly as long as femur, fourth tarsal segment 2.2 to 2.4 times as long as fifth ; claw bifid ; empodium very short. Wing 2.8 to 3.0 times as long as wide ; sensory pore 2 on distal portion of R_1, 1 on basal portion of R_5, 2 on distal half of R_5. Genitalia ; epandrium without distinct margin ; cerci and subanal plate bilobed ; gonostylus with a group of rather short spines distally ; gonocoxite narrowly united ventrally with a large triangular lobe ventro-distally ; hypandrium deeply incised by a large U-shaped emargination ; proximal margin also shallowly emarginated ; root of gonocoxite nearly as long as distance separating both roots ; transverse bridge indistinct ; distal margin of tegmen with a pair of small, pigmented projections dorsally ; aedeagus membranous ; genital rod simple, about 1.5 times as long as gonocoxite.

Female : unknown.

Holotype : ♂ (on slide), Iso, Kagoshima-City, Kyushu, 18. IV. 1967, J. Yukawa leg. Cecid. No. 61201. Paratypes : 4 ♂♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 12. V. 1967, J. Yukawa leg. Cecid. No. 66002-5.

Distribution : Japan (Kyushu).

Remarks : This species resembles *Parepidosis militaris* Mamajev (1966), but differs from it in the following respects : gonocoxite with a lobe not dorsally but ventrally ; 2 pigmented projections on distal margin of tegmen situated close to each other ; genital rod simple.

Genus **Monepidosis** Mamajev

Monepidosis Mamajev, 1966 ; Mamajev, 1969.

Monepidosis is distinguished from *Parepidosis* by the structure of male genitalia : gonostylus narrower distally, with lamellar claw ; hypandrium not emarginated, with a pair of projections medio-distally ; tegmen laterally with 2 pairs of sclerotized hooks which are not fused distally.

Monepidosis pectinata Mamajev

(Fig. 12 : H)

Monepidosis pectinata Mamajev, 1966 ; Mamajev, 1969.

Male : Wing length 2.3 to 2.5 mm. Eye bridge 4 to 5 facets wide medially. Palpus consisting of 1+4 segments, 1.0 to 1.2 times as long as height of head ; these 4 segments subequal in width ; first segment shortest ; second 1.2 to 1.5, third 1.4 to 1.8, fourth 2.0 to 2.5 times as long as first. Antenna with 2+14 segments ; scape about 1.5 times as long as pedicel, with a few long setae ventrally ; pedicel subcylindrical, a little shorter than wide, with a few rather short setae dorso-laterally and ventro-medially ; ring-shaped sensoria present on all flagellar segments except terminal 2 or 3 ; horse-shoe shaped sockets irregularly distributed ventrally, forming a single row dorsally ; fifth flagellar segment with a basal enlargement about 1.6 times as long as wide, stem about 1.8 times as long as basal enlargement ; terminal flagellar segment elongated subconical, 2.3 to 2.5 times as long as maximum width, without ring-shaped sensoria. Fore leg with tibia nearly as long as femur, fourth tarsal segment about 2.2 times as long as fifth ; middle and hind legs with tibia a little shorter than femur, fourth tarsal segment about 2 times as long as fifth ; second tarsal segments of all legs longer than femur ; claws of all legs trifid ; empodium very short. Wing 2.8 to 3.0 times as long as wide ; sensory pore 2 on distal portion of R_1, 1 on basal portion of R_5, 2 on distal half of R_5. Genitalia : epandrium without distinct distal margin ; cerci and subanal plate bilobed ; gonostylus attenuated, with lamellar claws distally ; gonocoxite broadly united ventraly ; hypandrium with a pair of sclerotized projections ; root of gonocoxite a little shorter than distance separating both roots ; transverse bridge indistinct ; tegmen laterally forming 2 pairs of strongly sclerotized hooks (sometimes outer pair folded downward and invisible) ; genital rod simple, nearly as long as gonocoxite.

Female : unknown.

Specimens examined : 2 ♂♂ (on slide), Mt. Kôra, Kurume-City, Fukuoka-Pref., Kyushu, 16. V. 1965, J. Yukawa leg. Cecid. No. 8001, 2 ; 1 ♂ (on slide), Mt. Hiko, Fukuoka-Pref., Kyushu, 24. V. 1965, J. Yukawa leg. Cecid. No. 10901 ; 3 ♂♂ (on slide), Ropponmatsu, Fukuoka-City, Kyushu, 15. V. 1965, J. Yukawa leg. Cecid. No. 13202-4 ; 1 ♂ (on slide), Mt. Ichifusa, Kumamoto-Pref., Kyushu, 11. V. 1967, J. Yukawa leg. Cecid. No. 63101.

Distribution : Japan (Kyushu), Europe.

Remarks : According to the figures by Mamajev (1966), this species is distinguished

from *Monepidosis furcata* Mamajev (1966) by the shape of projection of hypandrium: in *pectinata* the projection broader and windened apically, in *furcata* it is more slender and not widened distally. This is the first record of the species from Japan.

SUBFAMILY CECIDOMYIINAE

Supertribe LASIOPTERIDI

The members of Lasiopteridi are characterized as follows : antenna short ; costa clothed densely with scales ; R_5 close to R_1 and joining costa well before tip of wing; body covered with scales.

The following 12 species of the genus *Lasioptera* were previously recorded from Japan and an unnamed species is newly described.

Genus **Lasioptera** Meigen

Lasioptera Meigen, 1818 ; Macquart, 1834 ; Winnertz, 1853 ; Osten Sacken, 1862 ; Schiner, 1864 ; Bergenstamm & P. Löw, 1876 ; Rübsaamen, 1892 ; Kieffer, 1898 ; Felt, 1908 ; Felt, 1911b ; Kieffer, 1913f ; Felt, 1918b ; Brunetti, 1920 ; Felt, 1925 ; Rübsaamen & Hedicke, 1926 ; Senior-White, 1928 ; Mani, 1934 ; Shinji, 1944 ; Möhn, 1955 ; Kovalev, 1967 ; Mamajev, 1969.

Diomyza Meigen, 1818.

The genus *Lasioptera* comprises about 200 species distributed all over the world. They generally produce galls on stems, shoots, or sometimes on leaves and some of them prove to be of economic importance on the cultivated plants.

This genus is distinguished from the other known genera of the supertribe by the combination of the following characters : flagellum with more than 12 segments ; R_5 straight, not bowed at middle ; distance between costa and R_5 widest at base of wing; upper lamella of ovipositor with fish-hook shaped spines.

Key to Japanese species

1. Subanal plate of male genitalia weakly emarginated on distal margin ; upper lamella of ovipositor dorsally with 3 to 4 pairs of fish-hook shaped spines which are distributed in a clump ..... *rubi* Heeger
- Subanal plate of male genitalia not emarginated on distal margin ; upper lamella of ovipositor dorsally with sparsely distributed fish-hook shaped spines 2
2. Eye bridge 5 to 6 facets wide ; upper lamella of ovipositor dorsally with 4 to 6 pairs of fish-hook shaped spines, laterally with spines arranged in 2 to 3 rows ..... sp.
- Eye bridge 3 to 5 facets wide ; upper lamella of ovipositor dorsally with 6 to 9 pairs of fish-hook shaped spines, laterally with spines arranged in 1 to 2 rows ... 3
3. Lateral spines of upper lamella arranged distally in a single row and basally in double rows ..... *achyranthii* Shinji
- All lateral spines of upper lamella arranged in a single row ..... *lespedezae* Shinji

Lasioptera rubi Heeger

(Fig. 13 : G)

Lasioptera rubi Heeger, 1851.
Lasioptera rubi Heeger : Rübsaamen, 1892 ; Theobald, 1898 ; Kieffer, 1913f ; Barnes, 1948a ; Möhn, 1955 ; Mamajev, 1969.
Lasioptera rubi (Schrank) : Miles, 1921 ; Skuhravá, 1958 ; Skuhravá & Skuhravý, 1963 ; Kovalev, 1967.
Lasioptera ichigo Shinji, 1939g ; Shinji, 1939h ; Shinji, 1944. New synonymy.
Neolasioptera rubicola Monzen, 1955a. New synonymy.

Male : Wing length 1.8 to 2.0 mm. Eye bridge 5 to 6 facets wide medially. Palpus consisting of 4 segments, 2/3 to 3/4 as long as height of head, with rather short setae and scales ; first segment shortest, a little longer than wide ; second 2.1 to 2.3, third 2.2 to 2.7, fourth 3.2 to 3.4 times as long as first. Antenna with 2+15 to 2+17 segments ; scape with ventral setae and scales densely, dorso-medial ones sparsely ; pedicel with ventral setae and scales densely, dorsal ones sparsely ; fifth flagellar segment nearly as long as or slightly shorter than wide. Fore and middle legs with second tarsal segment a little longer (rarely slightly shorter) than femur and distinctly shorter than tibia, fourth tarsal segment about 1.8 times as long as fifth ; hind leg with second tarsal segment distinctly longer than femur and nearly as long as or a little longer than tibia, fourth about 1.8 times as long as fifth ; claw bifid on all legs, bent nearly at right angle ; empodium nearly as long as or slightly shorter than claw. Wing 2.3 to 2.5 times as long as wide ; sensory pore 2 on distal portion of R_1, 2 or rarely 1 on subbasal portion of R_5, 1 on distal portion of R_5. Genitalia : cerci incised by a V-shaped emargination, forming a pair of subtriangular lobes ; subanal plate shallowly emarginated on distal margin ; gonostylus basally broader, distally slender, apically with a strong claw ; gonocoxite basally with a setose lobe which is nearly as long as gonocoxite ; aedeagus slender, subtruncate distally.

Female : Wing length 1.8 to 2.1 mm, 2.4 to 2.6 times as long as wide. Antenna with 2+18 to 2+23 segments ; fifth flagellar segment a little shorter than wide. Ovipositor : ninth segment laterally with a dense group of short spines ; upper lamella dorsally with 3 to 4 pairs of fish-hook shaped spines which are distributed in a clump, laterally with short spines which are arranged in 2 to 3 rows.

Host plants in Japan : *Rubus phoenicolasius* Maxim. [Urajiroichigo], *Rubus parvifolius* L. [Nawashiroichigo], *Rubus trifidus* Thunb. [Kajiichigo].

Gall : Woody swelling usually on one side of the stem, sometimes completely encircling the stem ; size variable ; polythalamus. [Ichigo-kobufushi] : Monzen, 1955a.

Biological notes : Adults appear once a year. The first midge emerged on April 23, and emergence continued until June 2 at Fukuoka-City in 1965. The emergence period was delayed about one month in the northern parts of Japan. The females lay their eggs at the base of buds or side shoots. The orange larvae remain in the galls throughout the summer, autumn and winter, becoming full grown in the next spring. Pupation occurs in the gall. See also Theobald (1898), Miles (1921), Barnes (1927, 1948a), Skuhravá (1958).

Specimens examined : 1 ♂, 2 ♀♀ (on slide), type specimens of *Neolasioptera rubicola* Monzen, galls collected from Shimohei, Iwate-Pref., Honshu, 1950, M. Kikuti leg. emerged on 25. V. 1950 & 1. VII. 1950, reared by K. Monzen (host plant : *R. phoenicolasius*) ; 5 ♂♂, 6 ♀♀ (on slide), 27 ♂♂, 5 ♀♀ (in alcohol), galls collected form Inokashira, Mitaka-City, Tokyo, Honshu, 3. IV. 1965, M. Shiga leg. emerged on 23. IV. - 2. VI. 1965, reared by J. Yukawa (host plant : *R. pervifolius*), Cecid. No. A101-11 ; 3 ♂♂, 3 ♀♀ (on slide), 7 ♂♂, 10 ♀♀ (in alcohol), galls collected from Shimobaru, Fukuoka-City, Kyushu, 11. IV. 1965, J. Yukawa leg. emerged on 28. IV.-29. V. 1965, reared by J. Yukawa (host plant : *R. pervifolius*), Cecid. No. A112-17.

Distribution : Japan (Honshu, Kyushu), Europe, Far East of the USSR.

Remarks : The author sent the Japanese specimens to Dr. E. Möhn for identification.

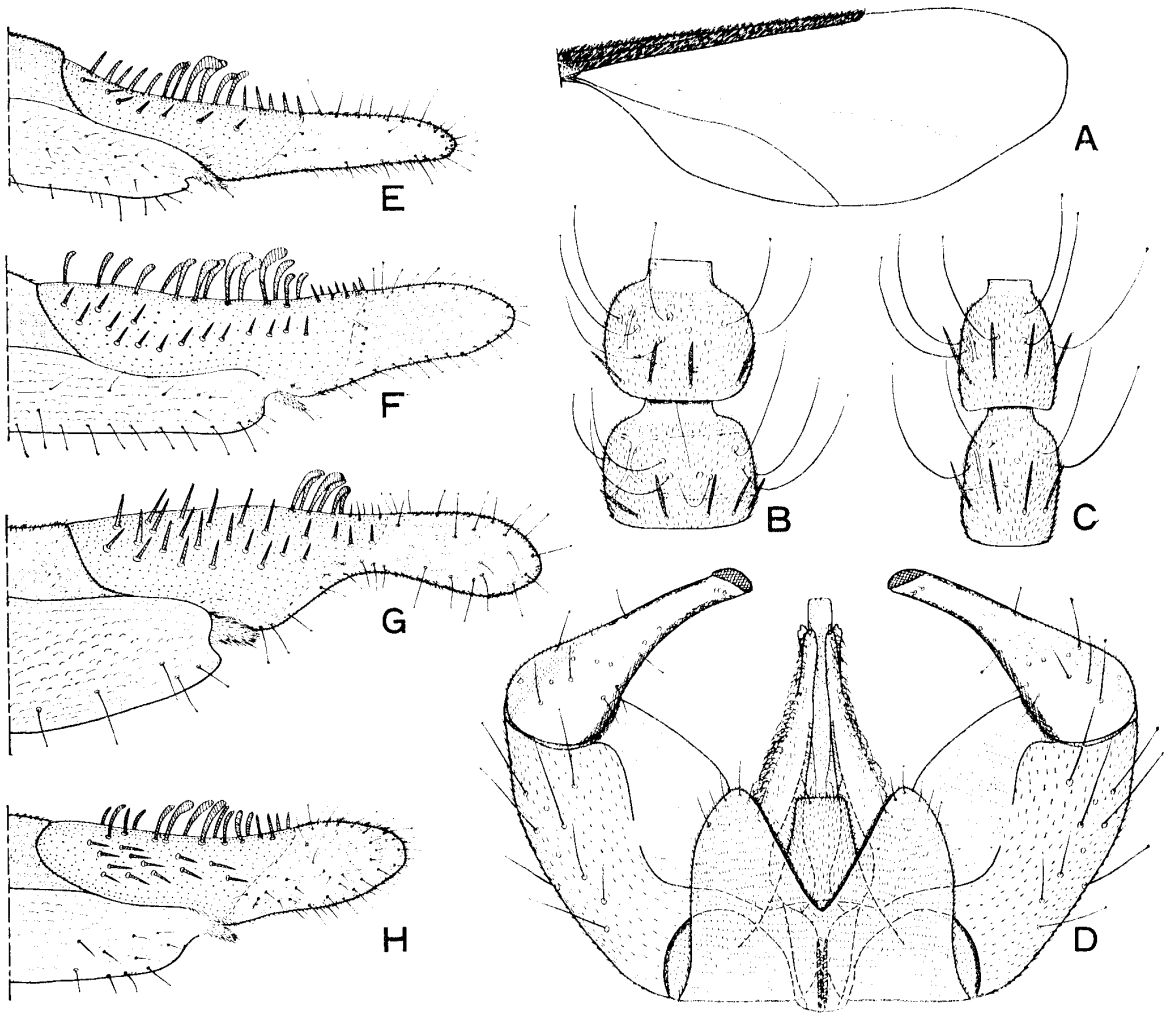

Fig. 13. *Lasioptera*

(A) wing, ♀ : *Lasioptera lespedezae* Shinji. (B) fifth and sixth flagellar segments, ♀ : ditto. (C) fifth and sixth flagellar segments, ♂ : ditto. (D) male genitalia, dorsal view : ditto. (E) ovipositor, lateral view : ditto. (F) ovipositor, lateral view : *Lasioptera achyranthii* Shinji. (G) ovipositor, lateral view : *Lasioptera rubi* Heeger. (H) ovipositor, lateral view : *Lasioptera* sp.

He compared them with the European specimens and reached the conclusion that the Japanese materials are identical with *L. rubi*. This species is characterized in the following respects : eye bridge 5 to 6 facets wide medially ; subanal plate of male genitalia weakly emarginated on distal margin ; upper lamella of ovipositor dorsally with 3 to 4 pairs of fish-hook shaped spines and laterally with spines arranged in 2 to 3 rows.

According to the description and accompanying notes on the gall, *Lasioptera ichigo* Shinji (1939g) ought to be synonymized with *L. rubi*, though it was rather insufficiently described. Shinji mentioned that *L. ichigo* provides palpus consisting of 3 segments, but the first segment is sometimes overlooked owing to its small size. *Neolasioptera rubicola* Monzen (1955a) was also synonymized with *L. rubi* based on the examination of the type specimens : claw bifid ; upper lamella of ovipositor with the typical fish-hook shaped spines of the genus *Lasioptera* (fish-hook shaped spines absent in *Neolasioptera*) ; number of flagellar segment variable.

Lasioptera achyranthii Shinji

(Fig. 13 : F)

Lasioptera achyranthii Shinji, 1939g ; Shinji, 1939h ; Shinji, 1944.
Copolodia ? achyranthii Shinji : Shinji, 1944.
Lasioptera inokozuchi Shinji, 1944. Synonymy ?

Male : Wing length 1.6 to 2.0 mm. Eye bridge 3 to 4 facets wide medially. Palpus consisting of 4 segments, about 2/3 as long as height of head, with rather short setae and scales ; first palpal segment shortest, a little longer than wide ; second 1.7 to 2.0, third 1.9 to 2.2, fourth 2.2 to 2.7 times as long as first. Antenna with 2+13 to 2+15 segments ; scape and pedicel yellow ; scape with ventral setae and scales densely, dorso-medial ones sparsely ; pedicel with ventral setae and scales densely, dorsal ones sparsely ; flagellar segment dark brown ; fifth flagellar segment a little longer than wide. All legs with tibia distinctly longer than femur and shorter than second tarsal segment, fourth tarsal segment 1.8 to 2.0 times as long as fifth ; claw bifid or trifid ; empodium nearly as long as or slightly shorter than claw. Wing 2.7 to 3.0 times as long as wide ; sensory pore 2 on distal portion of R_1, 2 on subbasal to medial portion of R_5, 1 on distal portion of R_5. Genitalia : cerci incised by a V-shaped emargination ; subanal plate distally subtruncate or weakly rounded ; gonostylus basally broader, distally slender, apically with a strong claw ; gonocoxite basally with a setose lobe which is nearly as long as gonocoxite ; aedeagus slender, distally weakly rounded.

Female : Wing length 1.8 to 2.5 mm, 2.6 to 2.9 times as long as wide. Antenna with 2+16 to 2+21 segments ; fifth flagellar segment nearly as long as or slightly shorter than wide. Ovipositor : ninth segment laterally with a dense group of short spines ; upper lamella dorsally with 7 to 9 pairs of fish-hook shaped spines which are sparsely distributed, laterally with short spines which are arranged distally in a single row and basally in double rows.

Host plant : *Achyranthes japonica* Nakai [Inokozuchi], *Achyranthes longifolia* Makino [Yanagiinokozuchi].

Gall : Subglobular swelling on knot of the stem, smooth on surface, green and becoming red later ; polythalamus. [Inokozuchi-zuifushi] : Monzen, 1932. [Inokozuchi-tsutofushi] : Shinji, 1944. [Yanagiinokozuchi-fushifukure] : Shinji, 1944.

Biological notes : Adults appear at least twice a year in the southern parts of Japan. The yellow larvae hibernate in the galls on the withered stem. Pupation occurs in the galls.

Specimens examined : 3 ♀♀ (on slide), 2 ♀♀ (in alcohol), galls colleted from Mt. Hiko, Fukuoka-Pref., Kyushu, 23. V. 1965, J. Yukawa leg. emerged on 31. V.-18. VI. 1965, reared by J. Yukawa (host plant : *A. japonica*), Cecid. No. A1501-3 ; 1 ♂, 1 ♀ (in alcohol), galls collected from Mikawa, Nishimuro, Wakayama-Pref., Honshu, 4. VIII. 1965, J. Yukawa leg. emerged on 8. VIII. 1965, reared by J. Yukawa (host plant : *A. japonica*) ; 3 ♂♂, 4 ♀♀ (on slide), 1 ♂, 33 ♀♀ (in alcohol), galls collected from Hirao, Fukuoka-City, Kyushu, 26. VIII. 1965, J. Yukawa leg. emerged on 16. IX.-30. X. 1965, reared by J. Yukawa (host plant : *A. japonica*), Cecid. No. A1504-10.

Distribution : Japan (Honshu, Kyushu).

Remarks : This species is characterized as follows : eye bridge 3 to 4 facets wide ; subanal plate of male genitalia not emarginated on distal margin ; upper lamella of ovipositor dorsally with sparsely distributed fish-hook shaped spines, laterally with spines arranged distally in a single and basally in double rows. This species with palpus cosisting of 4 segments, not 2 or 3 segments, Shinji (1939g, 1944) probably overlooked basal 1 or 2 segments.

Lasioptera inokozuchi Shinji (1944) was described as a different species from *L. achyranthii* by having less number of antennal segments and simple tarsal claw. *L. inokozuchi* can not be identified at present because the types have lost, but according to the galls described by Shinji (1944), it is rather likely that these 2 species are identical.

Lasioptera lespedezae Shinji

(Fig. 13 : A-E)

Lasioptera lespedezae Shinji 1939b ; Shinji, 1939h ; Shinji, 1944 ; Kovalev, 1967.

Male : Wing length 1.9 to 2.2 mm. Eye bridge 4 to 5 facets wide medially. Palpus consisting of 4 segments, about 2/3 as long as height of head, with rather short setae and scales ; first segment shortest, a little longer than wide ; second 1.2 to 1.8, third 1.9 to 2.6, fourth 2.1 to 3.5 times as long as first. Antenna with 2+15 to 2+17 segments ; scape with ventral setae and scales densely, dorso-medial ones sparsely ; pedicel with ventral setae and scales densely, dorsal ones sparsely ; fifth flagellar segment nearly as long as or slightly longer than wide. All legs with tibia distinctly longer than femur and shorter than second tarsal segment, fourth tarsal segment 1.7 to 1.9 times as long as fifth ; claw bifid on all legs, bent nearly at right angle ; empodium nearly as long as or slightly shorter than claw. Wing about 2.8 times as long as wide ; sensory pore 2 on distal portion of R_1, 2 on subbasal to medial portion of R_5. Genitalia : cerci deeply incised by a V-shaped emargination, forming a pair of subtriangular lobes ; subanal plate truncate distally ; gonostylus basally broader, distally slender, apically with a strong claw ; gonocoxite basally with a setose lobe which is nearly as long as

gonocoxite ; aedeagus slender, distally truncate.

Female : Wing length 2.2 to 2.6 mm, about 2.6 times as long as wide. Antenna with 2+18 to 2+23 segments ; fifth flagellar segment nearly as long as or slightly shorter than wide. Ovipositor : ninth segment laterally with a dense group of short spines ; upper lamella dorsally with 6 to 9 pairs of fish-hook shaped spines which are sparsely distributed, laterally with shot spines which are arranged in a single row.

Host plants in Japan : *Lespedeza bicolor* Turcz. [Ezoyamahagi], *Lespedeza cyrtobotrya* Miq. [Marubahagi].

Gall : Elongated, spindle shaped, woody swelling on the stem ; sometimes inconspicuously swollen ; polythalamus. [Hagi-tsutofushi] : Shinji, 1944.

Biological notes : Adults appear once a year, from the middle of May to early in June in Kagoshima-Pref. and from early in June to the middle of July in northern parts of Honshu. The larvae hibernate in the gall, become full grown in the next spring. Pupation occurs in the gall.

Specimens examined : 2 ♂♂, 7 ♀♀ (on slide), 18 ♀♀ (in alcohol), galls collected from Yunono, Mt. Kirishima, Kagoshima-Pref., Kyushu, 3. XI. 1968, J. Yukawa leg. & 31. V. 1969, A. Mori leg. emerged on 10. V.-11. VI 1969, reared by J. Yukawa (host plant : *L. cyrtobotrya*), Cecid. No. B3101-9.

Distribution : Japan (Honshu, Shikoku, Kyushu), Far East of the USSR.

Remarks : This species is similar to *L. achyranthii*, but distinguished from it by having upper lamella of ovipositor laterally with spines arranged in a single row.

Lasioptera sp.

(Fig. 13 : H)

Male : Wing length 1.6 to 1.8 mm. Eye bridge 5 to 6 facets wide medially. Palpus consisting of 4 segments, about 3/4 as long as height of head, with rather short setae and scales ; first palpal segment shortest, a little longer than wide ; second 1.8 to 2.0, third 1.9 to 2.2, fourth 2.6 to 3.1 times as long as first. Antenna with 2+14 to 2+15 segments ; scape with ventral setae and scales densely, dorso-medial ones sparsely ; pedicel with ventral setae and scales densely, dorsal ones sparsely ; fifth flagellar segment about 1.2 times as long as wide. All legs with tibia distinctly longer than femur and shorter than second tarsal segment, fourth tarsal segment about 1.8 times as long as fifth ; claw bifid on all legs, bent nearly at right angle ; empodium nearly as long as or slightly shorter than claw. Wing about 2.5 times as long as wide ; sensory pore 2 on distal portion of R_1, 2 on subbasal to medial portion of R_5, 1 on distal portion of R_5. Genitalia : cerci incised by a V-shaped emargination ; subanal plate distally subtruncate or weakly rounded ; gonostylus basally broader, distally slender, apically with a strong claw ; gonocoxite basally with a setose lobe which is nearly as long as gonocoxite ; aedeagus slender, distally weakly rounded.

Female : Wing length 1.8 to 2.0 mm, about 2.4 times as long as wide. Antenna with 2+21 to 2+23 segments ; fifth flagellar segment nearly as long as or slightly shorter than wide. Ovipositor : ninth segment laterally with a dense group of short spines ; upper lamella dorsally with 4 to 6 pairs of fish-hook shaped spines which are sparsely

distributed, laterally with short spines which are arranged in 2 to 3 rows.

Host plant : *Paederia scandens* Merrill [Hekusokazura].

Gall : Woody swelling on the stem ; polythalamus.

Biological notes : Adults appear once a year. The larvae hibernate in the gall, pupation occurs in the gall.

Specimens examined : 4 ♂♂, 4 ♀♀ (on slide), 3 ♂♂, 16 ♀♀ (in alcohol), galls collected from Mt. Inunaki, Fukuoka-Pref., Kyushu, 2. V. 1963, J. Yukawa leg. emerged on 17. VI. -5. VII. 1963, reared by J. Yukawa (host plant : *P. scandens*), Cecid. No. A1001-8.

Remarks : This species is distinguished from *L. achyranthii* Shinji by having eye bridge 5 to 6 facets wide and upper lamella of ovipositor laterally with spines arranged in 2 to 3 rows, but is left unnamed until further informaitons are obtained.

Lasioptera artemisifoliae Shinji

Lasioptera artemisifoliae Shinji, 1939f ; Shinji, 1944.
Steffaniela artemisifoliae Shinji : Shinji, 1939h.

Host plant : *Artemisia japonica* Thunb. [Otokoyomogi].

Gall : Larva lives in the leaf as a minor.

Distribution : Japan (Honshu).

Lasioptera astericola Shinji

Lasioptera astericola Shinji, 1939d ; Shinji, 1944.
Dasyneura astericola Shinji : Shinji, 1944.

Host plant : *Aster scaber* Thunb. [Shirayamagiku].

Gall : Spindle-shaped swelling on the stem. [Shirayamagiku-fukurefushi] : Shinji, 1944.

Distribution : Japan (Honshu).

Lasioptera azami Shinji

Lasioptera azami Shinji, 1939e ; Shinji, 1944.

Host plant : *Hemistepta carthamoides* O. Kuntze [Kitsuneazami].

Gall : Spindle-shaped swelling on the stem ; polythalamus.

Distribution : Japan (Honshu ?).

Lasioptera callicarpae (Shinji)

Calopedia callicarpae Shinji, 1938o.
Lasioptera callicarpae Shinji : Shinji, 1944.

Host plant : *Callicarpa japonica* Thunb. [Murasakishikibu].

Gall : Oblong or almost cylindrical swelling on newly growing tender twig. [Murasakishikibu-edafushi?] : Shinji, 1944.

Distribution : Japan (Honshu).

Lasioptera euphobiae Shinji

Lasioptera euphobiae Shinji, 1944.
Lasioptera eupatrii Shinji, 1944. Synonymy?

Host plants : *Eupatorium chinense* L. var. *simplicifolium* Kitam. [Hiyodoribana], *Aster tataricus* L. [Shion] ? *Patrinia villosa* (Thunb.) Juss. [Otokoeshi] ?

Gall : Strongly elongated spindle-shaped swelling on the stem. [Hiyodoribana-zuifushi] : Monzen, 1932 ; Shinji, 1944. [Hiyodoribana-kukifushi] : Shinji, 1944.

Distribution : Japan (Honshu ?).

Remarks : Shinji (1944) used the name, *L. eupatrii* in the explanation of photograph of the gall. Probably he had prepared this name for the species emerged from the galls of *Eupatorium chinense*, but it is likely that he spelled incorrectly as *euphobiae* in his original description of the species.

Lasioptera gibaushi Shinji

Lasioptera gibaushi Shinji, 1939g ; Shinji, 1944.

Host plant : *Aster scaber* Thunb. [Shirayamagiku].

Gall : Larvae associated with flowers ; polythalamus. [Shirayamagiku-hossufushi ?] : Shinji, 1944.

Distribution : Japan (Honshu ? Kyushu ?).

Lasioptera impatientis (Osten Sacken) ?

Cecidomyia impatientis Osten Sacken, 1862 ; Walsh, 1869 ; Beutenmüller, 1907 ; Kieffer, 1913f ; Felt, 1925 ; Shinji, 1938a ; Shinji, 1938e ; Shinji, 1938f ; Barnes, 1948b.
Fulvomyia ? impaiensae ! (Osten Sacken) : Shinji, 1938f.
Lasioptera impatientis (Osten Sacken) : Shinji, 1939h ; Shinji, 1944.

Host plant in Japan : *Impatientis noli-tangere* L. [Kitsurifunesô].

Gall : Subglobular swelling on the stem ; diameter 8 to 11 mm, smooth on surface, color green with reddish spots ; Oligothalamus. [Kitsurifuneso-kukitamafushi] : Shiji, 1944.

Distribution : Japan (Honshu), N. America.

Remarks : *Lasioptera impatientis*, a North American species is known only by galls and larvae, and it was recently combined with the genus *Schizomyia* of the supertribe ASPHONDYLIIDI (Stone & Others, 1965). According to the description of the Japanese species and its galls, this Japanese species, however, belongs to the genus *Lasioptera* and may be related to another North American species, *Lasioptera impatientifolia* Felt (1907).

Lasioptera puerariae (Shinji)

Calopedia puerariae Shinji, 1938 l.
Lasioptera puerariae Shinji : Shinji, 1939h ; Shinji, 1944.

Host plant : *Pueraria lobata* Ohwi [Kuzu].

Gall : Subspindle-shaped swelling on the stem ; polythalamus. [Kuzu-tsutofushi] : Shinji, 1944.

Distribution : Japan (Honshu), Korea.

Lasioptera ukogi Shinji

Lasioptera ukogi Shinji, 1940 ; Shinji, 1944.

Host plant : *Acanthopanax Sieboldianum* Makino [Ukogi].

Gall : Spindle-shaped swelling on the stem ; polythalamus. [Ukogi-edatsutofushi] : Shinji, 1944.

Distribution : Japan (Honshu).

Supertribe OLIGOTROPHIDI

Most species of this supertribe are primarily phytophagous or gall makers, some are zoophagous, mycetophagous or inquilinous. They are characterized as follows : male flagellar segment not binodose, consisting of a subcylindrical basal enlargement and a cylindrical distal stem, circumfila simple ; cross-vein Rs absent or indistinct ; R_5 well separated from R_1.

Over 40 species of this supertribe were previously recorded in Japan. Some of them are redescribed and the rest are listed below with some of the important references and the brief notes on their host plants, gall and distribution. In listing the species, the present author followed Möhn's gereric grouping proposed by the larval characters (Möhn, 1955). The generic synopsis were partly based on Felt's key (1929).

Tribe PHEGOMYINI Rübsaamen

Genus **Phegomyia** Kieffer

Phegomyia Kieffer, 1913c ; Keffer, 1913f ; Möhn, 1955.

Palpus consisting of 4 segments ; antenna with 2 + 14 to 2 + 18 segments ; male flagellar segment stemmed ; first and second flagellar segments not fused ; tarsal claw simple ; gonostylus of male genitalia rather slender, long, tapering gradually.

Phegomyia tokunagai Sasakawa & Koyama

Phegomyia tokunagai Sasakawa & Koyama, 1953 ; Tsujita, 1954.

Host plant : *Fagus crenata* Blume [Buna].

Gall : Spindle-shaped swelling on the upper side of the leaf ; color green, height about 10 mm, somewhat thin-walled ; monothalamus.

Distribution : Japan (Honshu).

Rhopalomyia-Group

This group includes many species which are mainly responsible for galls on COMPOSITAE. In Japan, 17 species of the group were previously recorded, but there are considerable problems left as to the synonymy among them, and it is also necessary to compare them with their allied species in foreign countries.

Genus **Bouchéella** Rübsaamen

Bouchéella Rübsaamen, 1914 ; Möhn, 1955 ; Mamajev, 1969.

Bouchéella artemisiae (Bouché)

Cecidomyia artemisiae Bouché, 1834.
Misospatha artemisiae Bouché : Kieffer, 1913f.
Bouchéella artemisiae Bouché : Shinji, 1938c ; Shinji, 1938f ; Shinji, 1939f ; Shinji, 1939h ; Mamajev, 1969.

Host plants in Japan : *Artemisia japonica* Thunb. [Otokoyomogi], *Artemisia Feddei* Lév. et Van. [Himeyomogi].

Gall : Terminal bud transformed into a rosette gall, ceasing the growth of stem ; polythalamus. [Otokoyomogi-hanafushi] : Shinji, 1938f ; Shinji, 1944.

Distribution : Japan (Honshu), Europe.

Genus **Rhopalomyia** Rübsaamen

Rhopalomyia Rübsaamen, 1892 ; Felt, 1908 ; Felt, 1911b ; Kieffer, 1913f ; Rübsaamen & Hedicke, 1926 ; Vimmer, 1928 ; Möhn, 1955 ; Mamajev, 1969.

The genus *Rhopalomyia* is characterized in the following respects : palpus usually consisting of 2 segments ; flagellar segment with a distinct stem in both sexes ; claw simple ; empodium nearly as long as or a little longer than claw ; R_5 meeting with costa nearly at apex of wing ; ovipositor long, not distinctly chitinized.

Rhopalomyia struma Monzen

(Fig. 14 : A)

Rhopalomyia struma Monzen, 1937 ; Shinji, 1939f ; Monzen, 1955a ; Kovalev, 1967.
Rhopalomyia yomogi Shinji, 1938c ; Shinji, 1938f* ; Shinji, 1938n ; Shinji, 1939h ; Shinji, 1944. New synonymy.

---

* Shinji (1938f) probably used this name incorrectly for *Rhopalomyia tubiartemisiae* Shinji (=*R. caterva* Monzen).

Male : Wing length 1.5 to 1.8 mm. Eye bridge 3 to 4 facets wide medially. Palpus very short, consisting of 2 segments, with rather long setae sparsely ; first segment suboval, about 1.6 times as long as maximum width ; second segment subconical, distinctly narrower and a little shorter than first. Antenna usually with 2+14 or 2+15 segments, rarely with 2+13 or 2+16 ; scape a little longer than pedicel, with ventral setae rather sparsely ; pedicel with dorsal and ventral setae sparsely ; first and second flagellar segments fused ; fifth flagellar segment with a basal enlargement about 1.7 times as long as wide, 1.6 to 2.3 times as long as distal stem ; penultimate segment usually without distal stem ; terminal segment subconical, 2.0 to 3.0 times as long as maximum width, or sometimes constricted medially. All legs with femur distinctly shorter than tibia and distinctly longer than second tarsal segment ; fore and middle legs with fourth tarsal segment about 1.8 times as long as fifth ; hind leg with fourth tarsal segment about 2.0 times as long as fifth ; claw simple, bent nearly at right angle ; empodium moderately broad, nearly as long as claw. Wing about 2.7 times as long as wide ; R_5 meeting with costa nearly at apex of wing ; sensory pore 2 on distal portion of R_1, 1 on basal and 1 or 2 on medial to subdistal portion of R_5. Genitalia : cerci rather deeply and narrowly incised by a V-shaped emargination, forming a pair of lobes which are rounded distally ; subanal plate narrower than cerci, very shallowly emarginated on distal margin ; gonostylus rather short, with a dense group of strong teeth distally ; inner angle of gonocoxite ventrally developed into a setose lobe which is rather narrowly rounded distally ; aedeagus slender, distally rounded.

Female : Wing length 1.8 to 2.1 mm, about 3 times as long as wide. Antenna with 2+13 to 2+15 segments ; first and second flagellar segments fused ; stem of each flagellar segment very short ; basal enlargement of fifth flagellar segment about 2 times as long as wide ; terminal few segments sometimes not distinctly differentiated, forming a rather elongated subconical segment. Fore and middle legs with femur distinctly shorter than tibia and much longer than second tarsal segment, fourth tarsal segment about 1.6 times as long as fifth ; hind leg with femur slightly longer (or sometimes slightly shorter) than tibia and much longer than second tarsal segment, fourth about 1.8 times as long as fifth. Ovipositor long ; terminal lobe suboval, with short setae rather sparsely.

Host plants in Japan : *Artemisia montana* Pamp. [Yamayomogi], *Artemisia princeps* Pamp. [Yomogi], *Artemisia japonica* Thunb. [Otokoyomogi] ?

Gall : Subglobular swelling on the side of the stem ; greenish brown ; polythalamus. [Yamayomogi-kobufushi] : Monzen, 1929 ; Monzen, 1937 ; Monzen, 1955a. [Yomogi-ibofushi] : Shinji, 1944.

Biological notes : According to Monzen (1955a) and Shinji (1938e, 1944), there may be at least 2 emergence periods in a year, the first one from April to June and the second from July to September.

Specimens examined : 1 ♂, 3 ♀♀ (on slide), type specimens, galls collected from Takamatsu, Morioka-City, Honshu, K. Monzen leg. emerged on 4. V. 1951, reared by K. Monzen (host plant : *A. montana*) ; 5 ♀♀ (on slide), type specimens, galls collected from Takamatsu, Morioka-City, Honshu, 28. VIII. 1951, K. Monzen leg. emerged on 5. IX. 1951, reared by K. Monzen (host plant : *A. montana*) ; 12 ♂♂, 12 ♀♀ (on slide), 15 ♂♂, 30 ♀♀ (in alcohol), galls collected from Kuriyagawa, Morioka-City, Honshu, 28. VI. 1965,

J. Yukawa leg. emerged on 4-9. VII. 1965, reared by J. Yukawa (host plant : *A. princeps*) Cecid. No. A4601-24.

Distribution : Japan (Honshu), Far East of the USSR.

Remarks : *Rhopalomyia yomogi* Shinji (1938c) is very similar to this species. Based on the original descriptions of the both species and accompanying photographs of their galls, these two species ought to be considered to be identical. As mentioned by Monzen (1955a), the number of antennal segment is variable in this species. On the host plant range of this species, Shinji (1944) stated that *R. struma* is also responsible for the gall of terminal bud on *Artemisia japonica* Thunb. by showing only a photograph of the gall, which is, however, rather different in shape from those on *A. montana* or on *A. princeps*. To confirm the fact, the materials from *A. japonica* ought to be examined.

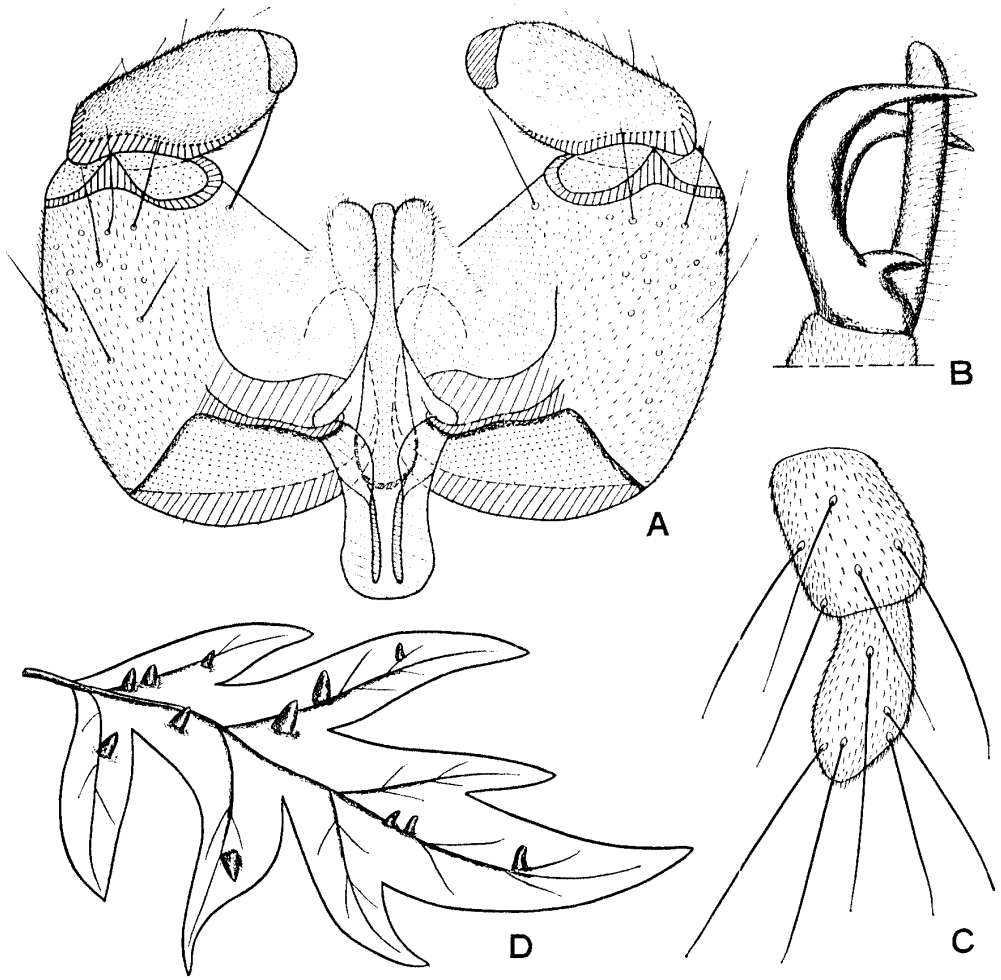

Fig. 14. *Rhopalomyia* and *Diathronomyia*.
(A) male genitalia, dorsal view (cerci and subanal plate removed) : *Rhopalomyia struma* Monzen. (B) claw and empodium, ♂ : *Diathronomyia yomogicola* (Matsumura). (C) palpus, ♂ : ditto. (D) leaf galls on *Artemisia princeps* Pamp. : ditto.

Rhopalomyia abdominalis Shinji

Rhopalomyia abdominalis Shinji, 1938n ; Shinji, 1939f ; Shinji , 1939h ; Shinji, 1944.

Host plant : *Artemisia montana* Pamp. [Yamayomogi].

Gall : Terminal bud transformed into a turbinated swelling, ceasing the growth of stem ; oligothalamus.

Distribution : Japan (Honshu?).

Remarks : This species is very closely related to *R. iwatensis*.

Rhopalomyia caterva Monzen

Rhopalomyia caterva Monzen, 1937 ; Shinji, 1939h ; Monzen, 1955a.
Rhopalomyia tubiartemisiae Shinji, 1938c ; Shinji, 1939f. Synonymy?
Mesospathi !! *atubiartemisiae* !! Shinji, 1944.
Rhopalomyia yomogi Shinji : Shinji, 1938f*.

Host plants : *Artemisia Feddei* Lév. et Van. [Himeyomogi], *Artemisia japonica* Thunb. [Otokoyomogi].

Gall : Bottle-shaped swelling produced on the top or side of the stem or on the leaf, with many leaflets which are flattened and pointed distally ; monothalamus. [Otoko-yomogi-himetsubofushi] : Monzen, 1929 ; Monzen, 1937 ; Shinji, 1944 ; Monzen, 1955a. [Otokoyomogi-no-tsubotamabaefushi] : Shinji, 1938f.

Distribution : Japan (Honshu).

Rhopalomyia cinerarius Monzen

Rhopalomyia cinerarius Monzen, 1937 ; Monzen, 1955a ; Kovalev, 1967.

Host plant in Japan : *Artemisia princeps* Pamp. [Yomogi].

Gall : Subglobular or suboval swelling, usually under side of the leaf ; diameter 5 to 9 mm ; brownish with white, short hairs densely ; monothalamus. [Yomogi-ketama-fushi] : Monzen, 1929 ; Monzen, 1937 ; Monzen, 1955a. [Yomogi-shirokefushi] : Shinji, 1944.

Distribution : Japan (Honshu, Kyushu), Far East of the USSR.

Remarks : Monzen (1937) described this species as a distinct species under the name, *R. cinerarius*, but Shinji (1938h, 1944) identified it as an European species, *R. baccarum* (Wachtl, 1883) and synonymized *cinerarius* with *baccarum*. (see also Shinji, 1939f and 1939h). Recently, Kovalev (1967) recorded this species from the Far East of the USSR by using the name, *R. cinerarius*.

Rhopalomyia iwatensis Shinji

Rhopalomyia iwatensis Shinji, 1938n ; Shinji, 1939f ; Shinji, 1944.

* Shinji (1938f) probably used the name *R. yomogi* incorrectly instead of *R. tubiartemisiae*. (see also *R. struma*).

Host plant : *Artemisia princeps* Pamp. [Yomogi].

Gall : Terminal bud transformed into a turbinated swelling, ceasing the growth of stem ; oligothalamus.

Distribution : Japan (Honshu).

Rhopalomyia chrysanthemum Monzen

Rhopalomyia chrysanthemum Monzen, 1937 ; Monzen, 1955a ; Ishihara, 1957.

Host plant : *Chrysanthemum morifolium* Hemsl. [Kiku]. Monzen (1955a) used the name *C. japonicum* Thunb. which was combined with the genus *Artemisia* later.

Gall : Small, oblong, yellowish protuberance on the leaf and stem ; length 2 mm, diameter 0.7 mm ; monothalamus. [Kiku-ibofushi] : Monzen, 1932 ; Monzen, 1937. [Kiku-himekobufushi] : Monzen, 1955a.

Distribution : Japan (Honshu, Shikoku, Kyushu).

Remarks : *Diathronomyia chrysanthemi* Ahlberg (1939), a serious pest of cultivated chrysanthemum in Europe and North America, ought to be compared with this species. Yago (1929) and Esaki (1950) applied the name, *D. hypogaea* (F.Löw, 1885) to this species.

Rhopalomyia japonica Monzen

Rhopalomyia japonica Monzen, 1937 : Monzen, 1955a.

Host plants : *Artemisia japonica* Thunb. [Otokoyomogi], *Artemisia princeps* Pamp. [Yomogi].

Gall : Wart-like swelling or elliptical protuberance on the leaf ; 3 to 4 mm in length, about 1.5 mm in width ; usually yellowish green, sometimes with reddish tinge ; monothalamus. [Yomogi-ibofushi] : Monzen, 1923 ; Monzen, 1937 ; Monzen, 1955a.

Distribution : Japan (Honshu).

Remarks : This species is very similar to *Diathronomyia foliorum* (H. Loew, 1850). Precise comparision of the both mature and immature stages between these 2 species is needed.

The following 4 species of the genus *Rhopalomyia* which were previously recorded from Japan are not associated with *Artemisia* or *Chrysanthemum*.

Rhopalomyia callicarpae Shinji

Rhopalomyia callicarpae Shinji, 1939g ; Shinji, 1944.

Host plant : *Callicarpa japonica* Thunb. [Murasakishikibu].

Gall : Subglobular or spindle-shaped swelling on the leafstark or on the stem ; monothalamus. [Murasakishikibu-edafushi] & [Murasakishikibu-hagukifushi ?] : Shinji, 1944.

Distribution : Japan (Honshu).

Rhopalomyia ilexifoliae Shinji

Rhopalomyia ilexifoliae Shinji, 1944.
Mesospathia! *ilicifoliae*! Shinji, 1944.

Host plants : *Ilex serrata* Thunb. [Umemodoki], *Symplocos chinensis* Druce [Sawafutagi].

Gall: Terminal several leaves somewhat thickened and fused ; yellowish brown larvae living between leaves. [Umemodoki-hamachijimi!] : Shinji, 1944. Both sides of a leaf swollen like a hydropy, diameter about 6 mm, thickness about 1 mm, monothalamus. [Sawafutagi-hafukure] : Shinji, 1944.

Distribution: Japan (Honshu).

Rhopalomyia styracophila Shinji

Rhopalomyia styracophila Shinji, 1944. (Original description unknown to the author).

Host plant : *Styrax japonica* Sieb. et Zucc. [Egonoki].

Gall : Subglobular swelling on the leaf ; outer surface smooth, white or pale green ; diameter about 5 mm, height about 3 mm ; monothalamus. [Ego-hiratamarufushi] : Shinji, 1944.

Distribution : Japan (Honshu).

Rhopalomyia uetsukii Inouye

Rhopalomyia uetsukii Inouye, 1959.

Host plant : *Juniperus rigida* Sieb. et Zucc. [Nezumisashi].

Gall : Bud transformed into a hexagon- or sometimes pentagon-contical swelling, which is 5 to 8 mm in length and 1.0 to 1.5 mm in maximum width, consisting of 5 to 6 short needles which are surrounded by several long needles.

Distribution : Japan (Honshu).

Genus **Misospatha** Kieffer

Misospatha Kieffer, 1913c ; Kieffer, 1913f ; Rübsaamen & Hedicke, 1926 ; Möhn, 1955 ; Mamajev, 1969.

This genus is distinguished from the genus *Rhopalomyia* by having female flagellar segment sessile or subsessile, from the genns *Arceuthomyia* by having palpus uniarticulate and empodium not longer or only a little longer than claw.

Misospatha giraldii (Kieffer & Trotter)

Rhopalomyia giraldii Kieffer & Trotter, 1900.
Misospatha giraldii Kieffer & Trotter : Kieffer, 1913f ; Yasumatsu, 1955.
Rhopalomyia neoartemisiae Shinji, 1938c ; Shinji, 1939h. Synonymy?

Rhopalomyia gossypii Monzen, 1955a ; Kovalev, 1967. Synonymy ?

Host plants in Japan : *Artemisia motana* Pamp. [Yamayomogi], *Artemisia princeps* Pamp. [Yomogi].

Gall : One or more, Subglobular, small, monothalamus galls produced on the stem ; galls covered densely with soft, long, whitish hairs ; like a small mass of cotton in appearance, of which size is variable. [Yomogi-watafushi] : Monzen, 1929 ; Shinji, 1938 ; Shinji, 1944 ; Monzen, 1955a.

Distribution : Japan (Honshu, Shikoku, Kyushu), China, Far East of the USSR.

Remarks : According to Yasumatsu (1955), Dr. M. S. Mani examined the materials forwarded from Japan and identified the Japanese species reared from the cotton-mass gall as *Misospatha giraldii* (Kieffer & Trotter, 1900). Shinji (1938c) described *Rhopalomyia neoartemisiae* as a distinct species, but Miyoshi (1929) and Shinji (1939f) identified this species as an American species *Rhopalomyia alticola* (Cockerell, 1890), subsequently Shinji (1944) identified it as an European species *Rhopalomyia lütkenmülleri* Thomas (1893). On the other hand, Monzen (1955a) also described *Rhopalomyia gossypii* as a distinct species and recently Kovalev (1967) recorded it from the Far East of the USSR. Judging from the figures, photographs or descriptions of the galls of the above mentioned Japanese species, they are probably synonymized within one species.

Misospatha artemisiae Shinji

Misospatha artemisiae Shinji, 1939c.
Misospatha yomogi Shinji, 1939h. Synonymy ?
Panteliola ampuila Monzen, 1955a. Synonymy ?

Host plant : *Artemisia princeps* Pamp. [Yomogi].

Gall : Lateral bud on the leaf axile transformed into bottle-shaped swelling, with height 10 to 15 mm, diameter 3 to 7 mm ; monothalamus. [Yomogi-kukitsubofushi] : Monzen, 1929. [Yomogi-tsubofushi] : Shinji, 1944 ; Monzen, 1955a.

Distribution : Japan (Honshu).

Remarks : The names, *Misospatha tubicola* (Kieffer, 1889) and *Rhopalomyia tubifex* (Bouché 1847) were applied to this species by Shinji (1939f, 1944) respectively.

Misospatha longitubifix Shinji

Misospatha longitubifix Shinji, 1939f ; Shinji, 1939h ; Shinji, 1944.

Host plant : *Artemisia princeps* Pamp. [Yomogi].

Gall : Almost same as in the former species, *M. artemisiae* except that the relative length to the diameter is longer than that of *artemisiae*. [Yomogi-nagatsubofushi] : Shinji, 1944.

Distribution : Japan (Honshu ?).

Remarks : This species is very closely related to *M. artemisiae*.

Genus **Arceuthomyia** Kieffer

Arceuthomyia Kieffer, 1913c ; Kieffer, 1913f.

This genus is distinguished from the genus *Rhopalomyia* by having female flagellar segment sessile or subsessile, from the genus *Misospatha* by having empodium twice as long as claw.

Arceuthomyia nakaharai Inouye

Arceuthomyia nakaharai Inouye, 1959.

Male : Wing length 2.7 to 3.1 mm. Eye bridge 2 to 3 facets wide, but ommantidia absent just at medial portion. Palpus very short, consisting of 2 segments, sparsely with short setae and short spines ; first segment suboval, about 1.6 times as long as maximum width ; second segment a little narrower than and about 1.3 times as long as first. Antenna with 2 + 15 segments; scape subconical, larger than pedicel, with short setae sparsely ; pedicel a little shorter than wide, with short setae sparsely ; first and second flagellar segment fused ; fifth flagellar segment with a basal enlargement 1.8 to 2.0 times as long as wide, about 1.4 times as long as distal stem ; terminal segment subconical, 1.6 to 2.0 times as long as maximum width. Fore leg with femur a little shorter than tibia and nearly as long as or slightly longer than second tarsal segment ; middle leg with femur nearly as long as or slightly shorter than tibia and slightly longer than second tarsal segment ; hind leg with femur a little longer than tibia, tibia nearly as long as or slightly longer than second tarsal segment ; fourth tarsal segment 2.1 to 2.4 times as long as fifth; claw simple, bent nearly at right angle ; empodium much broader distally, about 2 times as long as claw. Wing about 2.5 times as long as wide ; R_5 meeting with costa beyond apex of wing; sensory pore 2 to 3 on distal portion of R_1, 1 on basal and 3 to 5 on medial to subdistal portion of R_5. Genitalia : cerci broadly incised by an U-shaped emargination, forming a pair of lobes which are distally rounded ; subanal plate distinctly narrower and a little longer than cerci, incised by a V-shaped emargination, forming a pair of lobes which are rather narrowly rounded distally ; gonostylus rather short, distally with a dense group of strong teeth ; inner angle of gonocoxite ventrally developed into a large, ronuded, setose lobe ; aedeagus nearly parallel sided, truncated or weakly rounded distally.

Female : Wing length 2.7 to 3.5 mm, about 3 times as long as wide. Antenna usually with 2 + 15 segments, sometimes 2 + 14 or 2 + 16 ; first and second flagellar segments fused; stem of each flagellar segment very short ; basal enlargement of fifth flagellar segment about 2 times as long as wide ; terminal segment elongated subconical, 2.9 to 3.8 times as long as maximum width, sometimes constricted medially or divided into 2 segments. Fore leg with tibia nearly as long as or slighly longer than femur, distinctly longer than second tarsal segment; middle and hind legs with tibia a little shorter than femur, distinctly longer than second tarsal segment ; fourth tarsal segment 2.1 to 2.4 times as long as fifth. Ovipositor long, distally with many short setae, apically rounded. Otherwise nearly as in male.

Host plant : *Juniperus rigida* Sieb. et Zucc. [Nezumisashi].

Gall : Subconical leaf bud gall ; color green, shading to brown ; length about 8 mm,

diameter about 5 mm ; consisting of 2 parts : outer conical, thich walled gall and inner small waxy blister in which only one larva is living.

Biological notes : Larvae hibernate in the galls and they pupate in the galls early in spring. Emergence starts from the end of April and lasts until the middle of May with a peak at early in May.

Specimens examined : 5 ♂♂, 4 ♀♀ (on slide), galls collected from Shinodayama, Izumi-City, Osaka-Pref., Honshu, 10. IV. 1962, J. Yukawa leg. emerged on 10-15. V. 1962, reared by J. Yukawa (host plant : *J. rigida*), Cecid. No. B3301-9 ; 2 ♂♂ (on slide), 3 ♀♀ (in alcohol), galls collected from Mt. Ryûmon, Naga, Wakayama-Pref., Honshu, 8. IV. 1962, J. Yukawa leg. emerged on 10-12. V. 1962, reared by J. Yukawa (host plant : idid.), Cecid. No. B3310-11 ; 3 ♀♀ (in alcohol), galls collected from Mt. Kazan, Kyoto-City, Honshu, 18. IV. 1962, J. Yukawa leg. emerged on 7. V. 1962, reared by J. Yukawa (host plant : ibid.).

Distribution : Japan (Honshu).

Remarks : Antecedently to Inouye (1959), Kikuti (1940) described a gall midge speeics which was reared from subconical leaf-bud gall on *Juniperus rigida* Sieb. et Zucc. and named it as *Oligotrophus nezu*. According to the original description, Kikuti's species has 3 segmented palpus, by which this species was probably refered to the genus *Oligotrophus*. On the other hand, Inouye (1959) described *Arceuthomyia nakaharai* reared from the gall of the same kind on Juniper. This species was refered to the genus *Arceuthomyia* by the facts that palpus consists of 2 segments and basal 2 flagellar segments are fused. All the specimens examined by the present author, including the 3 females collected from the type locality of *O. nezu*, have also 2-segmented palpus and fused basal 2 flagellar segments. Because the author could not examined the type specimens of *O. nezu*, it was left uncombined with the genus *Arceuthomyia* and the specimens examined here were tentatively identified as *A. nakaharai*. When the further materials are obtained from the type locality of *nezu*, the synonymy between the both species will be discussed.

Genus **Diathronomyia** Felt

Diathronomyia Felt, 1908 ; Felt, 1911b ; Kieffer, 1913f ; Rübsaamen & Hedicke, 1926; Möhn, 1955 ; Memajev, 1969.
Dichelonyx Rübsaamen, 1914.

This genus is distinguished from the genus *Rhopalomyia* and the related genera by having tarsal claw with basal tooth.

Diathronomyia yomogicola (Matsumura) new combination

(Fig. 14 : B-D)

Asynapta yomogicola Matsumura, 1931.

Male : Wing length 1.7 to 2.2 mm. Eye bridge 3 to 4 facets wide. Palpus consisting of 2 segments, sparsely with rather long setae ; first segment suboval ; second a little

longer than and a little narrower than first. Antenna usually with 2 + 14 segments; scape larger than pedicel, ventrally with rather many setae; pedicel with ventral setae rather sparsely ; first and second flagellar segments fused ; fifth flagellar segment with a basal enlargement about 1.7 times as long as wide, about 1.6 times as long as distal stem ; terminal segment usually subconical, sometimes constricted medially, 1.7 to 2.8 times as long as maximum width. Fore and middle legs with femur a little shorter than or sometimes nearly as long as tibia and distinctly longer than second tarsal segment; hind leg with femur nearly as long as or slightly shorter than tibia and a little longer than second tarsal segment ; fourth tarsal segment 1.7 to 1.9 times as long as fifth; claw bent nearly at right angle, with a small basal tooth ; empodium moderately broad, nearly as long as or slightly shorter than claw. Wing hyaline, about 2.5 times as long as wide; R_5 meeting with costa nearly at apex of wing ; sensory pore 2 to 3 on distal portion of R_1, 1 on basal and 1 or more on medial to subdistal portion of R_5. Genitalia : cerci rather deeply incised by an U-shaped emargination, forming a pair of lobes which are distally rounded ; subanal plate entire, rather weakly rounded distally, nearly as long as and distinctly narrower than cerci ; gonostylus rather short, distally with a dense group of strong teeth ; inner angle of gonocoxite ventrally developed into a setose lobe which is rather narrowly rounded distally; aedeagus slender, narrowly rounded distally.

Female : Wing length 1.8 to 2.1 mm, about 2.8 times as long as wide. Antenna with 2 + 13 segments; first and second flagellar segments fused; stem of each flagellar segment very short ; basal enlargement of fifth flagellar segment 1.8 to 2.1 times as long as wide ; terminal segment rather elongated subconical, 2.3 to 3.1 times as long as maximum width. Fore and middle legs with femur nearly as long as or slightly shorter than tibia and distinctly longer than second tarsal segment ; hind leg with femur nearly as long as or slightly longer than tibia and distinctly longer than second tarsal segment ; fourth tarsal segment 1.6 to 1.8 times as long as fifth. Ovipositor long, terminal lobe slightly elongated suboval, rather narrowly rounded apically, with short setae rather sparsely.

Host plants : *Artemisia japonica* Thunb. [Otokoyomogi], *Artemisia princeps* Pamp. [Yomogi].

Gall : Subconical swelling usually on the upper side of the leaf ; green to yellow with reddish tinge ; height 3 to 4 mm, maximum width about 3 mm ; monothalamus. [Otokoyomogi-eboushifushi] & [Yomogi-eboushifushi] : Shinji, 1944.

Biological notes : This species may repeats several generations in a year. According to Shinji (1938i, 1944), the first midge appears around early in March and larvae fall into hibernation around the middle of October

Specimens examined : 7 ♀♀ (type specimens), Sapporo-City, Hokkaido, 29. VIII. 1915, S. Matsumura leg. : 3 ♂♂, 6 ♀♀ (on slide) galls collected from Mt. Wakasugi, Fukuoka-Pref., Kyushu, 5. V. 1963, J. Yukawa leg. emerged on 16. V. 1963, reared by J. Yukawa (host plant : *A. princeps*), Cecid. No. A301-9 ; 3 ♂♂, 1 ♀ (on slide), galls collected from Rôji, Fukuoka-City, Kyushu, 7. VI. 1963, M. Shiga leg. emerged on 13. VI. 1963, reared by J. Yukawa (host plant : ibid.), Cecid. No. A310-13.

Distribution : Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks : This species was originally described under the genus *Asynapta* by Matsu-

mura (1931). As mentioned in the tribe Asynaptini, this species is apparently distinguished from the members of the tribe and ought to be combined with the genus *Diathronomyia* by the combination of the following characters : being gall-maker on *Artemisia* ; Rs indistinct ; palpus consisting of 2 segments ; claw toothed ; ovipositor not aciculate. Subsequently Shinji (1944) identified this species as an European gall midge, *Diathronomyia florum* (Kieffer, 1890) (=*Rhopalomyia florum*), whose larvae live in the misshapen capitula and flowers (Barnes, 1949). The present author tentaitvely considers the Japanese species to be a distinct one, until the immature stages of the both species are compared, because the shape and position of the galls are rather different from each other.

Oligotrophus-Group

Genus **Oligotrophus** Latreille

Oligotrophus Latreille, 1805 ; Rübsaamen, 1892 ; Felt, 1908 ; Felt, 1911b ; Kieffer, 1913f ; Brunetti, 1920 ; Felt, 1925 ; Rübsaamen & Hedicke, 1926 ; Senior-White, 1928 ; Mani, 1934 ; Möhn, 1955 ; Felt, 1958 ; Gagné, 1967 ; Mamajev, 1969.

Palpus consisting of 3 segments ; first and second flagellar segments not fused ; tarsal claw simple on all legs ; empodium longer than claw ; R_5 meeting with costa beyond apex of wing ; ovipositor not chitinized, without distinct pocket. The members of this genus are usually associated with Juniper.

Oligotrophus faggalli Monzen

Oligotrophus faggalli Monzen, 1955a.

Host plant : *Fagus crenata* Blume [Buna].

Gall : Hemispherical, yellowish swelling produced along the mid and side-ribs on the upper or under side of the leaf ; gall consisting of 2 shell-shaped lobes ; monothalamus. [Buna-kaigarafushi] : Monzen, 1929 ; Monzen, 1955a.

Distribution : Japan (Honshu).

Oligotrophus japonicus Monzen

Oligotrophus japonicus Monzen, 1955a.

Host plant : *Weigela hortensis* (Sieb. et Zucc.) K. Koch [Taniutsugi].

Gall : Bud transformed into a subglobular swelling. [Taniutsugi-mefukure] : Monzen, 1929. [Taniutsugi-mefushi] : Monzen, 1955a.

Distribution : Japan (Honshu).

Remarks : As mentioned in the remarks on *Asphondylia diervillae*, this species is unlikely to be a true gall maker of the host plant and its generic position as well as that of the former species, *O. faggalli* is also rather doubtful.

Neomikiella-Group.

Genus **Janetiella** Kieffer

Janetiella Kieffer, 1898 ; Felt, 1908 ; Felt, 1911b ; Kieffer, 1913f ; Rübsaamen & Hedicke, 1926 ; Felt, 1958 ; Mamajev, 1969.

Palpus consisting of 4 segments ; antenna with 2 + 12 segments or more ; tarsal claw simple on all legs ; R_5 meeting with costa before apex of wing ; gonostylus of male genitalia moderately large, pubescent, gradually tapering ; ovipositor long, cylindrical.

Janetiella infrafoli Monzen

Janetiella infrafoli Monzen, 1955a.

Host plant : *Fagus crenata* Blume [Buna].

Gall : Subconical, smooth, yellowish green swelling produced along mid-rib on the under side of the leaf ; diameter abont 4 mm, height about 2 mm ; monothalamus. [Buna-haurakobufushi] : Monzen, 1929 ; Monzen, 1955a.

Distribution : Japan (Honshu).

Janetiella kimurai Inouye

Janetiella kimurai Inouye, 1964a ; Inouye, 1964b.

Host plant : *Pinus pentaphylla* Mayr. [Himekomatsu].

Gall : The bases of 2 needles fused and slightly thickened, forming a elongated oval-shaped swelling ; monothalamus.

Distribution : Japan (Honshu).

Dasineura-Group

Genus **Dryomyia** Kieffer

Dryomyia Kieffer, 1898 ; Felt, 1911b ; Kieffer, 1913f ; Möhn, 1955 ; Felt, 1958.

Palpus consisting of 3 segments ; flagellar segment stemmed in male, sessile in female ; tarsal claw bifid.

Dryomyia circinnans (Giraud)

Cecidomyia circinnans Girand, 1861 ; Sasaki, 1902.
Dryomyia circinnans (Girand) : Kieffer, 1913f ; Barnes, 1951.

Host plant in Japan : *Quercus* spp.?

Gall : Subglobular swelling on the under side of the leaf.

Distribution : Japan?, Asia Minor, Europe.

Genus **Dasineura** Rondani

Dasineura Rondani, 1840 ; Stone & Others, 1965 ; Prasad, 1966.
Dasyneura Agassiz & H. Loew, 1846. (preocc. Saunders, 1842).
Dasyneura Rondani : Felt, 1908 ; Felt, 1911b ; Kieffer, 1913f ; Brunetti, 1920 ; Felt, 1925 ; Rübsaamen & Hedicke, 1926 ; Senior-White, 1928 ; Mani, 1934 ; Möhn, 1955 ; Felt, 1958 ; Mamajev, 1969.
Perrisia Rondani, 1846 ; Kieffer, 1913f.
Neocerata Coquillett, 1900 ; Kieffer, 1913f.

This genus includes many species which give rise to galls on living plants, and some of them are economically important. They are characterized as follows : palpus consisting of 4 segments ; antenna usually with 2 + 12 or more segments ; claws on all legs toothed ; R_5 meeting with costa before wing apex ; M_{3+4} and Cu forming a fork ; ovipositor long.

Dasineura abietiperda (Henschel)

Cecidomyia abietiperda Henschel, 1880; Sasaki, 1901.
Perrisia abietiperda Henschel : Kieffer, 1913f.
Dasyneura abietiperda (Henschel) : Barnes, 1951.

Host plant in Japan : *Picea jezoensis* Carr. var. *hondensis* Rehd. [Touhi].

Gall : Larva lives in a small keg-shaped cavity in the bark or in the wood of current year's growth. Several such galls occur in close proximity on a single shoot. (Barnes, 1951).

Distribution : Japan ?, Europe.

Dasineura ezomatsue Uchida & Inouye

Dasyneura ezomatsue Uchida & Inouye, 1954 ; Inouye, 1964a.

Host plant : *Picea jezoensis* Carr. [Ezomatsu].

Gall : Larva associated with the terminal or lateral bud, or sometimes with newly growing twig, forming a subglobular swelling ; monothalamus.

Distribution : Japan (Hokkaido, Honshu).

Dasineura fulvicola Shinji

Dasynewca ! *fulvicola* Shinji, 1938n.
Dasyneura fulvicola Shinji : Shinji, 1939f ; Shinji, 1944.

Host plant : *Artemisia japonica* Thunb. [Otokoyomogi], *Artemisia princeps* Pamp. [Yomogi].

Distribution : Japan (Honshu ?).

Remarks : This species was originally described as an inquiline in the galls produced by *Misosatha artemisiae* Shinji (1939c). Subsequently Shinji (1944) mentioned that this

species is also responsible for rather elongated, elliptical galls on the leaves of *A. japonica*. The generic position, habit and host plant range of this species should be examined again in the future.

Dasineura nipponica Inouye

Dasyneura nipponica Inouye, 1966a ; Inouye, 1966b.

Host plant : *Larix leptolepis* Gord. [Karamatsu or Nipponkaramatsu].

Gall : Larvae associated with flower buds.

Distribution : Japan (Honshu).

Remarks : Sasaki (1901) used the name, *Cecidomyia kellneri* Henschel in his book.

Dasineura paederiae Shinji

Dasyneura paederiae Shinji, 1944.

Host plant : *Paederia scadens* Merrill [Hekusokazura].

Gall : Larva of this species forming gall on leaf, laef bud, leaf stalk and peduncle. [Hekusokazura-hatamafushi] & [Hekusokazura-mefushi] : Shinji, 1944.

Distribution : Japan (Honshu).

Dasineura viburni Shinji

Dasyneura viburni Shinji, ? ; Shinji, 1939h.

Host plant : *Viburnum Wrightii* Miq. [Miyamagamazumi].

Gall : Terminal bud transformed into an inverted bottle-shaped gall.

Distribution : Japan (Honshu ?).

Dasineura viciae (Kieffer)

Cecidomyia viciae Kieffer, 1888.
Perrisia viciae Kieffer : Kieffer, 1913f.
Dasyneura viciae Kieffer : Shinji, 1938m ; Shinji, 1939h ; Shinji, 1944.

Host plant in Japan : *Vicia Cracca* L. [Kusafuji].

Gall : Young leaves folded along the mid-rib and swollen ; polythalamus.

Distribution : Japan (Honshu), Europe.

Dasineura vicicola Shinji

Dasyneura vicicola Shinji, 1939b ; Shinji, 1944.

Host plant : *Vicia Pseudo-Orobus* Fisch. et Mey [Ôbakusafuji].

Gall : Young leaves folded along the mid-rib and swollen ; polythalamus. [Ôbakusa-fuji-shintomefushi] : Shinji, 1944.

Distribution : Japan (Honshu ?).

Remarks : Shinji (1939b, 1944) distinguished this species from *viciae* by the only difference of number of antennal segment.

Dasineura wisteriae Mani

Dasyneura wisteriae Mani, 1954b.

Host plant : *Wisteria floribunda* DC. [Fuji].

Gall : Flower bud does not open, forming a globular swelling.

Distribution : Japan (Kyushu).

Genus **Rhabdophaga** Westwood

Rhabdophaga Westwood, 1847 ; Felt, 1908 ; Felt, 1911b ; Kieffer, 1913f ; Rübsaamen & Hedicke, 1926 ; Möhn, 1955 ; Mamajev, 1969.
Bertieria Kieffer, 1896b.
Epourenia Rapp, 1946.

This genus comprises rather many species which are mainly responsible for galls on *Salix* and *Populus*, and they are characterized as follows : palpus consisting of 4 segments ; antenna usually with 2 + over 12 segments ; claw bifid ; R_5 meeting with costa near or at apex of wing ; ovipositor not chitinized.

Rhabdophaga salicivora Shinji

(Fig. 15)

Rhabdophaga salicivora Shinji, 1938h ; Shinji, 1938k ; Shinji, 1939h ; Shinji, 1944 ; Monzen, 1955b ; Kovalev, 1967.

Male : Wing length 4.4 to 4.8 mm. Eye bridge 6 to 8 facets wide medially. Palpus consisting of 4 segments, about 2/3 as long as height of head, with short setae and narrow scales rather densely ; first, second and third palpal segments subequal in length or slightly longer to distal segment ; fourth 1.0 to 1.4 times as long as third. Antenna with 2 + 21 segments ; scape larger than pedicel, with ventral and lateral setae sparsely ; pedicel with ventral, lateral and dorsal setae rather sparsely ; first and second flagellar segments fused ; fifth flagellar segment with a basal enlargement 1.2 to 1.4 times as long as wide, stem 2/5 to 3/5 as long as basal enlargement ; terminal segment subconical, 1.8 to 2.0 times as long as maximum width, sometimes fused with penultimate segment. Fore and middle legs with femur, tibia and second tarsal segment subequal in length, fourth tarsal segment about 2 times as long as fifth ; hind leg with tibia a little longer than femur and a little shorter (sometimes a little longer) than second tarsal segment, fourth tarsal segment about 2.1 times as long as fifth ; claw bent nearly at right angle, with a basal tooth on all legs ; empodium nearly as long as claw, distally broader. Wing about 2.6 times as long as wide ; R_5 nearly straight, meeting with costa a ltttle before apex of wing ; M_{3+4} and distal portion of Cu invisible ; number of sensory pore varying with specimen. Genitalia : cerci rather deeply incised by a

V-shaped emargination, forming a pair of lobes which are distally rounded ; subanal plate nearly as long as and distinctly narrower than cerci, incised by a V-shaped emargination, forming a pair of lobes which are rather narrowly rounded distally ; gonostylus weakly arched, tapering distally, with a strong apical claw ; inner angle of gonocoxite ventrally developed into a large, setose lobe, which has a few, small protuberances ventrodistally ; aedeagus distally narrower, apically truncated or slightly rounded.

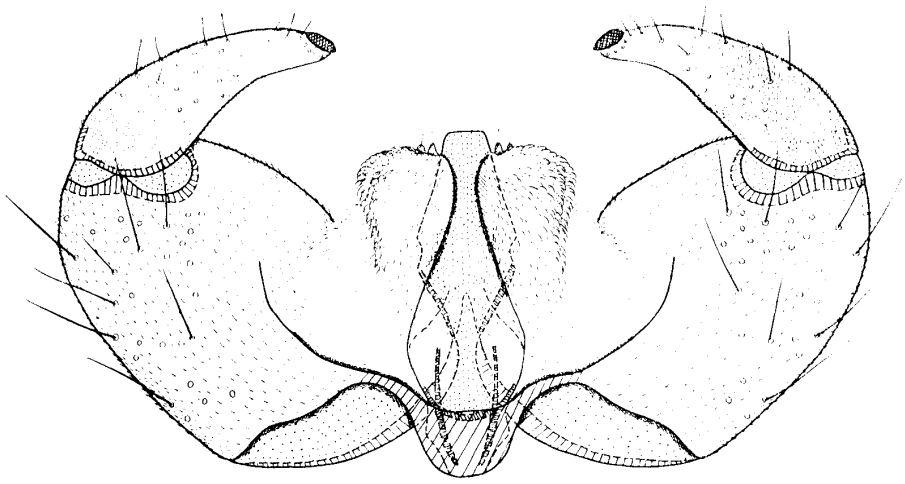

Fig. 15. *Rhabdophaga salicivora* Shinji.
Male genitalia, dorsal view (cerci and subanal plate removed).

Female : Wing length 4.5 to 5.0 mm, about 2.6 times as long as wide. Antenna with 2 + 22 to 2 + 24 segments ; first and second flagellar segments fused ; stem of each flagellar segment very short; basal enlargement of fifth flagellar segment 1.5 times as long as wide ; terminal few flagellar segments sometimes not distnctly differentiated, forming a rather elongated subconical segment. Fore and middle legs with femur and tibia subequal in length or sometimes one is a little longer than the other, fourth tarsal segment about 1.9 times as long as fifth ; hind leg with tibia a little longer than or rarely as long as femur and slightly longer than or nearly as long as second tarsal segment, fourth tarsal segment about 2.2 times as long as fifth. Ovipositor rather short; terminal lobe suboval, with short setae.

Host plants in Japan : *Salix babylonica* L. [Shidareyanagi], *Salix bakko* Kimura [Bakkoyanagi], *Salix Gilgiana* Seem. [Kawayanagi], *Salix kinuyanagi* Kimura [Kinuyanagi], *Salix koriyanagi* Kimura [Koriyanagi].

Gall : Subglobular or spindle-shaped, woody swelling on the twig ; color green, shading to brown ; length 8 to 20 mm, diameter 5 to 18 mm ; monothalamus. [Yanagi-zuifushi] : Monzen, 1929 ; Monzen, 1955b. [Yanagi-edatamafushi] : Shinji, 1944.

Biological notes : This species hibernates at the larval stage and pupation occurs in spring. Emergence starts from early in April or sometimes from the middle of March and lasts until early in May. Muramatsu (1916) gave the brief notes about the biology of this species and subsequently Masaki (1932a, 1932b, 1932c) published the detailed account of its morphology and biology under the name, *Rhabdophaga salicis* (Schrank, 1803).

Specimens examined : 4 ♂♂, 4 ♀♀ (on slide), 3 ♂♂, 2 ♀♀ (in alcohol), galls collected from Higashihamatani, Sasayama, Hyogo-Pref., Honshu, 22. IV. 1965, A. Nakanishi leg. emerged on 26. IV.–8. V. 1965, reared by J. Yukawa (host plant : *S. gilgiana*), Cecid. No. A3001-8.

Distribution : Japan (Honshu, Kyushu), Far East of the USSR, Korea.

Remarks : Muramatsu (1911) and Masaki (1932a, 1932b, 1932c) considered that this species is identical with *Rhabdophaga salicis* (Schrank, 1803), but Shinji (1938h) described it as a distinct species owing to the fact that the galls of this species are monothalamus, while those of *salicis* are polythalamus. On the other hand, this species resembles *Rhabdophaga dubia* (Kieffer, 1891) which is responsible for woody gall on *Salix aurita* L. and *Salix cinerea* L. in Europe. To clarify the distinction between the both species, structure of immature stages ought to be examined in the future.

Rhabdophaga saliyonai Shinji.

Rhabdophaga saliyonai Shinji, 1938i ; Shinji, 1938k ; Shinji, 1944.
Zygiobia saliyonai Shinji, 1939h.
Helichomyia chidai Monzen, 1955b. Synonymy?

Male : Wing length 2.8 to 3.2 mm. Eye bridge 6 to 7 facets wide medially. Palpus consisting of 4 segments, about 2/3 as long as height of head, with short setae and short scales rather densely ; first palpal segment shortest, 1.5 to 2.0 times as long as wide ; second slightly longer than first ; third 1.2 to 1.6, fourth 1.4 to 1.8 times as long as first ; third and fourth sometimes fused. Antenna with 2 + 17 to 2 + 19 segments ; scape larger than pedicel, with short setae except on outer-dorsal portion, more numerous on inner side ; pedicel with short setae, more numerous on inner side and ventral portion ; first and second flagellar segments fused ; fifth flagellar segment with a basal enlargement about 1.4 times as long as wide, stem about 1/2 as long as basal enlargement ; terminal segment subconical, 1.4 to 2.3 times as long as maximum width, sometimes fused with penultimate segment. Fore and middle legs with femur, tibia and second tarsal segment subequal in length, sometimes second tarsal segment a little shorter than femur or tibia, fourth tarsal segment 2.0 to 2.2 times as long as fifth ; hind leg with tibia a little longer than femur and nearly as long as or slightly longer than second tarsal segment, fourth tarsal segment about 2.1 times as long as fifth ; claw bent nearly at right angle, with a basal small tooth on all legs ; empodium nearly as long as claw, distally broader. Wing about 2.4 times as long as wide ; R_5 nearly straight or slightly curved, meeting with costa a little before apex of wing ; M_{3+4} and Cu forming an inconspicuous fork, sometimes M_{3+4} and distal portion of Cu invisible ; number of sensory pore varying with the specimen. Genitalia : cerci rather deeply incised by a V-shaped emargination, forming a pair of lobes ; subanal plate nearly as long as and distinctly narrower than cerci, incised by a V-shaped emargination, forming a pair of lobes which are rather narrowly rounded distally ; gonostylus weakly arched, tapering distally, with a strong apical claw ; inner angle of gonocoxite ventrally developed into a large, setose lobe which has 2 small protuberances ventro-distally ; aedeagus nearly parallel sided on distal portion, apically truncated or weakly rounded.

Female : Wing length 2.5 to 2.9 mm, 2.3 to 2.6 times as long as wide. Antenna usually with 2 + 17 to 2 + 18 segments ; first and second flagellar segments fused ; stem of each flagellar segment very short ; basal enlargement of fifth flagellar segment 1.5 to 1.7 times as long as wide ; terminal 2 segments sometimes not distinctly differentiated, forming a rather elongated subconical segment. Fore and middle legs with femur nearly as long as tibia and a little longer than second tarsal segment, about 1.8 times as long as fifth ; hind leg with femur nearly as long as tibia or second tarsal segment, fourth tarsal segment about 2.1 times as long as fifth. Ovipositor rather long ; terminal lobe elongated suboval, with short setae.

Host plants : *Salix babylonica* L. [Shidareyanagi], *Salix bakko* Kimura [Bakkoyanagi], *Salix gracilistyla* Miq. [Nekoyanagi], *Salix hondoensis* Koidz. [Ezoyanagi], *Salix Sieboldiana* Blume [Yamayanagi], *Salix* spp.

Gall : Subglobular, hemispherical or spindle-shaped, woody swelling on the twig ; size variable ; polythalamus. [Yanagi-edakobufushi] : Monzen, 1929 ; Monzen, 1955b. [Yanagi-tsutofushi] : Shinji, 1944.

Biological notes : This species hibernates as the larval stage and pupation occurs in early spring. Emergence starts from the middle of April and lasts until early in June.

Specimens examined : 2♂♂, 1 ♀ (on slide), 2♂♂, 8♀♀ (in alcohol), galls collected from Mt. Hiko, Fukuoka-Pref., Kyushu, 18. V. 1963, J. Yukawa leg. emerged on 23. V.–1. VI. 1963, reared by J. Yukawa (host plant : *Salix* sp.), Cecid. No. A201-3 ; 2♂♂, 4♀♀ (on slide), 20♀♀ (in alcohol), galls collected from ibid., 19. III. 1966, M. Shiga leg. emerged on 19–28. IV. 1966, reared by J. Yukawa (host plant : *Salix* sp.), Cecid. No. A204-9 ; 1♂, 2♀♀ (on slide), 2♂♂, 3♀♀. (in alcohol), galls collected from Mt. Takadake, Aso, Kumamoto-Pref., Kyushu, 25. III. 1963, Y. Miyatake leg. emerged on 21. IV.–17. V. 1963, reared by J. Yukawa (host plant : *Salix* sp.), Cecid. No. A210-12.

Distribution : Japan (Honshu, Kyushu), Korea.

Remarks : This species is similar to *Rhabdophaga salicis* (Schrank, 1803) and was considered to be identical with it. (Sasaki, 1902 ; Niijima, 1913). Shinji (1938i, 1944) described this species as distinct one, but he did not state any differences between them. As mentioned on the last species, *R. salicivora*, the larval and pupal stages of this species ought to be compared with those of *salicis* or the related species in the future. Monzen (1955b) described *Helicomyia chidai* reared from the galls on the twigs of *Salix babylonica* L. and *Salix rorida* Lack. (=*S. hondoensis* Koidz.) and he stated that *H. chidai* is distinguished from *R. saliyonai* by having 20 segmented antenna, simple tarsal claw and simple Cu vein. As the type specimens of the both species have been lost, the comparision between these 2 species is rather difficult. It is, however, likely that they are identical because the basal small tooth of tarsal claw and very faint M_{3+4} vein are sometimes overlooked and the number of antennal segment varies with the spiecimens. The gall of *H. chidai* is also simlar to that of *R. saliyonai*.

On the other hand, *R. saliyonai* is distinguished from *R. salicivora* in the following respects : much smaller in size ; number of flagellar segment not over 20 ; gall polythalamus. This species also differs from *Helicomyia saliciperda* (Dufour, 1841) by the shape of gall (Barnes, 1951) : obvious woody swelling in *saliyonai*, while feeble swelling on the twig in *saliciperda*.

Rhabdophaga heterobia (H. Loew)

Cecidomyia heterobia H. Loew, 1850 ; Kurata, 1918.
Rhabdophaga heterobia (H. Loew) : Kieffer, 1913f ; Barnes, 1929a ; Barnes, 1930a ; Barnes, 1931 ; Barnes, 1934 ; Barnes, 1940 ; Barnes, 1949 ; Barnes, 1951 ; Mamajev, 1969.

Host plant in Japan : *Salix* sp.

Gall : Larvae in the catkins or in the terminal buds.

Distribution : Japan?, Europe.

Rhabdophaga marginemtorquens (Bremi)

Cecidomyia marginemtorquens Bremi, 1847 ; Winnertz, 1853.
Cecidomyia marginemtorquens Winnertz : Sasaki, 1902.
Perrisia marginemtorquens Winnertz : Kieffer, 1900.
Rhabdophaga marginemtorquens Winnertz : Kieffer, 1913f.
Rhabdophaga marginemtorquens (Bremi) : Barnes, 1949 ; Barnes, 1951.

Host plant in Japan : *Salix* sp.

Gall : Larvae in marginal rolls on the leaves.

Distribution : Japan?, Europe.

Rhabdophaga rosaria (H. Loew)

Cecidomyia rosaria H. Loew, 1850 ; Matsumura, 1899 ; Sasaki, 1902 ; Kurata, 1918.
Dichelomyia rosaria H. Loew : Rübsaamen, 1892.
Rhabdophaga rosaria (H. Loew) : Kieffer, 1900 ; Houard, 1908 ; Kieffer, 1913f ; Rübsaamen, 1915 ; Rübsaamen & Hedicke, 1926 ; Monzen, 1929 ; Fujimatsu, 1935 ; Shinji, 1938j ; Shinji, 1938k ; Shniji, 1939h ; Matsushita, 1943 ; Shinji, 1944 ; Barnes, 1951 ; Möhn, 1955 ; Monzen, 1955b ; Skuhravá & Skuhravý, 1963 ; Kovalev, 1967 ; Mamajev, 1969.
Cecidomyia cinerearum Hardy, 1850.

Host plant in Japan : *Salix Gilgiana* Seem. [Kawayanagi], *Salix integra* Thunb. [Inukoriyanagi], *Salix subfragilis* Anderss. [Tachiyanagi].

Gall : Terminal bud transformed into a rosette gall, ceasing the growth of the stem. [Yanagi-hanafushi] : Monzen, 1929 ; Monzen, 1955b. [Yanagi-shintomefushi] : Shinji, 1944.

Distribution : Japan (Honshu, Kyushu), Europe, Far East of the USSR, Korea, China?, Syria?

Rhabdophaga salicifoliae Shinji

Rhabdophaga salicifoliae Shinji, 1944.

Host plant : *Salix* sp.

Gall : Larvae probably on the leaves. [Yanagi-hasujifushi] : Shinji, 1944.

Distribution : Japan (Honshu?).

Rhabdophaga terminalis (H. Loew)

Cecidomyia terminalis H. Loew, 1850 ; F. Löw, 1877 ; Sasaki, 1902.
Rhabdophaga terminalis (H. Loew) : Kieffer, 1913f ; Rübsaamen & Hedicke, 1926 ; Barnes, 1932b ; Barnes, 1951 ; Skuhravá & Skuhravý, 1963 ; Kovalev, 1967 ; Mamajev, 1969.

Host plant in Japan : *Salix* sp.

Gall : Leaves of the terminal bud failing to open out, internodes foreshortened, ceasing the terminal growth.

Distribution : Japan ?, Europe, Far East of the USSR.

Rhabdophaga yanagi (Shinji)

Zygiobia yanagi Shinji, 1938i ; Shinji, 1938k.
Rhabdophaga yanagi Shinji, 1939h ; Shinji, 1944.

Host plants : *Salix babylonica* L. [Shidareyanagi], *Salix koriyanagi* Kimura [Koriyanagi].

Gall : Obvious, hemispherical woody swelling on the twig, which is oligothalamus and usually associated with bud. [Yanagi-katagawafushi] : Shinji, 1944.

Distribution : Japan (Honshu).

Remarks : Shinji (1938f) incorrectly used the name, *R. salisivora* for this species. According to Shinji (1944), the species is characterized by having 2 segmented palpus and simple tarsal claw.

The following 2 species of the genus *Rhabdophaga* which were previously recorded from Japan are not associated with *Salix* or *Populus*. Their generic position ought to be examined again in the future.

Rhabdophaga asteriae Shinji

Fulvomyia ?? asteriae Shinji, 1938f. (original description unknown to the author).
Rhabdophaga asteriae Shinji, 1944.

Host plant : *Aster scaber* Thunb. [Shirayamagiku].

Gall : [Shirayamagiku-kawarimefushi] & [Shirayamagiku-mefushi ?] : Shinji, 1944.

Distribution : Japan (Honshu ?).

Rhabdophaga dioscoreae Shinji

Riveraella dioscoreae Shinji, 1939b.
Rhabdophaga dioscoreae Shinji, 1944.

Host plant : *Dioscorea nipponica* Makino [Uchiwatokoro].

Gall : Subglobular swelling on the both sides of the leaves and the stems ; diameter about 5 mm ; color green, smooth on surface ; monothalamus. [Uchiwatokoro-marufushi] : Shinji, 1944.

Distribution : Japan (Honshu).

Genus **Helicomyia** Rübsaamen

Helicomyia Rübsaamen, 1915b ; Rübsaamen & Hedicke, 1926 ; Möhn, 1955.

This genus is distinguished from the genus *Rhabdophaga* by having whitish, opalescent wing and the general appearance in which it is more suggestive of a *Lasioptera* species with its squat abdomen than of a *Rhabdophaga*. (Barnes, 1951).

Helicomyia saliciperda (Dufour)

Lasioptera saliciperda Dufour, 1841.
Cecidomyia saliciperda Dufour : Sasaki, 1902.
Rhabdophaga saliciperda Dufour : Cecconi, 1912 ; Kieffer, 1913f ; Barnes, 1935 ; Mamajev, 1969.
Helicomyia saliciperda (Dufour) : Rübsaamen, 1915b ; Barnes, 1951 ; Möhn, 1955.

Host plant in Japan : *Salix* sp. ?

Gall : There are many small chambers under the outer layer of the stem, causing at most a feeble swelling.

Distribution : Japan ?, Europe.

Arnoldiola-Group

Genus **Arnoldiola** Strand

Arnoldia Kieffer, 1895b ; Felt, 1911 ; Kieffer, 1913f. (preocc. Mayer).
Arnoldiola Strand, 1928 ; Möhn, 1955 ; Mamajev, 1969.
Arnoldiana Strand : Rübsaamen & Hedicke, 1926.

Palpus consisting of 4 segments ; flagellar segment sessile in both sexes ; tarsal claw bifid ; R_5 meeting with costa nearly at apex of wing.

Arnoldiola cerris (Kollar)

Lasioptera cerris Kollar, 1850.
Cecidomyia cerris Kollar : Sasaki, 1902.
Arnoldia cerris (Kollar) : Kieffer, 1913f ; Barnes, 1951.

Host plants in Japan : *Quercus* spp. ?

Gall : Leaf gall.

Distribution : Japan ?, Asia Minor, Europe.

Tribe BRACHYNEURINI Kieffer

Genus **Mikiola** Kieffer

Mikiola Kieffer, 1896c ; Felt, 1911b ; Kieffer, 1913f ; Möhn, 1955.

Palpus consisting of 4 segments ; antenna with 2 + 18 to 2 + 22 segments ; flagellar segment stemmed in male, sessile in female ; tarsal claw simple ; R_5 meeting with costa

nearly at apex of wing ; both cerci and subanal plate of male genitalia emarginated ; ovipositor short, lobed.

Mikiola fagi Hartig

Cecidomyia fagi Hartig, 1839 ; Sasaki, 1902.
Mikiola fagi (Hartig) : Kieffer, 1913f ; Barnes, 1951.

Host plant in Japan : *Fagus crenata* Blume [Buna].

Gall : The galls are ovoid, hard, smooth and polished, 8 to 10 mm high, with a diameter about 5 mm, and projecting from the upper surface of the leaves, attached to a vein. (Barnes, 1951).

Distribution : Japan ?, Asia Minor, Europe.

Mikiola populi Shinji

Mikiola populi Shinji, 1938j.

Host plant : *Populus Maximowiczii* Henry [Doronoki]. Larvae live in the Cortex.

Distribution : Japan (Honshu ?).

Mikiola populicola Shinji

Mikiola populicola Shinji, 1938j.

Host plant : *Populus nigra* L. var. *italica* (Munchh.) Koehne [Popura]. Larvae live in the Cartex.

Distribution : Japan (Honshu ?).

Remarks : The last 2 Shinji's species are not associated with *Fagus*. There is considerable room for doubt as to their generic position.

Unclassified Genera of OLIGOTROPHIDI

Genus **Psectrosema** Kieffer

Psectrosema Kiefier, 1904a ; Felt, 1911b ; Kieffer, 1913f.

Palpus consisting of 2 segments ; tarsal claw simple ; pulvilli nearly 2 times as long as empodium.

Psectrosema gagaimo Monzen

Psectrosema gagaimo Monzen, 1955b.

Host plant : *Metaplexis japonica* (Thunb.) Makino [Gagaimo].

Gall : Leaf wrinkled irregularly ; white larvae live on the under side. [Gagaimo-hatijimi] : Monzen, 1955b.

Distribution : Japan (Honshu).

Remarks : As this species is not associated with *Tamarix*, it is necessary to examine

its generic position again.

Genus **Hasegawaia** Monzen

Hasegawaia Monzen, 1937 ; Monzen, 1955b.

This genus is characterized in the following respects : palpus consisting of 4 segments ; antenna usually with over 2 + 22 segments ; claw bifid on all legs, bent nearly at right angle ; R_5 meeting with costa before apex of wing ; M_{3+4} free from Cu ; ovipositor long.

Hasegawaia sasacola Monzen

(Fig. 16 : A–E)

Hasegawaia sasacola Monzen, 1937 ; Shinji, 1944 ; Monzen, 1955b.
Rhabdophaga sasae Shinji, 1938g.

Male : Wing length about 4.5 mm. Eye bridge 3 to 4 facets wide, but ommantidia absent just at medial portion. Palpus consisting of 4 segments, nearly as long as or a little shorter than height of head, with short setae rather sparsely and scales densely; first segment shortest; second 1.1 to 1.5, third 1.6 to 2.1, fourth 1.8 to 2.5 times as long as first. Antenna usually with 2 + 22 to 2 + 24 segments ; scape much larger than peicel, with scattered setae ventrally, more numerous on inner side ; pedicel about 1.3 times as long as wide, sparsely with rather short setae and rather narrow, short scales dorsally and ventrally ; first and second flagellar segments fused ; fifth flagellar segment with a basal enlargement about 1.5 times as long as wide, a little longer than distal stem ; terminal segment subconical, 1.3 to 2.2 times as long as maximum width. Fore leg with second tarsal segment a little longer than femur and a little shorter than tibia, fourth tarsal segment about 2.2 times as long as fifth ; middle and hind legs with second tarsal segment nearly as long as or slightly longer than femur and distinctly shoter than tibia, fourth tarsal segment 2.0 times as long as fifth ; claw bifid on all legs, bent nearly at right angle ; empodium broad, distally broader, nearly as long as claw. Wing about 2.6 times as long as wide, densely with narrow, brownish scales on surface and rather long brownish hairs on hind margin ; R_5 meeting with costa distinctly before apex of wing; M_{3+4} very faint, free from Cu ; Cu strongly curved ; sensory pore 2 to 3 on distal portion of R_1, 1 on basal and 2 to 5 on submedial to subdistal portion of R_5. Genitalia : cerci rather deeply incised by a V-shaped emargination, forming a pair of lobes which are largely rounded ; subanal plate rather deeply incised by a narrow, pear-shaped emargination, forming a pair of lobes which are narrowly rounded distally ; gonostylus suboval in shape, with a pectinated claw apically ; inner angle of gonocoxite ventrally developed into a large, setose lobe which has several, small protuberances ventro-distally ; aedeagus slipper-shaped.

Female : Wing length 4.4 to 5.2 mm, about 2.6 times as long as wide. Antenna usually with 2 + 25 to 2 + 26 segments ; first and second flagellar segments fused ; stem of each flagellar segment very short ; basal enlargement of fifth flagellar segment about 1.8 times as long as wide ; length of basal enlargement getting shorter to distal segment ; terminal segment subconical, nearly as long as or a little longer than wide.

All legs with femur a little shorter than tibia and much longer than second tarsal segment, fourth tarsal segment 1.5 to 1.7 times as long as fifth. Ovipositor long ; terminal lobe strongly elongated, with short setae rather densely.

Host plant : *Sasaella ramosa* Makino [Azumazasa].

Gall : Bud swelling, spindle-shaped, somewhat flattened ; length 7.0 to 30.0 cm, width 1.0 to 2.5 cm ; green in color, turn to yellowish in Autumn ; polythalamus. [Sasa-uo-fushi] : Hasegawa, 1745? ; Monzen, 1929 ; Monzen, 1937 ; Shinji, 1944 ; Monzen, 1955b ; Muroi, 1963.

Biological notes : There is one generation in a year. According to Shinji (1938h), yellowish larvae begin to pupate from the end of November and become orange yellow. Adult midges appear in the middle of March. Based on the laboratory breeding of the galls from Morioka by the author, the first midge emerged on the 9th of April and emergence lasted until the 20th of April, with a sex ratio (♀/♂+♀ × 100) about 94 % in 1966.

Specimens examined : 3 ♂♂, 11 ♀♀ (on slide), type specimens, galls collected from Takamatsu, Morioka-City, Honshu, K. Monzen leg. emerged on IV-VI. 1922, 1950, 1951,

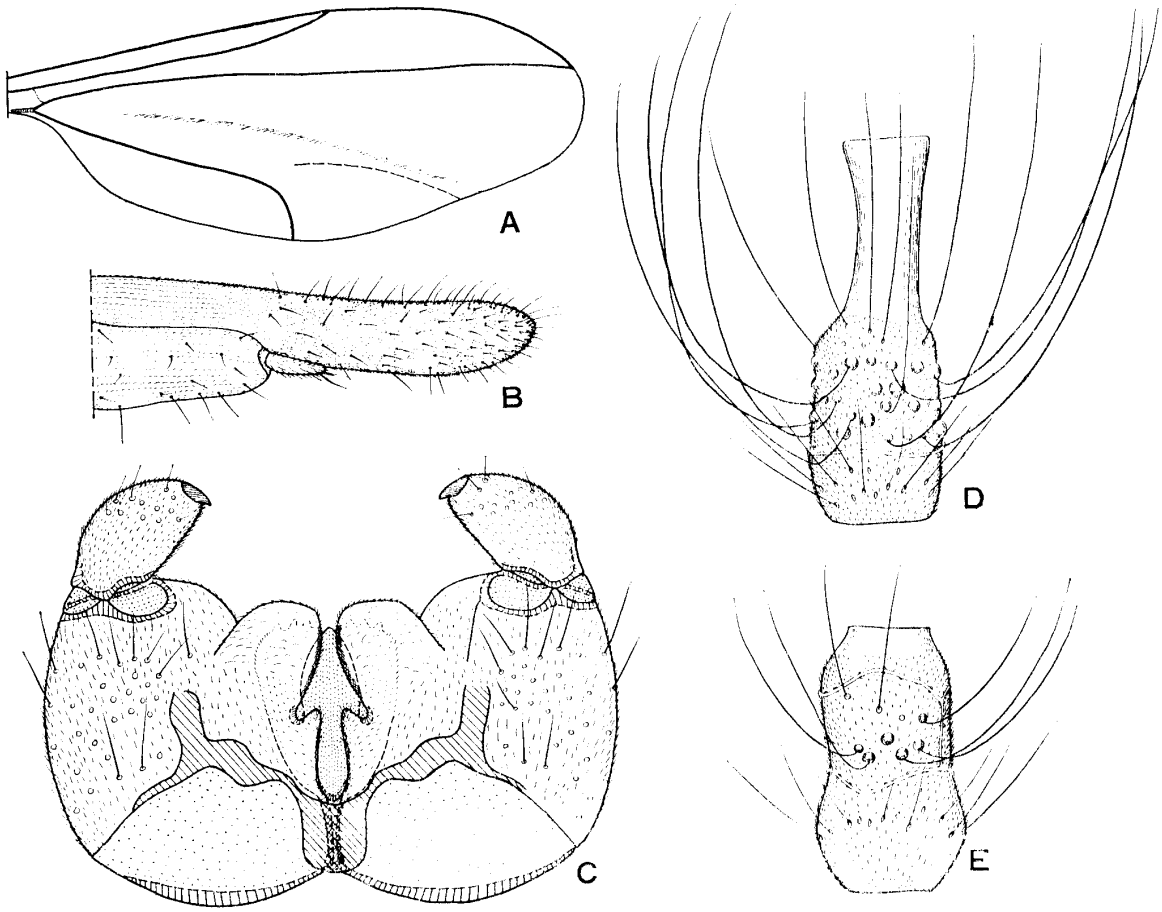

Fig. 16. *Hasegawaia sasacola* Monzen.
(A) wing, ♀. (B) ovipositor, lateral view. (C) male genitalia, dorsal view (cerci and subanal plate removed). (D) fifth flagellar segment, ♂. (E) fifth flagellar segment, ♀.

reared by K. Monzen, (host plant : *S. ramosa*) ; 4 ♂♂, 6 ♀♀ (on slide), 2 ♂♂, 83 ♀♀ (in alcohol), galls collected from Kuriyagawa, Morioka-City, Honshu, 1. IV. 1966, Y. Maeta leg. emerged on 9-20. IV. 1966, reared by J. Yukawa (host plant : *S. ramosa*), Cecid. No. A4801-10.

Distribution : Japan (Honshu, Shikoku?, Kyushu?).

Remarks : According to Muroi (1963), this kind of gall is known to occur on : *Sasa paniculata* Makino et Shibata [Chimakizasa], *Sasa kurilensis* Makino et Shibata [Chishimazasa], *Pseudosasae japonica* Makino [Yadake], *Pseudosasae purpurascens* Makino [Suzutake], *Phyllostachys pubescens* Mazel [Môsôchiku], *Pleioblastus simonii* Nakai [Medake], and *Pleioblastus variegatus* Makino [Nezasa], of which, last five are mainly found in Shikoku and Kyushu and their galls are somewhat smaller in size than those of the first two. The author recently obtained the galls of same kind on *Pleioblastus linearis* Nakai [Ryûkyûchiku] which were forwarded from Tokara Is., Kagoshima-Pref., Kyushu. Because adults or larvae from the above mentioned host plants have not been examined, it is unknown at present whether these galls are caused by a single species or two or more different species.

Supertribe ASPHONDYLIIDI

Most of the members of this supertribe are known to be gall makers and they are characterized in the following respects : antenna usually with 2 + 12 segments ; basal enlargement of flagellar segment elongate, cylindrical, with short distal stem, distinctly reduced distally in female ; circumfila usually tortuous in male ; tarsal claw simple ; R_5 well separated from R_1 and meeting with costa nearly at or beyond wing apex ; ovipositor slender or aciculate in many cases. The following 10 named and 1 unnamed species were previously recorded from Japan. Seven species of them are redescribed and the rest are listed below with the references and the brief notes on their host plant range, gall and distribution. *Kiefferia miscanthi* (Shinji, 1938f) is excluded from the members of the supertribe and newly combined with the genus *Orseolia* of the supertribe Cecidomyiidi.

Key to Japanese genera

1. Male flagellum not constricted ; gonostylus of male genitalia apically with 1 or 2 sclerotized claw or teeth ; ovipositor basally with a bilobed dorsal pouch 2
- Male flagellum constricted ; gonostylus of male genitalia subapically with a dense group of short, stiff setae ; ovipositor basally with a small dorsal swelling in the Japanese species ..... *Asteralobia* Kovalev
2. Gonostylus apically with a bidentate claw .....*Asphondylia* H. Loew
- Gonostylus apically with 2 teeth which are separately situated ....*Pseudasphondylia* Monzen

Genus **Asphondylia** H. Loew

Asphondylia H. Loew, 1850 ; Winnertz, 1853 ; Osten Sacken, 1862 ; Osten Sacken, 1869 ; Rübsaamen, 1892 ; Theobald, 1892 ; Kieffer, 1898 ; Kieffer, 1900 ; Felt, 1908 ; Felt, 1911b ; Kieffer, 1913f ; Felt,1916 ; Brunetti, 1920 ; Felt, 1925 ; Rübsaamen & Hedicke,

1926 ; Senior-White, 1928 ; Mani, 1934 ; Möhn, 1955 ; Möhn, 1959 ; Kovalev, 1964 ; Mamajev, 1969.

Phyllophaga Rondani, 1856 ; Kieffer, 1900.
Cylindrocera Lioy, 1863.
Gisonobasis Rübsaamen, 1915a.
Ischnonyx Rübsaamen, 1916.

This genus includes many species and some of them are ecnomically important. They are characterized as follows : palpus usually consisting of 1 + 2 segments ; antenna with 2 + 12 segments in both sexes ; male flagellar segments subequal in length or only slightly reduced distally, with remarkably convolute circumfila ; female flagellar segment with 2 regular whorls of circumfila connected by longitudinal bands ; distal 3 segments, especially terminal one, distinctly shortened in female ; tarsal claw simple, bent nearly at right angle ; R_5 meeting with costa near or beyond wing apex. Genitalia : cerci usually divided into 2 parts, sometimes not divided though deeply incised by a emargination ; tegmen emarginated ; gonostylus apically with a sclerotized and bidentate claw ; leaf- or finger-shaped, rarely plate-like structure sometimes present at base of gonocoxite ; aedeagus usually tapering distally. Ovipositor protractile, slender, aciculate, basally with a bilobed dorsal pouch.

Asphondylia baca Monzen

(Fig. 17 : A, C-G)

Asphondylia baca Monzen, 1937 ; Shinji, 1944 ; Monzen, 1955b ; Yukawa, 1967d.
Contarinia ampelopsivora Shinji, 1938d. Synonymy ?
Kiefferia ampelopsivora Shinji, 1939h.

Male : Wing length 2.5 to 3.2 mm. Eye bridge 8 to 12 facets wide medially. Palpus consisting of 1 + 2 segments ; first palpal segment 2.4 to 3.0 times as long as wide ; second 1.6 to 1.8 times as long as first. Antenna with 2 + 12 segments ; scape distally a little broader, about 1.5 times as long as distal width, 2.1 to 2.3 times as long as pedicel, with dorsal and ventral setae densely ; pedicel subcylindrical, 3/4 to 4/5 as long as wide, with dorsal setae rather sparsely and ventral setae densely ; flagellar segments subequal in length ; basal enlargement of fifth flagellar segment 3.3 to 4.4 times as long as wide. Fore leg with tibia nearly as long as femur and a little longer than second tarsal segment, fourth tarsal segment about 1.9 times as long as fifth ; middle leg with tibia a little longer than femur and much longer than second tarsal segment, fourth about 1.7 times as long as fifth ; hind leg with tibia nearly as long as femur and much longer than second tarsal segment, fourth about 1.7 times as long as fifth ; first tarsal segments of all legs with an apical spur ; claw simple on all legs, bent nearly at right angle ; empodium nearly as long as claw. Wing about 2.5 times as long as wide ; R_5 meeting with costa beyond wing apex ; sensory pore 2 on distal portion of R_1, 1 on basal portion of R_5, 2 on distal half of R_5. Genitalia : cerci divided into 2 lobes ; tegmen rather deeply emarginated dorsally, rather shallowly emarginated ventrally ; gonostylus subglobular, apically with a sclerotized and bidentate claw ; gonocoxite massive, ventrally extending beyond insertion of gonostylus ; aedeagus laterally sclerotized, distally tapering, basally with a rather weakly sclerotized plate-like structure, which is developed into a pair of small lobes caudo-laterally and connected laterally with

inner portion of gonocoxite (when the material is boiled with Lacti-phenol solution, the connection results in irregularly notched lateral margin of the structure).

Female : Wing length 2.5 to 3.5 mm. Flagellar segment getting shorter to distal segment ; basal enlargement of fifth flagellar segment 4.0 to 4.5 times as long as wide ; terminal segment subglobular. Fourth tarsal segments of all legs 1.3 to 1.5 times as long as fifth. Ovipositor protractile, slender, aciculate, basally with a bilobed dorsal pouch. Otherwise almost as in male.

Mature larva : Second antennal segment short, conical, about 0.01 mm, 1.4 times as long as basal width ; 2 ventral and 2 lateral cervical papillae each with a seta, 2 dorsal and sometimes 1 of 2 lateral cervical papillae invisible. Number and position of stigma normal ; 4 dorsal papillae each with a seta ; 3 pleural papillae present on each side, each with a seta ; 2 dorsal papillae of eighth abdominal segment each with a seta ; 2 of 6 terminal papillae somewhat cone-shaped, remaining 4 terminal papillae each with a short seta. Sternal spatula 0.29 to 0.36 mm, distally with 4 lobes which are rather weakly rounded apically and not acutely pointed ; 2 outer lobes a little longer than 2 inner lobes ; 3 inner and 2 outer lateral papillae all with a seta ; sternal and inner pleural papillae also with a seta ; 2 anterior ventral papillae and 2 posterior ventral papillae each with a seta ; 2 ventral papillae of eighth abdominal segment each with a seta ; anal papillae without seta.

Pupa : Apical spine long, 0.33 to 0.38 mm, acutely pointed, with finely denticulate inner margin ; apical papilla with a seta which is 0.05 to 0.06 mm ; an upper frontal spine present, strongly sclerotized ; 3 lower frontal spines present, each about 1/2 as long as upper one ; 1 of 2 lower facial papillae with a seta ; usually 1 of 3 lateral facial papillae with a seta ; prothoracic horn rather short, about 0.1 mm ; stigma present on first to eighth abdominal segments, not distinctly produced ; each abdominal segment, except first one, dorsally with several transvers rows of spines which are successively longer and more regularly arranged posteriorly ; usually 4 of 8 dorsal papillae each with a seta.

Host plants : *Ampelopsis brevipedunculata* (Maxim.) Trautv. var. *heterophylla* (Thunb.) Hara [Nobudô], *Aucuba japonica* Thunb. [Aoki].

Gall : Fruit of *Ampelopsis* swelling, about 3 times as large as normal one, yellowish green with purple tinge, mono- or sometimes oligothalamus. This gall was first reported by Mukaigawa (1917) and subsequently by Monzen (1929). [Nobudô-mifushi] : Monzen, 1929 ; Shinji, 1938d ; Monzen, 1937 ; Shinji, 1944 ; Monzen, 1955b. Fruit of *Aucuba* irregularly transformed, smaller than normal fruit, green and partly red, polythalamus. [Aoki-okuremi] : Shinji, 1944.

Biological notes : Adults emerge from the galls of *Ampelopsis* on September and October (Mukaigawa, 1917 ; Shinji, 1944). According to the laboratory breedings and the field observations by the present author, the adults emerged from galls of *Aucuba* around June and July, and young larvae were observed on early September in the small but distinctly developed galls of *Aucuba*. The young larvae hibernate and became full grown in the spring. It was observed in the field that about 50 % of the galls of *Aucuba* desended during the hibernation. (Yukawa, 1967d). Pupations occur in the galls.

Specimens examined : 2 ♀♀ (on slide), type specimens, labeled as Towada, Aomori-Pref., Honshu, 20. IV. 1928, K. Monzen leg. (host plant : probably *Aucuba japonica*) ; 5

♂♂, 5 ♀♀, 3 larvae, 1 pupa (on slide), many others (in alcohol), galls collected from Mt. Hiko, Fukuoka-Pref., Kyushu, 26. VI. 1966, J. Yukawa leg. emerged on 2–11. VII. 1966, reared by J. Yukawa (host plant : *Aucuba japonica*), Cecid. No. A3911-24 ; 5 ♂♂, 5 ♀♀, 4 larvae, 1 pupa (on slide), many others (in alcohol), galls collected from Mt. Ichifusa, Kumamoto-Pref., Kyushu, 2. VI. 1966, J. Yukawa leg. emerged on 16. VI.–5. VII. 1966, reared by J. Yukawa (host plant : ibid.), Cecid. No. A3925-39 ; 4♂♂, 32♀♀ (in alcohol), galls collected from Mt. Inunaki, Fukuoka-Pref., Kyushu, 19. V. 1967, J. Yukawa leg. emerged on 9–17. VII. 1967, reared by J. Yukawa (host plant : ibid.); 2 ♂♂, 3 ♀♀, 1 pupa (on slide), 4 ♂♂, 13 ♀♀ (in alcohol), galls collected from Hanando, Fukui-City, Honshu, 15. V. 1968, J. Yukawa leg. emerged on 16–27. V. 1968, reared by J. Yukawa (host plant : ibid.), Cecid. No. A3940-45.

Distribution : Japan (Honshu, Shikoku, Kyushu).

Remarks : Monzen (1937) reported in his original description of the species that *Asphondylia baca* makes galls on 2 different genera of the plants, *Ampelopsis* and *Aucuba*, but he did not describe any biological details of the species. If we follow Monzen's explanation, we have to take one of the following two possibilities concering its life cycle and host plant range : (i) there are 2 generations in a year, the adults emerge from *Aucuba* on June-July and from *Ampelopsis* on September-October, or (ii) there are 2 biological races with different life cycle and host plant, and each appers once a year. Actually *Asphondylia*-species are very difficult to separate in the adult specimens, but judging from the development of larva and gall in relation with the flowering and fruiting seasons of the host plants, it is rather difficult to cnnsider that this species exhibits one of the above two possibilities. It is, however, impossible at present to discuss their morphological differences, because Monzen's type specimens reared from *Ampelopsis* have been lost and only 2 females from *Aucuba* were left in bad conditions. When the materials of the both mature and immature stages are obtained from *Ampelopsis* and their life history are better known, they may be definitely compared. Consequently, the specimens reared from *Aucuba* and examined here were tentatively identified as *Asphondylia baca*.

Contarinia ampelopsivora Shinji (1938d), which was subsequently cited under the genus *Kiefferia* by Shinji (1939h), is probably synonymized with *A. baca*, though the numbers of antennal and palpal segments were differently described.

Asphondylia diervillae Felt

(Fig. 17 : B)

Asphondylia diervillae Felt, 1907 ; Felt, 1908 ; Felt, 1916 ; Shinji, 1938 m ; Shinji, 1944.
Cecidomyia inaequalis Stebbins, 1910.

Male : Wing length 3.1 to 3.7 mm. Eye bridge 9 to 10 facets wide medially. Palpus consisting of 1 + 2 segments, with scattered setae ; first palpal segment about 3 tmes as long as wide ; second 1.5 to 1.9 times as long as first, with rather long, narrow scales sparsely. Antenna with 2 + 12 segments ; scape with dorsal and ventral setae densely ; pedicel with dorsal setae rather sparsely, ventral setae densely ; flagellar segments subequal in length ; basal enlargement of fifth flagellar segment 4.0 to 5.5 times as long as wide. Fore leg with femur nearly as long as or slightly shorter (rarely a little

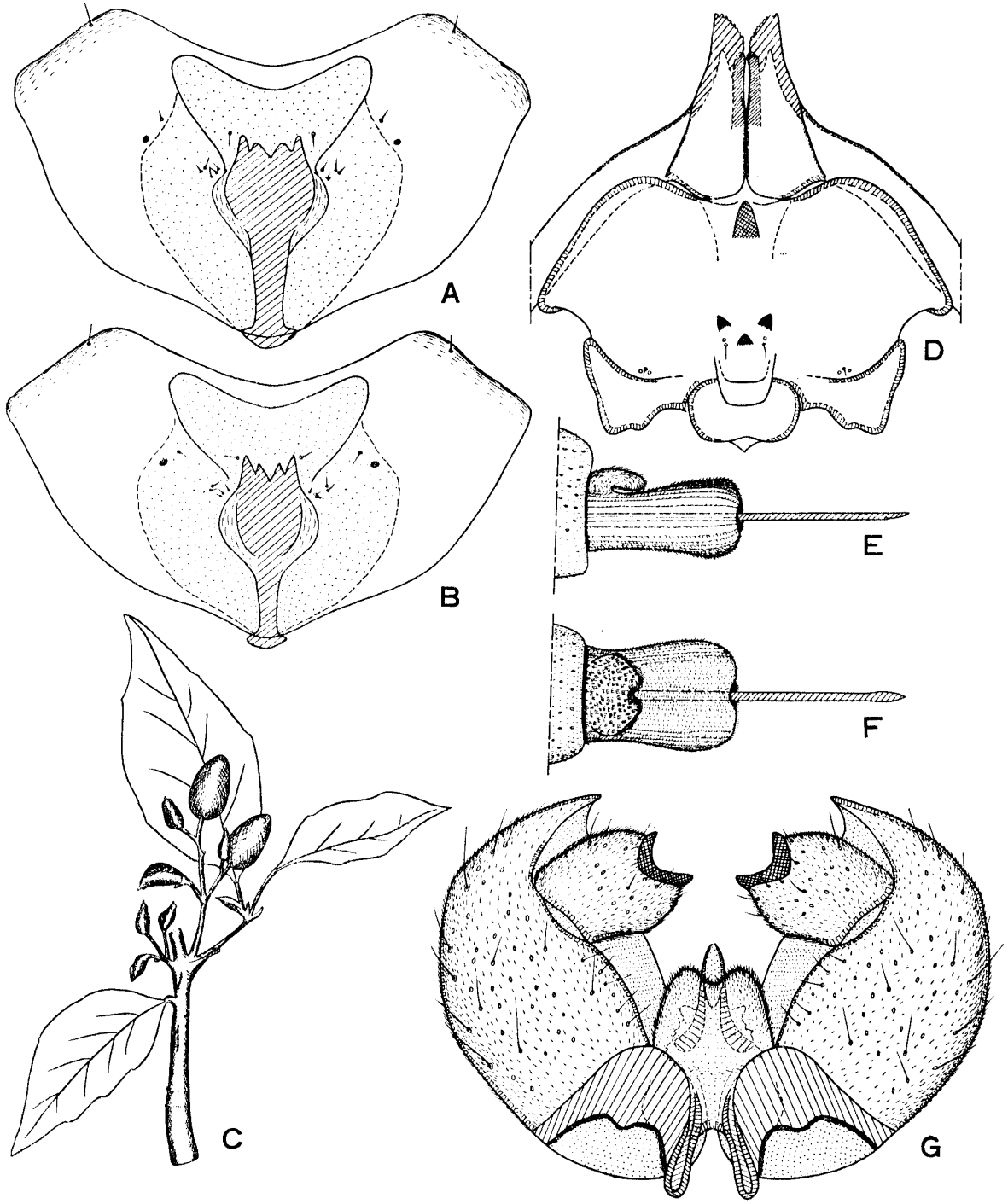

Fig. 17. *Asphondylia*

(A) prothorax of larva, ventral view: *Asphondylia baca* Monzen. (B) prothorax of larva, ventral view: *Asphondylia diervillae* Felt. (C) fruit galls on *Aucuba japonica* Thunb.: *Asphondylia baca* Monzen. (D) anterior portion of pupa, ventral view: ditto. (E) ovipositor, lateral view: ditto. (F) ovipositor, dorsal view: ditto. (G) male genitalia, dorsal view (cerci removed); ditto.

longer) than tibia and a little longer (rarely slightly shorter) than second tarsal segment, fourth tarsal segment about 1.9 times as long as fifth ; middle leg with femur a little shorter (rarely a little longer) than tibia and distinctly longer than second tarsal segment, fourth tarsal segment about 1.7 times as long as fifth ; hind leg with femur a little shorter (rarely slightly longer) than tibia and much longer than second tarsal segment, fourth segment 1.7 to 1.9 times as long as fifth ; first tarsal segments of all legs with an apical spur ; claw simple on all legs, bent nearly at right angle ; empodium nearly as long as claw. Wing about 2.5 times as long as wide ; R_5 meeting with costa beyond wing apex ; sensory pore 2 or sometimes 3 on distal portion of R_1, 1 on basal portion and 2 on distal half of R_5. Genitalia : cerci divided into 2 lobes ; tegmen rather deeply emarginated dorsally, rather shallowly emarginated ventrally ; gonostylus subglobular, apically with a sclerotized and bidentate claw ; gonocoxite massive, ventrally extending beyond insertion of gonostylus ; aedeagus laterally sclerotized, distally tapering, basally with a rather weakly sclerotized plate-like structure, which is developed into a pair of small lobes caudo-laterally and connected laterally with inner portion of gonocoxite (when the material is boiled with Lacti-phenol solution, the connection results in irregularly notched lateral margin of the structure).

Female : Wing length 3.7 to 4.2 mm, about 2.5 times as long as wide. Flagellar segment getting shorter to distal segment ; basal enlargement of fifth flagellar segment 3.6 to 4.8 times as long as wide ; terminal segment subglobular. Fore leg with femur nearly as long as tibia and a little longer than second tarsal segment, fourth tarsal segment about 1.7 times as long as fifth ; middle and hind legs with femur distinctly shorter than tibia and much longer than second tarsal segment, fourth tarsal segment a little longer than fifth. Ovipositor protractile, slender, aciculate, basally with a bilobed dorsal pouch. Otherwise almost as in male.

Mature larva : Second antennal segment short, about 0.01 mm, 1.6 times as long as basal width ; 2 ventral cervical papillae each with a seta, others invisible. Number and position of stigma normal ; 4 dorsal papillae each with a seta ; 3 pleural papillae present on each side, each with a seta ; 2 dorsal papillae of eighth abdominal segment each with a seta ; 2 of 6 terminal papillae somewhat cone-shaped, remaining 4 terminal papillae each with a short seta. Sternal spatula 0.30 to 0.33 mm, distally with 4 lobes which are pointed apically ; 2 outer lobes longer than inner 2 lobes ; 3 inner and 2 outer lateral papillae all with a seta ; sternal and inner pleural papillae also with a seta ; 2 anterior ventral papillae and 2 posterior ventral papillae also with a seta ; 2 ventral papillae of eighth abdominal segment each with a seta; anal papillae without seta.

Pupa : Apical spine long, 0.40 to 0.44 mm, acutely pointed, with finely denticulate inner margin ; apical papilla with a seta which is 0.06 to 0.07 mm ; an upper frontal spine present, strongly sclerotized ; 3 lower frontal spines present, each about 1/2 as long as upper one ; 1 of 2 lower facial papillae and 1 or sometimes 2 of 3 lateral facial papillae each with a seta ; prothoracic horn rather short, 0.10 to 0.13 mm, sometimes branched distally ; stigma present first to eighth abdominal segments, not distinctly produced ; each abdominal segment, except first one dorsally with several transvers rows of spines which are successively longer and more regularly arranged posteriorly ; usually 4 of 8 dorsal papillae each with a seta.

Host plants in Japan : *Weigela hortensis* (Sieb. et Zucc.) K. Koch [Taniutsugi],

Weigela japonica Thunb. [Tsukushiyabuutsugi].

Gall : Axillary bud transformed into a subglobular, sappy swelling which has several scale-like leaves ; usually mono-, sometimes oligothalamus. [Taniutsugi-mefukure] : Monzen, 1929 ; Shinji 1944. [Taniutsugi-mefushi] : Monzen, 1955a.

Biological notes : Adults apper, probably once a year, around June-July. Larvae hibernate and pupations occur in the galls on May-July.

Specimens examined : 1 larva, 2 pupae (on slide), 15 ♂♂, 7 ♀♀ (in alcohol), galls collected from Iino, Miyazaki-Pref., Kyushu, 25. V. 1963, J. Yukawa leg. emerged on 9-20. VI. 1963, reared by J. Yukawa (host plant : *W. japonica*), Cecid. No. A1616-18 ; 8 ♂♂, 7 ♀♀ (on slide), 19 ♂♂, 18 ♀♀ (in alcohol), galls collected from Mt. Hiko, Fukuoka-Pref., Kyushu, 23. V. 1965, J. Yukawa leg. emerged on 23. VI.-3. VII. 1965, reared by A. Taketani (host plant : ibid.), Cecid. No. A1601-15 ; 1 pupa (on slide), 7 ♂♂, 9 ♀♀ (in alcohol), galls collected from Mt. Nyûtô, Akita-Pref., Honshu, 30. VI. 1965, J. Yukawa leg. emerged on 3-12. VII. 1965, reared by J. Yukawa (host plant : *W. hortensis*) Cecid. No. A1620 ; 2 ♂♂, 3 ♀♀, 2 larvae (on slide), galls collected from Senganbira, Kagoshima-Pref., Kyushu, 27. IV. 1969, S. Hatsushima leg. emerged on 16-20. V. 1969, reared by J. Yukawa (host plant : *W. japonica*), Cecid. No. B3901-7.

Remarks : Shinji (1938 m) identified this species as *A. diervillae* which is responsible for bud gall or elongated fruit of bush honeysuckle, *Diervilla trifida* in North America. The present author tentatively followed his identification, because the larval and pupal stages of the Japanese specimens have not been precisely compared yet with those of *diervillae*. This species is distinguishable from *A. baca* by having sternal spatula of mature larva with distinctly pointed apical lobes.

Monzen (1955a), on the other hand, described *Oligotrophus japonicus* based on female specimens reared from the galls of the same kind. According to his original description and accompanying figures, this species apparently differs from the members of *Asphondylia*. There is, however, ample room for doubt as to its generic position and habit as a gall maker.

Asphondylia sp.

Male : Wing length 3.0 to 3.6 mm. Eye bridge 8 to 11 facets wide medially. Palpus consisting of 1 + 2 segments ; first palpal segment 2.0 to 2.6 times as long as wide ; second 1.7 to 2.2 times as long as first. Antenna with 2 + 12 segments ; scape with dorsal and ventral setae densely ; pedicel with dorsal setae rather sparsely and ventral setae densely ; flagellar segments subequal in length ; basal enlargement of fifth flagellar segment 4.2 to 5.0 times as long as wide. Fore leg with femur nearly as long as tibia and a little longer than second tarsal segment, fourth tarsal segment 1.8 to 2.0 times as long as fifth ; middle leg with femur nearly as long as or slightly shorter than tibia and distinctly longer than second tarsal segment, fourth tarsal segment 1.6 to 1.8 times as long as fifth ; hind leg with femur nearly as long as tibia and distinctly longer than second tarsal segment, fourth 1.7 to 2.0 times as long as fifth ; first tarsal segments of all legs with an apical spur ; claw simple on all legs, bent nearly at right angle ; empodium nearly as long as claw. Wing 2.5 to 2.7 times as long as wide ; R_5 meeting with costa beyond wing apex ; sensory pore 2 on distal portion of R_1, 1 on basal and 2 or 3 on

medial to subdistal portion of R_5. Genitalia : cerci divided into 2 lobes ; tegmen rather deeply emarginated dorsally, rather shallowly emarginated ventrally ; gonostylus subglobular, apically with a sclerotized and bidentate claw ; gonocoxite massive, ventrally extending beyond insertion of gonostylus ; aedeagus laterally sclerotized, distally tapering, bsally with a rather weakly sclerotized plate-like structure, which is developed into a pair of small lobes caudo-laterally and connected laterally with inner portion of gonocoxite (when the material is boiled with Lacti-phenol solution, the connection results in irregularly notched lateral margin of the structure).

Female : Wing length 3.7 to 4.3 mm, about 2.5 times as long as wide. Flagellar segment getting shorter to distal segment ; basal enlargement of fifth flagellar segment 3.8 to 5.3 times as long as wide ; terminal segment subglobular. Fourth tarsal segment of fore leg about 1.6 times as long as fifth ; those of middle and hind legs 1.1 to 1.3 times as long as fifth. Ovipositor protractile, slender, aciculate, basally with a bilobed, dorsal pouch. Otherwise nearly as in male.

Host plants : *Cassia Nomame* (Sieb.) Honda [Kawaraketsumei], *Desmodium oxyphyllum* DC. [Nusubitohagi], *Glycine Max* Merrill [Daizu], *Glycine soya* Sieb. et Zucc. [Tsurumame], *Indigofera pseudo-tinctoria* Matsum. [Komatsunagi], *Lespedeza bicolor* Turcz. var. *japonica* Nakai [Yamahagi], *Sophora flavescens* Aiton [Kurara], *Vicia amoena* Fisch. [Tsurufujibakama].

Gall : Larvae feed on the inside of pod and prevent the normal growing of bean.

Biological notes : Biological or ecological studies of this species were carried out by such authors as Kuwayama & Others (1953), A. Naitô (1964), A. Naitô & Ôsaka (1959), Shibuya & Maebara (1953), Tamura (1952), Yuasa & Kumazawa (1937) and etc. According to Tamura (1952), there are at least 2 emergence periods in a year. The adults of the first generation emerge from *Sophora flavescens* around early in July and the second from *Glycine Max* from the beginning of August to October. A. Naitô & Osaka (1959) and Shibuya & Maebara (1953) also observed the similar seasonal changes in density of the field populations.

Specimens examined : 8 ♂♂, 8 ♀♀ (on slide), galls collected from Kônosu, Saitama-Pref., Honshu, emerged on 16-28. X. 1963, reared by T. Nambu (host plant : *G. Max*), Cecid. No. B2401-16.

Distribution : Japan (Honshu, Shikoku, Kyushu). See also A. Naitô (1964).

Remarks : Since Kanzawa (1918) recorded this species, it has been left unnamed though the biological or ecological studies were carried out as an injurious pest of soy bean pod. Dr. E. P. Felt received the specimens from Dr. I. Kuwana and assumed they were closely related to *Asphondylia ervi* Rübsaamen (1895a), which had been originally described from *Vicia hirsuta* in Germany. Dr. H. F. Barnes, on the other hand, examined the specimens reared by Dr. H. Yuasa and suggested that it ought to be described as new. To clarify the position of this species, the precise comparision of larval and pupal characters as well as adult morphology is much needed.

Asphondylia humuli Shinji

Asphondilia ! *humuli* Shinji, 1939e ; Shinji, 1939h.
Parasphondylia humuli Shinji : Shinji, 1944.

Host plants : *Humulus japonicus* Sieb. et Zucc. [Kanamugura], *Humulus Lupulus* L. var. *cordifolius* (Miq.) Maxim. [Karahanasô].

Gall : Subglobular swelling produced usually on the veins of under side of the leaves, sometimes on the upper side of the leaves, flower bud or peduncles; diameter about 5 mm ; monothalamus. [Kanamugura-haurafushi] : Shinji, 1944.

Distribution : Japan (Honshu ?).

Asphondylia patriniae (Shinji)

Schizomyia patriniae Shinji, 1938o.
Asphondylia parpatriniae ! Shinji, 1944.
Parasphondylia patrici ! Monzen? : Shinji, 1944.

Host plant : *Patrinia villosa* (Thunb.) Juss. [Otokoeshi].

Gall : Flowering part transformed into a globular, succulent swelling, with a diameter about 10 mm ; outer surface smooth, pale yellow. [Otokoeshi-mifushi] : Monzen, 1929 ; Shinji, 1944.

Distribution : Japan (Honshu).

Asphondylia sphaera Monzen

Asphondylia sphaera Monzen, 1937 ; Monzen, 1955b.
Parasphondylia sphaera Monzen : Shinji, 1944.

Host plant : *Ligustrum obtusifolium* Sieb. et Zucc. [Ibota].

Gall : Flower bud transformed into a globular swelling ; diameter about 3 mm ; green on surface ; monothalamus. [Ibota-miokure] : Shinji, 1944. [Ibota-mifushi] : Monzen, 1955b.

Distribution : Japan (Honshu).

Asphondylia styraci Shinji

Asphondylia styraci Shinji, 1944.

Host plant : probably *Styrax japonica* Sieb. et Zucc. [Egonoki].

Gall : ?

Distribution : Japan (Honshu?).

Genus **Pseudasphondylia** Monzen

Pseudasphondylia Monzen, 1955b.

The present author examined Monzen's specimens of *Pseudasphondylia rokuharaensis* and came to the conclusion that the genus *Pseudasphondylia* is similar to the genera *Bruggmanniella* Tavares (1909) and *Philadelphella* Kovalev (1964) in the respect of the male genitalia, but differs from the former by the structure of immature stage and from the latter by having palpus consisting of 1 + 3 segments. The redescription of the genus is given below : palpus consisting of 1 + 3 segments ; antenna with 2 + 12 segments

in both sexes ; male flagellar segments only slightly reduced distally, with remarkably convolute circumfila ; female flagellar segment distinctly shortened on distal few segments, with 2 regular whorls of circumfila connected by longitudinal bands ; tarsal claw simple on all legs, bent nearly at right angle. Genitalia : cerci emarginated, but not completely divided into 2 parts ; tegmen emarginated ; gonostylus distally with 2 teeth which are separately situated from each other ; gonocoxite basally with a finger-shaped lobe ; aedeagus slender and tapering distally. Ovipositor protractile, slender, aciculate, basally with a bilobed, dorsal pouch.

Pseudasphondylia rokuharaensis Monzen

(Fig. 18 : A–B)

Pseudasphondylia rokuharaensis Monzen, 1955b.

Male : Eye bridge 7 to 8 facets wide medially. Palpus consisting of 1 + 3 segments. Antenna with 2 + 12 segments ; both scape and pedicel with dorsal, lateral and ventral setae ; third flagellar segment with a cylindrical basal enlargement which is about 2.6 times as long as wide ; circumfila remarkably convolute. First tarsal segment with a rather short apical spur ; claw simple on all legs ; empodium nearly as long as or a little shorter than claw. Genitalia : cerci incised by an U-shaped emargination ; tegmen incised by a V-shaped emargination ; gonostylus suboval, distally with 2 teeth which are separately situated from each other ; gonocoxite rather elongated, with a finger-shaped lobe basally ; root of gonocoxite rather long ; aedeagus slender, tapering distally.

Female : Wing length 2.7 to 3.1 mm, about 2.2 times as long as wide ; R_5 meeting with costa nearly at wing apex. Flagellar segment getting shorter to distal segment ;

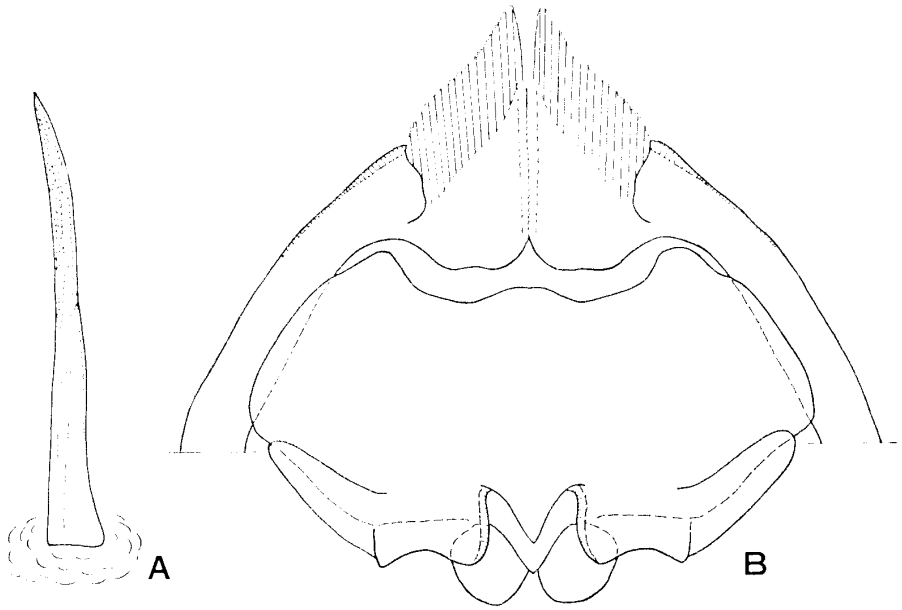

Fig. 18. *Pseudasphondylia rokuharaensis* Monzen
(A) prothoracic horn of pupa. (B) anterior portion of pupa, ventral view.

fifth flagellar segment with a cylindrical basal enlargement which is 2.1 to 2.9 times as long as wide ; distal 3 flagellar segments, especially terminal one, markedly shortened. Ovipositor protractile, slender, aciculate, basally with a bilobed, dorsal pouch.

Pupa : Apical spine long, about 0.23 mm, acutely pointed, with finely denticulate outer margin ; apical papilla situated on a small protuberance and with a seta which is about 0.06 mm ; upper and lower frontal spines probably absent ; lower and lateral facial papillae ? ; prothoracic horn long, about 0.45 mm ; stigma present on second to fourth abdominal segments, each 0.20 to 0.25 mm ; each abdominal segment, except first one, dorsally with several transvers rows of rather long spines.

Host plant : *Viburnum dilatatum* Thunb. [Gamazumi].

Gall : Fruit a little swollen, covered with white, short hairs densely. [Gamazumi-kefushi] : Monzen, 1929. [Gamazumi-mifushi] : Monzen, 1955b.

Biological notes : According to Monzen (1955b), larvae pupate in the galls and adults appear in May from the overwintered galls.

Specimens examined : 1 ♂, 8 ♀♀, 4 pupae (on slide), type specimens, galls collected from Rokuhara, Iwate-Pref., Honshu, 24. X. 1949, K. Monzen leg. emerged on 5. V. 1950, reared by K. Monzen (host plant : *V. dilatatum*).

Distribution : Japan (Honshu, Kyushu).

Pseudasphondylia matatabi (Yuasa & Kumazawa) new combination

(Fig. 19 : A-K)

Asphondylia matatabi Yuasa & Kumazawa, 1938.

Male : Wing length 2.3 to 2.8 mm. Eye bridge 6 to 7 facets wide medially. Palpus consisting of 1 + 3 segments ; first palpal segment subglobular, with some long setae ; second 1.8 to 2.2 times as long as first, with rather long setae and a few spines ; third long, 3.5 to 5.0 times as long as first, with rather long setae, narrow scales and scattered spines. Antenna with 2 + 12 segments ; scape yellowish brown, with rather many setae dorsally, laterally and ventrally ; pedicel dark greyish brown, with rather short setae, more numerous ventrally ; flagellar segments dark greyish brown, subequal in length or slightly reduced distally ; circumfila remarkably convolute ; first flagellar segment somewhat elongated, without distinct stem ; basal enlargement of fifth flagellar segment 2.5 to 2.8 times as long as wide. Fore leg with tibia nearly as long as or slightly longer than femur and distinctly longer than second tarsal segment ; middle leg with tibia nearly as long as or slightly shorter than femur and distinctly longer than second tarsal segment ; hind leg with tibia distinctly shorter than femur and disitnctly longer than second tarsal segment ; first tarsal segments of all legs with a rather short apical spur ; fourth tarsal segment 1.1 to 1.4 times as long as fifth ; claw simple on all legs, bent nearly at right angle ; empodium nearly as long as claw. Wing about 2.0 times as long as wide, densely with dark greyish hairs ; R_5 meeting with costa beyond wing apex ; sensory pore usually 2 on distal portion of R_1, 1 on basal and 2 on medial to subdistal portion of R5. Genitalia : cerci incised by a V-shaped emargination, forming a pair of setose lobes ; tegmen incised by a rather small, V-shaped emargination ; gonostylus suboval, distally with 2 sclerotized teeth which are separately situated from each other ;

gonocoxite rather elongated, ventrally extending beyond insertion of gonostylus, basally with a small finger-shaped lobe ; root of gonocoxite nearly as long as or a little longer than distance separating both roots ; aedeagus slender, tapering distally.

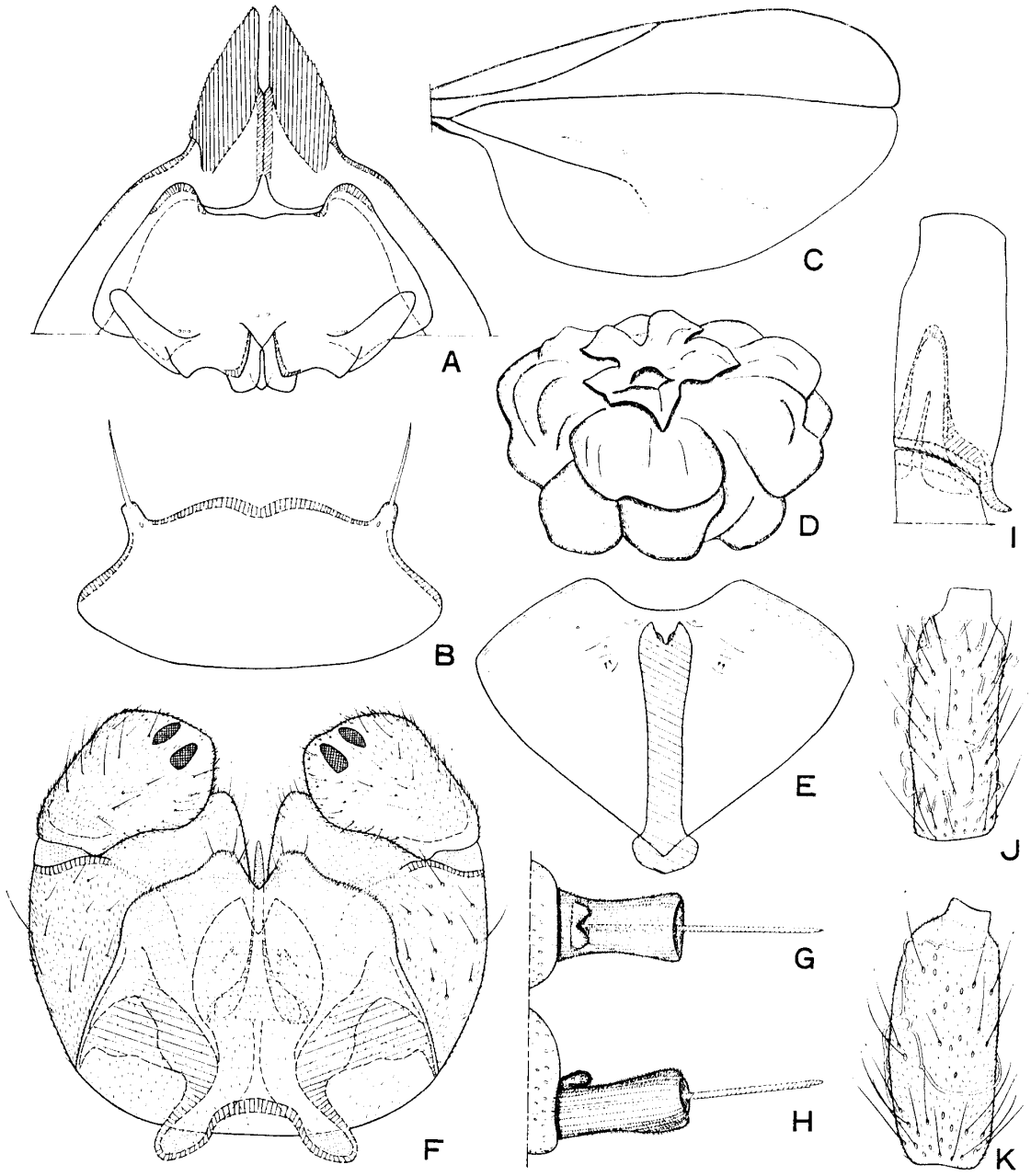

Fig. 19. *Pseudasphondylia matatabi* (Yuasa & Kumazawa).
(A) anterior portion of pupa, ventral view. (B) apical papillae of pupa. (C) wing, ♂. (D) fruit gall on *Actinidia polygama* (Sieb. et Zucc.). (E) prothorax of larva, ventral view. (F) male genitalia, dorsal view. (G) ovipositor, dorsal view. (H) ovipositor, lateral view. (I) first tarsal segment, ♀. (J) fifth flagellar segment, ♂. (K) fifth flagellar segment, ♀.

Female : Wing length 2.3 to 3.0 mm, about 2.0 times as long as wide. Flagellar segment getting shorter to distal segment ; basal enlargement of fifth flagellar segment 2.5 to 3.3 times as long as wide ; terminal segment subglobular. Fourth tarsal segment nearly as long as or slightly longer than fifth. Ovipositor protractile, slender, aciculate, basally with a bilobed, dorsal pouch. Otherwise almost as in male.

Mature larva : Second antennal segment short, conical, about 0.015 mm, 1.2 to 1.5 times as long as basal width ; cervical papillae all without seta. Each abdominal segment ventrally with many transvers rows of minute spines, which are more sparsely distributed dorso-laterally ; number and position of stigma normal ; 4 dorsal papillae each with a short seta ; 2 additional papillae present antero-dorsally, without seta ; 2 pleural papillae visible on each side, each with a minute seta ; eighth abdominal segment with 4 dorsal papillae (if 2 of them are not pleural papillae), each with a short seta ; 2 additional papillae also present antero-dorsally ; 6 terminal papillae present, of which 2 have rather large seta, remaining 4 usually with a minute seta. Sternal spatula 0.55 to 0.60 mm, distally incised by a large V-shaped emargination, forming a pair of triangular lobes ; inner margin of emarginated portion with a sclerotized lobe ; inner lateral papillae 2, each with a short seta ; outer lateral papilla 1, without seta ; sternal papillae without seta on pro- and mesothorax, with a short seta on metathorax ; inner pleural papillae without seta on prothorax, with a short seta on meso- and metathorax ; 2 anterior and 2 posterior ventral papillae each with a minute seta ; 2 ventral papillae visible on eighth abdominal segment, each with a minute seta ; 2 anal papillae without seta.

Pupa : Apical spine long, 0.27 to 0.35 mm, acutely pointed, with finely denticulate outer margin ; apical papilla situated on a small protuberance and with a seta which is 0.09 to 0.11 mm ; upper and lower frontal spines absent ; usually 1 lower and 3 lateral facial papillae present, all without seta ; prothoracic horn long, 0.40 to 0.46 mm ; stigma present on second to fifth abdominal segments, each 0.17 to 0.19 mm ; each abdominal segment, except first one, dorsally with several transvers rows of rather long spines on anterior half.

Host plant : *Actinidia polygama* (Sieb. et Zucc.) Maxim. [Matatabi].

Gall : Flower bud infested, resulting in the transformation of the fruit, which is somewhat flattened and divided into several parts with longitudinal furrows ; polythalamus. [Matatabi-mifushi] : Monzen, 1929 ; Shinji, 1944.

Biological notes : Detailed biology of this species is unclarified. Adults appear on September-October.

Specimens examined : 11 ♂♂, 8 ♀♀, 12 larvae, 7 pupae (on slide), many others (in alcohol), galls collected from Mt. Takakuma, Kagoshima-Pref., Kyushu, 26. IX. 1969, S. Hayashi leg. emerged on 27. IX. - 29. X. 1969, reared by J. Yukawa (host plant : *A. polygama*), Cecid. No. A5501-38.

Distributoin : Japan (Honshu, Kyushu).

Remarks : By judging from the structure of male genitalia and the pupal characters, the present author newly combined this species with the genus *Pseudasphondylia* Monzen (1955b) in this paper. This species is very similar to *P. rokuharaensis*, but is distinguished from it by the following differences in the pupal stage : apical spine longer than that of *rokuharaensis* ; apical papilla with a longer seta ; stigma of abdominal segment shorter and present on second to fifth segments.

Genus **Asteralobia** Kovalev

Asteralobia Kovalev, 1964.

Palpus consisting of 1 + 4 segments ; antenna with 2 + 12 segments in both sexes ; male flagellar segment shallowly constricted and divided into 3 parts (subgenus *Asteralobia*), or a lower constriction forming a neck between basal and distal enlargement (subgenus *Euasteralobia*), with remarkably convolute circumfila ; female flagellar segment with constrictions poorly defined or without, circumfila 2 regular whorls, terminal segment greatly shortened as in *Asphondylia* ; tarsal claw simple, bent nearly at right angle. Male genitalia : cerci emarginated, but not completely divided into 2 parts ; tegmen rather slender, emarginated ; gonostylus subapically with a dense group of short, stiff setae ; gonocoxite rather elongated, ventro-distally developed into a setose lobe, basally with a finger-shaped lobe ; root of gonocoxite distinct ; aedeagus rather slender, tapering distally. Ovipositor slender, aciculate, sclerotized.

Asteralobia sasakii (Monzen) new combination

(Fig. 20 : A–E)

Parasphondylia sasakii Monzen, 1937 ; Shinji, 1939h ; Shinji, 1944 ; Monzen, 1955b
Schizomyia sasakii (Monzen) : Kikuti, 1939.
Schizomyia ilexicola Shinji, 1938l.

Male : Wing length 2.1 to 2.7 mm. Eye bridge 6 to 8 facets wide medially. Palpus consisting of 1 + 4 segments, with setae rather sparsely ; first palpal segment about 2 times as long as wide ; second nearly as long as or slightly longer than first ; third 1.5 to 2.0, fourth over 2.0 times as long as first respectively. Antenna with 2+12 segments ; scape larger than pedicel, ventrally with rather short setae and a few rather long setae, dorsally with a few rather short setae ; pedicel sparsely with rather short setae ; flagellar segments only slightly reduced distally ; each flagellar segment divided into 3 parts by shallow constrictions, which are more conspicuous on distal several segments ; first and second flagellar segments fused ; basal enlargement of fifth flagellar segment about 2.8 times as long as wide. Fore leg with femur nearly as long as or slightly shorter than tibia and distinctly longer than second tarsal segment, fourth tarsal segment 1.6 to 1.8 times as long as fifth ; middle leg with femur nearly as long as or slightly longer than tibia and distinctly longer than second tarsal segment, fourth 1.5 to 1.7 times as long as fifth ; hind leg with femur nearly as long as or slightly longer than tibia and a little longer than second tarsal segment, fourth 1.7 to 2.0 times as long as fifth ; claws of all legs simple, bent nearly at right angle ; empodium nearly as long as claw. Wing 2.1 to 2.3 times as long as wide ; R_5 meeting with costa nearly at apex of wing ; sensory pore 2 on distal portion of R_1, 1 on basal portion and 2 on distal half of R_5. Genitalia : cerci incised by a rather small V-shaped emargination, forming a pair of lobes which are rounded on outer margin ; tegmen slender, incised by an U-shaped emargination, forming a pair of narrow lobes which have an apical seta respectively ; gonostylus rather short, slightly curved inwardly, ending ventro-distally in an acute angle, with a dense group of short stiff setae subdistally ; gonocoxite elongated, ventro-distally developed into a large setose lobe, basally with a rather small finger-shaped lobe ; root of gono-

coxite rather short ; aedeagus slender, laterally weakly sclerotized, distally tapering.

Female : Wing length 2.2 to 2.8 mm, 2.1 to 2.4 times as long as wide. Flagellar segment not distinctly constricted, getting shorter to distal segment ; basal enlargement of fifth flagellar segment 2.4 to 3.0 times as long as wide ; terminal segment subglobular. Ovipositor protractile, slender, aciculate, basally with a small dorsal lobe ; apical lobe of ovipositor with 2 short cilia. Otherwise almost as in male.

Mature larva : Second antennal segment, short, conical, about 0.014 mm, 1.8 to 2.0 times as long as basal width ; cervical papillae all without seta. Number and position of stigma normal ; 4 dorsal and 3 pleural papillae each with a seta ; 2 dorsal papillae of eighth abdominal segment usually absent ; 6 of 8? terminal papillae each with a short seta, remaining 2 invisible (probably inconspicuous swelling, if present). Sternal spatula 0.30 to 0.33 mm, distally emarginated, forming a pair of triangular lobes ; number and position of inner and outer lateral papillae usually normal, some of unspined inner or outer lateral papillae sometimes inconspicuous or invisible ; sternal papillae without seta on prothorax, with a seta on meso- and metathorax ; inner pleural papillae all with a seta ; usually 2 (or rarely 3) anterior and 2 posterior ventral papillae each with a seta ; usually 2 (or rarely 3) ventral papillae of eighth abdominal segment with a seta ; 2 anal papillae visible, usually without seta, rarely with a very short seta.

Pupa : Apical spine short, triangular in shape ; apical papilla with a seta which is about 0.09 mm ; upper and lower frontal spines absent ; 1 of 2 lower facial papillae with a seta which is 0.025 to 0.030 mm ; usually 1 of 3 or 4 lateral facial papillae with a seta which is 0.027 to 0.040 mm ; prothoracic horn rather long, 0.17 to 0.20 mm ; stigma very short, present on second to sixth abdominal segments ; each abdominal segment, except first one, dorsally with several transvers rows of spines on anterior third ; usually 4 of 8 dorsal papillae each with a short seta.

Host plants in Japan : *Ilex crenata* Thunb. [Inutsuge], *Ilex integra* Thunb. [Mochinoki].

Gall : Axillary bud transformed into a subglobular swelling ; diameter 6 to 20 mm ; color green, sometimes with purplish tinge ; polythalamus. [Inutsuge-metamafushi] : Monzen, 1929 ; Monzen, 1937 ; Monzen, 1955b. [Inutsuge-tamafushi] : Shinji, 1944. See also Sasaki (1902) and Niijima (1913). [Mochinoki-mefushi] : Shinji, 1944.

Biological notes : Adults appear once a year, from the middle of May to the end of June. This species hibernates at the larval stage and pupations occur in the galls around the late spring.

Specimens examined : 8 ♂♂, 9 ♀♀, 7 larvae, 1 pupa (on slide), 12 ♂♂, 26 ♀♀ (in alcohol), galls collected from Mt. Hiko, Fukuoka-Pref., Kyushu, 24. V. 1965, J. Yukawa leg. emerged on 7-25. VI. 1965, reared by J. Yukawa (host plant : *I. crenata*), Cecid. No. A1301-25 ; 2 pupae (on slide), 7 ♂♂, 29 ♀♀ (in alcohol), galls colls collected from Mt. Kajigamori, Kôchi-Pref., Shikoku, 8. V. 1969, J. Yukawa leg. emerged on 18. V.-8. VI. 1969, reared by J. Yukawa (host plant : ibid.), Cecid. No. A1326-27.

Remarks : This species was newly combined with the genus *Asteralobia*, because the constricted male flagellar segment and distinctly bidentate sternal spatula of larva agree well with the generic characters of *Asteralobia* rather than those of *Schizomyia*, in which the male flagellar segment is cylindrical and the sternal spatula is incised by a small

emargination. According to the subdivision of the genus by Kovalev (1964), this species probably belongs to the subgenus *Asteralobia* by having male flagellar segment shallowly constricted and divided into 3 parts.

Shinji (1944) mentioned that this species (Shinji incorrectly used the name, *Paraasphondylia baca*, instead of *sasakii*) is also responsible for the bud gall of *Ilex integra* Thunb. This fact is highly probable, but the further comparative study of the immature stages is necessary to reconfirm it. The host plant range of the membes of the genus will be discussed again in the remarks of the next species.

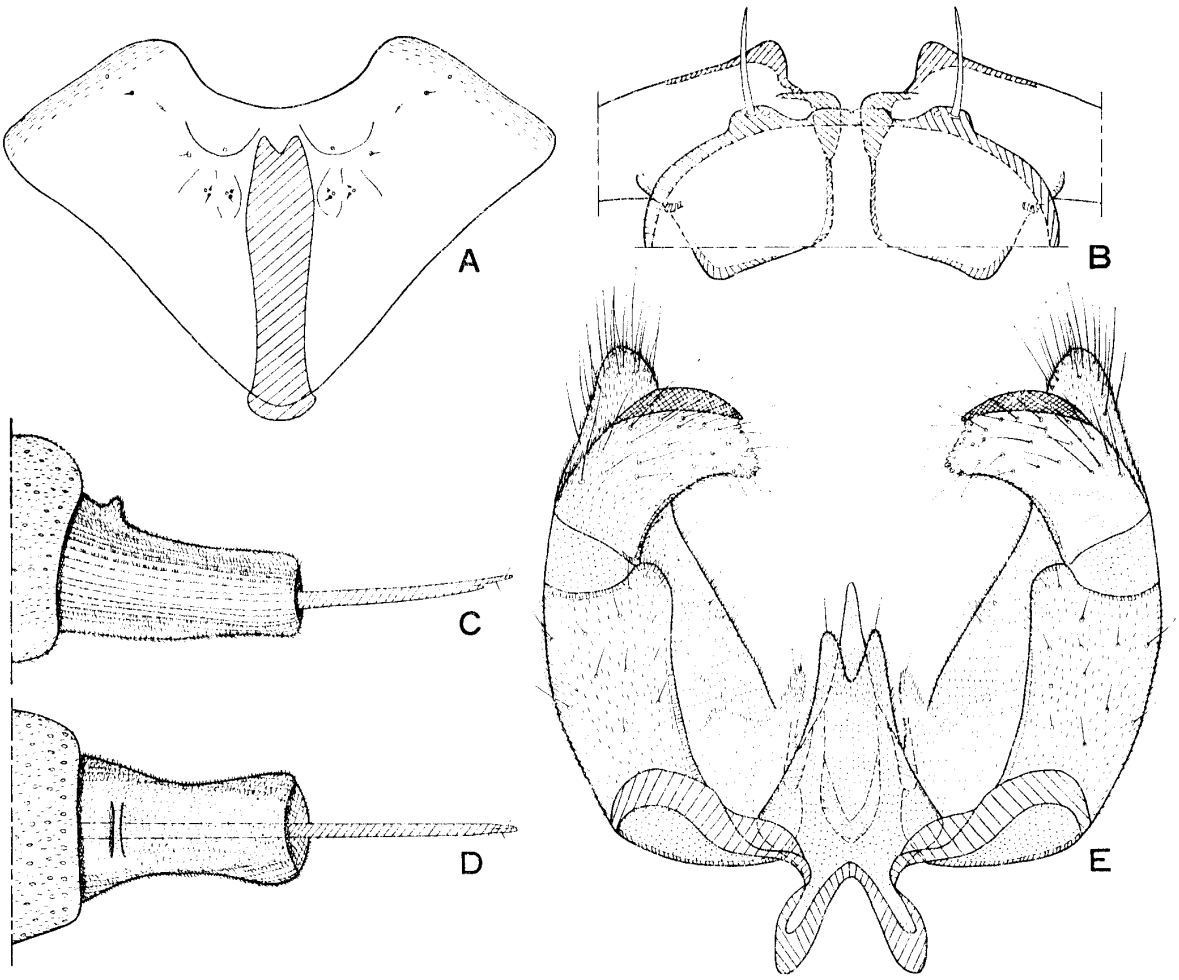

Fig. 20. *Asteralobia sasakii* (Monzen).
(A) prothorax of larva, ventral view. (B) anterior portion of pupa, dorsal view. (C) ovipositor, lateral view. (D) ovipositor, dorsal view. (E) male genitalia, dorsal view (cerci removed).

Asteralobia soyogo (Kikuti) new combination

Schizomyia soyogo Kikuti, 1939.

Male : Wing length 2.3 to 2.6 mm. Eye bridge 6 to 8 facets wide medially. Palpus consisting of 1 + 4 segments, with setae rather sparsely ; first palpal segment about 2

times as long as wide ; second nearly as long as or slightly longer than first ; third 1.6 to 2.5, fourth 2.0 to 2.5 times as long as first respectively. Antenna with 2 + 12 segments ; scape ventrally with rather short setae and a few long setae, dorsally with a few rather short setae ; pedicel sparsely with rather short setae ; flagellar segments only slightly reduced distally ; each flagellar segment divided into 3 parts by shallow constrictions, which are more conspicuous on distal several segments ; first and second flagellar segments fused ; basal enlargement of fifth flagellar segment 2.8 to 3.2 times as long as wide. Fore leg with femur nearly as long as or slightly shorter than tibia and distinctly longer than second tarsal segment, fourth tarsal segment about 1.7 times as long as fifth ; middle leg with femur nearly as long as or slightly longer than tibia and distinctly longer than second tarsal segment, fourth about 1.6 times as long as fifth ; hind leg with femur nearly as long as or slightly longer than tibia and a little longer than second tarsal segment, fourth 1.8 to 2.0 times as long as fifth ; claws of all legs simple, bent nearly at right angle ; empodium nearly as long as claw. Wing about 2.2 times as long as wide ; R_5 meeting with costa nearly at apex of wing ; sensory pore 2 or sometimes 3 on distal portion of R_1, 1 on basal portion and 2 on distal half of R_5. Genitalia : cerci incised by a rather small V-shaped emargination, forming a pair of lobes which are rounded on outer margin ; tegmen slender, incised by an U-shaped emargination, forming a pair of narrow lobes, which have an apical seta respectively ; gonostylus rather short, slightly curved inwardly, ending ventro-distally in an acute angle, with a dense group of short stiff setae subdistally ; gonocoxite elongated, ventro-distally developed into a large setose lobe, basally with a rather small finger-shaped lobe ; aedeagus slender, laterally sclerotized, distally tapering.

Female : Wing length 2.3 to 2.8 mm, 2.1 to 2.4 times as long as wide. Flagellar segment not distinctly constricted, getting shorter to distal segment ; basal enlargement of fifth flagellar segment 2.7 to 3.1 times as long as wide ; terminal segment subglobular. Ovipositor protractile, slender, aciculate, basally with a small dorsal lobe ; apical lobe of ovipositor with 2 short cilia. Otherwise almost as in male.

Mature larva : Second antennal segment short, conical, about 0.015 mm, 1.7 times as long as basal width ; cervical papillae all without seta. Number and position of stigma normal ; 4 dorsal and 3 pleural papillae each with a seta ; 2 dorsal papillae of eighth abdominal segment usually absent ; 6 of 8? terminal papillae each with a short seta, remaining 2 invisible (probably inconspicuous swelling, if present). Sternal spatula 0.23 to 0.35 mm, usually emarginated distally, forming a pair of triangular lobes, sometimes shallowly emarginated or not emarginated ; number and position of inner and outer lateral papillae usually normal, some of unspined inner or outer lateral papillae sometimes inconspicuous or invisible ; sternal papillae without seta on prothorax, with a seta on meso- and metathorax ; inner pleural papillae each with a seta ; 2 anterior and 2 posterior ventral papillae each with a seta ; 2 ventral papillae of eighth abdominal segment with a seta ; 2 anal papillae visible, usually without seta, rarely with a very short seta.

Pupa : Apical spine short, triangular in shape ; apical papilla with a seta which is 0.075 to 0.088 mm ; upper and lower frontal spines absent ; 1 of 2 lower facial papillae with a seta which is 0.025 to 0.028 mm ; usually 1 of 3 lateral papillae with a seta which is 0.012 to 0.014 mm ; prothoracic horn rather long, 0.15 to 0.20 mm ; stigma very short, present on second to sixth abdominal segments ; each abdominal segment, except first one, dorsally with several transvers rows of spines on anterior third ; usually 4 of

8 dorsal papillae each with a seta.

Host plant : *Ilex pedunculosa* Miq. [Soyogo].

Gall : Axillary bud transformed into a subglobular swelling ; diameter 8 to 25 mm ; color green, sometimes with purplish tinge ; polythalamus.

Biological notes : Adults appear once a year, from the end of April to early in June. This species hibernates at the larval stage and pupations occur in the galls in the spring.

Specimens examined : 7 ♂♂, 7 ♀♀ (on slide), 4 ♂♂, 48 ♀♀ (in alcohol), galls collected from Mt. Kazan, Kyoto-City, Honshu, 18. IV. 1962, J. Yukawa leg. emerged on 28. IV.–15. V. 1962, reared by J. Yukawa (host plant : *I. pedunculosa*), Cecid. No. A3609-22 ; 2 pupae, 5 larvae (on slide), 7 ♂♂, 15 ♀♀ (in alcohol), galls collected from Kisaichi, Kitakawachi, Osaka-Pref., Honshu, 5. IV. 1962, R. Inoue leg. emerged on 27. IV.–8. V. 1962, reared by J. Yukawa (host plant : ibid.), Cecid. No. A3623-29 ; 2 ♂♂, 1 ♀ (in alcohol), galls collected from Mt. Kajigamori, Kôchi-Pref., Shikoku, 8. V. 1969, J. Yukawa leg. emerged on 20–23. V. 1969, reared by J. Yukawa (host plant : ibid).

Distribution : Japan (Honshu, Shikoku, Kyushu).

Remarks : This species is very closely related to the former species, *A. sasakii*. It is rather difficult to find clear diagnostic differences between 2 species, and the both species are sometimes observed to co-exist in the same area. Recently, the author reared many adult specimens from galls of the same kind on *Ilex chinensis* Sims. [Nanamenoki], which are also very similar to the above mentioned 2 species. To clarify the differences between these species and their host plant range, careful comparisions of the immature stages and biological studies are required.

Supertribe CECIDOMYIIDI

The members of this tribe are varied in their habits. Many are primarily phytophagous or gall makers, some are zoophagous, mycetophagous or inquilinous.

They are distinguished from OLIGOTROPHIDI by having male flagellar segment binodose with 2 or 3 sets of circumfilar loops.

In Japan, some 30 species of this supertribe have been known. Some of them are redescribed and the rest are listed below with some of the important references and the brief notes on their host plants, gall and distribution. The author also adds 3 unnamed species of the tribe Lestodiplosini.

The tribal grouping and the generic synopsis used in this supertribe were mainly based on Harris (1966, 1968) and partly on Felt (1929).

Key to Japanese tribes (males)

1. Each flagellar segment with 2 sets of circumfilar loops ; tarsal claws of all legs simple ..... Contariniini
- Each flagellar segment usually with 3 sets, or sometimes 2 sets of circumfilar loops ; tarsal claw simple or at least a pair of claws unidentate 2
2. R_5 meeting with costa before or nearly at apex of wing ..... Lestodiplosini

R_5 meeting with costa nearly at or beyond apex of wing 3
3. Flagellar segment with one or more extraordinarily long circumfilar loops..... ..... Aphidoletini
- Flagellar segment with regular circumfilar loops 4
4. Flagellar segment with rather long circumfilar loops ; gonostylus slender ; tegmen bilobed ..... Clinodiplosini
- Flagellar segment with rather short circumfilar loops ; gonostylus not slender ; tegmen entire or slightly emarginated ..... Hormomyiini

Tribe CONTARINIINI Rübsaamen & Hedicke

Contariniini Rübsaamen & Hedicke, 1926 ; Harris, 1966.

Harris (1966) abandoned the old classification of the Cecidomyiidi into Bifila and Trifila, and delimitted the tribe Contariniini in the following respects : palpus consisting of 3 to 4 segments ; antenna with 2 + 12 segments in both sexes ; male flagellar segment binodose ; distal and basal enlargements roughly equal in size and each bearing a single set of circumfilar loops ; female flagellar segment with a subcylindrical enlargement, simple circumfila and a relatively short distal stem ; tarsal claw simple on all legs ; Rs often absent or incomplete. Male genitalia : "lower lamella" bilobed ; gonostylus relatively short ; aedeagus broad basally, tapering to a blunt point. Ovipositor usually very long, retractile and tapered.

The members of this tribe associated with living flowering plants and ferns, and usually result in the formation of galls.

Genus **Contarinia** Rondani

Contarinia Rondani, 1860 ; Kieffer, 1896d ; Kieffer, 1900 ; Felt, 1908 ; Felt, 1911b ; Kieffer, 1913f ; Brunetti, 1920 ; Felt, 1925 ; Rübsaamen & Hedicke, 1926 ; Senior-White, 1928 ; Mani, 1934 ; Möhn, 1955 ; Felt, 1958 ; Hardy, 1960 ; Harris, 1966 ; Mamajev, 1969.
Eudiplosis Kieffer, 1894b.
Stictodiplosis Kieffer, 1894b ; Kieffer, 1913f.
Doxodiplosis Kieffer, 1912b ; Kieffer, 1913f.

This genus includes many species which are more or less economically important. They are characterized as follows (Harris, 1966) : palpus consisting of 4 segments (sometimes 3) ; male flagellar segment with relatively long distal and intermediate stem ; female flagellar segment with a comparatively short distal stem, circumfila not looped ; "lower lamella" of male genitalia deeply incised ; gonostylus slightly narrower distally ; ovipositor long, retractile, tapering to a pair of narrow terminal lobes.

The following 3 named and 1 unnamed species of the genus are known to occur in Japan.

Contarinia inouyei Mani

Contarinia inouyei Mani, 1954a ; Inouye, 1961a ; Inouye, 1964a.

Host plant : *Cryptomeria japonica* D. Don [Sugi].

Gall : Usually only 1, sometimes 2 or 3 galls produced on a needle, mainly on the basal part ; monothalamus.

Distribution : Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks : Biological and ecological details ought to be consulted with Inouye (1961a, 1964a) and accompanying list of the references cited.

Contarinia mali Barnes

Contarinia mali Barnes, 1939a ; Barnes, 1948a.

Host plant : *Malus pumila* Mill. [Seiyôringo].

Gall : Flower bud swollen, remain closed ; petals becoming thick and spotted with a dark pink ; whole flower bud enlarged. (Barnes, 1948a).

Distribution : Japan (Honshu).

Remarks : Detailed biology of this species was studied by Tanabe (1936a, 1936b).

Contarinia matusintome Haraguti & Monzen

Contarinia matusintome Haraguti & Monzen, 1955 ; Saito, 1957 ; Inouye, 1964a ; Inouye, 1964b.
Contarinia tonensis Uchida & Inouye, 1956.

Host plants : *Pinus densiflora* Sieb. et Zucc. [Akamatsu], *Pinus Thunbergii* Parl. [Kuromatsu].

Gall : Terminal bud transformed into a conical swelling which is covered with reddish brown scales ; polythalamus. [Matsu-shintomefushi] : Monzen, 1929 ; Monzen, 1955b.

Distribution : Japan (Honshu, Shikoku, Kyushu).

Remarks : Haraguti (1936) reported detailed biology of this species.

Contarinia sp.

Yuasa (1935) reported that there are 2 species of wheat gall midges in Japan. One of them was identified as *Sitodiplosis mosellana* (Géhin, 1857) and this was confirmed by Dr. H. F. Barnes. Another species, which is distributed in Honshu, was first considered to be closely related to *Contarinia tritici* (Kirby, 1798), but later Yuasa (1937a) compared the Japanese specimens with those of *tritici* which were sent from Dr. H. F. Barnes and came to the conclusion that the former is a distinct species. This species was, however, left unnamed though it has been tentatively called as [Mugi-kuro-tama-bae] in Japanese. Morphology, biology and ecology of this species ought to be consulted with Yuasa (1937a) and Tsutsui (1956).

Genus **Thecodiplosis** Kieffer

Thecodiplosis Kieffer, 1895g ; Felt, 1911b ; Kieffer, 1913f ; Rübsaamen & Hedicke, 1926 ; Möhn, 1955 ; Felt, 1958 ; Harris, 1966 ; Mamajev, 1969.

Many of the members of the genus are known to develop in the needles of Conifeare. They are characterized and distinguished from *Contarinia* in the following respects (Harris, 1966) : palpus usually consisting of 3 segments ; both distal and basal enlargements of male flagellar segment slightly unequal and slightly angular ; female flagellar segment with a long distal stem and a moderately constricted basal enlargement ; male genitalia with roundly bilobed cerci and relatively short gonostylus ; ovipositor less markedly tapered than in *Contarinia*.

Only 1 species was recorded by Uchida & Inouye (1955) from Japan.

Thecodiplosis japonensis Uchida & Inouye

Thecodiplosis japonensis Uchida & Inouye, 1955 ; Inouye, 1962 ; Inouye, 1964a ; Inouye, 1964b.
Thecodiplosis pinicola Kim, 1955.

Host plants in Japan : *Pinus densiflora* Sieb. et Zucc. [Akamatsu], *Pinus Thunbergii* Parl. [Kuromatsu].

Gall : Two needles fused and swollen basally, containing several larvae ; infested needles distinctly shorter than normal ones.

Distribution : Japan (Honshu, Shikoku, Kyushu), Korea.

Remarks : This species is very closely related to an European species, *Thecodiplosis brachyntera* (Schwägrichen, 1835), but Inouye (1964a) distinguished this species from *brachyntera* by the morphological characters of the larva. As to the biology of this species, see also Oda & Iwasaki (1953) and Takagi (1954-55).

Tribe CLINODIPLOSINI Rübsaamen & Hedicke

Clinodiplosini Rübsaamen & Hedicke, 1926 ; Harris, 1966.

Harris (1966) defined the tribe as follows : palpus consisting of 4 segments ; antenna with 2 + 12 segments ; male flagellar segment binodose, distal enlargement larger than basal one and bearing 2 sets of looped circumfila, basal enlargement with a single set (except in the genera *Sitodiplosis* and *Ametrodiplosis*, which have a single set on each enlargement); female flagellar segment with a quite long distal stem and simple circumfila ; at least a pair of tarsal claws unidentate (simple in *Mycetodiplosis*) ; cross-vein Rs usually present ; R_5 meeting with costa beyond wing apex. Genitalia : gonostylus long, relatively narrow and curved ; gonocoxite with a basal lobe on inner angle ; aedeagus long, exceeding length of relatively long cerci or tegmen. Ovipositor not fully retractile and with a pair of well developed terminal lobe.

Genus **Ametrodiplosis** Rübsaamen

Ametrodiplosis Rübsaamen, 1911 ; Kieffer, 1913f ; Rübsaamen & Hedicke, 1926; Möhn, 1955 ; Mamajev, 1961b ; Harris, 1966 ; Mamajev 1969.
Loewodiplosis Kieffer, 1912b ; Kieffer, 1913f.
Cyrtodiplosis Kieffer, 1912b ; Kieffer, 1913f.

Nouryodiplosis Tavares, 1930.

According to Harris (1966), this genus is easily distinguished by the following combination of characters : male flagellar segment with a single set of very short circumfilar loops on each enlargement ; distal enlargement usually elongate and of inverted pyriform shape ; male wing with a striking inflation of wing base in area lying between R_1 and costa.

Ametrodiplosis acutissima (Monzen) new combination

Loewodiplosis acutissima Monzen, 1937 ; Monzen, 1955b.

Host plants : *Quercus acutissima* Carr. [Kunugi], *Quercus dentata* Thunb. [Kashiwa], *Quercus variabillis* Blume [Abemaki].

Gall : Subglobular swelling on the twigs and leaves, diameter about 2 mm ; monothalamus. [Kunugi-himekobufushi] : Monzen, 1932 ; Monzen, 1937 ; Monzen, 1955b.

Distribution : Japan (Honshu), Korea.

Remarks : Monzen (1955b) tentatively placed this species in the genus *Loewodiplosis*, but this species ought to be combined with the genus *Ametrodiplosis* at present because the synonymity between these 2 genera is generally accepted by Möhn (1955) and Harris (1966). When the materials of the species will be obtained in the future, its generic position will be established.

Genus **Clinodiplosis** Kieffer

Clinodiplosis Kieffer, 1894f ; Kieffer, 1896d ; Felt, 1911b ; Kieffer, 1913f ; Felt, 1918c ; Brunetti, 1920 ; Felt, 1925 ; Rübsaamen & Hedicke, 1926 ; Senior-White, 1928 ; Mani, 1934 ; Möhn, 1955 ; Felt, 1958 ; Harris, 1966 ; Mamajev, 1969.
Crapodiplosis Kjellanden, 1945.
Parallelodiplosis Rübsaamen : Hardy, 1960.

This genus is characterized by the distinct shape of male genitalia : cerci incised by a narrow median emargination, forming a pair of quadrate lobes, of which outer edge is slightly produced ; gonostylus slender, distinctly curved. Tarsal claw of fore leg unidentate.

Harris (1966) mentioned that the species of *Clinodiplosis* are generally considered to be inquilines, since they have been reared on many occasion from plant hosts that had been damaged by other gall midge species or by other insects, although their exact role in this association has not been determined.

In Japan, the following 4 species of the genus *Clinodiplosis* were previously described by Shinji (1938m, 1938n, 1939a, 1944) as gall making species. There is, however, considerable room for doubt as to their habit, otherwise their generic position.

Clinodiplosis styracifoliae Shinji

Clinodiplosis styracifoliae Shinji, 1944.

Host plant : *Styrax Obassia* Sieb. et Zucc. [Hakuunboku].

Gall : Subglobular swelling on the under side of the leaf, with whitish, short hairs. [Hakuunboku-kefushi) : Shinji, 1944.

Distribution: Japan (Honshu?).

Clinodiplosis corylicola (Shinji)

Schizoneura? corylicola Felt?: Shinji, 1938 m.
Clinodiplosis corylicola Shinji, 1944.

Host plant: *Corylus heterophylla* Fisch. var. *Thunbergii* Blume [Hashibami].

Gall: Whitish subglobular swelling on the mid or side-rib on the under side of the leaf; monothalamus. [Hashibami-shirofushi]: Shinji, 1944.

Distribution: Japan (Honshu).

Clinodiplosis kumayanagii (Shinji)

Orthodiplosis kumayanagii Shinji, 1938 n.
Clinodilplosis kumayanagi! Shinji, 1944.

Host plant: *Berchemia racemosa* Sieb. et Zucc. [Kumayanagi].

Gall: Swelling on the petiole, with length about 20 mm, diameter about 4 mm, smooth on surface.

Distribution: Japan (Honshu?).

Clinodiplosis rosaefoliae (Shinji)

Schizeneura? rosaefoliae Shinji, 1939a.
Clinodiplosis rosiperda Shinji, 1944 preoccup. *Clinodiplosis rosiperda* (Rübsaamen, 1892).
Dicrodiplosis rosiperda Kieffer?: Shinji, 1944.

Host plant: *Rosa multiflora* Thunb. [Noibara].

Gall: Galls produced on the petiole, mid-rib and peduncle; polythalamus. [Noibara-haore] : Shinji, 1944.

Distribution : Japan (Honshu?).

Genus **Mycetodiplosis** Kieffer

Mycetodiplosis Kieffer, 1912b; Kieffer, 1913f; Möhn, 1955.

Palpus consisting of 4 segments ; circumfila well developed and not conspicuously irregular ; tarsal claw simple, bent nearly at right angle; R_5 meeting with costa beyond apex of wing ; both cerci and tegmen emarginated ; gonocoxite not lobed.

The following 2 species were previously described from Japan, but their generic position is rather doubtful.

Mycetodiplosis astilbensis (Shinji)

Schizoneura? *astilbensis* Shinji, 1939a.
Mycetodiplosis astilbensis Shinji, 1944.

Host plant: *Astilbe Thunbergii* (Sieb. et Zucc.) Miq. var. *congesta* Boiss [Toriashi-shôma].

Gall : Subcylindrical swelling on the stem, petiole and mid-rib, sometimes bent nearly at right angle ; polythalamus. [Toriashishôma-sujifukure] : Shinji, 1944.

Distribution : Japan (Honshu).

Mycetodiplosis cleamatidis Shinji

Mycetodiplosis cleamatidis Shinji, 1944. (=*Silvestris clematii* Shinji, 1944?)

Host plant : Probably *Clematis apiifolia* DC. [Botanzuru].
Gall : ?
Distribution : Japan (Honshu?).

Genus **Sitodiplosis** Kieffer

Sitodiplosis Kieffer, 1913c ; Kieffer, 1913f ; Rübsaamen & Hedicke, 1926 ; Möhn, 1955 ; Harris, 1966 ; Mamajev, 1969.

Male flagellar segment with a single set of circumfilar loops on each enlargement ; tarsal claw simple on all legs ; cerci of male genitalia triangularly incised ; gonostylus relatively short ; inner angle of gonocoxite broadly expanded.

Sitodiplosis mosellana (Géhin)

Cecidomyia mosellana Géhin, 1857.
Clinodiplosis mosellana Géhin : Kieffer, 1896d.
Sitodiplosis mosellana (Géhin) : Kieffer, 1913c ; Kieffer, 1913f ; Yuasa, 1935 ; Yuasa, 1936a ; Yuasa, 1937a ; Barnes, 1956 ; Tsutsui, 1956 ; Harris, 1966 ; Mamajev, 1969.
Diplosis aurantica Wagner, 1866.

Host plants in Japan : *Triticum aestivum* L. [Komugi], *Hordeum vulgare* L. var. *hexastichon* Aschers. [Ômugi], *Agropyron ciliare* (Trin.) Franchet var. *minus* (Miq.) Ohwi [Aokamojigusa], *Agropyron ciliare* (Trin.) Franchet var. *pilosum* (Korsh.) Honda [Tachikamojigusa], *Agropyron tsukushiense* Nees var. *transiensis* Ohwi [Enbaku].

Gall : Usually a solitary larva occurs on the developing grain, although frequently there are 2, 3 or 4, and as many as 12 have been found on rare occasions. In all cases the result is a shrunken grain, more or less according to the number of larvae that have been feeding on it. (Barnes, 1956).

Distribution : Japan (Honshu, Shikoku, Kyushu), China, Europe, N. America.

Remarks : This species is well known as the Orange Wheat Blossom Midge. In Japan, Tsutsui (1956) studied detailed biology and ecology of this species.

Tribe LESTODIPLOSINI Harris

Lestodiplosini Harris, 1966.

This tribe is characterized in the following respects: first and second flagellar segment fused; each flagellar segment of male binodose; distal enlargement elongate, with 2 circumfilar loops and basal one subglobular, with 1 circumfilar loop; wing hyaline or spotted; partial crossvein Rs usually present; R_5 meeting with costa before or nearly at apex of wing. Male genitalia: cerci bilobed; "lower lamella" entire; inner angle of basal part of gonocoxite developed into a setose lobe; aedeagus long.

The members of this tribe are known to feed on some species of Acarina or Insecta.

Genus **Lestodiplosis** Kieffer

Lestodiplosis Kieffer, 1894f; Kieffer, 1895g; Kieffer, 1896d; Kieffer, 1898; Felt, 1908; Felt, 1911b; Kieffer, 1913f; Brunetti, 1920; Felt, 1921; Felt, 1925; Barnes, 1928b; Senior-White, 1928; Mani, 1934; Möhn, 1955; Felt, 1958; Hardy, 1960; Harris, 1966; Mamajev, 1969; Harris, 1968.
Leptodiplosis Kieffer, 1894b.
Hemidiplosis Kieffer, 1894g.
Coprodiplosis Kieffer, 1894f; Kieffer, 1913f.

This genus includes large number of species, which are very difficult to separate, though Barnes (1928b) made a key by using proportions of length and width of the flagellar and palpal segments. Harris (1966) mentioned that the genus contains at least 2 distinct group of species, characterized by *Lestodiplosis trifolii* Barnes (1928b) and *L. raphani* Barnes (1929b).

The members of this genus are widespred in the world, and distinguished from the other known genera of the tribe by having tarsal claws of all legs simple and aedeagus distally bulbous or broadly truncate.

Lestodiplosis sp.

(Fig. 21: A)

Male: Wing length about 1.2 mm. Eye bridge with 8 to 9 facets wide medially. Palpus consisting of 1+4 segments, about 3/5 as long as height of head, with scattered setae; first segment subcylindrical, about 1.8 times as long as wide; second and third subequal in length, each about 1.5 times as long as first; fourth longest, 1.8 to 2.0 times as long as first. Antenna with 2+12 segments; scape larger than pedicel, both with ventral setae rather sparsely; fifth flagellar segment with a distal stem a little longer than distal enlargement. Fore and middle legs with tibia a little shorter than femur and distinctly longer than second tarsal segment, fourth tarsal segment about 1.2 times as long as fifth; hind leg with tibia distinctly shorter than femur and slightly longer than second tarsal segment; empodium 3/4 to 4/5 as long as claw. Wing hyaline, about 2.2 times as long as wide; sensory pore 2 on distal portion of R_1, 1 on basal and 1 on distal portion of R_5. Genitalia: cerci bilobed, shorter than "lower lamella"; "lower lamella" entire, weakly rounded on distal margin; gonostylus long, about 9 times as

long as wide, with a strong distal tooth; inner angle of basal part of gonocoxite developed into a setose lobe; aedeagus long, slightly bulbous and smoothly rounded distally, with several pores on distal portion.

Female: Basal enlargement of fifth flagellar segment distinctly constricted medially, about 2 times as long as basal width, a little longer than distal stem; terminal flagellar segment elongated conical, 2.5 to 3.6 times as long as wide; hind leg with tibia distinctly shorter than femur and a little shorter than second tarsal segment; terminal lobe of ovipositor suboval, with scattered setae.

Biological notes: The specimens examined here were forwarded to the author for identification from Toyama Agricultural Experimental Station through Mr. N. Fukuhara,

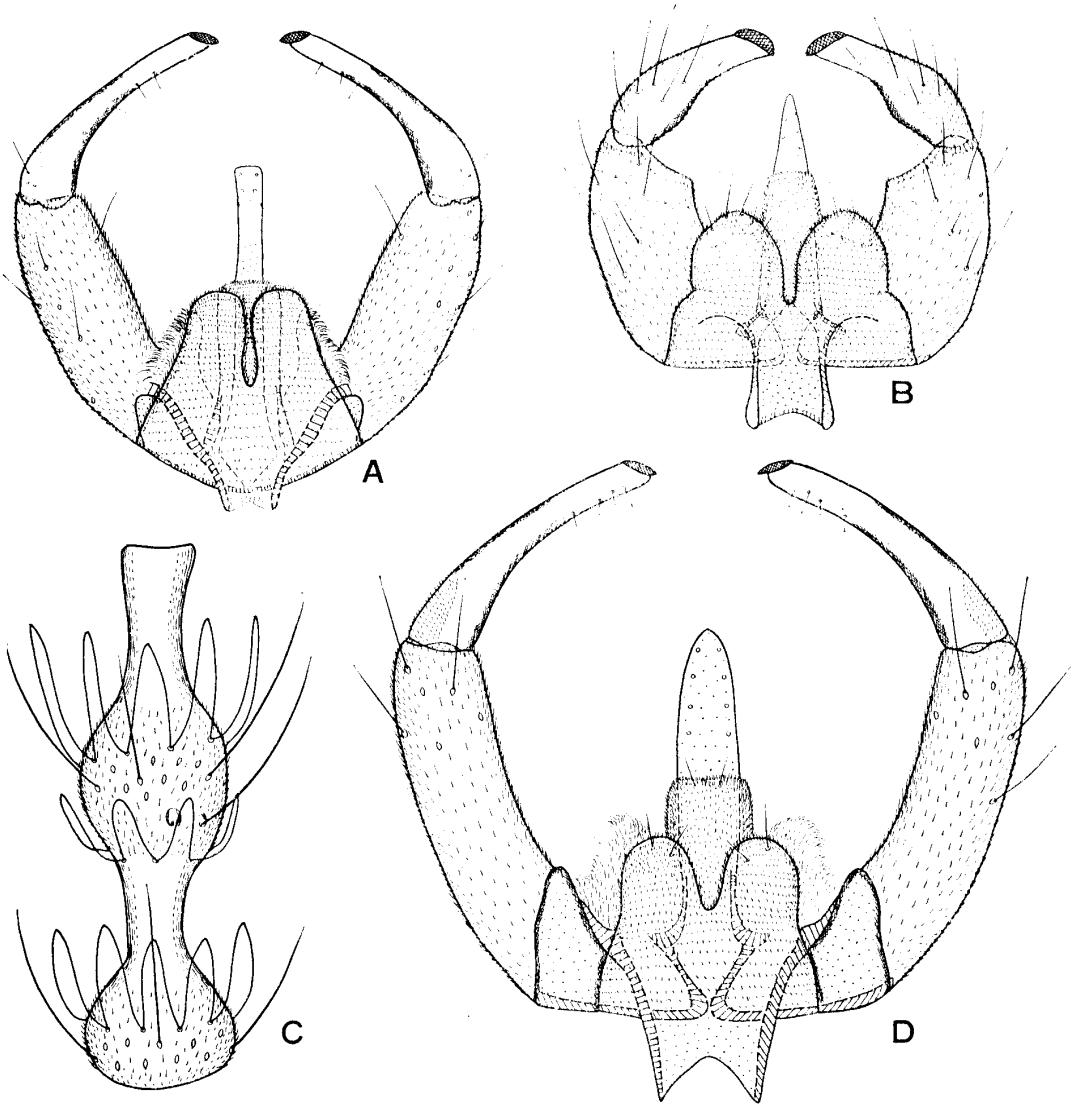

Fig. 21. *Lestodiplosis*, *Silvestrina* and *Feltiella*.
(A) male genitalia, dorsal view: *Lestodiplosis* sp. (B) male genitalia, dorsal view: *Silvestrina* sp. (C) fifth flagellar segment, ♂: *Feltiella* sp. (D) male genitalia, dorsal view: ditto.

National Institute of Agricultural Sciences, Tokyo. According to his personal communication (1967), the midges, accompanying with other species of Scatopsidae, emerged from decayed part of hyacinth bulb under storing. This species, as well as other species of the genus, seems to be predator on some species of Acarina or Insecta. The detailed life history of the species are not known at present.

Specimens examined: 1 ♂, 5 ♀♀ (on slide), 7 ♀♀ (in alcohol), emerged from decayed part of hyacinth bulb, Tonami, Toyama-Pref., Honshu, 24-25. VIII. 1968, Cecid. No. B5101 6.

Distribution: Japan (Honshu).

Remarks: Judging from the shape of distal part of aedeagus in male genitalia, this species probably belongs to *trifolii*-group, but is distinguished from *Lestodiplosis trifolii* Barnes (1928b) by having wing without pigmented area. This species is, however, left unnamed until further specimens are obtained and biology of the species is better known.

Genus **Feltiella** Rübsaamen

Feltiella Rübsaamen, 1911; Felt, 1911b; Kieffer, 1913f; Möhn, 1955; Felt, 1958.

The genus *Feltiella* is very closely related to the genus *Therodiplosis* Kieffer (1921), which is suspected to be identical with the former (Harris, 1967, personal communication).

Based on the differences between *Therodiplosis* and *Lestodiplosis* which are described by Harris (1966), *Feltiella* may be also distinguishd from *Lestodiplosis* in the following respects: flagellar segment of female with relatively short stem; at least a pair of tarsal claws unidentate; aedeagus distally roundly tapered, not bulbous or truncate.

Feltiella sp.

(Fig. 21: C-D)

Male: Wing length 1.0 to 1.5 mm. Eye bridge with 7 to 8 facets wide medially. Palpus consisting of 1+3 segment, with scattered setae; first segment subglobular; second and third subequal in length, about 3 times as long as first. Antenna dark brown, with 2+12 segments; scape a little larger than pedicel, with a few setae on distal portion; pedicel subglobular, with several setae on basal half; fifth flagellar segment with a distal stem as long as distal enlargement and about 1.3 times as long as intermediate stem or basal enlargement. Fore leg with femur, tibia and second tarsal segment subequal in length, tarsal claw unidentate; middle leg with second tarsal segement slightly shorter than femur or tibia; tarsal claw of middle and hind legs simple; empodium about 2/3 as long as claw. Wing hyaline, 2.2 to 2.4 times as long as wide; R_5 meeting with costa nearly at apex of wing; sensory pore 2 on distal part of R_1, 1 on basal and 1 on distal portion of R_5. Genitalia: cerci bilobed; "lower lamella" entire, weakly rounded on distal margin; gonostylus long, about 8 to 10 times as long as wide, with a strong distal tooth; inner angle of basal part of gonocoxite developed into a setose lobe of which distal end is bluntly pointed; aedeagus long, roundly tapered apically, with 2 parallel rows of 5 to 6 pores on each side.

Female: Basal enlargement of fifth flagellar segment cylindrical, 1.2 to 1.4 times as

long as wide; stem about 1/3 as long as basal enlargement; terminal lobe of ovipositor rather elongate, roundly triangular, with setae densely.

Biological notes: Kawano (1969) reported that this species feeds on some species of Tetranychid mites in the field, i. e. *Oligonychus* sp., *Panonychus citri* (McGregor), *Tetranychus urticae* Koch and *Tetranychus* sp. Based on the results of breeding in the laboratory, he estimated that this species repeats 9 to 10 generations in a year. Hibernation was observed in every stage at Kagoshima-Pref.

Specimens examined : 1 ♂ (on slide), larva collected from Mt. Shiroyama, Kagosihma-City, Kyushu, 18. V. 1966, K. Kawano leg. emerged on 28. V. 1966, reared by K. Kawano ; 3 ♂♂ (on slide), larvae and pupae collected from Uearata, Kagoshima-City, Kyushu, 21. X. 1966, K. Kawano leg. emerged on 27-31. X. 1966, reared by K. Kawano ; 1 ♂, 1 ♀ (on slide), larvae and pupae collected from Kajiya-chô, Kagoshima-City, Kyushu, 18. XII. 1966, K. Kawano leg. emerged on 22-23. I. 1967, reared by K. Kawano ; 7 ♂♂, 6 ♀♀ (on slide), larvae and pupae collected from Toso, Kagoshima-City, Kyushu, 25, 28. XII. 1966, K. Kawano leg. emerged on 27. I. - 5. II. 1967, reared by K. Kawano.

Distribution : Japan (Kyushu).

Remarks : The following 4 species, *Feltiella minuta* (Felt, 1907), *F. davisi* Felt (1915c), *F. tetranychi* Rübsaamen (1911) and *Therodiplosis persicae* Kieffer (1912b), may be distinguished from the other members of the genus by having only fore leg with unidentate tarsal claw and middle and hind legs with simple claw. They are vrey closely related to each other and *F. davisi* is considered to be identical with *minuta* (Gagné, 1967, personal communication). The Japanese species may also be included in the above mentioned species-group, but can not be identified at present. The Japanese species, if not identical, may be distinguished from them by having "lower lamella", weakly rounded on distal margin in some specimens and aedeagus with some greater number of pores i. e. 2 parallel rows of 5 to 6 pores on each side. The shape of distal margin of the "lower lamella" is, however, sometimes transformed depending on the position of specimen on a slide. Acutually some of the Japanese specimens have the "lower lamella" truncate distally. Number of pores also varies with the specimens.

Genus **Silvestrina** Kieffer

Silvestrina Kieffer, 1912a ; Kieffer, 1913f ; Felt, 1929 ; Barnes, 1932a ; Grover, 1965.

Kieffer (1912a) separated this genus from *Arthrocnodax* Rübsaamen (1895b) by the differences in male genitalia and empodium. According to the description by Rübsaaman (1895b), "lower lamella" of male genitalia is bilobed in *Arthrocnodax*, whereas in *Silvestrina* "lower lamella" entire. Relatively short or rudimentary empodium is usually considered to be characteristic of *Silvestrina*, but *S. lobata* which was recently described by Grover (1965) has rather long empodium. Gonostylus of male genitalia rather short, stout, swollen basally, not slender as in the genera *Lestodiplosis* or *Feltiella*.

Barnes (1932a) transfered some species from *Arthrocnodax* to *Silvestrina* and indicated that many species which ought to be referred to *Silvestrina* are still left in the genus *Arthrocnodax*.

Though the tribal position of this genus is not established, it is temporary grouped

with the tribe LESTODIPLOSINI in this paper judging by the shape of male genitalia, position of R_5 vein and the fact that the genus *Arthrocnodax* is included in the tribe (Gagné, 1968). If the larval characters and the connection with the allied genera are better known, the tribal position of the genus will be established.

Silvestrina sp.

(Fig. 21 : B)

Male : Wing length about 1.0 mm. Eye bridge with 6 facets wide medially. Palpus consisting of 1 + 4 segments, about 2/3 as long as height of head, with scattered setae ; first palpal segment subglobular ; second about 1.5, third 1.8 to 2.0, and fourth about 3.0 times as long as first. Antenna with 2 + 12 segments ; scape nearly as large as pedicel, with a few setae ventrally ; pedicel with a few setae on outer side, more numerous on inner side and ventrally ; first and second flagellar segments sometimes not completely fused ; fifth flagellar segment with a distal stem about 3/5 as long as distal enlargement, 1.5 times as long as intermediate stem, 3/4 as long as basal enlargement. Fore and middle legs with tibia nearly as long as or slightly shorter than femur and 1.5 to 1.7 times as long as second tarsal segment ; hind leg with tibia a little shorter than femur and about 1.2 times as long as second tarsal segment ; fourth tarsal segments of all legs 1.1 to 1.3 times as long as fifth ; claw simple, slender ; empodium less than 1/2 the length of claw. Wing about 2 times as long as wide ; R_5 meeting with costa a little before apex of wing ; sensory pore 2 (rarely 3) on distal portion of R_1, 1 on basal and 1 (rarely 2) on distal portion of R_5. Genitalia : cerci bilobed, shorter than "lower lamella"; "lower lamella" entire, rounded on distal margin; gonostylus rather short, stout, swollen basally, with a strong distal tooth; gonocoxite with a rather small, setose lobe on inner angle of basal part ; aedeagus sharply tapered apically, with several pores on distal portion.

Female : Wing length 1.1 to 1.2 mm, about 2.1 times as long as wide ; basal enlargement of fifth flagellar segment slightly constricted medially, 1.7 to 1.9 times as long as basal width, 2.7 to 3.0 times as long as distal stem ; terminal segment 2.3 to 2.5 times as long as basal width, with a blunt end which is distinctly produced ; terminal lobe of ovipositor suboval, with rather dense setae.

Biological notes : The adults of this species emerged from rice bran which was used for breeding of *Ephestia cautella* Walker. It is likely that this species is predator of some species of grain mites also found in the rice bran. Detailed biology of the species is not known at present.

Specimens examined : 7 ♂♂, 5 ♀♀ (on slide), 27 ♂♂, 18 ♀♀ (in alcohol), emerged from rice bran, Uearata, Kagoshima-City, Kyushu, 25. IX. - 4. XI. 1968, reared by J. Yukawa, Cecid. No. B2501-12.

Distribution : Japan (Kyushu).

Remarks : This species may be identical with one of the previously described species, but is left unnamed at present because the members of this genus are very difficult to separate and there has been considerable confusion as to the genera *Silvestrina* and *Arthrocnodax*.

Shinji described the following 4 species of the genus from Japan and assumed that they are phytophagous or gall makers, but there are considerable problems left concerning their generic position, otherwise their host plant. *Silvestrina smilacifoliae* is probably an inquilinous species (Shinji, 1944).

Silvestrina artemisiae (Shinji)

Sitodiplosis artemisiae Shinji, 1939e.
Silvestrina artemisiae Shinji, 1944.

Host plant : *Artemisia princeps* Pamp. [Yomogi]

Gall : Larvae live under the bark.

Distribution : Japan (Honshu).

Silvestrina euphorbiae (Shinji)

Contarinia euphorbiae Shinji, 1939d.
Silvestrina euphobiae ! Shinji, 1944.

Host plant : *Euphorbia pekinensis* Rupr. [Takatôdai].

Gall : Terminal several leaves bound and somewhat swollen.

Distribution : Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Silvestrina hydrangeae (Shinji)

Contarinia hydrangeae Shinji, 1939c ; Shinji, 1939h.
Silvestrina hydrangeae Shinji, 1944.

Host plant : *Hydrangea paniculata* Sieb. [Noriutsugi].

Gall : Fruit swelling, subglobular, smooth on surface, about 2.5 times as large as normal one, polythalamus. [Noriutsugi-mifushi] : Monzen, 1929 ; Shinji, 1944.

Distribution : Japan (Honshu).

Silvestrina quercifoliae Shinji

Silvestrina quercifoliae Shinji, 1944.

Host plant : *Quercus serrata* Thunb. [Konara].

Gall : Leaf margin near the petiole folded from the both sides to the upper side, forming a kind of cone-shaped pouch. [Nara-haorefushi] : Shinji, 1944.

Distribution : Japan (Honshu).

Genus **Arthrocnodax** Rübsaamen

Arthrocnodax Rübsaamen, 1895b ; Kieffer, 1896d ; Kieffer, 1898 ; Felt, 1908 ; Felt, 1911b ; Kieffer, 1913f : Felt, 1921 ; Felt, 1925 ; Senior-White, 1928 ; Mani, 1934 ; Möhn, 1955 ; Felt, 1958 ; Hardy, 1960.

Feltodiplosis Kieffer, 1913f ; Brunetti, 1920.

As mentioned in the genus *Silvestrina*, the genus *Arthrocnodax* is distinguished from it by having male genitalia with deeply incised "lower lamella".

Arthrocnodax occidentalis Felt

Arthrocnodax occidentalis Felt, 1912c ; Felt, 1912d ; Quayle, 1912 ; Ewing, 1914 ; Hotta, 1916 ; Felt, 1921 ; Yasumatsu & Watanabe, 1964.

Prey in Japan : *Tetranychus kanzawai* Kishida.

Distribution : Japan (Honshu), N. America.

Arthrocnodax sp.

It is used to be considered that a certain species of gall midge is injurious to the Japanese medlar (Takahashi, 1930 ; K. Tanaka, 1938 ; Oda, 1940 ; Shiraki, 1952), but judging from the figure of the larva by Tanaka (1938), Koizumi (1962a, 1962b) suggested that this gall midge is not phytophagous but predacious, probably on *Eriophytesu* sp. and it may be closely related to the members of the genus *Arthrocnodax*.

Tribe APHIDOLETINI Harris

Aphidoletini Harris, 1966.

Harris (1966) supported Möhn's grouping of genera which was based on the larval characters (Möhn, 1955) by the adult morphology and the biology of the genera concerned, and he erected a new tribe, which is characterized as follows : palpus consisting of 4 segments ; antenna with 2 + 12 segments ; male flagellar segment binodose ; distal enlargement larger than basal one and bearing 2 sets of circumfila ; basal one with 1 set ; one or more of the circumfilar loops extraordinarily long ; female flagellar segment with a relatively long, cylndrical basal enlargement, a short distal stem and simple circumfila ; at least a pair of tarsal claws unidentate ; R_5 meeting with costa beyond wing apex ; partial cross-vein Rs present ; male genitalia of varied ; cerci usually triangularly incised ; tegmen variously modified ; ovipositor short, not retractile.

The members of this tribe are known to be predators of Hemiptera-Homoptera, particularly Aphididae and related families.

Genus **Aphidoletes** Kieffer

Aphidoletes Kieffer, 1904b ; Felt, 1911b ; Kieffer, 1913f ; Möhn, 1955 ; Nijveldt, 1957 ; Mamajeva, 1964 ; Harris, 1966 ; Mamajev, 1969.

Tribremia Kieffer, 1912b ; Kieffer, 1913f.

Phaenobremia Kieffer, 1912b ; Kieffer, 1913f ; Nijveldt, 1957 ; Möhn, 1955 ; Felt, 1958 ; Hardy, 1960.

Isobremia Kieffer, 1912c ; Kieffer, 1913f ; Möhn, 1955.

Aphidoletes is distinguished from the genus *Monobremia* Kieffer (1912b) by the distinct shape of male genitalia : tegmen greatly modified ; gonocoxite massive, without distinct setose lobe on inner angle of basal part. Hitherto 2 closely related species of the genus have been known in Japan.

Aphidoletes meridionalis Felt

Aphidoletes meridionalis Felt, 1908 ; Davis, 1916 ; Felt, 1918c ; Ninomiya, 1959 ; Yasumatsu & Watanabe, 1964.
Phaenobremia meridionalis (Felt) : Kieffer, 1913f ; Barnes, 1927b ; Barnes, 1929c ; Nijveldt, 1957 ; Hardy, 1960.

Prey in Japan : *Aphis craccivora* Koch, *Aphis glycines* Matsumura, *Aphis gossypii* Glover, *Myzus persicae* Sulzer.

Distribution : Japan (Honshu, Kyushu), Europe, Hawaii, N. America.

Aphidoletes aphidimyza (Rondani)

(Fig. 22 : A–C)

Cecidomyia aphidimyza Rondani, 1847.
Bremia aphidimyza Rondani : Rondani, 1860 ; Kieffer, 1898 : Kieffer, 1900.
Diplosis aphidimyza (Rondani) : Bergenstamm & P. Löw, 1876 ; Rübsaamen, 1892.
Aphidoletes aphidimyza (Rondani) : Kieffer, 1904b ; Mamajeva, 1964 ; Harris, 1966 ; Skuhrava, 1969 ; A. Tanaka, 1971.
Phaenobremia aphidimyza (Rondani) : Kieffer, 1913f ; Barnes, 1929c ; Roberti, 1946 ; Nijveldt, 1957 ; Nijveldt, 1966.
Cecidomyia cerasi H. Loew, 1850.
Phaenobremia cerasi H. Loew : Kieffer, 1913f.
Diplosis aphidisuga Rübsaamen, 1891.
Bremia aphidisuga Rübsaamen : Kieffer, 1898.
Aphidoletes aphidisuga Rübsaamen : Kieffer, 1904b.
Phaenobremia aphidisuga (Rübsaamen) : Kieffer, 1913f ; Barnes, 1929c ; Möhn, 1955.
Diplosis aphidivora Rübsaamen, 1891.
Bremia aphidivora Rübsaamen : Kieffer, 1898.
Aphidoletes aphidivora Rübsaamen : Kieffer, 1904b.
Phaenobremia aphidivora (Rübsaamen) : Kieffer, 1913f ; Barnes, 1929c ; Nijveldt, 1953 ; Nijveldt, 1954 ; Nijveldt, 1955 ; Nijveldt, 1957 ; Nijveldt, 1963 ; Azab & others, 1965b.
Bremia sonchi Kieffer, 1896e.
Isobremia sonchi (Kieffer) : Kieffer, 1912c ; Kieffer, 1913f ; Barnes, 1929c ; Möhn, 1955.
Phaenobremia helichrysis Barnes, 1927b ; Barnes, 1929c ; Nijveldt, 1957.
Tribremia aphidophaga Marikovskii, 1956.

Male : Wing length 1.5 to 1.8 mm. Eye bridge about 12 or more facets wide medially. Palpus consistng of 4 segments, with scattered, rather short setae ; first palpal segment shortest ; second 1.4 to 1.6, third 1.9 to 2.1 and fourth 2.3 to 3.3 times as long as first. Antenna with 2 + 12 segments ; scape sparsely with ventral setae ; pedicel with a irregular whorl of rather short setae ; first and second flagellar segments fused ; fifth flagellar segment with a distal stem nearly as long as or slightly shorter than distal enlargement, 1.2 to 1.4 times as long as intermediate stem, about 1.7 times as long as basal enlargement ; both distal and basal enlargements of each flagellar segment respectively with 1 or 2 extraordinarily long circumfilar loops ; terminal flagellar segment apically with a pubescent protrusion. Fore leg with femur a little longer than tibia

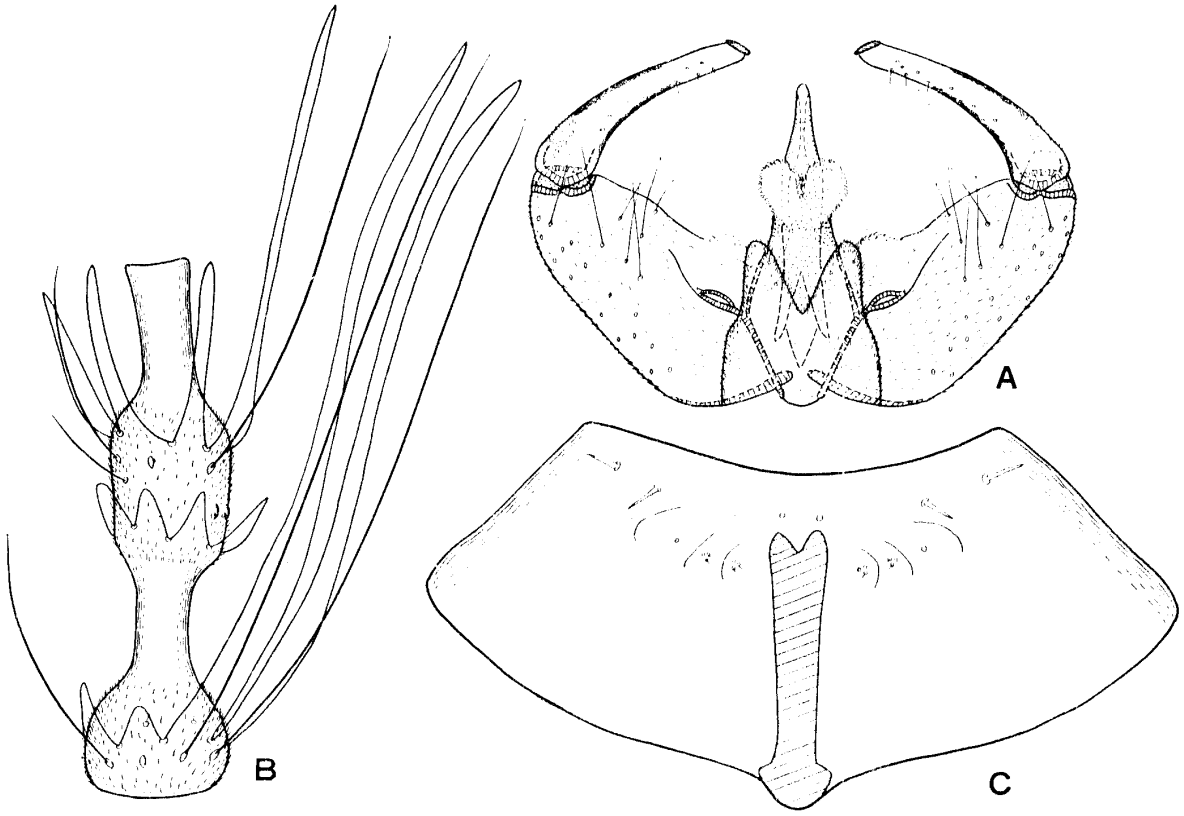

Fig. 22. *Aphidoletes aphidimyza* (Rondani).
(A) male genitalia, dorsal view. (B) fifth flagellar segment, ♂. (C) prothorax of larva, ventral view.

and nearly as long as or slightly shorter than second tarsal segment, fourth tarsal segment 2.1 to 2.3 times as long as fifth ; middle leg with femur a little longer than tibia and nearly as long as or slightly longer than second tarsal segment, fourth tarsal segment 2.3 to 2.4 times as long as fifth ; hind leg with femur distinctly longer than tibia and slightly shorter than second tarsal segment, fourth tarsal segment 2.3 to 2.4 times as long as fifth ; claw bifid on fore and middle legs, usually simple (sometimes bifid or with a small basal tooth) on hind leg ; empodium a little shorter than claw. Wing 2.5 to 2.7 times as long as wide ; R_5 meeting with costa beyond wing apex ; sensory pore 2 on distal portion of R_1, 1 on basal and 2 on subdistal portion of R_5. Genitalia : cerci incised by a V-shaped emargination, forming a pair of subtriangular, setose lobes ; tegmen distally enlarged and cordate, enlarged portion densely pubescent ; gonostylus rather long, slender, slightly curved, with an apical claw ; gonocoxite rather elongated ; aedeagus long, distally slender and divided into 2 parts.

Female : Wing length 1.6 to 2.0 mm, 2.3 to 2.5 times as long as wide. Antenna with 2 + 12 segments ; first flagellar segment somewhat elongated, fused with second flagellar segment ; fifth segment with a basal enlargement 2.6 to 2.8 times as long as wide, 3.3 to 3.6 times as long as distal stem ; termial flagellar segment apically with a pubescent protrusion. Ovipositor short ; terminal lobe somewhat, elongated suboval, with scattered setae.

Mature larva : Second antennal segment 0.025 to 0.028 mm ; cervical papillae without seta. Abdominal segment dorsally providing a transvers row of 6 to 9 rounded, rather large spines on anterior third of each segment ; an additional row of rounded spines situated on postero-lateral portion of the former row ; number and position of stigma normal ; 6 dorsal papillae each with a seta ; 2 pleural papillae present on each side, each with a seta ; 2 dorsal papillae of eighth abdominal segment each with a seta ; anal segment dorso-medially with a group of rounded spines which are irregularly and longitudinally distributed ; 8 terminal papillae each with a seta. Sternal spatula 0.15 to 0.18 mm, with rather elongated stem, distally incised by a rather rounded V-shaped emargination, forming a pair of rounded lobes. Lateral papillae normal in number and position ; sternal papillae without seta ; inner pleural papillae of prothorax without seta, those of meso- and metathorax with a seta. Abdominal segment ventrally with many transvers rows of very small, blunt spines and fine furrows ; 4 anterior ventral papillae without seta ; 2 posterior ventral papillae each with a seta ; 4 ventral papillae of eighth abdominal segment without seta ; anal segment ventrally with some longitudinal rows of spines around anus and many transvers rows of small spines on upper side of anus ; 6 anal papillae all without seta.

Pupa : Apical spine short, antero-laterally pointed ; apical papilla with a seta about 0.09 mm ; upper and lower frontal spines absent ; some of lower and lateral facial papillae with a short seta ; prothoracic horn long, about 0.25 mm ; stigma present on second to sixth abdominal segments ; each abdominal segment, except first one, dorsally providing several transvers rows of triangular spines on anterior third ; 2 (first and sixth) of 6 dorsal papillae each with a seta which is about 0.01 mm ; 2 pleural papillae each with a short seta.

Prey in Japan : This species is known to be a polyphagous species. Host range of the species ought to be consulted with Barnes (1929c) and Nijveldt (1954, 1955, 1957, 1963). The specimens examined here were reared from the larvae feeding upon the colonies of *Longiunguis sacchari* Zehntner on Sorgo.

Biological notes : The biology of this species was studied mainly in Europe by such authors as Roberti (1946), Nijveldt (1954, 1957, 1963, 1966) and Balker (1964), and recently by Azab & Others (1965a, 1965b) in U. A. R. According to Nijveldt (1963), the eggs are laid on plants and when the conditions permit the larvae may be full grown within a week. Pupation takes place on the upper surface of the soil within a dark brown cocoon. The pupal stage lasts for about 2 to 3 weeks. Several generations occur anually.

Specimens examined : 3 ♂♂, 3 ♀♀, 3 larvae, 2 pupae (on slide), larvae collected from Kotobuki-chô, Kanoya-City, Kagoshima-Pref., Kyushu, 12. VIII. 1969, A. Tanaka leg. emerged on 22-29. VIII. 1969, reared by A. Tanaka (prey : *L. sacchari*), Cecid. No. B5301-11.

Distribution : Japan (Kyushu), Europe, Israel, U. A. R.

Remarks : This species is probably widely distributed in the world and is distinguished from *A. abietis* (Kieffer, 1896e) and *A. urticariae* (Kieffer, 1895h) by having distally enlarged and cordate tegmen ; the enlarged portion of tegmen densely pubescent. The North American speices, *A. meridionalis* Felt (1908) is very similar to this speices and it is possible that the species known as *meridionals* in Japan may be *aphidimyza*.

Tribe HORMOMYIINI Rübsaamen & Hedicke

Hormomyiini Rübsaamen & Hedicke, 1926 ; Harris, 1966.

Harris (1966) defined the tribe as follows : palpus consisting of 2 to 4 segments ; antenna with 2 + 12 segments ; male flagellar segment binodose ; distal enlargement with 2 and basal enlargement with 1 set of very short circumfilar loops ; female flagellar segment with a cylindrical basal enlargement and a relatively short distal stem, circumfila simple but with short loops in some genera ; tarsal claw variable ; R_5 meeting with costa beyond wing apex ; Rs indistinct or absent. Male genitalia : tegmen entire or slightly emarginated ; gonostylus and gonocoxite densely clothed with short setae ; gonocoxite massive or stout ; aedeagus long. Ovipositor short, stout, partially retractile ; terminal lobe well developed and clothed in fine short setae.

Genus **Geromyia** Coutin & Harris

Geromyia Coutin & Harris, 1969.

Genus *Geromyia* is characterized in the following respects : palpus consisting of 4 segments ; male flagellar segment binodose, with 3 sets of circumfilar loops which consist of nearly regular, short bows ; tarsal claw simple ; R_5 meeting with costa beyond apex of wing. Male genitalia : cerci bilobed ; tegmen entire or shallowly emarginated ; gonocoxite massive. Ovipositor long.

Geromyia nawai (Monzen) new combination

(Fig. 23 : A–E)

Clinodiplosis nawai Monzen, 1937.
Macrodiplosis nawai Monzen : Monzen, 1955b.

Male : Wing length 3.1 to 3.8 mm. Eye bridge 3 to 5 facets wide medially. Palpus consisting of 4 segments, about 3/4 as long as height of head, with scattered short setae ; first palpal segment suboval, a little broader than distal 3 segments ; second and third subequal in length, each about 1.5 times as long as first ; fourth nearly as long as or slightly longer than second or third. Antenna with 2 + 12 segments ; scape larger than pedicel, with a few setae ventrally ; pedicel with a few setae ventrally and on both sides ; first and second flagellar segments not fused ; fifth flagellar segment with a rather elongated distal enlargement which is 1.5 to 1.8 times as long as distal stem and 1.6 to 2.0 times as long as basal enlargement or intermediate stem. Fore and middle legs with tibia nearly as long as or slightly shorter than femur and distinctly longer than second tarsal segment, fourth segment 2.0 to 2.5 times as long as fifth ; hind leg with tibia distinctly shorter than femur and nearly as long as or slightly longer (sometimes slightly shorter) than second tarsal segment, fourth 2.2 to 2.6 times as long as fifth ; claw simple, rather weakly curved subdistally ; empodium as long as claw. Wing about 3 times as long as wide ; R_5 meeting with costa beyond apex of wing ; sensory pore 3 to 4 on distal portion of R_1, 1 on basal and 1 to 3 on medial to subdistal portion of R_5. Genitalia : cerci well bilobed, with a large V-shaped emargination ; tegmen longer than cerci, rather shallowly emarginated on distal margin ; gonostylus rather

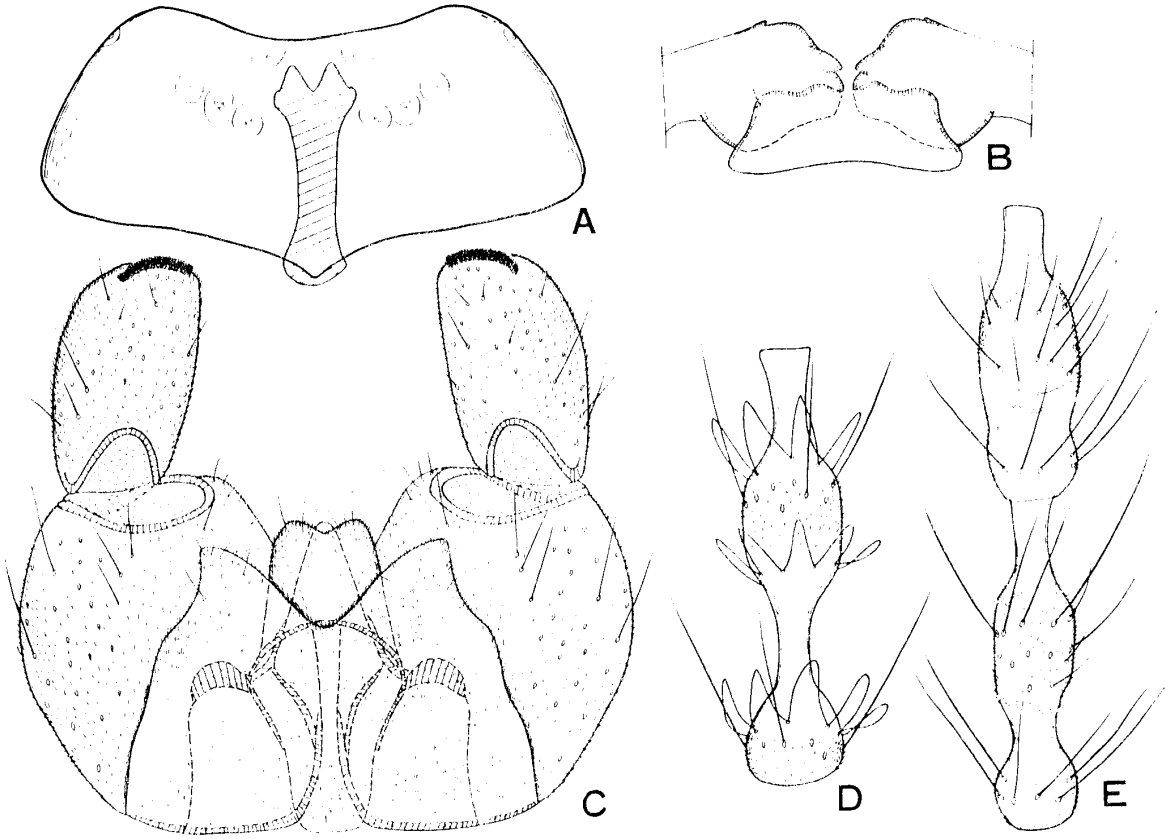

Fig. 23. *Geromyia nawai* (Monzen)
(A) prothorax of larva, ventral view. (B) anterior portion of pupa, dorsal view. (C) male genitalia, dorsal view. (D) fifth flagellar segment, ♂. (E) fifth and sixth flagellar segments, ♀.

short, stout, about 1.9 times as long as wide, with a group of strong teeth apically ; gonocoxite thick, without basal lobe ; aedeagus nearly as long as tegmen, apically roundly tapered, with several sensory pores.

Female : Wing length 3.4 to 4.2 mm, about 3 times as long as wide ; first and second flagellar segments fused ; basal 4 to 6 flagellar segments each with a basal enlargement which is well constricted medially ; rest of the segments with weakly constricted or nearly subcylindrical basal enlargement ; fifth flagellar segment with a basal enlargement 2.2 to 3.0 times as long as wide, 2.4 to 2.9 times as long as distal stem ; stem of flagellar segment getting shorter to distal segment : penultimate segment almost without stem ; terminal segment 1.6 to 2.2 times as long as wide, with a small protrusion distally. Fore leg with tibia a little shorter than femur and much longer than second tarsal segment, fourth segment 2.0 to 2.7 times as long as fifth ; middle and hind legs with tibia distinctly shorter than femur and much longer than second tarsal segment, fourth 1.3 to 2.1 times as long as fifth ; ovipositor very long ; terminal lobe elongated suboval, with setae rather densely.

Pupa : Apical spine very short, directed inwardly ; apical papilla with a seta which is 0.03 to 0.05 mm ; 1 of 2 lower facial papillae each with a short seta ; usually 1 of

3 lateral facial papillae each with a short seta ; upper and lower frontal spines absent ; prothoracic horn long, about 0.35 mm ; stigma present on second to sixth abdominal segments, each about 0.038 mm ; each abdominal segment, except first one, dorsally with several transverse rows of triangular spines on anterior third ; abdominal segment dorsally and ventrally with densely distributed minute spines.

Host plant : *Pleioblastus simonii* Nakai [Medake].

Gall : The gall of this species was first reported by Nawa (1909) and subsequently redescribed by Monzen (1932, 1955b). Rather long, sword-shaped swelling on the twig ; length 30 to 40 mm, diameter about 4 mm, with a slit on one side of apical part of the swelling ; inner side of the swelling covered with fine hairs ; polythalamus. [Medake-edafushi] : Monzen, 1932 ; Monzen, 1937 ; Monzen, 1955b.

Biological notes : According to Nawa (1909), the adults of the species appear once a year, from the middle to the end of April. Larvae becoming full grown before winter and pupation occurs next spring in the gall.

Specimens examined : 8 ♂♂, 8 ♀♀, 13 pupae (on slide), many others (in alcohol), galls collected from Shiratori-cho, Atsuta-ku, Nagoya-City, Honshu, M. Sato & N. Yamada leg. emerged on III.-IV. 1966, reared by M. Sato (host plant : *P. simonii*), Cecid. No. A5601-29.

Distribution : Japan (Honshu).

Remarks : In this paper, this species newly combined with the genus *Geromyia* which was recently erected by Coutn & Harris (1969). This species is distinguished from the millet grain midge, *G. penniseti* (Felt, 1920) by having tegmen roundly tapered apically.

Genus **Orseolia** Kieffer & Massalongo

Orseolia Kieffer & Massalongo, 1902.

According to the personal communication (Gagné, 1970), this genus includes 20 species, most of which are responsible for grass stem galls and some are for bud galls. In the Oriental catalog which he is now preparing, he treats *Orseoliella*, *Courteia*, *Pachydiplosis* and *Dyodiplosis* as synonyms of *Orseolia*. Diagnostic characters of the genus will be revised in the future.

Orseolia miscanthi (Shinji) new combination

(Fig. 24 : A-F)

Contarinia miscanthi Shinji, 1938b.
Kiefferia miscanthi Shinji : Shinji, 1938f ; Shinji, 1939h.
Asphondylia sasae Shinji : Shinji, 1944.

Male : Wing length 3.2 to 3.4 mm. Eye bridge 3 to 6 facets wide medially. Palpus consisting of 4 segments, with scattered setae ; first palpal segment shortest, 1.3 to 1.7 times as long as wide ; second 1.4 to 1.6, third 1.4 to 1.8, fourth 1.8 to 2.3 times as long as first ; third and fourth segments sometimes fused. Antenna with 2 + 12 segments ; scape with a few ventral setae ; pedicel with an irregular whorl of scattered setae ; distal enlargement of each flagellar segment somewhat elongated and constricted ;

first and second flagellar segments fused ; fifth flagellar segment with a distal enlargement about 1.5 times as long as distal stem, about 1.8 times as long as intermediate stem, 2.0 times as long as basal enlargement ; terminal flagellar segment distally with a setose, subconical protrusion which is provided with some rather long bristles. Fore and middle legs with femur nearly as long as tibia and a little longer than second tarsal segment, fourth tarsal segment 1.5 to 1.7 times as long as fifth ; hind leg with femur a little longer than tibia and nearly as long as or slightly longer than second tarsal segment, fourth about 1.9 times as long as fifth ; claw simple on all legs, bent nearly at right angle ; empodium nearly as long as or slightly longer than claw. Wing about 2.5 times as long as wide ; R_5 meeting with costa beyond wing apex ; sensory pore 2 to 4 on distal portion of R_1, 1 on subbasal and 2 on subdistal portion of R_5, sometimes additional 1 on medial portion of R_5. Genitalia : cerci rather small, incised by a V-shaped emargination, forming a pair of subtriangular lobes ; tegmen entire, basally broader, distally rounded ; gonostylus short, stout, basally broader, distally with a claw ; gonocoxite rather massive ; aedeagus rather slender, nearly parallel sided, caudo-laterally pointed, rather shallowly emarginated on distal margin, with a needle-shaped protrusion on emarginated portion.

Female : Wing length 3.6 to 4.6 mm, about 2.5 times as long as wide ; antenna with 2 + 12 segments ; basal enlargement of basal several flagellar segments distinctly constricted on basal third, those of distal several segments slightly constricted ; first and second flagellar segments fused ; fifth flagellar segment with a basal enlargement about 2.5 to 2.9 times as long as its maximum width, 3.0 to 4.0 times as long as distal stem ; terminal flagellar segment as in male ; all legs with tibia distinctly shorter than femur and distinctly longer than second tarsal segment ; fourth tarsal segments of fore and middle legs 1.1 to 1.4 times as long as fifth ; that of hind leg 1.4 to 1.8 times as long as fifth, ovipositor long, terminal lobe elongated suboval.

Pupa : Apical spine long, about 0.3 mm, pointed apically ; lateral spine absent ; apical papilla with a seta which is 0.07 to 0.10 mm ; upper and lower frontal spines absent ; 1 of 3 lower facial papillae with a short seta ; some of lateral facial papillae with a short seta ; prothoracic horn long, about 0.25 mm ; stigma present on first to eighth abdominal segments ; each abdominal segment, except first one, dorsally with 2 to 3 irregular rows of spines on anterior third.

Host plants : *Miscanthus sinensis* Anderss. [Susuki], *Miscanthus sinensis* Anderss. var. *condensatus* (Hackel) Makino [Hachijôsusuki].

Gall : Young bud transformed into a spindle-shaped swelling, of which length is 30 to 80 mm, diameter 15 to 25 mm ; polythalamus. [Susuki-no-tamabaefushi] : Shinji, 1938f.

Biological notes : According to Shinji (1938b), the adults of this species appear once a year, around early in September at Morioka, Honshu. The present author also obtained adults on the second of October at Kagoshima-Pref., Kyushu in 1969. Koizumi (personal communication, 1969) informed to the author that there are 2 generations in a year at Hachijô Island, which is located about 280 km away from Tokyo in a south direction.

Specimens examined : 2 ♂♂, 2 ♀♀, 2 pupae (on slide), 8 ♂♂, 12 ♀♀, many pupae (in alcohol), galls collected from Hachijô-I., K. Koizoumi leg. V. 1960, reared by K. Koizumi (host plant : *M. sinensis* var. *condensatus*), Cecid. No. B3201 - 6 ; 3 ♀♀, 2 pupae

(on slide), 16 ♀♀, 18 pupae (in alcohol), galls collected from Kamogawa, Hachijô-I., 27. V. 1964, Y. Hirashima & M. Shiga leg. reared by Y. Hirashima & M. Shiga (host plant : ibid.), Cecid. No. B3207-11 ; 2 ♂♂ (on slide), Mitsune-Noboriryû Pass, Hachijô-I., Y. Hirashima & M. Shiga leg. Cecid. No. B3212-13 ; 2 ♂♂, 2 ♀♀, 2 pupae (on slide), 4 ♀♀, 3 pupae (in alcohol), galls collected from Shibi, Miyanojô, Kagoshima-Pref., Kyushu, 1. X. 1969, Y. Tajima leg. emerged on 2. X. 1969, reared by J. Yukawa (host plant : *M. sinensis*), Cecid. No. B3214-19.

Remarks : Shinji (1938b) first described this species under the genus *Contarinia* and subsequently (Shinji, 1938f, 1939h) refered it to the genus *Kiefferia*. Judging by the results of examination of the original description and the specimens reared by the author from the galls of same kind of *Miscanthus sinensis*, it is difficult to consider that

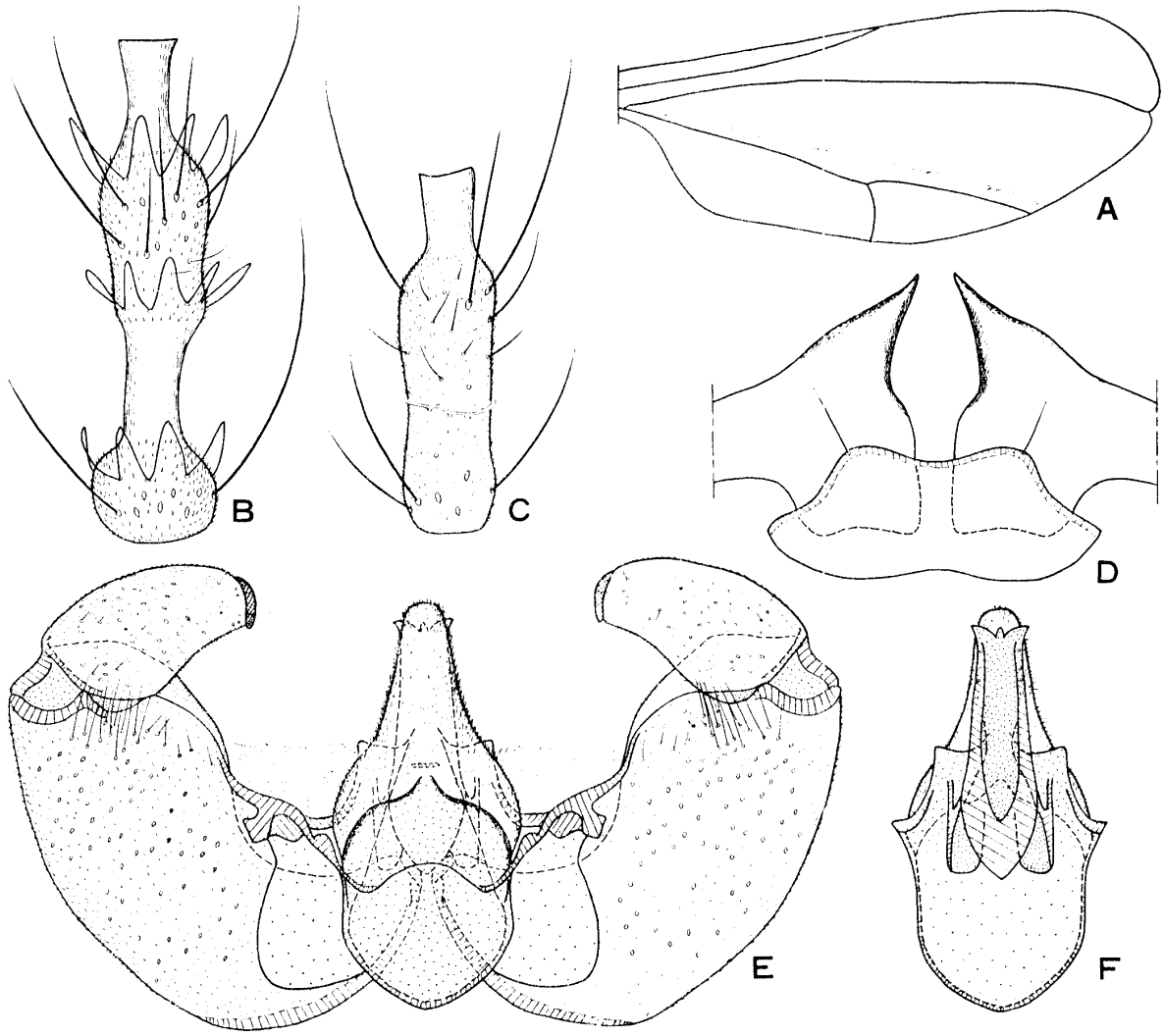

Fig. 24. *Orseolia miscanthi* (Shinji)
(A) wing, ♂. (B) fifth flagellar segment, ♂. (C) fifth flagellar segment, ♀. (D) anterior portion of pupa, dorsal view. (E) male genitalia, dorsal view (cerci removed). (F) tegmen and aedeagus, ventral view.

this species belongs to either *Contarinia* or *Kiefferia*, bacause the male flagellar segments of this species are apparently binodose and consist of 3 sets of circumfilar loops. According to the personal communication (Harris, 1970 ; Gagné, 1970), this species ought to be combined with the genus *Orseolia* though it has a considerably long tegmen.

Genus **Trishormomya** Kieffer

Trishormomya Kieffer, 1912b ; Rübsaamen & Hedicke, 1926 ; Stone & Others, 1965.
Trishormomyia Kieffer, 1913f ; Felt, 1921 ; Felt, 1958.

Palpus consisting of 3 segments ; basal enlargement of female flagellar segment cylindrical and mostly with 3 circumfila ; tarsal claw simple on all legs ; ovipositor moderately long.

Trishormomya bambusae Felt

Trishormomya bambusae Felt, 1932.

Host plant : Bamboo.

Gall : ?

Distribution : Japan (Kyushu).

Remarks : Felt (1932) described this species based on the 2 males which were forwarded by Mr. Tenji Uye from Oita-Pref., Kyushu, accompanied by the brief statement that the insects were reared from bamboo. Further information of this species is not known to the author at present.

Unclassified Genera of CECIDOMYIIDI

Genus **Agevillea** Hubault

Agevillea Hubault, 1945 ; Möhn, 1955.

Agevillea manii Inouye

Aschistonyx abietis Mani, 1954a (preocc. *Agevillea abietis* Hubault, 1945).
Agevillea manii Inouye, 1959.

Host plant : *Abies sachalinensis* Mast. [Akatodomatsu].

Gall : The infested portion of a needle, usually basal part, slightly swollen ; monothalamus or sometimes oligothalamus.

Distribution : Japan (Hokkaido).

Genus **Aschistonyx** Rübsaamen

Aschistonyx Rübsaamen, 1917 ; Rübsaamen & Hedicke, 1926 ; Möhn, 1955 ; Mamajev, 1969.

Palpus consisting of 4 segments ; antenna with 2 + 12 segments ; male flagellar seg-

ment binodose ; distal enlargement with 2 and basal enlargement with 1 set of circumfilar loops ; tarsal claw simple on all legs ; wing hyaline ; R_5 meeting with costa nearly at apex of wing; cerci of male genitalia bilobed ; "lower lamella" broadly and roundly emarginated.

Aschistonyx eppoi Inouye

Aschistonyx eppoi Inouye, 1964a.

Host plant : *Juniperus chinensis* L. var. *globosa* Hornibr. [Tamaibuki].

Gall : Bud swelling.

Distribution : Japan (Honshu).

Genus **Dicrodiplosis** Kieffer

Dicrodiplosis Kieffer, 1895g ; Felt, 1911b ; Kieffer, 1913f ; Rübsaamem & Hedicke, 1926 ; Felt, 1958 ; Hardy, 1960 ; Harris, 1968.

This genus was recently defined by Harris (1968) : palpus consisting of 4 segments, occasionally reduced to 3 ; R_5 meeting with costa slightly before wing apex ; tarsal claws of all legs unidentate ; gonocoxite of male genitalia with lobes and sclerotized prosses of varied form on internal angle ; gonostylus slender, curved ; "lower lamella" entire.

Dicrodiplosis minuta Shinji

Dicrodiplosis minuta Shinji, 1939f ; Shinji, 1944.

Host plant : *Artemisia princeps* Pamp. [Yomogi].

Habit : Larvae live under the bark near the growing point.

Distribution : Japan (Honshu).

Remarks : The generic position or habit of this species ought to be examined again.

Genus **Etsuhoa** Inouye

Etsuhoa Inouye, 1959.

This genus is characterized as follows : palpus consisting of 1 segment ; antenna with 2 + 12 segments in both sexes ; male flagellar segment binodose ; distal enlargement with 2 and basal enlargement with 1 set of short circumfilar loops ; female flagellar segment with a cylindrical basal enlargement, a very short distal stem and 3 rings of circumfila with very short loops ; tarsal claw simple on all legs ; empodium longer than claw ; R_5 meeting with costa nearly at wing apex. Male genitalia : cerci incised by a relatively deep, V-shaped emargination ; "lower lamella" shallowly incised ; gonostylus short, stout. Ovipositor short, thick and unextensile.

Etsuhoa okayamana Inouye

Etsuhoa okayamana Inouye, 1959.

Host plant : *Juniperus rigida* Sieb. et Zucc. (Nezumisashi).

Gall : Basal part of the needles swollen.

Distribution : Japan (Honshu).

Genus **Golanudiplosis** Grover & Prasad

Golanudiplosis Grover & Prasad, 1968.

This genus is characterized as follows : palpus consisting of 4 segments ; antenna with 2 + 12 segments in both sexes ; male flagellar segment binodose, with 3 regular circumfilar loops ; female flagellar segment with a subcylindrical basal enlargement and a cylindrical short, distal stem ; claws of all legs bifid ; empodium shorter than claw ; wing hyaline ; R_5 meeting with costa a little beyond apex of wing ; Rs not visible ; Cu forked ; both cerci and tegmen bilobed ; gonostylus with an apical claw ; gonocoxite without basal lobe ; ovipositor rather short, not chitinized. This genus is closely related to the geuns *Ghesquierinia* Barnes (1939c), but is distinguished from it by the following combination of characters : palpus consisting of 4 segments ; only a pair of lateral papillae associated with sternal spatula.

Golanudiplosis japonicus Grover & Prasad

(Fig. 25 : A C)

Golanudiplosis japonicus Grover & Prasad, 1968.

Male : Wing length 0.9 to 1.4 mm. Eye bridge 5 to 6 facets wide medially. Palpus consisting of 4 segments, with scattered setae ; first palpal segment nearly as long as wide ; second about 1.7 times as long as first ; third and fourth subequal in length, sometimes fused together. Antenna with 2 + 12 segments ; scape with some ventral setae ; pedicel with ventral, lateral and dorsal setae sparsely ; first and second flagellar segments fused ; fifth flagellar segment with a distal stem about 1/3 as long as distal enlargement, 1.7 times as long as intermediate stem, and about 1/2 as long as basal enlargement. All legs with femur much longer than tibia and nearly as long as or a little longer than second tarsal segment ; claw bifid on all legs, bent nearly at right angle ; empodium shorter than claw. Wing hyaline, about 2.3 times as long as wide. Genitalia : cerci rather deeply incised by an emargination forming a pair of lobes ; tegmen longer and narrower than cerci, medially narrowed, distally incised by a V-shaped emargination, forming a pair of lobes which are divergent ; gonostylus tapering distally, with an apical claw ; gonocoxite about 3 times as long as wide, without basal lobe ; aedeagus nearly as long as or a little longer than tegmen.

Female : Wing length 1.1 to 1.6 mm, about 1.4 times as long as wide. Antenna with 2 + 12 segments ; first and second flagellar segments fused ; fifth flagellar segment with a basal enlargement 1.2 to 1.7 times as long as wide and 4.0 to 5.0 times as long as distal stem ; terminal flagellar segment subconical, rather elongated, 2.0 to 2.8 times as long as basal width. Ovipositor rather short ; terminal lobe elongated suboval, with scattered setae.

Mature larva : Second antennal segment about 0.025 mm ; cervical papillae probably without seta. Abdominal segment dorsally and ventrally with many transverse rows of

small spines ; number and position of stigma normal ; 6 dorsal papillae each with a seta which is 0.020 to 0.025 mm ; 2 pleural papillae each with a rather long seta which is 0.030 to 0.035 mm ; 2 dorsal papillae of eighth abdominal segment each with a seta which is about 0.025 mm ; 4 terminal papillae each with a rather long seta which is about 0.05 mm. Sternal spatula about 0.16 mm, distally incised by a V-shaped emargination, forming a pair of subtriangular lobes which are not sharply pointed apically ; 3 lateral papillae present on each side, usually 2 of them with a short seta ; sternal papillae all without seta ; all inner pleural papillae with a seta which is about 0.030 mm on prothorax, 0.020 to 0.025 mm on meso- and metathorax ; 4 anterior ventral papillae each with a rather large, rounded base, all without seta ; 2 posterior ventral papillae each with a seta which is about 0.015 mm ; 2 ventral papillae of eighth abdominal segment each with a rather large, rounded base, both without seta ; anal segment ventrally with 2 rather large, rounded bases of anal papillae and 2 large, subglobular swellings.

Pupa : Apical spine short ; apical papilla with a rather long seta which is about 0.20 mm ; upper and lower frontal spines absent ; 1 of 2 lower facial papillae with a seta which is about 0.013 mm ; lateral facial papillae? ; prothoracic horn rather short, about 0.10 mm ; stigma present on second to sixth abdominal segments, each 0.055 mm to 0.065 mm ; each abdominal segment, except first one, dorsally with 4 to 5 transvers rows of spines on anterior half ; usally 4 of 8? dorsal papillae each with a seta.

Biological notes : Larvae of this species is known to feed on the eggs and larvae of *Pseudococcus comstocki* Kuwana in Japan (Grover & Prasad, 1968). Recently, the present author examined the specimens reared from *Crisicoccus matsumotoi* (Shiraiwa) and came to the conclusion that they are identical with those from *P. comstocki*. Detailed biology of this species is not known at present, but judging from the laboratory breeding and field observation by Dr. H. Kajita and Mr. M. Miyahara there may be, at least, 2 or 3 generations in a year.

Specimens examined : 1 ♂ (on slide), 1 ♀ (in alcohol), larvae collected from Daishaka, Aomori-Pref., Honshu, 17-30. IX. 1962, Y. Murakami leg. (prey : *P. comstocki*), Cecid. No. B5201 ; 2 ♀♀ (on slide), larvae collected from Atsugi-City, Kanagawa-Pref., Honshu, 21-27. V. 1963, Y. Murakami leg. (prey : ibid.), Cecid. No. B5202-3 ; 1 ♂ (on slide), larva collected from Yabase, Tottori-Pref., Honshu, 22. VII. 1964, Y. Murakami leg. (prey : ibid.), Cecid. No. B5204 ; 4 ♂♂, 4 ♀♀ (on slide), larvae collected from Hibaru, Fukuoka-City, Kyushu, 24. VIII.-IX. 1964, M. Miyahara leg. emerged on IX. 1964, reared by M. Miyahara (prey: ibid.), Cecid. No. B5205-12 ; 1 ♂, 3 ♀♀ (on slide), ibid. (prey : *C. matsumotoi*), Cecid. No. B5213-16 ; 2 ♂♂ (on slide), larvae collected from Kasugai-City, Aichi-Pref., Honshu, 4. IX. 1969, H. Kajita leg. (prey : unknown), Cecid. No. B5217-18 ; 3 ♂♂, 4 ♀♀, 3 larvae, 1 pupa (on slide), larvae collected from Ryûgeji, Fukuoka-City, Kyushu, 5. VII. 1968, 15. VIII. 1969, 8. IX. 1969, 28. IX. 1969, 14. XI. 1969, H. Kajita leg. (prey : *C. matsumotoi*), Cecid. No. B5219-29.

Distribution : Japan (Honshu, Kyushu).

Remarks : Detailed morphology of the species ought to be consulted with Grover & Prasad (1968).

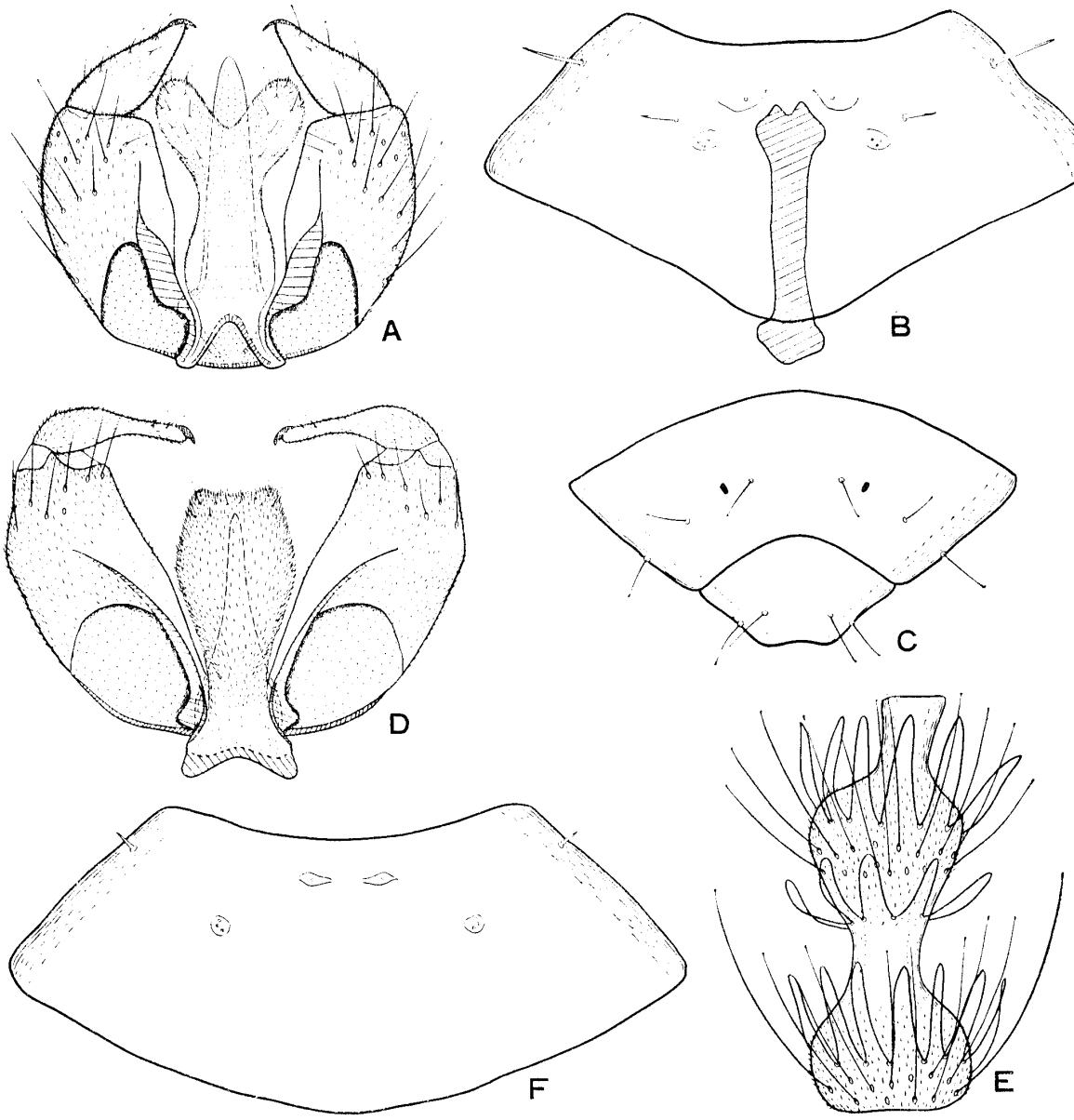

Fig. 25. *Golanudiplosis* and *Nipponodiplosis*
(A) male genitalia, dorsal view (cerci removed): *Golanudiplosis japonicus* Grover & Prasad. (B) prothorax of larva, ventral view: ditto. (C) eighth abdominal and anal segments of larva, dorsal view: ditto. (D) male genitalia, dorsal view (cerci removed): *Nipponodiplosis hirticornis* (Felt). (E) fifth flagellar segment, ♂: ditto. (F) prothorax of larva, ventral view: ditto.

Genus **Nipponodiplosis** Harris

Nipponodiplosis Harris, 1968.

Palpus consisting of 4, or sometimes 3 segments; R_5 meeting with costa at wing apex; tarsal claws unidentate on prothoracic legs, unidentate or simple on others; gonocoxite

of male genitalia moderately large ; gonostylus relatively small ; tegmen entire, slightly emarginated or truncate ; terminal lobe of ovipositor well developed.

Nipponodiplosis hirticornis (Felt)

(Fig. 25 : D–F)

Diadiplosis hirticornis Felt, 1915d ; Felt, 1918c ; Barnes, 1930b.
Nipponodiplosis hirticornis (Felt) : Harris, 1968.

Male : Wing length 1.2 to 1.6 mm. Eye bridge 7 to 9 facets wide medially. Palpus consisting of 4 segments, with scattered setae ; first palpal segment shortest, 1.2 to 1.4 times as long as wide ; second and third subequal in length, each 1.9 to 2.2 times as long as first ; fourth 2.0 to 2.5 times as long as first. Antenna with 2 + 12 segments ; scape with a few ventral setae ; pedicel with rather many ventral and lateral setae ; first and second flagellar segments fused ; fifth flagellar segment with a distal stem about 1/2 as long as distal enlargement, about 1.4 times as long as intermediate stem and 3/5 as long as basal enlargement. Tarsal claw unidentate on fore leg, simple on others ; empodium about 1/2 as long as tarsal claw. Wing hyaline, 2.2 times as long as wide. Genitalia : cerci deeply incised by a V-shaped emargination, forming a pair of lobes ; tegmen entire, medialy a little broader, slightly emarginated on distal margin ; gonostylus rather slender, basally a little swollen, with an apical claw ; gonocoxite about 2.2 times as long as wide, without basal lobe ; aedeagus tapering distally, nearly as long as or a little shorter than tegmen.

Female : Wing length 1.5 to 1.9 mm, about 2.3 times as long as wide. Antenna with 2 + 12 segments ; first and second flagellar segments fused ; fifth flagellar segment with a basal enlargement 1.8 to 2.0 times as long as wide and 4.4 to 4.7 times as long as distal stem ; circumfila simple but departing from generalized plan ; terminal flagellar segment subconical, 2.0 to 2.5 times as long as maximum width. Ovipositor not markedly retractile ; a pair of terminal lobes well developed.

Mature larva : Second antennal segment 0.025 mm, about 5.0 times as long as basal width ; cervical papillae probably without seta. Number and position of stigma normal ; 6 dorsal papillae each with a seta which is 0.015 to 0.025 mm on thoracic segments and 0.030 to 0.040 mm on abdominal segments ; 2 pleural papillae each with a seta which is 0.020 to 0.035 mm ; 2 dorsal papillae of eighth abdominal segment each with a seta which is about 0.040 mm ; 4 terminal papillae each with a seta which is about 0.035 mm. Sternal spatula absent ; 3 lateral papillae present on each side, usually 2 of them with a short seta ; sternal papillae all without seta ; inner pleural papillae could not be recognized (if present, probably without seta) ; 4 anterior ventral papillae each with a rather large, rounded base, but all without seta ; 2 posterior ventral papillae could not be recognized (if present, probably without seta) ; ventral papillae of eighth abdominal segment invisible ; anal segment ventrally with 2 large, subglobular swellings ; anal papillae invisible.

Pupa : Apical spine short ; apical papilla with a rather long seta which is 0.17 to 0.21 mm ; upper and lower frontal spine absent ; 1 of 2 lower facial papillae with a seta which is about 0.012 mm ; 1 of 3 ? lateral facial papillae with a seta which is about 0.010 mm ; prothoracic horn about 0.14 mm ; stigma present on second to sixth

abdominal segments, each 0.060 to 0.075 mm ; each abdominal segment, except first one, dorsally with 3 to 4 irregularly distributed transvers rows of spines on anterior third ; usually 6 of 8 ? dorsal papillae each with a short seta.

Prey in Japan : *Planococcus citri* (Risso), *Planococcus kraunhiae* (Kuwana), *Pseudococcus citriculus* Green, *Pseudococcus vapor* (?).

Specimens examined : 1 ♂, 2♀♀ (on slide), larvae collected from Kibi, Arida, Wakayama-Pref., Honshu, M. Matsuura leg. emerged on 12. III. 1970, reared by M. Matsuura (prey : *P. citriculus*), Cecid. No. B7801-3 ; 2 ♂♂, 6 larvae, 4 pupae (on slide), larvae collected from Kibi, Arida, Wakayama-Pref., Honshu, IX. 1970, M. Matsuura leg. emerged on 28. IX- 3. X. 1970, reared by J. Yukawa (prey : *P. citriculus*), Cecid. No. B7804-15.

Distribution : Japan (Honshu, Shikoku), India, N. America.

Remarks : According to Harris (1968), this species is similar to *Nipponodiplosis duni* Harris (1968), but differs from it by differences in the structure of the male genitalia and the ovipositor.

Genus **Profeltiella** Kieffer

Profeltiella Kieffer, 1912b ; Kieffer, 1913f ; Möhn, 1955 ; Mamajev, 1969.

Palpus consisting of 4 segments ; male flagellar segment binodose ; distal enlargement with 2 and basal enlargement with 1 set of regular circumfilar loops ; usually tarsal claw of fore leg bifid, others simple ; wing mottled ; both cerci and tegmen of male genitalia distinctly emarginated.

This genus includes phytophagous, predacious and inquilinous species.

Profeltiella soya (Monzen)

(Fig. 26 : A)

Contarinia soya Monzen, 1936 ; Shinji, 1939h.
Profeltiella soya (Monzen) : Yuasa, 1937b ; Barnes, 1946b ; Monzen, 1955b.

Male : Wing length about 2.2 mm. Eye bridge probably 10 to 12 facets wide medially. A distinct protuberance present at vertex. Palpus consisting of 4 segments, with scattered setae ; first palpal segment shortest, a little longer than wide ; second 2.6 to 3.0, third about 3.0, fourth 3.8 to 4.1 times as long as first. Antenna with 2+12 segments ; scape with scattered setae ventrally ; pedicel with an irregular whorl of scattered setae ; first and second flagellar segments fused ; distal enlargement of each flagellar segment somewhat constricted ; fifth flagellar segment with a distal stem about 4/5 as long as distal enlargement, 1.3 times as long as intermediate stem, and a little longer than basal enlargement ; terminal segment distally with a long, setose protrusion. Fore and middle legs : femur and tibia subequal in length, somewhat darkened on distal and basal portion ; first tarsal segment darkened ; second a little shorter than tibia, distinctly darkened on distal and basal portion ; third and fourth darkened on distal portion ; fourth about 1.7 times as long as fifth ; fifth not darkened. Hind leg : femur a little longer than tibia, darkened on distal and basal portion ; tibia distinctly

darkened on distal and subbasal to medial portion ; first tarsal segment darkened ; second nearly as long as or slightly longer than tibia, darkened on distal portion ; third and fourth darkened on distal portion ; fourth about 2.1 times as long as fifth ; fifth not darkened. Tarsal claw slender, basally bent nearly at right angle, bifid on fore leg, simple on others ; empodium very short. Wing mottled, about 2.6 times as long as wide ; R_5 meeting with costa beyond apex of wing. Genitalia : cerci rather deeply incised by a V-shaped emargination, forming a pair of rounded lobes ; tegmen rather shallowly emarginated on distal margin ; gonostylus slender, arched, weakly tapered distally, apically with a strong claw ; aedeagus slender, nearly parallel sided, weakly rounded apically.

Female : Wing length about 2.4 mm, 2.6 times as long as wide. First and second flagellar segments fused ; fifth flagellar segment with a basal enlargement about 2.4 times as long as wide, 3.6 times as long as distal stem ; terminal flagellar segment distally with a long, setose protrusion ; terminal lobe of ovipositor rather elongated suboval, with setae.

Host plant : *Glycine Max* Merrill [Daizu].

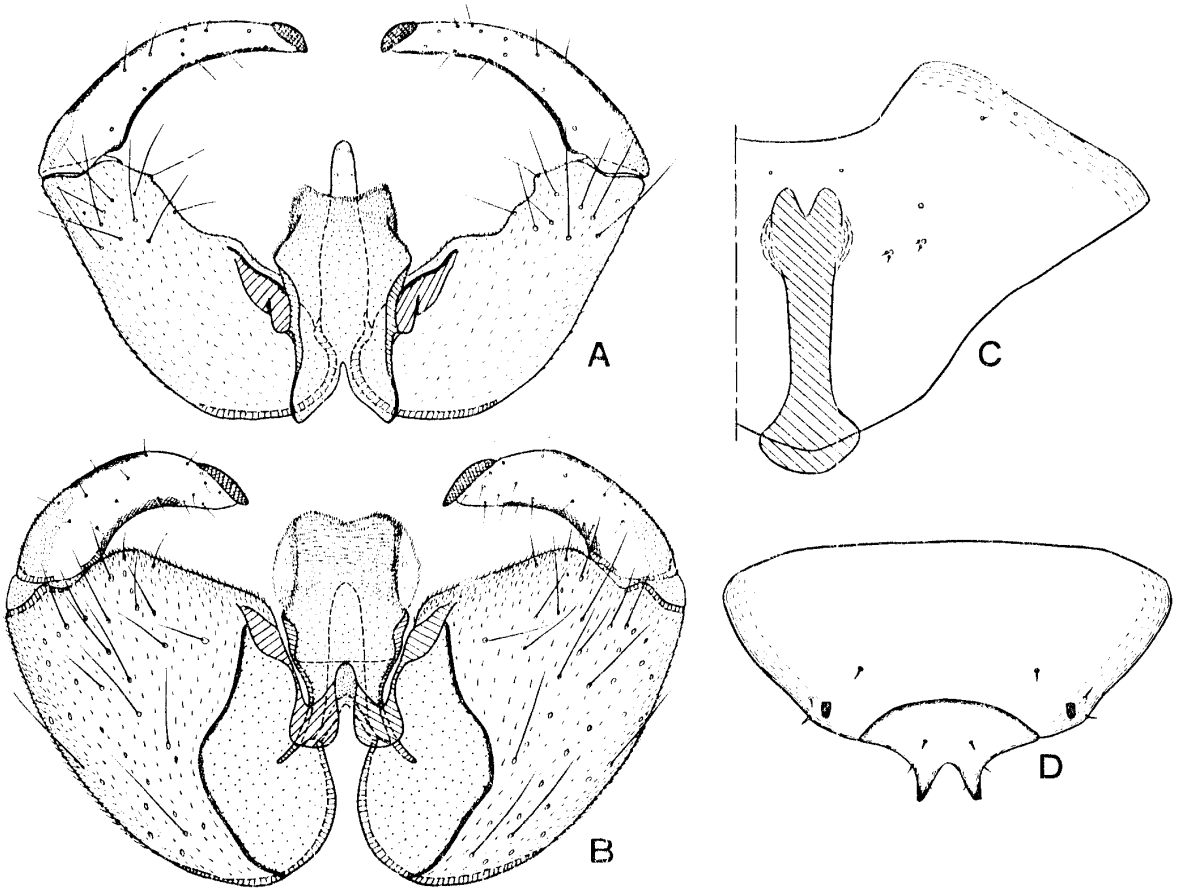

Fig. 26. *Profeltiella* and *Thomasiniana*.
(A) male genitalia, dorsal view (cerci removed) ; *Profeltiella soya* (Monzen). (B) male genitalia, dorsal view (cerci removed) : *Thomasiniana odai* Inouye. (C) prothorax of larva, ventral view : ditto. (D) eighth abdominal and anal segments of larva, dorsal view : ditto.

Gall : Numerous larvae live in a petiole, withering leaves.

Biological notes : This species is injurious to the cultivated soy bean. According to Kuwayama (1926), the adults appear once a year, from the end of July to the end of August. Larvae hibernate in the soil and pupations take place also in the soil. Further details of its biology ought to be consulted with Kuwayama (1926), Kuwayama & Others (1953), Monzen (1936) and Yuasa (1936b, 1937b).

Specimens examined : 1 ♂, 1 ♀ (on slide), preserved in the Monzen's collection, galls collected from Shimohei, Iwate-Pref., Honshu, 1936, H. Yuasa leg. emerged on IX. 1936, reared by H. Yuasa (host plant : *G. Max*).

Distribution : Japan (Hokkaido, Honshu), Korea ?

Remarks : This species is similar to *Profeltiella dizygomyzae* Barnes (1933) whose larvae lives as inquilines in the burrows of the cambium miner of Basket Willows (Agromyzidae), but is distinguished from it by having a distinct protuberance at vertex.

Genus **Thomasiniana** Strand

Thomasia Rübsaamen, 1911 ; Felt, 1911b ; Kieffer, 1913f ; Rübsaamen & Hedicke, 1926. (preocc. Poche, 1908).
Thomasiniana Strand, 1916 ; Möhn, 1955 ; Pitcher, 1955b ; Harris, 1966 ; Mamajev, 1969.

This genus is characterized as follows : palpus consisting of 4 segments ; male flagellar segment binodose, with 3 sets of regular circumfilar loops ; claws of all legs with a basal tooth, bent nearly at right angle ; empodium rather short ; wing hyaline or rather dark ; R_5 meeting with costa nearly at apex of wing. Male genitalia : cerci well bilobed, with a deep U- or V-shaped emargination ; tegmen also bilobed ; gonostylus usually tapering ; gonocoxite moderately stout, without distinct lobe. Ovipositor long.

Several previously described species of the genus, except an Indian species, *Thomasiniana salvadorae* Rao (1949), are known to live under peeling or broaken surface of the host plant, causing local death of cells, but no proliferation (Barnes, 1927c, 1939b, 1953 ; Pitcher, 1955a, 1955b, 1955c). In Japan, the following one species of the genus is known to live under the bark of the Japanese ceder.

Thomasiniana odai Inouye

(Fig. 26 : B-D)

Thomasiniana odai Inouye, 1955 ; Inouye, 1964a.

Male : Wing length 1.8 to 2.4 mm. Eye bridge with 10 to 11 facets wide medially. Palpus consisting of 4 segments, 3/5 to 2/3 as long as height of head, with scattered setae ; first palpal segment shortest, slightly longer than wide ; second about 2 times as long as first ; third nearly as long as or slightly longer than second ; fourth longest, 3.0 to 3.5 times as long as first. Antenna with 2+12 segment ; scape larger than pedicel, with some short and a few rather long setae ventrally ; pedicel with some short setae ventrally and laterally, and a few dorsally ; first and second flagellar segments fused ; fifth flagellar segment with a rather elongated distal enlargement which

is about 1.5 times as long as distal stem or basal enlargement, 2.5 to 2.8 times as long as intermediate stem. Fore leg with femur a little longer than tibia and nearly as long as or slightly shorter than second tarsal segment ; middle leg with femur a little longer than tibia and slightly longer than second tarsal segment ; hind leg with femur distinctly longer than tibia and nearly as long as second tarsal segment ; fourth tarsal segment 1.7 to 2.1 times as long as fifth ; claw bent nearly at right angle, with a basal tooth on all legs ; empodium very short. Wing about 2.6 times as long as wide; R_5 meeting with costa a little beyond tip of wing ; sensory pore 2 on distal portion of R_1, 1 on basal and 1 or 2 on distal portion of R_5. Genitalia : cerci well bilobed, with a deep, narrowly V-shaped emargination ; tegmen weakly bilobed, with a rather shallow emargination on distal margin, laterally membranous, basally with a pair of broadly sclerotized roots ; gonostylus rather slender, curved, weakly tapering, with a strong apical tooth ; gonocoxite stout, without internal lobe ; root of gonocoxite narrowly sclerotized basally ; transverse bridge linear on distal margin; aedeagus membranous, nearly as long as tegmen, rather slender, nearly parallel sided or slightly narrower distally, rounded apically.

Female : Wing length 2.1 to 2.6 mm, about 2.6 times as long as wide ; first and second flagellar segments rather elongated, fused together ; each flagellar segment, except terminal one, with a rather short, cylindrical distal stem and a subcylindrical basal enlargement which is inconspicuously constricted medially on basal several segments ; basal enlargement of fifth flagellar segment about 3 times as long as wide, 4 times as long as distal stem ; terminal segment with a subcylindrical basal enlargement 2.3 to 3.0 times as long as wide, and with a rather long, setose, apical protrusion which is about 1/2 as long as basal enlargement and provided with a few bristles basally. Fore leg with femur nearly as long as tibia and a little shorter than second tarsal segment ; middle leg with femur nearly as long as or slightly longer than tibia or second tarsal segment ; hind leg with femur a little longer than tibia and nearly as long as second tarsal segment ; fourth tarsal segment 1.7 to 2.1 times as long as fifth. Ovipositor very long ; terminal lobe strongly elongated, with setae rather sparsely.

Mature larva : Second antennal segment 0.014 mm in length, 0.008 mm in width, apically rounded ; cervical papillae without seta. Abdominal segment dorsally with 11 to 15 transvers rows of rather small, triangular spines on anterior half of each segment; number and position of stigma normal ; 6 dorsal and 2 of 3 pleural papillae each with a seta ; 2 dorsal papillae of eighth abdominal segment each with a seta ; 2 of 8 terminal papillae large, conical ; 2 terminal papillae, which are situated on inner side of the large conical papillae, each with a very short, seta ; remaining 4 terminal papillae each with a rather long seta. Sternal spatula 0.20 to 0.25 mm, distally rather deeply incised by a V-shaped emargination, forming a pair of subtriangular lobes. Lateral papillae normal in number and position ; sternal and inner pleural papillae all without seta. Abdominal segment ventrally with 17 to 20 transvers rows of spines ; 4 anterior and 2 posterior ventral papillae without seta ; 4 ventral papillae of eighth abdominal segment without seta ; anal segment ventrally with some longitudinal rows of spines around anus ; 6 anal papillae all without seta, of which 2 are situated on lateral side of anus and remaining 4 are on posterior half of anal segment.

Host plant : *Cryptomeria japonica* D. Don [Sugi].

Biological notes : According to Inouye (1955, 1964a), there are at least 2 generations in a year. The young larvae are whitish, but mature ones are salmon pink. Those larvae pass the winter under the bark of host plant and pupations occur in silken cocoons. The first emergence period begins from early in May and lasts for about one month at Miyazaki-Pref., Kyushu, the second from the middle of July to the middle of October with a peak at the first to the middle of August.

Specimens examined : 8 ♂♂, 8 ♀♀, 4 larvae (on slide), many others (in alcohol), larvae collected from Izumi, Yatsushiro, Kumamoto-Pref., Kyushu, M. Kobayashi leg. emerged on 8. IX.-9. X. 1965, reared by J. Yukawa (host plant : *C. japonica*), Cecid. No. A2701-20.

Distribution : Japan (Honshu, Shikoku, Kyushu).

Remarks : The members of the genus are very similar and morphologically difficult to separate from each other. Barnes (1939b) and Pitcher (1955a) made successful attempts to separate them biologically by carrying out experiments concerning the host plant range. The Japanese species, *T. odai* may also be characterized biologically by the fact that it is the only species occurs under the bark of the Japanese cedar, though it is morphologically very closely related to the Lavender gall midge, *Thomasiniana lavendulae* Barnes (1953).

Genus **Tricontarinia** Kieffer

Tricontarinia Kieffer, 1910a ; Felt, 1911b ; Kieffer, 1913f ; Harris, 1968.

The following 2 species are included in this genus, but they have not been recognized since their original descriptions. According to Kieffer (1910a), this genus is characterized by having a male resembling *Contarinia* and a female resembling *Lestodiplosis*. Recently a Philippine species, *Tricontarinia luzonensis* Felt (1918) was transferred to the genus *Lestodiplosis* by Gagné (1969).

Tricontarinia ciliatipennis Kieffer

Tricontarinia ciliatipennis Kieffer, 1910a ; Kieffer, 1913f ; Barnes, 1930b ; Yasumatsu & Watanabe, 1964 ; Harris, 1968.

Prey : *Pseudaulacaspis pentagona* Targioni-Tozzetti.

Distribution : Japan (Honshu).

Tricontarinia japonica Kieffer

Tricontarinia japonica Kieffer, 1910b ; Kieffer, 1913f, Barnes, 1930b ; Yasumatsu & Watanabe, 1964 ; Harris, 1968.

Prey : *Pseudaulacaspis pentagona* Targioni-Tozzetti.

Distribution : Japan (Honshu).

INSUFFICIENTLY KNOWN SPECIES OF THE FAMILY

The following several species were previously recorded from Japan under the genus *Diplosis*, but their generic positions ought to be examined again.

Diplosis mori Yokoyama

Diplosis mori Yokoyama, 1929 ; Esaki, 1950.
Trishormomyia maculata Sasaki, 1931. Synonymy ?

Host plant : *Morus alba* L. [Kuwa].

Gall : Terminal or lateral bud transformed, ceasing the growth of the host plant ; polythalamus.

Distribution : Japan (Honshu, Shikoku, Kyushu), Korea.

Remarks : *Diplosis mori* is injurious to the cultivated mulberry and details of this species were studied by Tutida (1909), Nawa (1916), Yokoyama (1929), Tanabe & Sekiya (1931) and Sasaki (1931).

Diplosis morivorella Naito

Diplosis morivorella M. Naito, 1919 ; Yokoyama, 1929.

Host plant : *Morus alba* L. [Kuwa].

Gall : Gingko-nut-shaped swelling produced on the basal part of the petiole or on the vein of the leaf.

Distribution : Japan (Hokkaido, Honshu).

Diplosis quadrifasciata Niwa

Diplosis 4-fasciata Niwa, 1910 ; Matsumura, 1915.
Diplosis fasciata Niwa : Yokoyama, 1929.
Diplosis quadrifasciata Niwa : Ishihara, 1957.

Host plant : *Morus alba* L. [Kuwa].

Gall : Larvae live under the bark nearly at the root of young tree.

Distribution : Japan (Honshu), Korea.

Remarks : This species is provided with mottled wing.

Diplosis moricola Matsumura

Diplosis moricola Matsumura, 1931.

Host plant : *Morus alba* L. [Kuwa].

Gall : Spindle-shaped swelling produced on the petiole.

Distribution : Japan (Hokkaido).

Remarks : Judging from type specimen (1 ♀, Sapporo, Hokkaido, 25. VII. 1918, S. Matsumura leg.), this species probably belongs to the Supertribe Asphondyliidi.

Diplosis okadai Miyoshi

Diplosis okadai Miyoshi, 1919.

Host plant : *Citrus unshiu* Marc. [Unsyûmikan].

Gall : Flower bud containing many larvae, remain closed, later drop to the ground.

Distribution : Japan (Honshu, Kyushu ?).

Remarks : The wing of this species is pigmented with pale blackish pattern, being similar to that of *Diplosis quadrifasciata* Niwa (1910). See also Okada (1918, 1919a, 1919b) as to the biology of this species.

Several unnamed species of the genus *Diplosis* have been known in Japan. Okada (1918a, 1918b) recorded a gall midge with mottled wings which is attacking pear in Honshu. Later Yago (1929) reported another pear gall midge from Honshu, which is distinguished from the former species by having unmottled wings. Aoyama (1938) recorded a pear codlin midge from Korea. (See also Barnes, 1948a). On the other hand, Nishikawa (1925) found 2 gall midges injuring the cultivated mulberry, later Yokoyama (1929) also recorded an additional mulberry gall midge from Kyushu.

Shinji (1938e) recorded subconical galls on the upper side of the leaf of *Vitis Coignetiae* Pulliat [Yambudô] from Honshu. He assumed that this gall was caused by a North American species, *Cecidomyia viticola* Osten Sacken (1862), but adults of this species have not been obtained and its generic position is not established yet. (Stone & Others, 1965). *Urosema mori* Sasaki (1931) and *Porricondyla acanthopanici* Shinji (1944) were already mentioned. (See p. 32 & p. 65 respectively).

Yuasa (1937a) found an additional gall midge larva on the wheat grain. He figured it and tentatively named in Japanese as [Mugi-benitamabae], but he had a doubt that this species is a primary pest of the wheat grain.

Matsumura (1899) listed the following species of the gall midges in his book.

Cecidomyia rosarria, Löw ..... *Rhabdophaga rosaria* (H. Loew, 1850).
C. brassicae ..... *Dasineura brassicae* (Winnertz, 1853).
C. oenophila, Haim. ..... *Janetiella oenophila* (Haimhoffen, 1875).
C. destructor, Say ..... *Mayetiola destructor* (Say, 1817).
Diplosis tristis, K. (?) ..... *Contarinia tritici* (Kirby, 1798).

DISTRIBUTIONAL PATTERN OF THE JAPANESE GALL MIDGES

Approximately 180 species belonging to 68 genera of the gall midges are known to occur in Japan. These numbers correspond to about 1/20 and 1/8 the numbers of species and genera recorded in the world respectively. Owing to the insufficient collecting data, the number of species is rather poor in Japan at present, but it will increase gradually with the progress of taxonomic and biological studies of the family and it is expected that over 400 species will be recognized in this country.

Roughly speaking, the gall midge fauna of Japan is similar to that of Europe and North America. In the subfamily LESTREMIINAE, most of the genera are common to those in Europe and North America, though the members of the tribes ACOENONINI,

MIASTORINI, MOEHNIINI and HETEROPEZINI have not been recorded yet from Japan. Four cosmopolitan species of the tribe LESTREMIINI are also distributed in Japan. In the tribe MICROMYINI, the species of the genera *Peromyia* and *Aprionus* are rich in number as they are so in other Palaearctic and Nearctic Regions. The genera *Campylomyza* and *Monardia* include rather many species in Europe and North America, but only a few species of them are known to occur in Japan at present. The genus *Anodontoceras* is known only in the southern parts of Japan, but it is uncertain whether the genus is widely distributed in the South-east Asia or not.

Though the members of the subfamily PORRICONDYLINAE are not adecuately known in Japan, the following tendencies are recognized according to the collecting data by the author. The members of the tribe PORRICONDYLINI are abundant in numbers of species and individuals, and the majority of them will be proved to be common in the Palaearctic Region when they are better known. The members of the tribes ASYNAPTINI and WINNERTZIINI are not many and these of the tribes DIALLACTINI and LEPTOSYNINI heve not been recorded in Japan. On the other hand, it is highly probable that some of the genera in the Oriental Region may be distributed in the southern parts of Japan.

When the gall making genera are associated with the plants which are widely distributed in both Palaearctic and Nearctic Regions, the ratio of common species between Japan and Europe or North America is naturally high. For instance, the group *Rhopalomyia* and the genus *Rhabdophaga* of the supertribe OLIGOTROPHIDI, which make galls mainly on *Artemisia* and *Salix* respectively, include many species, and most of them are probably common in Japan and in other Plaearctic and Nearctic Regions. Contrary to this, when the gall making genera are associated with the broad-leaved evergreens such as LAURACEAE-species which are more abundant in the Oriental Region, the ratio of common species is proved to be low. It is expected that some of the Oriental genera of the supertribe ASPHONDYLIIDI may be distributed in the southern parts of Japan.

Some of the predacious gall midges are widely distributed in the world. One European and 2 North American species are also distributed in Japan. The genus *Golanudiplosis* is known only in Japan at present.

A LIST OF THE JAPANESE SPECIES OF THE CECIDOMYIIDAE

Subfamily LESTREMIINAE

Genus *Catotricha* Edwards

Catotricha antennata Alexander, 1959.
Catotricha nipponensis (Alexander, 1924).

Genus *Catocha* Haliday

Catocha fagi Shinji, 1938j?
Catocha kirii Shinji, 1938j?
Catocha latipes Haliday, 1833.

Genus *Lestremia* Macquart

Lestremia cinerea Macquart, 1826.
Lestremia leucophaea (Meigen, 1818).

Genus *Anaretella* Enderlein

Anaretella defecta (Winnertz, 1870).
Anaretella spiraeina (Felt, 1907).

Genus *Anarete* Haliday

Anarete sp.

Genus *Peromyia* Kieffer

Peromyia albicornis (Meigen, 1830).
Peromyia fungicola (Kieffer, 1901).
Peromyia lobata Yukawa n. sp.
Peromyia ovalis (Edwards, 1938b).
Peromyia photophila (Felt, 1907).
Peromyia prominens Yukawa, 1967a.
Peromyia truncata Yukawa, 1967c.

Genus *Campylomyza* Meigen

Campylomyza pinetorum (Edwards, 1938b).

Genus *Cordylomyia* Felt

Cordylomyia excavata Yukawa, 1967a.
Cordylomyia spinifera Yukawa n. sp.

Genus *Aprionus* Kieffer

Aprionus interruptus Yukawa, 1967a.
Aprionus longitegminis Yukawa, 1967c.
Aprionus multispinosus Yukawa n. sp.
Aprionus rostratus Yukawa n. sp.
Aprionus similis Mamajev, 1963a.
Aprionus spiniger Kieffer, 1894c.

Genus *Monardia* Kieffer

Monardia antennata (Winnertz, 1870).
Monardia monotheca Edwards, 1938b.
Monardia toxicodendri (Felt, 1907).
Monardia yasumatsui Yukawa, 1967a.

Genus *Trichopteromyia* Williston

Trichopteromyia japonica Yukawa, 1967a.

Genus *Bryomyia* Kieffer

Bryomyia bergrothi Kieffer, 1895a.
Bryomyia gibbosa (Felt, 1907).

Genus *Heterogenella* Mamajev

Heterogenella linearis Yukawa n. sp.
Heterogenella mamajevi Yukawa, 1967b.
Heterogenella sp. A
Heterogenella sp. B
Heterogenella sp. C

Genus *Micromya* Rondani

Micromya kyushuensis Yukawa, 1967a.

Genus *Anodontoceras* Yukawa

Anodontoceras saigusai Yukawa, 1967a.

Subfamily PORRICONDYLINAE

Genus *Winnertzia* Rondani

Winnertzia calciequina Felt, 1907.
Winnertzia hikosanensis Yukawa, 1967c.

Genus *Kronomyia* Felt

Kronomyia concava (Yukawa, 1967c) n. comb.

Genus *Camptomyia* Kieffer

Camptomyia breviradicis Yukawa, 1968a.
Camptomyia shibuyai Yukawa, 1968a.
Camptomyia spinifera Mamajev, 1961a.

Genus *Holoneurus* Kieffer

Holoneurus paneliusi Yukawa n. sp.
Holoneurus sp.

Genus *Porricondyla* Rondani

Porricondyla albimana (Winnertz, 1853).
Porricondyla aurantiaca Panelius, 1965.
Porricondyla decussata Yukawa n. sp.
Porricondyla gracilipennis Yukawa n. sp.
Porricondyla lamellata Yukawa n. sp.
Porricondyla nigripennis (Meigen, 1830).
Porricondyla rotundata Yukawa n. sp.
Porricondyla separata Yukawa n. sp.

Genus *Claspettomyia* Grover

Claspettomyia nipponensis Yukawa n. sp.
Claspettomyia perlongitegminis Yukawa n. sp.
Claspettomyia serrata Yukawa n. sp.
Claspettomyia tenuiforceps Yukawa n. sp.

Genus *Parepidosis* Kieffer

Parepidosis ventralis Yukawa n. sp.

Genus *Monepidosis* Mamajev

Monepidosis pectinata Mamajev, 1966.

Subfamily CECIDOMYIINAE

Supertribe LASIOPTERIDI

Genus *Lasioptera* Meigen

Lasioptera achyranthi Shinji, 1939g.
Lasioptera artemisifoliae Shinji, 1939f.
Lasioptera astericola Shinji, 1939d.
Lasioptera azami Shinji, 1939e.
Lasioptera callicarpae (Shinji, 1938o).
Lasioptera euphobiae Shinji, 1944.
Lasioptera gibaushi Shinji, 1939g.
Lasioptera impatientis (Osten Sacken. 1862) ?
Lasioptera lespedezae Shinji, 1939b.
Lasioptera puerariae (Shinji, 1938 l).
Lasioptera rubi Heeger, 1851.
Lasioptera ukogi Shinji, 1940.
Lasioptera sp.

Supertribe OLIGOTROPHIDI

Genus *Phegomyia* Kieffer

Phegomyia tokunagai Sasakawa & Koyama, 1953.

Genus *Bouchéella* Rübsaamen

Bouchéella artemisiae (Bouché, 1834).

Genus *Rhopalomyia* Rübsaamen

Rhopalomyia abdominalis Shinji, 1938n.
Rhopalomyia callicarpae Shinji, 1939g.
Rhopalomyia caterva Monzen, 1937.
Rhopalomyia chrysanthemum Monzen, 1937.
Rhopalomyia cinerarius Monzen, 1937.
Rhopalomyia ilexifoliae Shinji, 1944.
Rhopalomyia iwatensis Shinji, 1938n.
Rhopalomyia japonica Monzen, 1937.
Rhopalomyia struma Monzen, 1937.
Rhopalomyia styracophila Shinji, 1944 ?
Rhopalomyia uetsukii Inouye, 1959.

Genus *Misospatha* Kieffer

Misospatha artemisiae Shinji, 1939c.
Misospatha giraldii (Kieffer & Trotter, 1900).
Misospatha longitubifix Shinji, 1939f.

Genus *Arceuthomyia* Kieffer

Arceuthomyia nakaharai Inouye, 1959.

Genus *Diathronomyia* Felt

Diathronomyia yomogicola (Matsumura, 1931) n. comb.

Genus *Oligotrophus* Latreille

Oligotrophus faggalli Monzen, 1955a.
Oligotrophus japonicus Monzen, 1955a.

Genus *Janetiella* Kieffer

Janetiella infrafoli Monzen, 1955a.
Janetiella kimurai Inouye, 1964a.

Genus *Dryomyia* Kieffer

Dryomyia circinnans (Giraud, 1861).

Genus *Dasineura* Rondani

Dasineura abietiperda (Henschel, 1880).
Dasineura ezomatsue Uchida & Inouye, 1954.
Dasineura fulvicola Shinji, 1938n.
Dasineura nipponensis Inouye, 1966a.
Dasineura paederiae Shinji, 1944.
Dasineura procera Rübsaamen, 1914.
Dasineura viburni Shinji, 1939h ?
Dasineura viciae (Kieffer, 1888).
Dasineura vicicola Shinji, 1939b.
Dasineura wisteriae Mani, 1954b.

Genus *Rhabdophaga* Westwood

Rhabdophaga asteriae Shinji, 1938f.
Rhabdophaga dioscoreae Shinji, 1939b.
Rhabdophaga heterobia (H. Loew, 1850).
Rhabdophaga marginemtorquens (Bremi, 1847).
Rhabdophaga rosaria (H. Loew, 1850).
Rhabdophaga salicifoliae Shinji, 1944.
Rhabdophaga salicivora Shinji, 1938h.
Rhabdophaga saliyonai Shinji, 1938i.
Rhabdophaga terminalis (H. Loew, 1850).
Rhabdophaga yanagi (Shinji, 1938i).

Genus *Helicomyia* Rübsaamen

Helicomyia saliciperda (Dufour, 1841).

Genus *Arnoldiola* Strand

Arnordiola cerris (Kollar, 1850).

Genus *Mikiola* Kieffer

Mikiola fagi Hartig, 1839.
Mikiola populi Shinji, 1938j.
Mikiola populicola Shinji, 1938j.

Genus *Psectrosema* Kieffer

Psectrosema gagaimo Monzen, 1955b.

Genus *Hasegawaia* Monzen

Hasegawaia sasacola Monzen, 1937.

Supertribe ASPHONDYLIIDI

Genus *Asphondylia* H. Loew

Asphondylia baca Monzen, 1937.
Asphondylia dierviellae Felt, 1907.
Asphondylia humuli Shinji, 1939e.
Asphondylia patriniae (Shinji, 1938o).
Asphondylia sphaera Monzen, 1937.
Asphondylia styraci Shinji, 1944.
Asphondylia sp. Kanzawa, 1918.

Genus *Pseudasphondylia* Monzen

Pseudasphondylia matatabi (Yuasa & Kumazawa, 1938) n. comb.
Pseudasphondylia rokuharaensis Monzen, 1955b.

Genus *Asteralobia* Kovalev

Asteralobia sasakii (Monzen, 1937) n. comb.
Asteralobia soyogo (Kikuti, 1939) n. comb.

Supertribe CECIDOMYIIDI

Genus *Contarinia* Rondani

Contarinia inouyei Mani, 1954a.
Contarinia mali Barnes, 1939a.
Contarinia matusintome Haraguti & Monzen, 1955.
Contarinia sp.

Genus *Thecodiplosis* Kieffer

Thecodiplosis japonensis Uchida & Inouye, 1955.

Genus *Ametrodiplosis* Rübsaamen

Ametrodiplosis acutissima (Monzen, 1937) n. comb.

Genus *Clinodiplosis* Kieffer

Clinodiplosis corylicola (Shinji, 1938m).
Clinodiplosis kumayanagi (Shinji, 1938n).
Clinodiplosis rosaefoliae (Shinji, 1939a).
Clinodiplosis styracifoliae Shinji, 1944.

Genus *Mycetodiplosis* Kieffer

Mycetodiplosis astilbensis (Shinji, 1939a).
Mycetodiplosis cleamatidis Shinji, 1944.

Genus *Sitodiplosis* Kieffer

Sitodiplosis mosellana (Géhin, 1857).

Genus *Lestodiplosis* Kieffer

Lestodiplosis sp.

Genns *Feltiella* Rübsaamen

Feltiella sp.

Genus *Silvestrina* Kieffer

Silvestrina artemisiae (Shinji, 1939e).
Silvestrina euphorbiae (Shinji, 1939d).
Silvestrina hydrangeae (Shinji, 1939c).
Silvestrina quercifoliae Shinji, 1944.
Silvestrina smilacifoliae Shinji, 1944?
Silvestrina sp.

Genus *Arthrocnodax* Rübsaamen

Arthrocnodax occidentalis Felt, 1912c.
Arthrocnodax sp.

Genus *Aphidoletes* Kieffer

Aphidoletes aphidimyza (Rondani, 1847).
Aphidoletes meridionalis Felt, 1908.

Genus *Geromyia* Coutin & Harris

Geromyia nawai (Monzen, 1937) n. comb.

Genus *Orseolia* Kieffer & Massalongo

Orseolia miscanthi (Shinji, 1938b) n. comb.

Genus *Trishormomya* Kieffer

Trishormomya bambusae Felt, 1932.

Genus *Agevillea* Hubault

Agevillea manii Inouye, 1959.

Genus *Aschistonyx* Rübsaamen

Aschistonyx eppoi Inouye, 1964a.

Genus *Dicrodiplosis* Kieffer

Dicrodiplosis minuta Shinji, 1939f.

Genus *Etsuhoa* Inouye

Etsuhoa okayamana Inouye, 1959.

Genus *Golanudiplosis* Grover & Prasad

Golanudiplosis japonicus Grover & Prasad, 1968.

Genus *Nipponodiplosis* Harris

Nipponodiplosis hirticornis (Felt, 1915d).

Genus *Profeltiella* Kieffer

Profeltiella soya (Monzen, 1936).

Genus *Thomasiniana* Strand

Thomasiniana odai Inouye, 1955.

Genus *Tricontarinia* Kieffer

Tricontarinia ciliatipennis Kieffer, 1910a.
Tricontarinia japonica Kieffer, 1910b.

Insufficiently known species

Cecidomyia viticola Osten Sacken, 1862.
Diplosis mori Yokoyama, 1929.
Diplosis moricola Matsumura, 1931.
Diplosis morivorella M. Naito, 1919.
Diplosis okadai Miyoshi, 1919.
Diplosis quadrifasciata Niwa, 1910.
Diplosis sp. Okada, 1918a.
Diplosis sp. Yago, 1929.
Diplosis spp. Nishikawa, 1925.
Diplosis sp. Yokoyama, 1929.
Porricondyla acanthopanici Shinji, 1944.
Urosema mori Sasaki, 1931.

A LIST OF THE PLANTS ATTACKED BY THE JAPANESE GALL MIDGES

Abies sachalinensis Mast. [Akatodomatsu]
Agevillea manii Inouye, 1959. Needle

Acanthopanax Sieboldianum Makino [Ukogi]
Lasioptera ukogi Shinji, 1940. Stem

Achyranthes japonica Nakai [Inokozuchi]
Lasioptera achyranthi Shinji, 1939g. Stem

Achyranthes longifolia Makino [Yanagiinokozuchi]
Lasioptera achyranthi Shinji, 1939g. Stem

Actinidia polygama Maxim. [Matatabi]
Pseudasphondylia matatabi (Yuasa & Kumazawa, 1938). Fruit

Agropyron ciliare Franchet var. *minus* Ohwi [Aokamojigusa]
Sitodiplosis mosellana (Géhin, 1857). Grain

Agropyron ciliare Franchet var. *pilosum* Honda [Tachikamojigusa]
Sitodiplosis mosellana (Géhin, 1857). Grain

Agropyron tsukushiense Nees var. *transiensis* Ohwi [Enbaku]
Sitodiplosis mosellana (Géhin, 1857). Grain

Ampelopsis brevipedunculata Trautv. var. *heterophylla* Hara [Nobudô]
Asphondylia baca Monzen, 1937. Fruit

Artemisia Feddei Lév. et Van. [Himeyomogi]
Bouchéella artemisiae (Bouché, 1834). Terminal bud
Rhopalomyia caterva Monzen, 1937. Bud, Leaf

Artemisia japonica Thunb. [Otokoyomogi]
Bouchéella artemisiae (Bouché, 1834). Terminal bud
Dasineura fulvicola Shinji, 1938n. Inquiline ?
Diathronomyia yomogicola (Matsumura, 1931). Leaf
Lasioptera artemisifoliae Shinji, 1939f. Leaf minor
Rhopalomyia caterva Monzen, 1937. Bud, Leaf
Rhopalomyia japonica Monzen, 1937. Leaf
? *Rhopalomyia struma* Monzen, 1937. Stem

Artemisia montana Pamp. [Yamayomogi]
Misospatha giraldii (Kieffer & Trotter, 1900). Stem
Rhopalomyia abdominalis Shinji, 1938n. Terminal bud
Rhopalomyia struma Monzen, 1937. Stem

? : It is uncertain that the species is associated with the plant.

Artemisia princeps Pamp. [Yomogi]

Dasineura fulvicola Shinji, 1938n. Inquiline ?
Diathronomyia yomogicola (Matsumura, 1931). Leaf
Dicrodiplosis minuta Shinji, 1939f. Bark
Misospatha artemisiae Shinji, 1939c. Lateral bud
Misospatha giraldii (Kieffer & Trotter, 1900). Stem
Misospatha longitubifix Shinji, 1939f. Terminal or lateral bud
Rhopalomyia cinerarius Monzen, 1937. Leaf
Rhopalomyia iwatensis Shinji, 1938n. Terminal bud
Rhopalomyia japonica Monzen, 1937. Leaf.
Rhopalomyia struma Monzen, 1937. Stem
Silvestrina artemisiae (Shinji, 1939e) Bark

Aster scaber Thunb. [Shirayamagiku]

Lasioptera astericola Shinji, 1939d. Stem
Lasioptera gibaushi Shinji, 1939g. Flower
* *Rhabdophaga asteriae* Shinji, 1938f ? Bud

Aster tataricus L. [Shion]

? *Lasioptera euphobiae* Shinji, 1944. Stem

Astilbe Thunbergii Miq. var. *congesta* Boiss [Toriashisyôma]

* *Mycetodiplosis astilbensis* (Shinji, 1939a). Leaf, Petiole, Stem

Aucuba japonica Thunb. [Aoki]

Asphondylia baca Monzen, 1937. Fruit

Berchemia racemosa Sieb. et Zucc. [Kumayanagi]

* *Clinodiplosis kumayanagii* (Shinji, 1938n). Petiole

(*Bamboo*)

Trishormomya bambusae Felt, 1932.

Callicarpa japonica Thunb. [Murasakishikibu]

Lasioptera callicarpae (Shinji, 1938o). Stem
Rhopalomyia callicarpae Shinji, 1939g. Leafstark, Stem

Cassia Nomame Honda [Kawaraketsumei]

Asphondylia sp. Kanzawa, 1918. Pod

Chrysanthemum morifolium Hemsl. [Kiku]

Rhopalomyia chrysanthemum Monzen, 1937. Leaf, Stem

Citrus unshiu Marc. [Unsyûmikan]

* *Diplosis okadai* Miyoshi, 1919.

Clematis apiifolia DC. [Botanzuru].

* *Mycetodiplosis cleamatidis* Shinji, 1944.

* : Either generic position or habit ought to be examined again.

Corylus heterophylla Fisch. var. *Thunbergii* Blume [Hashibami]
* *Clinodiplosis corylicola* (Shinji, 1938m ?). Leaf

Cryptomeria japonica D. Don [Sugi]
Contarinia inouyei Mani, 1954a. Needle
Thomasiniana odai Inouye, 1955. Bark

Desmodium oxyphyllum DC. [Nusubitohagi]
Asphondylia sp. Kanzawa, 1918. Pod

Dioscorea nipponica Makino [Uchiwatokoro]
? *Rhabdophaga dioscoreae* Shinji, 1939b. Leaf, Stem

Eupatrium chinensis L. var. *simplicifolium* Kitam. [Hiyodoribana]
Lasioptera euphobiae Shinji, 1944. Stem

Euphorbia pekinensis Ripr. [Takatôdai]
* *Silvestrina euphorbiae* (Shinji, 1939). Leaf

Fagus crenata Blume [Buna]
Janetiella infrafoli Monzen, 1955a. Leaf
Mikiola fagi Hartig, 1839. Leaf
Oligotrophs faggalli Monzen, 1955a. Leaf
Phegomyia tokunagai Sasakawa & Koyama, 1953. Leaf

Glycine Max Merrill [Daizu]
Asphondylia sp. Kanzawa, 1918. Pod
Profeltiella soya (Monzen, 1936) Petiole

Glycine soya Sieb. et Zucc. [Tsurumame]
Asphondylia sp. Kanzawa, 1918. Pod

Hemistepta carthamoides O. Kuntze [Kitsuneazami]
Lasioptera azami Shinji, 1939e. Stem

Hordeum vulgare L. var. *hexastichon* Aschers. [Oomugi]
Sitodiplosis mosellana (Géhin, 1857). Grain

Humulus japonicus Sieb. et Zucc. [Kanamugura]
Asphondylia humuli (Shinji, 1939e). Leaf, Flower bud, Peducle

Humulus Lupulus L. var. *cordifolius* Maxim. [Karahanasô]
Asphondylia humuli (Shinji, 1939e). Leaf, Flower bud, Peduncle

Hydrangea paniculata Sieb. [Noriutsugi]
* *Silvestrina hydrangeae* (Shinji, 1939c). Fruit

Ilex chinensis Sims. [Nanamenoki]
? *Asteralobia sasakii* (Monzen, 1937). Bud

Ilex crenata Thunb. [Inutsuge]
Asteralobia sasakii (Monzen, 1937). Bud

Ilex integra Thunb. [Mochinoki]
Asteralobia sasakii (Monzen, 1937). Bud

Ilex pedunculosa Miq. [Soyogo]
Asteralobia soyogo (Kikuti, 1939). Bud

Ilex serrata Thunb. [Umemodoki]
Rhopalomyia ilexifoliae Shinji, 1944. Leaf

Impatientis noli-tangere L. [Kitsurifunesô]
? *Lasioptera impatientis* (Osten Sacken, 1862). Stem

Indigofera pseudo-tinctoria Matsum. [Komatsunagi]
Asphondylia sp. Kanzawa, 1918. Pod

Juniperus chinensis L. var. *globosa* Hornobr. [Tamaibuki]
Aschistonyx eppoi Inouye, 1964a. Bud

Juniperus rigida Sieb. et Zucc. [Nezumisashi]
Arceuthomyia nakaharai Inouye, 1959. Bud
Etsuhoa okayamana Inouye, 1959. Needle
Rhopalomyia uetsukii Inouye, 1959. Bud

Kalimeris Yomena Kitam. [Yomena]
Dasineura pocera Rübsaamen, 1914. Bud

Larix leptolepis Gord. [Karamatsu]
Dasineura nipponica Inouye, 1966a. Flower bud

Lespedeza bicolor Turcz. [Yamahagi or Ezoyamahagi]
Asphondylia sp. Kanzawa, 1918. Pod
Lasioptera lespedezae Shinji, 1939b. Stem

Lespedeza cyrtobotrya Miq. [Marubahagi]
Lasioptera lespedezae Shinji, 1938b. Stem

Ligustrum obtusifolium Sieb. et Zucc. [Ibota]
Asphondylia sphaera Monzen, 1937. Fruit

Marus pumila Mill. [Seiyôringo]
Contarinia mali Barnes, 1939a. Fruit

Metaplexis japonica Makino [Gagaimo]
Psectrosema gagaimo Monzen, 1955b. Leaf

Miscanthus sinensis Anderss. [Susuki]
Orseolia miscanthi (Shinji, 1938b). Bud

Miscanthus sinensis Anderss. var. *condensatus* Makino [Hachijôsusuki]
Orseolia miscanthi (Shinji, 1938b). Bud

Morus alba L. [Kuwa]
* *Diplosis mori* Yokoyama, 1929. Bud

* *Diplosis moricola* Matsumura, 1931. Petiole
* *Diplosis morivorella* M. Naito, 1919. Leaf, Petiole
* *Diplosis quadrifasciata* Niwa, 1910. Bark
* *Diplosis* sp. Nishikawa, 1925.
* *Diplosis* sp. Yokoyama, 1929.
* *Urosema mori* Sasaki, 1931.

Paederia scadens Merrill [Hekusokazura]

Dasineura paederiae Shinji, 1944. Leaf, Leaf bud, Leaf stalk, Peduncle
Lasioptera sp. Stem

Patrinia villosa Juss. [Otokoeshi]

Asphondylia patriniae (Shinji, 1938o). Fruit
? *Lasioptera euphobiae* Shinji, 1944. Stem

Picea jezoensis Carr. [Ezomatsu]

Dasineura ezomatsue Uchida & Inouye, 1954. Bud, Twig

Picea jezoensis Carr. var. *hondensis* Rehd. [Touhi]

Dasineura abietiperda (Henschel, 1880). Bark

Pinus densiflora Sieb. et Zucc. [Akamatsu]

Contarinia matusintome Haraguchi & Monzen, 1955. Bud
Thecodiplosis japonensis Uchida & Inouye, 1955. Leaf

Pinus pentaphylla Mayr [Himekomatsu]

Janetiella kimurai Inouye, 1964a. Needle

Pinus Thunbergii Parl. [Kuromatsu]

Contarinia matusintome Haraguti & Monzen, 1955. Bud

Pleioblastus simonii Nakai [Medake]

Geromyia nawai (Monzen, 1937). Stem

Populus Maximowiczii Henry [Doronoki]

Mikiola populi Shinji, 1938j. Cortex

Populus nigra L. var. *italica* Koehne [Popura]

Mikiola populicola Shinji, 1938j. Cortex

Pyrus pyrifolia Nakai var. *culta* Nakai [Nashi]

* *Diplosis* sp. Okada, 1918a.
* *Diplosis* sp. Yago, 1929.

Quercus acutissima Corr. [Kunugi]

Ametrodiplosis acutissima (Monzen, 1937). Leaf, Stem

Quercus dentata Thunb. [Kashiwa]

Ametrodiplosis acutissima (Monzen, 1937). Leaf, Stem

Quercus serrata Thunb. [Konara]

* *Silvestrina quercifoliae* Shinji, 1944. Leaf

Quercus variabillis Blume [Abemaki]

Ametrodiplosis acutissima (Monzen, 1937). Leaf, Stem

Quercus spp.

Arnoldiola cerris (Kollar, 1850). Leaf
Dryomyia circinnans (Giraud, 1861). Leaf

Rosa multiflora Thunb. [Noibara]

* *Clinodiplosis rosaefoliae* (Shinji, 1939a). Leaf

Rubus parvifolius L. [Nawashiroichigo]

Lasioptera rubi Heeger, 1851. Stem

Rubus phoenicolasius Maxim. [Urajiroichigo]

Lasioptera rubi Heeger, 1851. Stem

Rubus trifidus Thunb. [Kajiichigo]

Lasioptera rubi Heeger, 1851. Stem

Salix babylonica L. [Shidareyanagi]

Rhabdophaga salicivora Shinji, 1939h. Stem
Rhabdophaga saliyonai Shinji, 1938i. Stem
Rhabdophaga yanagi (Shinji, 1938i). Stem

Salix bakko Kimura [Bakkoyanagi]

Rhabdophaga salicivora Shinji, 1938h. Stem
Rhabdophaga saliyonai Shinji, 1938i. Stem

Salix Gilgiana Seem. [Kawayanagi]

Rhabdophaga rosaria (H. Loew, 1850). Terminal bud
Rhabdophaga salicivora Shinji, 1938h. Stem

Salix gracilistyla Miq. [Nekoyanagi]

Rhabdophaga saliyonai Shinji, 1938i. Stem

Salix hondoensis Koidz. [Ezoyanagi]

Rhabdophaga saliyonai Shinji, 1938i. Stem

Salix kinuyanagi Kimura [Kinuyanagi]

Rhabdophaga salicivora Shinji, 1938h. Stem

Salix koriyanagi Kimura [Koriyanagi]

Rhabdophaga salicivora Shinji, 1938h. Stem
Rhabdophaga yanagi (Shinji, 1938i). Stem

Salix Sieboldiana Blume [Yamayanagi]

Rhabdophaga saliyonai Shinji, 1938i. Stem

Salix subfragilis Anderss. [Tachiyanagi]

Rhabdophaga rosaria (H. Loew, 1850). Terminal bud

Salix spp.

Helicomyia saliciperda (Dufour, 1841). Stem
Rhabdophaga heterobia (H. Loew, 1850). Catkins, Terminal bud
Rhabdophaga marginemtorquens (Bremi, 1847). Leaf
Rhabdophaga salicifoliae Shinji, 1944. Leaf ?
Rhabdophaga terminalis (H. Loew, 1850). Terminal bud

Sasaella ramosa Makino [Azumazasa]

Hasegawaia sasacola Monzen, 1937. Bud

Sophora flavescens Aiton [Kurara]

Asphondylia sp. Kanzawa, 1918. Pod

Styrax japonica Sieb. et Zucc. [Egonoki]

Asphondylia styraci Shinji, 1944.
* *Porricondyla acanthopanici* Shinji, 1944.
Rhopalomyia styracophila Shinji, 1944 ?

Styrax Obassia Sieb. et Zucc. [Hakuunboku]

* *Clinodiplosis styracifoliae* Shinji, 1944. Leaf

Symplocos chinensis Druce [Sawafutagi]

Rhopalomyia ilexifoliae Shinji, 1944. Leaf

Triticum aestivum L. [Komugi]

Contarinia sp. Yuasa, 1935. Grain
Sitodiplosis mosellana (Géhin, 1857). Grain
[*Mugi-beni-tamabae*] Yuasa, 1937a.

Viburnum dilatatum Thunb. [Gamazumi]

Pseudasphondylia rokuharaensis Monzen, 1955b. Fruit

Viburnum Wringhtii Miq. [Miyamagamazumi]

Dasineura viburni Shinji, ? Terminal bud

Vicia amoena Fisch. [Tsurufujibakama]

Asphondylia sp. Kanzawa, 1918. Pod

Vicia Cracca L. [Kusafuji]

Dasineura viciae (Kieffer, 1888). Leaf

Vicia Pseudo-Orobus Fisch. et Mey. [Ôbakusafuji]

Dasineura vicicola Shinji, 1939b. Leaf

Vicia unijuga A. Br. [Nantenhagi]

Dasineura vicicola Shinji, 1939b. Terminal bud

Vitis Coignetiae Pulliat [Yamabudô]

* *Cecidomyia viticola* Osten Sacken, 1862b. Leaf

Weigela hortensis K. Koch [Taniutsugi]

Asphondylia dierviellae Felt, 1907. Bud
Oligotrophus japonicus Monzen, 1955a. Bud

Weigela japonica Thunb. [Tsukushiyabuutsugi]

Asphondylia dierviellae Felt, 1907. Bud

Wisteria floribunda DC. [Fuji]

Dasineura wisteriae Mani, 1954b. Flower bud

TENTATIVE KEYS TO THE JAPANESE GALL MIDGES OF ECONOMIC IMPORTANCE

Artemisia & Chrysanthemum

1. Larvae in the buds 2
- Larvae in the stems 3
- Larvae on the leaves 4
- Larvae in the barks ..... *Dicrodiplosis minuta* Shinji & *Silvestrina artemisiae* Shinji
2. Terminal bud transformed into a rosette gall ..... *Bouchéella artemisiae* (Bouché)
- Terminal bud transformed into a turbinated swelling ..... *Rhopallomyia abdominalis* Shinji & *R. iwatensis* Shinji
- Lateral bud transformed into a bottle-shaped swelling ..... *Misospatha artemisiae* Shinji & *M. longitubifix* Shinji
- Botlle-shaped swelling on the top or side of the stem or on the leaf, with many leaflets which are flattened and pointed distally ..... *Rhopalomyia caterva* Monzen
3. Subglobular swelling on the side of the stem ..... *Rhopalomyia struma* Monzen
- Galls covered densely with soft, long, whitish hairs ..... *Misospatha giraldii* (Kieffer & Trotter)
4. Subglobular or suboval swelling under side of the leaf, with short, whitish hairs densely ..... *Rhopalomyia cinerarius* Monzen
- Small, oblong protuberance ..... *Rhopalomyia chrysanthemum* Monzen
- Wart-like or elliptical swelling ..... *Rhopalomyia japonica* Monzen
- Subconical swelling on the upper side of the leaf ..... *Diathronomyia yomogicola* (Matsumura)
- Larva lives in the leaf as a minor ..... *Lasioptera artemisifoliae* Shinji

Cryptomeria

1. Male flagellar segment with 2 sets of circumfilar loops ; tarsal claw simple on all legs ..... *Contarinia inouyei* Mani
- Male flagellar segment with 3 sets of circumfilar loops ; tarsal claw with a basal tooth on all legs ..... *Thomasiniana odai* Inouye

Glycine

1. Wing not mottled ; male flagellar segment with an elongated basal enlargement and convolute circumfila ; ovipositor aciculate ..... *Asphondylia* sp.
- Wing mottled ; male flagellar segment binodose, with 3 sets of circumfilar loops ; ovipositor not aciculate ..... *Profeltiella soya* Monzen

Hordeum & Triticum

1. Gonocoxite without basal lobe ; aedeagus basally broader ..... *Contarinia* sp.
- Gonocoxite with a basal lobe ; aedeagus nearly parallel sided .... *Sitodiplosis mosellana* (Géhin)

Juniperus

1. Male flagellum with a subcylindrical basal enlargement 2
- Male flagellum binodose 3
2. The gall consisting of 5 to 6 short needles which are surrounded by several needles ..... *Rhopalomyia uetsukii* Inouye
- The galls consisting of outer conical, thick walled part and inner small, waxy blister ..... *Arceuthomyia nakaharai* Inouye
3. Palpus consisting of 1 segment..... *Etsuhoa okayamana* Inouye
- Palpus consisting of 4 segments ..... *Aschistonyx eppoi* Inouye

Pinus

1. Male flagellar segment with a subcylindrical basal enlargement, not binodose .... *Janetiella kimurai* Inouye
- Male flagellar segment binodose.....2
2. Palpus consisting of 4 segments ; female flagellum with a comparatively short distal stem ..... *Contarinia matusintome* Haraguti & Monzen
- Palpus consisting of 3 segments ; female flagellum with a long distal stem and a moderately constricted basal enlargement..... ..... *Thecodiplosis japonensis* Uchida & Inouye

Salix

1. Larvae in the catkins ..... *Rhabdophaga heterobia* (H. Loew)
- Larvae in the buds 2
- Larvae in the stems 3
- Larvae on the leaves..... 6
2. Terminal leaves curled, folded and crinkled ..... *Rhabdophaga terminalis* (H. Loew)
- Large rosette-like or strobili-form galls on terminal shoots .... *Rhabdophaga rosaria* (H. Loew)
- Small rosettes at the terminal or lateral buds ..... *Rhabdophaga heterobia* (H. Loew)
3. Feeble swelling..... *Helicomyia saliciperda* (Dufour)
- Obvious woody swelling 4
4. A single larva in a gall ..... *Rhabdophaga salicivora* Shinji
- Two or more larvae in a gall.....5
5. Palpus consisting of 4 segments ; tarsal claw bifid on all legs .... *Rhabdophaga saliyonai* Shinji
- Palpus consisting of 2 segments : tarsal claw simple on all legs..... ..... *Rhabdophaga yanagi* (Shinji)
6. Larvae in the marginal rolls..... *Rhabdophaga marginemtorquens* (Bremi)
- Larvae in [Yanagi-hasujifushi] ..... *Rhabdophaga salicifoliae* Shinji

A LIST OF THE INSECTS AND MITES ATTACKED BY THE JAPANESE PREDACIOUS GALL MIDGES

Aphis craccivora Koch
Aphidoletes meridionalis Felt, 1908.

Aphis glycines Matsumura
Aphidoletes meridionalis Felt, 1908.

Crisicoccus matsumotoi (Shiraiwa)
Golanudiplosis japonicus Grover & Prasad, 1968.

Eriophytesu sp.
Arthrocnodax sp.

Longiunguis sacchari Zehntner
Aphidoletes aphidimyza (Rondani, 1847).

Myzus persicae Sulzer
Aphidoletes meridionalis Felt, 1908.

Oligonychus sp.
Feltiella sp.

Panonychus sp.
Feltiella sp.

Planococcus citri (Risso)
Nipponodiplosis hirticornis (Felt, 1915d).

Planococcus kraunhiae (Kuwana)
Nipponodiplosis hirticornis (Felt, 1915d).

Pseudococcus citriculus Green
Nipponodiplosis hirticornis (Felt, 1915d).

Pseudococcus pentagona Targioni-Tozzetti
Tricontarinia ciliatipennis Kieffer, 1910a.
Tricontarinia japonica Kieffer, 1910b.

Pseudococcus vapor (?)
Nipponodiplosis hirticornis (Felt, 1915d).

Tetranychus kanzawai Kishida
Arthrocnodax occidentalis Felt, 1912c.

Tetranychus urticae Koch
Feltiella sp.

Tetranychus sp.

Feltiella sp.

Unidentified species of grain mite

Silvestrina sp.

Unknown (Acarina or Insecta)

Lestodiplosis sp.

A TENTATIVE KEY TO THE JAPANESE PREDACIOUS GALL MIDGES

1. Tarsal claws of all legs simple 2
- At least a pair of claws bifid 5
2. Gonostylus slender 3
- Gonostylus basally swollen 4
3. Palpus consisting of 4 segments ; "lower lamella" entire ..... *Lestodiplosis* sp.
- Palpus consisting of 3 segments ; "lower lamella" bifid ..... *Tricontarinia ciliatipennis* Kieffer & *Tricontarinia japonica* Kieffer
4. "Lower lamella" entire ..... *Silvestrina* sp.
- "Lower lamella" bilobed ..... *Arthrocnodax occidentalis* Felt
5. Male flagellum with one or more extraordinarily long circumfilar loops ..... *Aphidoletes aphidimyza* (Rondani) & *A. meridionalis* Felt
- Male flagellum with regular circumfilar loops 6
6. Gonostylus slender ; gonocoxite with a basal lobe ..... *Feltiella* sp.
- Gonostylus rather short, basally broader ; gonocoxite without basal lobe 7
7. Tegmen largely bilobed distally ..... *Golanudiplosis japonicus* Grover & Prasad
- Tegmen entire or shallowly emarginated ..... *Nipponodiplosis hirticornis* (Felt)

REFERENCES

Agassiz, L. & Loew, H.
1846 Nomina systematica generum dipterorum. part 4, 42 pp.

Ahlberg, O.
1939 *Diathronomyia chrysanthemi* nom. nov. (=*hypogaea* Felt nec Loew). Ent. Tidskr., 60 : 274-278.

Alexander, C. P.
1924 Undescribed species of nematocerous Diptera from North America and Japan. Ins. Insc. Mens., 12 : 81-84.
1959 Undescribed species of nematocerous Diptera. Part VI & VII. Bull. Brooklyn Ent. Soc., 54 : 37-43, 53-60.

Aoyama, T.
1938 Pear codlin midge *Diplosis* n. sp. Nippon Gakujutsu Kyôkai Hôkoku, 13 (3) : 473-476.

Azab, A. K., Tawfik, M. F. S. & Ismail, I. I.
1965a Seasonal changes in the abundance of certain aphids and their predators in Giza. Bull. Soc. ent. Egypt, 49 : 11-24.
1965b Morphology and biology of the aphidophagous midge, *Phaenobremia aphidivora* Rübsaamen. Bull. Soc. ent. Egypt, 49 : 25-45.

Bagnall, R. S. & Harrison, J. W. H.
1918 A preliminary catalogue of British Cecidomyidae (Diptera) with special reference to the gall-midges of the North of England. Trans. R. ent. Soc. Lond., 1917 : 346-426.
Balker, C. S. W.
1964 Aphidivorous Cecidomyiidae (Dipt.) an investigation of the occurence and bionomics of aphid-eating gall-midges, mainly in Britain. Ent. mon. Mag., 25 : 212-231.
Barnes, H. F.
1927a Material for a Monograph of the British Cecidomyidae or gall midges. British gall midges of economic importance I-V. J. S.-E. agric. Coll. Wye, no. 24 : 65-146.
1927b Four British aphid-eating gall-midges. Entomologist, 60 : 174-180.
1927c British gall midges. I. Ent. mon. Mag., 63 : 164-221.
1928a *Neputunimyia* Felt, a gall midge genus new to Great Britain. Entomologist, 61 : 173-175.
1928b British gall midges. II. *Lestodiplosis* Kieffer. Ent. mon. Mag., 64 : 68-148.
1929a Button Top of Bascket Willows. J. Minist. Agric., 36 : 65-71.
1929b Two gall midges (Cecidomyidae) found in stored products. Bull. Ent. Res., 20 : 119-122.
1929c Gall-midges (Diptera, Cecidomyidae) as enemies of aphids. Bull. Ent. Res., 20 : 433-442.
1930a On the resistance of Bascket Willows to button gall formation. Ann. appl. Biol., 17 : 638-640.
1930b Gall midges (Cecidomyidae) as enemies of the Tingidae, Psyllidae, Aleyrodidae and Coccidae. Bull. Ent. Res., 21 : 319-329.
1931 Further results of an investigation into the resistance of Bascket Willows to button gall formation. Ann. appl. Biol., 18 : 75-82.
1932a Notes on Cecidomyidae. Ann. Mag. nat. Hist., ser. 10, 9 : 475-484.
1932b On the gall midges injurious to the cultivation of willows. I. The Bat Willow Gall Midge (*Rhabdophaga terminalis* H. Lw.). Ann. appl. Biol., 19 : 243-252.
1933 A cambium miner of bascket willows (Agromyzidae) and its inquiline gall midge (Cecidomyidae). Ann. appl. Biol., 20 : 498-519.
1934 Studies of fluctuation in insect populations III. The gall midge, *Rhabdophaga heterobia* H. Lw., on black maul variety of *Salix triandra* at Syston, Leicestershire, 1927-33. J. Anim. Ecol., 3 : 165-181.
1935 On the gall midge injurious to the cultivation of willows. II. The so-called "shot hole" gall midge (*Rhabdophaga* spp.). Ann. appl. Biol., 22 : 86-105.
1937 Check list of the Cecidomyidae of New Zealand. Trans. R. Soc. N. Z., 67 : 115-121.
1939a *Contarinia mali* n. sp. The apple blossom midge, with notes on the more common gall midge attacking apple and pear. Kontyû, 13 : 126-132.
1939b Some gall midge species and their host plant range. Ann. appl. Biol., 26 : 318-347.
1939c Gall midges (Cecidomyidae) associated with coffee. Rev. zool. Bot. Afr., 32 : 324-336.
1940 Studies of fluctuations in insect populations. VII. The button top midge (*Rhabdophaga heterobia*) at Syston, 1934-39. J. Anim. Ecol., 9 : 202-214.
1946a Gall midges of economic importance. I. Root and vegetable crops. 103pp.
1946b Gall midges of economic importance. II. Fodder crops. 160pp.
1948a Gall midges of economic importance. III. Fruit. 184pp.
1948b Gall midges of economic importance. IV. Ornamental plants and shrubs. 165pp.
1949 Gall midges of economic importance. VI. Miscellaneous crops. 229pp.
1951 Gall midges of economic importance. V. Trees. 270pp.
1953 Description of the new gall midge found by M. R. Pussard on lavender, together with notes on the damage caused by some other species. (Dipt., Cecidomyidae). Bull. Soc. ent. Fr., 58 : 125-128.
1956 Gall midges of economic importance. VII. Cereal crops. 261pp.

Bergenstamm, J. V. & Löw, P.
1877 Synopsis Cecidomydarum. Verh. zool.-bot. Ges. Wien, 26 : 1-104.
Beutenmüller, W.
1907 New species of gall-producing Cecidomyiidae. Bull. Amer. Mus. nat. Hist., 23 : 385-400.
Bigot,
1854 Essai d'une classification génèrale et synoptique de l'ordre des insectes Diptères. Ann. Soc. ent. Fr., (ser. 3) 2 : 447-482.
Bouché, P. F.
1834 Naturgeschichte der Insekten, besonders in Hinsicht ihrer ersten Zustände als Larven und Puppen. 1. Berlin.
Bremi, J. J.
1847 Beitraege zu einer Monographie der Gallmücken, Cecidomyia Meigen. N. Denkschr. schweiz. Ges. Naturw., 9, 71pp., pls.
Brues, C. T. & Melander, A. L.
1932 Classification of insects. Bull. Mus. Comb. Zool. Harvard Coll., 73 : 1-672.
Brunetti, E.
1920 Catalogue of Oriental and South Asiatic Nematocera. Rec. Ind. Mus., 17 : 1-300.
Cecconi, G.
1912 La *Rhabdophaga* distruttrice dei salici in Italia. *Rhabdophaga saliciperda* Duf. Boll. Lab. Zool. Portici, 6 : 320-331.
Collin, J. E.
1904 A list of the British Cecidomyidae arranged according to the views of recent authors. Ent. mon. Mag., 40 : 93-99.
Coquillett, D. W.
1900 Two new cecidomyians destructive to buds of roses. Bull. U. S. D. A. Div. Ent., n. ser., 22 : 44-48.
1910 The type-species of the North American genera of Diptera. Proc. U. S. nat. Mus., 37 : 499-647.
Coutin, R. & Harris, K. M.
1969 The taxonomy, distribution, biology and economic importance of the millet grain midge, *Geromyia panniseti* (Felt), gen. n., comb. n. (Dipt., Cecidomyiidae). Bull. Ent. Res., (1968) 59 : 259-273.
Curran, C. H.
1934 The families and genera of North American Diptera. 512pp.
Davis, J. J.
1916 *Aphidoletes meridionalis*, an important dipterous enemy of aphids. J. Agr. Res. Wash., 6 : 883-887, pl.
Dufour, L.
1841 Histoire des métamophoses des Cécidomyies du pin martimeet du peuplier. Ann. Sci. nat. (Zool.) 16 : 257-263, pls.
Edwards, F. W.
1928 Nematocera. In Insects of Samoa, 6 (2) : 23-108.
1929 The British species of *Lestremia* and allied genera (Diptera, Cecidomyiidae). Ent. mon. Mag., 65 : 9-16.
1938a A re-definition of the genus *Campylomyza* Meigen, with notes on Meigen's types (Diptera, Cecidomyiidae). Ency. Ent. (ser. B, 2 Dipt.), 9 : 47-52.
1938b On the British Lestremiinae, with notes on exotic species. I. (Diptera, Cecidomyiidae). Proc. R. Ent. Soc. Lond., (ser. B) 7 : 18-24, 25-32, 102-108, 173-182, 199-210, 229-243, 253-265.

Enderlein, G.
1911a Die phyletischen Beziehungen der Lycoriiden (Sciariden) zu den Fungivoriden (Mycetophiliden) und Itonididen (Cecidomyiiden) und ihre systematische Gliederung. Arc. Nat., 77 : 116-201.
1911b *Anarete stettinensis*, eine neue deutsche Fliege (Sciaridae). Stett. ent. Zeit., 72 : 130-135.
1912 Zur Kentnnis der Zygophthalmen, Uber die Gruppierung der Sciariden and Scatopsiden. Zool. Anz., 40 : 261-263.
1936 Ordnung : Zweiflügeler, Diptera. In Die Tierwelt Mitteleuropas, 6 : 1-259.
Esaki, T.
1950 Iconographia Insectorum Japonicorum, p. 1567. (in Japanese).
Ewing, H. E.
1914 The common red spider, or spider mite. Ore. Agr. Expt. St. Bull., No. 121 : 1-95, pls.
Felt, E. P.
1907 New species of Cecidomyiidae. Bull. N. Y. St. Mus., 110 : 97-165.
1908 Studies in Cecidomyiidae 2. Bull. N. Y. St. Mus., 124 : 307-422, pls.
1911a New species of gall midges. J. econ. Ent., 4 : 476-484, 546-559.
1911b A generic synopsis of the Itonididae. J. N. Y. ent. Soc., 19 : 31-62.
1912a New Itonididae (Dipt.). J. N. Y. Ent. Soc., 20 : 102-107.
1912b Studies in Itonididae. J. N. Y. ent. Soc., 20 : 236-248.
1912c *Arthrocnodax occidentalis* n. sp. (Dipt.). J. econ. Ent., 5 : 402.
1912d The gall midge fauna of western North America. Pomona Col. J. Ent., 4 : 753-757.
1913a A study of gall midges. Bull. N. Y. St. Mus., 165 : 127-226, pls.
1913b The gall midge fauna of New Zealand. Psyche, 20 : 133-147.
1913c Descriptions of gall midges (Diptera). J. N. Y. ent. Soc., 21 : 213-219.
1915a New North American gall midges. Canad. Ent., 47 : 226-232.
1915b A study of gall midges 3. Bull. N. Y. St. Mus., 180 : 127-288, pls.
1915c New gall midges. J. econ. Ent., 8 : 405-409.
1915d New Asian gall midges. J. N. Y. ent. Soc., 23 : 173-184.
1916 A study of gall midges 4. Bull. N. Y. St. Mus., 186 : 101-172, pls.
1918a New Philippine gall midges, with a key to the Itonididae. Philipp. J. Sci. (D) 13 : 281-325, pl.
1918b A study of gall midges 5. Bull. N. Y. St. Mus., 198 : 7-276, pls.
1918c A study of gall midges 6. Bull. N. Y. St. Mus., 202 : 76-205, pls.
1919 New gall midges or Itonididae from the Adirondacks. J. N. Y. ent. Soc., 27 : 277-292.
1920 New Indian gall midges (Diptera). Mem. Dept. Agr. Ind., ser. 7 : 1-11.
1921 A study of gall midges 7. Bull. N. Y. St. Mus., 231, 232 : 81-240, pls.
1925 Key to gall midges (A resumé of studies 1-7, Itonididae). Bull. N. Y. St. Mus., 257 : 3-186, pls.
1926 New non-gall making Itonididae (Diptera). Canad. Ent., 58 : 265-268.
1929 Gall midges or gall gnats of the Orient (Itonididae or Cecidomyiidae). Lingnan Sci. J., 7 : 413-474.
1932 A new Japanese gall midge. Bull. Brooklyn Ent. Soc., 27 : 124.
1935 A new gall midge. J. N. Y. ent. Soc., 43 : 47.
1958 Family Itonididae (=Cecidomyiidae). In : Guide to the insects of Connecticut. 6 (6). Bull. Conn. geol. nat. Hist. Surv., 87 : 89-206.
1965 Plant galls and gall makers. 364 pp. (facsimile of the edition of 1940).
Frison, T. H.
1927 A list of the insect types in the collection of the Illinois State Natural History Survey and the University of Illinois. Bull. Ill. St. Nat. Hist. Surv., 16 : 1-309.

Fujimatsu, K.
1935 Studies on *Rhabdophaga rosaria* (H. Loew). Trans. Nat. Hist. Soc. Formosa, 25 : 344-351.
Fukushima, S.
1904 [On the mulberry-shoot worm]. Dainippon Sanshi Kaihô, No. 147 : 9-12 (in Japanese).
Gagné, R. J.
1967 The genus *Oligotrophus* Latreille (Diptera : Cecidomyiidae) in North America and a new species injurious to *Betula papyrifera* Marsh. Ent. News, 78 (5) : 129-134.
1968 A catalogue of the Diptera of the Americas south of the United States. 23. Family Cecidomyiidae, 62pp.
1969 A review of Felt's Philippine genera and species of Cecidomyiidae (Diptera). Pacif. Ins., 11 (3,4) : 561-570.
Géhin, J. B.
1857 Notes pour servir à l'histore des insectes nuisibles à l'agriculture dans le Départment de la Moselle. No. 2. Insects qui attaquent les blés. Mém. Soc. Horticult. Moselle, pp. 19-38.
Giraud, J.
1861 Fragments Entomologiques. 2. Supplément á l'histoire des Diptéres gallicoles. Verh. zool.-bot. Ges. Wien, 11 : 470-484.
Grover, P.
1962 Studies on new gall midges VIII (Itonididae : Cecidomyiidae : Diptera) from India. Proc. Nat. Acad. Sci. Ind., 32 (4) : 439-444.
1963 Studies on Indian gall-midges X : Five notable genera of the subfamily Lestremiinae. Marcellia, 31 (2) : 108-141, pls.
1964 Studies on gall midges XI. (Cecidomyiidae, Diptera). Two new genera and six new species of Indian Porricondylini (1). Marcellia, 31 : 189-229.
1965 Studies on Indian gall midges XIV. One new genus and seven new species of Trifilini (Cecidomyiidae : Diptera). Marcellia, 32 (1) : 21-61, pls.
Grover, P. & Prasad, S. N.
1968 *Golanudiplosis japonicus*-a new midge attacking comstock mealybug in Japan (Diptera : Itonididae). Beitr. Ent., 18 : 213-220.
Haimhoffen, G. R.
1875 Beobachtun gen über die Blattgalle und deren erzeuger auf *Vitis vinifera* L. Verh. zool.-bot. Ges. Wien, 25 : 803-810.
Haliday, A. H.
1833 Catalogue of Diptera occuring about Holywood in Downshire. Ent. Mag., 1 : 156-157.
Haraguti, T.
1936 [A forest insect pest, pine-shoot gall midge]. Goryôrin, No. 92: 14-24, pls. (in Japanese).
Haraguti, T. & Monzen, K.
1955 see Monzen, 1955b.
Hardy, E.
1960 Insects of Hawaii (Diptera : Nematocera-Brachycera) 10 : 235-307.
Harris, K. M.
1966 Gall midge genera of economic importance (Diptera : Cecidomyiidae) Part 1 : Introduction and subfamily Cecidomyiinae ; supertribe Cecidomyiidi. Trans. R. ent. Soc. Lond., 118 (10) : 313-358.
1968 A systematic revision and biological review of the cecidomyiid predators (Diptera : Cecidomyiidae) on world Coccoidea (Hemiptera : Homoptera). Trans. R. ent. Soc. Lond., 119 (13) : 401-494.

Hartig, T.
1839 Entomologische Notizen. Jber. Fortsch. Forstw., 1 : 640-646.
Hasegawa, C.
1745 ? Hishûshi. (in Japanese).
Heeger, E.
1851 Beiträge zur Naturgeschichte der Insekten. S. B. Akad. wiss. Wien, 7 : 203-204.
Henschel, G. A. O.
1880 *Cecidomyia abietiperda*. Zbl. ges. Forstw., 6 : 371-372.
Hotta, M.
1916 [On the natural enemies of red spider]. Ins. World, 20 : 231-232. (in Japanese).
Houard, C.
1908-1909-1913 Les Zoocécidies des Plantes d'Europe et du Bassin de la Mediterranée, I. II. III. 1560pp.
Hubault, E.
1945 Un parasite non encore singnanalé des aiguilles du sapin blanc (*Abies alba* Mill.). Bull. biol., 79 : 17-30.
Inouye, M.
1955 A new gall midge (Itonididae) which attacks the bark of Sugi (Japanese ceader). Bull. Gov. Forest Expt. St., No. 78 : 1-15, pl.
1959 Gall midges (Itonididae) attacking coniferous trees I. Bull. Gov. Forest Expt. St., No. 116 : 1-19, pls.
1961a [Studies on *Contarinia inouyei* Mani]. Forest Prot. News, 10 (11) : 230-233. (in Japanese).
1961b [On the bionomics and control of *Contarinia inouyei* Mani]. Nihon Ringaku-kai, Hokkaido-shibu, Kôenshû, 10 : 131-134. (in Japanese).
1962 [Observation of the pine gall midge in Tsushima]. Dantairin, 17 (11) : 16-19. (in Japanese)
1964a Gall midges (Itonididae) attacking coniferous trees II. Bull. Gov. Forest Expt. St., No. 164 : 1-39, pls.
1964b [On the gall midges infesting pine trees]. Forest Prot. News, 13 (8) : 190-194. (in Japanese).
1966a Gall midges (Itonididae) attacking coniferous trees III. J. Jap. Forestry Soc., 48 (1) : 20-24.
1966b [A new gall midge, *Dasyneura nipponica* injurious to *Larix leptolepis*]. Forest Prot. News, 15 (5) : 97-100. (in Japanese).
Ishihara, T.
1957 Taxono-agronomic entomology of Japan, pp. 297-299. (in Japanese).
Kanzawa, T.
1918 [On the soy bean pod gall midge]. J. Plant. Prot., 5 (4) : 283-285. (in Japanese).
Karsch, F.
1878 Revision der Gallmücken. Münster, 57pp, pl.
Kawano, K.
1969 Life history of *Feltiella* sp. (Diptera, Cecidomyiidae). Kontyû, 37 (2) : 127-133. (in Japanese, with English summary).
Kertész, C.
1902 Catalogus Dipterorum 2. 357pp.
Kieffer, J. J.
1888 Über Gallmücken und Mückengallen. Verh. zool.-bot. Ges. Wien, 38 : 95-114.
1890 Über Gallen und Gallmücken aus Blüthenköpfen verschiedener Compositen. Ent. Nachr. Berl., 16 : 27-32, 36-38.
1891 Zur Kenntnis der Weidengallmücken. Berl. Ent. Z., 36 : 241-258.

Kieffer, J. J. (Continued)

1894a Sur le rôle de la spatule sternale chez les larves de Cécidomyies. Ann. Soc. ent. Fr., 63 : 36-44.
1894b Trois nouveaux genres du groupe Diplosis. Bull. Soc. Ent. Fr., 63 : 28.
1894c Une note préliminaire sur le genre *Campylomyza* (Dipt.). Bull. Soc. Ent. Fr., 63 : 175-176.
1894d Uber die Heteropezinae. Wien ent. Ztg., 13 : 200-212, pl.
1894e Sur le groupe *Epidosis*. Ann. Soc. ent. Fr., 63 : 311-350, pls.
1894f Description de quelques larves de Cécidomyies. Feuill. jeun. Natur., 24 : 83-88, 119-123, 147-152, 185-198.
1894g Les oeufs des Cécidomyies. Ann. Sc. nat. Rouen, 1 : 9-10, 15-16.
1895a Essai sur le groupe *Campylomyza*. Misc. Ent., 3 : 46-47, 57-63, 74-79, 91-97, 109-113, 129-133.
1895b Beobachtungen über die Larven der Cecidomyinen. Wien. ent. Ztg., 14 : 1-16.
1895c Uber Papillen der Gallmückenlarven. Wien. ent. Ztg., 14 : 117-126.
1895d Observations sur les nymphes des Cécidomyies. Feuil. jeun. Natur., 25 (3) : 164-168.
1895e Beobachtungen über die Nymphen der Gallmücken. Wien. ent. Ztg., 14 : 266-270.
1895f Uber Moosbewohnende Gallmückenlarven. Ent. Nachr., 21 : 113-123.
1895g Nouvelles observations sur le groupe des Diplosis et description de cinq genres nouveaux. Bull. Soc. ent. Fr., 64 : 192-194.
1895h Observation sur les ornements des antennes des Cécidomyies. Feuill. jeun. Natur., 26 : 9.
1896a Neuer Beitrag zur Kenntniss der *Epidosis*-Gruppe. Berl. ent. Z., 41 : 1-44, pls.
1896b Sur les Cécidomyies du Saule (Dipt.), Description d'un genre nouveau et d'une espèce nouvelle. Bull. Soc. ent. Fr., 65 : 188-189.
1896c Ouatre nouveaux genres du group *Diplosis*. Misc. Ent., 4 : 4-5.
1896d Neue Mittheilungen über Gallmücken. Wien. ent. Ztg., 15 : 85-105.
1896e Observations sur les *Diplosis*, et diagnoses de cinq espèces nouvelles (Dipt.). Bull. Soc. ent. Fr., 65 : 382-384.
1898 Synopse des Cecidomyies d'Europe et d'Algerie. Bull. Soc. Hist. nat. Metz, (ser. 2) 8 : 1-64.
1900 Monographie des Cecidomydes d'Europe et d'Algerie. Ann. Soc. ent. Fr., 69 : 181-472, pls.
1901 Suite à la Synopse des Cécidomyies d'Europe et d'Algerie. Bull. Soc. Hist. nat. Metz, (ser. 2) 9 : 9-42.
1904a Étude sur les Cécidomyies gallcoles. Ann. Soc. Sci. Brux., 28 : 329-350.
1904b Nouvelles Cécidomyies xylophiles. Ann. Soc. Sci. Brux., 28 : 367-410.
1906 Description de nouveaux Diptères Nématocères d'Europe. Ann. Soc. Sci. Brux., 30 : 338-346.
1910a Description d'une espece nouvelle de *Tricontarinia* (Cecidomyidae). Boll. Lab. Zool. Portici, 4 : 71-72.
1910b Cécidomyies parasites de *Diaspis* sur le Mûrier. Boll. Lab. Zool. Portici, 4 : 128-133.
1912a Description de quatre nouveaux insectes exotiques. Boll. Lab. Zool. Portici, 6 : 171-175.
1912b Neue Gallmücken-Gattungen, 2pp. Bitish. (reprinted in Marcellia, Bibliografia e Recensioni, 11 : 10-11, 1913).
1913a Nouvelle contribution à la connaissance des Cécidomyies. Marcellia, 11 : 219-235.
1913b Nouvelle Cécidomyies mycophiles et xylophiles. Marcellia, 12 : 45-56.
1913c Glanures diptérologiques. Bull. Soc. Hist. nat. Metz, 28 : 45-55.
1913d Cécidomyies de l'Afrique orientale Bull. Soc. Hist. nat. Metz, 28 : 87-114.
1913e Deux nouvelles Cécidomyies d'Algérie (Diptères). Bull. Soc. Hist. nat. Afr. Nord, (Ann. 5) 4 : 90-92.
1913f Diptera, fam. Cecidomyidae. Genera Insect., 152, 346pp., pls.

Kieffer, J. J. & Massalongo
1902 Description des quelques Cécidomyies Nouvelles. Marcellia, 1 : 56.
Kieffer, J. J. & Trotter, A.
1900 Description d'une Cecidomyie nouvell de Chine. Bull. Soc. ent. Fr., 1900 : 233.
Kikuti, T.
1939 On two species of gall midges of genus *Schizomyia* (Diptera, Cecidomyidae). Annot. Zool. Jap., 18 (4) : 237-241, pl.
1940 A new gall-midge of genus *Oligotrophus* from central Japan. Annot. Zool. Jap., 19 (1) : 35-38.
Kim, C. W.
1955 Notes on the pine-needle sheath gall-midge, *Thecodiplosis pinicola* Takagi (Diptera, Cecidomyiidae). The Humidities and Sciences, Korea Univ., 1 : 88-90.
Kirby, W.
1798 History of *Tipula Tritici*, and *Ichneumon Tipulae*, with some observation upon other insects that attack the Wheat, in a letter to Thomas Marshan, Esq., Sec. L. S. Trans. Linn. Soc. Lond., (Zool) 4 : 230-239.
Kjellanden, E.
1945 *Carpodiplosis papaveris* n. gen., n. sp., ein neuer Schädling des Ölmohnes (Dipt. Cecid.). Opusc. ent., 10 : 38-43.
Koizumi, K.
1962a [Reexamination of systematic position and habit of some Japanese gall midges]. Bull. Kinki Branch, Ent. Soc. Japan, No. 14 : 2-3. (in Japanese).
1962b [On the habit of gall midge on Japanese medlar]. Kôbe Syokubutsu Bôeki Jôhô, 273 : 62. (in Japanese).
Kollar, V.
1850 Naturgeschichte der Zerr-Eichen-Saummücke (*Lasioptera cerris*) eines schädlichen Forstinsekts. Denkschr. Acad. Wiss. Wien, 1 : 48-50.
Kovalev, O. V.
1964 Review on gall-midges (Diptera, Itonididae) from the extreme south of far east. I. The supertribe Asphondylidi. Rev. Ent. USSR, 43 : 418-446. (in Russian)
1967 Contribution to the fauna and ecology of the gall-making insects of the far east of the USSR, with the descriptions of new species of Cecidomyiidae (Diptera). Trudy Zool. Inst. Akad. nauk SSSR, 41 : 80-133, pls. (in Russian).
Kurata, U.
1918 [Insect pests of basket willow]. J. Plant. Prot., 5 (4) : 289. (in Japanese).
Kuwayama, S.
1926 [On the insect pests of soy bean and their control measures]. Bull. Hokkaido Agr. Expt. St., No. 39. (in Japanese).
Kuwayama, S. & Others
1953 Survey on the fauna of soybean insect-pests in Japan. Tokyo, 129pp., pls. (in Japanese).
Latreille, P. A.
1805 Histoire naturelle, générale et particulière, des Crustacés et des Insectes, 14 : 288.
Lee, D. S.
1956 Studies on the pine gall midge (*Thecodiplosis pinicola* T.) injurious to red pine tree. Bull. Forest Expt. St. Korea, 5 : 1-38.
Loew, H.
1844 Beschreibung zweier merkwürdigen neuen Dipteren. Stett. ent. Ztg., 5 : 321-326.
1845 Beschreibung einiger vom Herrn Pastor Hoffmeister zu Nordshausen aufgefundenen, merkwürdigen Dipteren. Stett. ent. Ztg., 6 : 394-402.
1850 Dipterologische Beiträge, 4, 39pp., posen.
1862 Monographs of the Diptera of North America, 1, 221pp.

Löw, F.
1877 Uber Gallmücken. Verh. zool.-bot. Ges. Wien, 27 : 1-38.
Macquart, J.
1826 Insectes Diptères du Nord de la France. 1. Tipulaires, 175pp.
1834 Histoire naturelle des insectes, Diptères, 1, 578pp.
1835 Histoire naturelle des insectes, Diptères, 2, 710pp.
Malloch, J. R.
1914 Notes on North American Diptera, with descriptions of new species in the collection of the Illinois State Laboratory of Natural History. Bull. Ill. State Lab. Nat. Hist., 10 : 213-243.
Mamajev, B. M.
1960 Description of two new genera and one species of gall midge (Itonididae, Diptera) developing in rotten wood. Zool. Zh., 39 : 1521-1524. (in Russian, with English summary).
1961a Gall midges of the USSR. New species of the genus *Camptomyia* Kieffer (Itonididae, Diptera). Zool. Zh., 40 : 1677-1690. (in Russian, with English summary).
1961b Neue Gallmücken der Gattung *Ametrodiplosis* Rübs. (Diptera, Itonididae). Čas. Česk. Spol. Ent., 58 (4) : 384-388. (in Russian, with German summary).
1962 [Gall midges, their biology and economic importance]. 72pp. (in Russian).
1963a Gall midges of the USSR. 2. The tribe Micromyini (Diptera, Itonididae). Rev. Ent. USSR, 42 (2) : 436-454. (in Russian, with English summary).
1963b Gall midges of the USSR. 3. New species of the genus *Winnertzia* Rondani, developing in the soil, in the membranes of fungal mycelium and under decaying bark of coniferous trees (Itonididae, Diptera). Zool. Zh., 42 : 562-573. (in Russian, with English summary).
1963c Gall midges of the USSR. 5. New Central Asian species of the tribes Lestremiini, Micromyini, Porricondylini (Itonididae, Diptera). Uzbek Biol. J., 1963 : 70-77. (in Russian).
1964a Gall-midges of the USSR. 4. New species of the tribe Lestremiini (Itonididae, Diptera). Zool. Zh., 43 : 776-779. (in Russian, with English summary).
1964b Ecological aspects of the evolution of gall midges (Diptera, Itonididae-Cecidomyiidae). Zool. Zh., 43 : 1161-1172. (in Russian, with English summary).
1964c Gall midges of the USSR. 6. New species of the tribe Porricondylini (Diptera, Cecidomyiidae). Rev. Ent. USSR, 43 : 894-913. (in Russian, with English summary).
1966 New and little known Palaearctic gall midges of the tribe Porricondylini (Diptera, Cecidomyiidae). Acta ent. bohem., 63 : 213-239. (in Russian, with English summary).
1969 [Classification of insects in the European parts of the USSR]. Cecidomyiidae (Itonididae). 356-420. (in Russian).
Mamajev, B. M. & Krivosheina, N. P.
1965 [Larvae of gall midges]. 278pp. (in Russian).
Mamajeva, H. P.
1964 Gall-midges (Diptera, Itonididae) developing in colonies of aphids. Rev. Ent. USSR, 43 : 447-457. (in Russian, with English summary).
Mani, M. S.
1934 Studies on Indian Itonididae (Cecidomyiidae : Diptera). Rec. Ind. Mus., 36 : 371-451, pls.
1946 Studies on Indian Itonididae (Cecidomyiidae : Diptera). 8. Keys to the genera from the Oriental region. Ind. J. Ent., 7 : 189-235.

Mani, M. S. (Continued)
1954a Description of some new species of gall midges (Itonididae : Diptera) from the Orient. Agra Univ. J. Res., 3 (1) : 112-115.
1954b A new gall midges from Japan (Itonididae=Cecidomyiidae : Diptera). Mushi, 26 (3) : 9-12.
Marikovskii, P. I.
1956 New species of gall midges (Diptera, Itonididae) in the USSR fauna. Rev. Ent. USSR, 35 : 184-195.
Marshall, P.
1896 New Zealand Diptera. 1. Trans. Proc. N. Z. Inst., 28 : 216-250.
Masaki, J.
1932a [Morphological and biological studies on *Rhabdophaga salicis* Schrank, injurious to willows. I]. Ins. World, 36 (5) : 146-154, pl. (in Japanese).
1932b ibid. II. Ins. World, 36 (6) : 183-191. (in Japanese).
1932c ibid. III. Ins. World, 36 (7) : 219-224. (in Japanese).
Matsumura, S.
1899 [Japanese entomology]. pp. 127-128. (in Japanese).
1915 [Insect taxonomy, II]. p. 53. (in Japanese).
1931 6000 illustrated insects of Japanese-Empire. p. 403. (in Japanese).
Matsushita, M.
1943 [Forest pestology]. 410pp. (in Japanese).
Meigen, J. W.
1818 Systematische Beschreibung der bekannten europaischen zweiflügenligen Insekten, 1. 324pp.
1830 ibid. 6. 401pp.
De Meijere, J. C. H.
1901 Uber eine neue Cecidomyide mit eigenthümlicher Larve (*Cocopsis* n. g., *marginata* n. sp.) Tijdschr. Ent. 44 : 1-12, pl.
1906 Uber zwei neue holländische Cecidomyiden, von welchen die einean Kohlpflanzen schädlich ist. Tijdschr. Ent., 49 : 18-28, pls.
1939 Naamlijst van Nederlandsche Diptera afgesloten 1 April 1939. Tijdschr. Ent., 82 : 137-174.
Meunier, F.
1901 Nouvelles recherches sur quelques Cecidomyidae et Mycetophilidae de l'ambre et description d'un nouveau genre et d'un nouvelle espèce de Cecidomyidae du copal de l'Afrique. Ann. Soc. Sci. Brux., 25 (2) : 183-202, pls.
1902 Les Cecidomyidae de l'ambrede la Baltique. Marcellia, 1 : 100-103.
1904 Monographie des Ceciodmyidae, Sciaridae, Mycetophilidae et Chironomidae de l'ambre de la Baltique. Ann. Soc. Sci. Brux., 28 (2) : 1-264, pls.
Miles, H. W.
1921 The raspberry gall fly (*Lasioptera rubi* Schrk.). J. Minist. Agr., 28 : 548-550.
Miyoshi, K.
1929 [Galls on *Artemisia*]. Ins. World, 33 : 350-352. (in Japanese).
Möhn, E.
1955 Beiträge zur Systematik der Larven der Itonididae (=Cecidomyiidae, Diptera). 1. Porricondylinae und Itonidinae Mitteleuropas. Zoologica, 105, 247pp., pls.
1959 Gallmücken (Diptera, Itonididae) aus El Salvador. Senck. biol., 40 (5/6) : 297-368.
1961 Gallmücken (Diptera, Itonididae) aus El Salvador. 4. Zur Phylogenie der Asphondyliidi der neotropischen und holarktischen Region. Senck. biol., 42 (3) : 131-330.

Monzen, K.
1928 [Studies on the Japanese plant galls]. Saitô Hoonkai Jigyô Nenpô, 4 : 224-229. (in Japanese).
1929 [Studies on the galls]. Saitô Hoonkai Jigyô Nenpô, 5: 295-368, pl. (in Japanese).
1930 [Studies on the plant galls]. Saitô Hoonkai Jigyô Nenpô, 6 : 270-288, pls. (in Japanese).
1932 [Studies on the galls III]. Bull. Sci. Res. Alumni Assoc. Morioka Coll. Agr. Forest., 7 : 53-78, pls. (in Japanese).
1936 On soy bean gall midge. Bull. Sci. Res. Alumni Assoc. Morioka Coll. Agr. Forest., 12 : 45-58, pls. (in Japanese).
1937 On some new gall midges. Kontyû, 11 : 180-194. (in Japanese).
1955a Some Japanese gall midges with the descriptions of known and new genera and species. I. Annual Rep. Gakugei Fac. Iwate Univ., 8 (2) : 36-48.
1955b ibid. II. Annual Rep. Gakugei Fac. Iwate Univ., 9 (2) : 34-48, pls.
Mukaigawa, Y.
1917 [Wild grape gall midge]. Ins. World, 21 (3) : 96-98. (in Japanese).
Muramatsu, S.
1916 [Gall midge injurious to willow]. Ins. World, 20 (3) : 96-99. (in Japanese).
Muroi, H.
1963 [Bamboo]. pp. 134-137. (in Japanese).
Naito, A.
1964 Distribution of soy bean pod gall fiy. *Asphondylia* sp. (Diptera, Cecidomyiidae). Jap. J. Appl. Ent. Zool., 8 (4) : 300-304.
Naito, A. & Ôsaka, K.
1959 Occurrence of the soy bean pod gall midge and its Hymenopterous parasites in Kantô district, and notes on the parasites. Jap. J. Appl. Ent. Zool., 3 (2) : 91-98. (in Japanese, with English summary).
Naito, M.
1919 [On the mulberry black gall midge, *Diplosis morivorella* Naito]. Sangyô Shinpô, No. 310 : 29-31, pl. (in Japanese).
Nawa, U.
1909 [On the gall midge, Cecidomyia sp. ? infesting the medake bamboo]. Ins. World, 13 (8) : 320-324.
1916 [Notes on the mulberry-shoot gall midge]. Ins. World, 20 (9) : 355-365. (in Japanese).
Niijima, Y.
1913 [Forest entomology]. pp. 362-365. (in Japanese).
Nijveldt, W.
1953 *Phaenobremia aphidivora* Rübs. (Diptera, Itonididae) f. n. sp., een predator van *Aphis frangulae* Kltb. Ent. Ber., 14 : 193-195.
1954 The range of prey of *Phaenobremia urticariae* Kffr. and *Ph. aphidivora* Rübs. (Diptera, Itonididae). Ent. Ber., 15 : 207-211.
1955 Additional notes on my paper on the range of prey of *Phaenobremia aphidivora* Rübs. and *Ph. urticariae* Kffr. (Diptera, Itonididae). Ent. Ber., 15 : 436-437.
1957 Aphid-eating gall midges (Cecidomyiidae), with special reference to those in the Barnes collection. Ent. Ber., 17 : 233-239.
1963 Observations on gall midges of white and red clover. Neth. J. Plant Path., 69 : 161-187.
1966 The food necessity of *Phaenobremia aphidimyza* (Rond., Diptera : Cecidomyiidae). Cecid. Ind., 1 (3) : 185-187.
1969 Gall midges of economic importance. VIII. Miscellaneous. 221pp.
Ninomiya, E.
1959 Illustrated insect larvae of Japan, p. 656. (in Japanese).

Nishikawa, S.
1905 [Notes on the mulberry-shoot worm]. Ins. World, 9 (2) : 61-66. (in Japanese).
1925 [Cecidomyiidae on mulberry tree]. Sangyô Shinpô, No. 389 : 1252. (in Japanese).
Niwa, S.
1910 [Studies on *Diplosis 4-fasciata*]. Tokyo Sanji Hôkoku, No. 39 : 1-6, pl. (in Japanese).
Oda, F.
1940 [Disease and insect-pests of fruit trees]. p. 364. (in Japanese).
Oda, K. & Iwasaki, A.
1953 Studies on pine gall midge, *Cecidomyia brachyntera* Schwage? I. Life history in Kumamoto district. Bull. Gov. Forest Expt. St., No. 59 : 67-79, pls. (in Japanese, with English summary).
Okada, T.
1918 [On seven new insect pests]. Ins. World, 22 (1) : 11-15. (in Japanese).
1919a [Notes on the new insect pest, citrus flower gall midge]. Ins. World, 23 (7) : 252-255. (in Japanese).
1919b [Notes on the new insect pest, citrus flower gall midge]. Kaju, No. 195 : 26-28. (in Japanese).
Osten Sacken, B.
1862 V. On the North American Cecidomyiidae. In Loew, Monographs of the Diptera of North America, 1 : 173-207.
1869 Biological notes on Diptera (galls on Solidago). Trans. Amer. Ent. Soc., 2 : 299-303.
1893 On the characters of the three divisions of Diptera : Naemocera, Nemocera Anomala and Eremochaeta. Berl. ent. Z., 37 : 417-466.
Panelius, S.
1965 A revision of the European gall midges of the subfamily Porricondylinae (Diptera, Itonididae). Acta Zool. Fenn., 113 : 1-157.
Pitcher, R. S.
1955a A comparison of a group of gall midges of the genus *Thomasiniana* Strand, E. 1916 and a description of a new species from wild blackberry. Bull. Ent. Res., 46 (1) : 27-38.
1955b The larval instars of some gall midges of the genus *Thomasiniana* Strand, E. 1916 (Diptera : Cecidomyidae). Proc. R. ent. Soc. Lond., (A) 30 : 97-102.
1955c Observations on the raspberry cane midge (*Thomasiniana theobaldi* Barnes). J. Hort. Sci., 30 (2) : 73-85.
Pritchard, A. E.
1947 The North American gall midges of the tribe Micromyini ; Itonididae (Cecidomyiidae) ; Diptera. Ent. Amer., 27 : 1-87.
1948 The North American gall midges of the tribes Catotrichini and Catochini (Diptera : Itonididae (Cecidomyiidae)). Ann. Ent. Soc. Amer., 40 : 662-671.
1951 The North American gall midges of the tribe Lestremiini ; Itonididae (Cecidomyiidae) ; Diptera. Univ. Calif. Publ. Ent., 8 : 239-275.
1953 The gall midges of California. Diptera : Itonididae (Cecidomyiidae). Bull. Calif. Ins. Surv., 2 : 125-150.
1958 Family Itonididae (=Cecidomyiidae). In : Guide to the insects of Connecticut. 6 (6). Bull. Conn. geol. nat. Hist. Surv., 87 : 50-75, pls.
1960 Two new species of Catochine gall midges, with a key to genera of the Catochini (Diptera : Cecidomyiidae). Pan-Pacif. Ent., 36 (4) : 195-197.
Prasad, S. N.
1966 *Dasyneura* versus *Dasineura*. Cecid. Ind., 1 (2) : 129-130.
Quayle, H. J.
1912 Red spiders and mites of citrus trees. Cal. Agr. Expt. St. Bull., No. 234 : 483-530.

Rao, S. N.
1949 Descriptions of two new genera and nine new and one known species of gall midges from India. Ind. J. Ent., 11 : 109-127.
1952 Some new species of gall midges (Itonididae : Dipt.) from India. Proc. R. ent. Soc. Lond., 21 : 49-55.
1955 Catalogue of Oriental Itonididae (=Cecidomyiidae : Diptera). Agra Univ. J. Res., (Sci.) 4 : 213-281.
Rapp, W. F., Jr.
1946 Two new Nematocera Diptera (Sciaridae and Cecidomyidae). Trans. Amer. ent. Soc., (1945) 71 : 125-128.
Roberti, D.
1946 La *Phaenobremia ahidimyza* Rond. (Diptera-Cecidomyidae) predatrice di *Aphis* (*Doralis*) *frangulae* Koch. Bull. dell' Inst. di Ent. della Univ. Bologna, 15 : 233-256.
Rondani, C.
1840 Sopra alcuni generi di insetti ditteri, Memoria seconda per servire alla ditterlogia Italiana, 28pp., (Review in Isis von Oken, 1844 : 449-452).
1846 Compendio della seconda memoria ditterologica, con alcune aggiunte e correzioni. Nuovi annali delle Scienze Naturali de Bologna (ser. 2) 6 : 363-376.
1847 Osservazioni sopra parecchie specie di Esapodi Afidicidi e sui lero nemici. Nuovi annali delle Scienze Naturali de Bologna (ser. 2) 8 : 442-448.
1856 Dipteroiogiae Italicae Prodromus. 1. 288 pp.
1860 Stirpis Cecidomynarum genera revista. Atti Soc. ital. Sci. nat., 2 : 286-294.
Ross, H. & Hedicke, H
1927 Die Pflanzengallen (Cecidien). Mittel- und Nordeuropas ihre Erreger und Biologie und Bestimmungstabellen. 348pp., pls.
Rübsaamen, E. H.
1891 Über Gallmücken aus zoophagen Larven. Wien. ent. Ztg., 10 : 6-16.
1895a Cecidomyidenstudien, 2. Ent. Nachr. Berl., 21 : 257-263.
1895b Über Cecidomyiden. Wien. ent. Ztg., 14 : 181-193.
1899 Über die Lebensweise der Cecidomyiden. Biol. Zbl., 19 : 529-549, 561-570, 593-607.
1911 Über deutsche Gallmücken und Gallen. Zschr. wiss. Ins. Biol., 7 : 13-16, 51-56, 82-85, 120-125, 168-172, 278-282, 350-353, 390-394.
1914 Cecidomyidenstudien, 3. Marcellia, 13 : 88-114.
1915a Beitrag zur Kenntnis aussereuropäischer Gallmücken. S.-B. Ges. natruf. Fr. Berl., 1915 : 431-481.
1915b Cecidomyidenstudien, 4. Revision der deutschen Oligotropharien und Lasiopterarien nebst Beschreibung neuer Arten. S.-B. Ges. naturf. Fr. Berl., 1915 : 485-567.
1916 Cecidomyidenstudien, 5. Revision der deutschen Asphondylarien. S.-B. Ges. naturf. Fr. Berl., 1916 : 1-12.
1917 Cecidomyidenstudien, 6. S.-B. Ges. naturf. Fr. Berl., 1917 : 36-99.
Rübsaamen, E. H. & Hedicke, H.
1926 (1926-1938) Die Cecidomyiden (Gallmücken) und ihre Cecidien. Zoologica, 29 : 1-350, pls.
Saitô, K.
1957 [Forest entomology]. pp. 136-140. (in Japanese).
Sasakawa, M. & Koyama, M.
1953 Galls found on *Fagus crenata* Blume, with description of a new species (Dipt., Cecidomyidae). Sci. Rep. Saikyo Univ., Agr. No. 4 : 4-8.
Sasaki, C.
1901-1902 [Insect pests of forest in Japan]. (I) : 106-109, 167-168, (II) : 82-83, 150-153, 165-172, (III) : 148-149. (in Japanese).

Sasaki, C. (Continued)
1931 Studies on *Urosema mori* sp. n. and *Trishormomyia maculata* sp. n. injurious to Mulberry. Kogakukai, 24pp.
Say, T.
1817 Some account of the insect known by the name Hessian Fly, and of a parasitic insect that feeds on it. J. Acad. nat. Sci. Philad., 1 : 45-48.
Schiner, J. R.
1864 Fauna Austriaca. Die Fliegen (Diptera), 2, 658pp.
Schrank, P. F.
1803 Fauna Boica. Landshut, 3.
Senior-White, R.
1928 Cécidomyiidae. In : Catalogue of Indian insects, 15 : 1-23.
Shibuya, M. & Maebara, H.
1953 Seasonal fluctuation of populations of soy bean pod gall midge and its Hymenopterous parasites. Jap. J. Appl. Zool., 18 : 49-54. (in Japanese, with English summary).
Shinji, O.
1938a On the status of *Cecidomyia impatientis* (Osten Sacken). Annot. Zool. Jap., 17 : 428-430.
1938b [A new gall midge infesting *Miscanthus sinensis*]. Zool. Mag., 50 (6) : 314-315. (in Japanese, with English summary).
1938c [Four gall midges on *Artemisia*]. Zool. Mag., 50 (6) : 317-320. (in Japanese, with English summary).
1938d [A new gall midge, *Contarinia ampelopsivola*]. Zool. Mag., 50 (6) : 320-322. (in Japanese, with English summary).
1938e [On the gall midges occurring in the both countries, Japan and U. S. A.]. Zool. Mag., 50 (6) : 322-323. (in Japanese).
1938f Some unrecorded galls of Cecidomyia from Morioka and its vicinity. Botany & Zoology, 6 (6) : 1062-1066. (in Japanese).
1938g *Rhabdophaga sasae*, a new gall fly from Japan. Zool. Mag., 50 (7) : 232-234.
1938h [On the Japanese Cecidomyiidae]. Ins. World, 42 (4) : 115-121. (in Japanese).
1938i [On the Japanese Cecidomyiidae, II]. Ins. World, 42 (6) : 178-182. (in Japanese).
1938j [On the Japanese Cecidomyiidae, III]. Ins. World, 42 (7) : 208-212, pl. (in Japanese).
1938k [On the distinction of four gall midges on *Salix*]. Jap. J. Appl. Zool., 10 (5) : 211. (in Japanese).
1938l [Two new gall midges from Japan]. Ins. World, 42 (8) : 239-244. (in Japanese).
1938m Unrecorded species of the Cecidomyiidae from Japan. Ins. World, 42 (9) : 270-274. (in Japanese).
1938n Four new and one known species of gall midges from Japan. Ins. World, 42 (11) : 335-340. (in Japanese).
1938o Two new species of gall-flies (Dipt.) from northeastern Japan. Zool. Mag., 50 (7) : 371-374.
1939a Some new and unrecorded gall-flies from Morioka, Japan. Ins. World, 43 (3) : 66-70, pl. (in Japanese).
1939b Some new and unrecorded gall-flies from Morioka, Japan. Ins. World, 43 (4) : 98-102. (in Japanese).
1939c Five new species of gall-flies from Morioka, Japan. Ins. World, 43 (5) : 130-134, pl. (in Japanese).
1939d Five new species of gall-flies from Morioka, Japan. Ins. World, 43 (6) : 162-165. (in Japanese).
1939e Studies on Japanese Cecidomyiidae (Dipt.) IV. A Japanese *Asphondilia* and other new species. Ins. World, 43 (8) : 224-230. (in Japanese).

Shinji, O. (Continued)
1939f A key to 13 species of gall-flies, infesting *Artemisia* in Japan with the descriptions of 3 new species. Botany & Zoology, 7 (2) : 380-384. (in Japanese).
1939g 4 new species of Cecidomyiidae from north-eastern Japan. Volumen Jubilare pro Professore Sadao Yoshida, 2 : 561-569, pls. (in Japanese).
1939h A check list of the known Japanese gall insects. Volumen Jubilare pro Professore Sadao Yoshida, 2 : 571-588. (in Japanese).
1940 [A new gall midge from Japan]. Ins. World, 44 (2) : 34-35. (in Japanese).
1944 [Galls and gall making insects]. 580pp., pls. (in Japanese).
1948 [Classification and references of the Japanese Cecidomyiidae]. Kontyû Kenkyû (Nagoya), 4 (1, 2) : 12-18. (in Japanese).

Shiraki, T.
1952 Cat. Inj. Ins. Jap., 5 : 116.

Silvestri, F.
1901 Descrizione di nuovi Termitofili e relazioni di essi congli ospiti. Boll. Mus. Zool. Anat. comp. R. Univ. Torino, 16 (395) : 1-6.
1903 Contribuzione alla conoscenza dei Termitidi e Termitofili dell' america meridionale. Redia, 1 : 1-234.

Skuhravá, M.
1958 Morphologie und Bionomie der Brombeersaummücke *Lasioptera rubi* (Schrank). Acta Soc. Ent. Cech., 55 : 160-173.
1969 Die Prognose der Luzernegallmücken auf Grund der Bodengrabungen. Anz. Schädl. Pflanz., 42 : 9-12.

Skuhravá, M. & Skuhravý, V.
1960 Bejlomorky. 271pp. (in Czech.).
1963 Gallmücken und ihre Gallen auf Wildpflanzen. 116 pp.

Skuse, F. A. A.
1889 Diptera of Australia. 1. Proc. Linn. Soc. N. S. W., 3 (2) : 17-149, pls.
1890 Diptera of Australia. Nematocera. Supplement, 1. Proc. Linn. Soc. N. S. W., 5 (2) : 373-412, pl.

Speiser, P.
1906 Uber die systematische Stellung der Dipterenfamilie Termitomastidae. Zool. Anz., 30 : 716-718.

Stebbins, F. A.
1910 Insect galls of Springfield, Massachusetts, and vicinity. Bull. Springfield Mus. Nat. Hist., 2 : 1-64, pls.

Stone, A. & Others
1965 A catalog of the Diptera of America north of Mexico. 1696pp.

Strand, E.
1916 Ubersicht der in Fistel's Achthundert und zwanzig neue oder unbeschriebene wirbellose Thiere (1857) behandelten Insekten. Arch. Natur., 82 : 75-101.
1928 Miscellanea nomenclatorica zoologica et palaeontologica. Arch. Natur., 92, Abt. A, (8) : 30-79.

Strobl, P. G.
1894 Die Dipteren von Steiermark, 3. Mitt. naturw. Ver. Steierm., 31 : 123-246.
1909 Die Dipteren von Steiermark, 5. Mitt. naturw. Ver. Steierm., 46 : 45-293.

Takagi, K.
1954-1955 [Studies on the pine leaf gall midge, I-VI]. Agriculture, (1954-1955) : 55-859, 863. (in Japanese).

Takahashi, S.
1928 〔Injurious insects of vegetables〕. pp. 393-397. (in Japanese).
1930 〔Injurious insects of fruit trees, I, II〕. pp. 192-194, 425-427, 810-812, 1003-1004. (in Japanese).

Tamura, I.
1952 Ecological studies on the insect injury of soy bean plant. 287pp., pls. (in Japanese, with English summary).

Tanabe, T.
1936a 〔On the new insect pest, apple blossom midge, I〕. J. Plant Prot., 23 : 509-518. (in Japanese).
1936b 〔On the new insect pest, apple blossom midge, II〕. J. Plant Prot., 23 : 596-604. (in Japanese).

Tanabe, T. & Sekiya, I.
1931 〔Studies on the mulberry-shoot gall midge, I〕. Rep. Nagano Agr. Expt. St., No. 2 : 17-43, pls. (in Japanese).

Tanaka, A.
1971 〔Notes on the aphid-eating gall midge〕. Pulex, No. 49 : 197-198.

Tanaka, K.
1938 〔Notes on the control measures of insects injurious to the Japanese medlar〕. Jissai Engei, 24 (7) : 186-187. (in Japanese).

Tavares, J. S.
1909 Contributo pima ad cognitionem Cecidologia Braziliae. Broteria, 8 : 5-29.
1930 Quelques Cecidies du centre de la France. Ann. Soc. Linn., (1929) 75 : 145-167.

Theobald, F. V.
1892 An account of British flies, 1. 215pp.
1898 Notes on injurious insects. J. S.-E. agr. Coll. Wye, No. 7 : 3-39.

Tsujita, M.
1954 Galls found on *Fagus crenata* Blume. Kontyû, 20 (3-4) : 37-38. (in Japanese).

Tsutsui, K.
1956 Studies on the wheat gall midges in Japan. Nogyô Kairyô Gijutsu Shiryô, No. 83 : 1-102, pls. (in Japanese, with English summary).

Tutida, T.
1909 〔Notes on the mulberry-shoot gall midge〕. Trans. Ent. Soc. Japan, 2 (10) : 223-228, pl. (in Japanese).

Uchida, T. & Inouye, M.
1954 Eine neue *Dasyneura*-Art aus Hokkaido (Dip., Itonididae). Ins. Mats., 18 (3, 4) : 73-78.
1955 Eine neue *Thecodiplosis*-Art (Dip., Itonididae). Ins. Mats., 19 (1, 2) : 44-50.
1956 Eine neue *Contarinia*-Art (Dip., Itonididae). Ins. Mats., 20 (1, 2) : 34-38.

Vimmer, A.
1928 Monografie rodu *Rhopalomyia* v Ceskoslovensku (Dipt. Cecid.). Sbornik ent. odd. Nár. Musea Praze, 6 : 49-66.

Wagner, B.
1866 *Diplosis tritici* Kirby sp. und *Diplosis aurantiaca* n. sp. Stett. ent. Ztg., 27 : 65-96, 169-187.

Walker, F.
1856 Insecta Britannica. Diptera, 3. 352pp, pls.

Walsh, B. D.
1869 Gall on Spotted Touch-me-not. Amer. Ent. Bot., 2 : 63.

Westwood, J. O.
1840 Synopsis of the genera of British insects. Supplement to An introduction to the modern classification of insects, 2 : 1-158.
1847 The Willow-twig Midge. Gardener's Chronicle Nr. 63 : 588.
Williston, S. W.
1896 XI. On the Diptera of St. Vincent (West Indies). Trans. Ent. Soc. Lond., 1896 : 253-255.
1908 Manual of families and genera of North American Diptera. Third edition, 405pp.
Winnertz, J.
1846 Beschreibung einiger neuen Gattungen aus der Ordnung der Zweiflügler. Stett. ent. Ztg., 7 : 11-20, pls.
1853 Beitrag zu einer Monographie der Gallmücken. Linn. Ent., 8 : 154-322, pls.
1870 Die Gruppe der Lestreminae. Verh. zool.-bot. Ges. Wien, 20 : 9-36.
van der Wulp, F. M.
1877 Diptera Neelandica. De tweevlengelige Insecten van Nederland, 1. 496pp.
van der Wulp, F. M. & de Meijere, J. C. H.
1898 Nieuwe Naamlijst van Nederlandsche Diptera. Tijdschr. Ent., 41. Supplement. 149pp.
Yago, M.
1929 [Miscellaneous notes on orchard pests, II]. J. Plant. Prot., 16 : 667-671. (in Japanese).
Yamashita, S.
1953 Evasion of the soy bean pod gall midge (*Asphondylia* sp.) injury by the sowing date. Kyushu Nogyô Kenkyû, No. 11 : 119-121. (in Japanese).
Yasumatsu, K.
1955 [Notes on the scientific name of the gall midge producing cotton mass galls on *Artemisia*]. Kontyû, 23 (3) : 115. (in Japanese).
Yasumatsu, K. & Watanabe, C.
1964 A tentative catalogue of insect natural enemies of injurious insects in Japan, part 1 : 112-113.
Yokoyama, K.
1929 [Latest manual of silk industry insects in Japan]. pp. 381-395. (in Japanese).
Yuasa, H.
1935 [Gall midges infesting ears of wheat]. Nosan Ihô, No. 29 : 43-49. (in Japanese).
1936a [Gall midges infesting ears of wheat]. Jap. J. Appl. Zool., 8 (3) : 150-154. (in Japanese).
1936b [An outbreak of the soy bean stem gall midge observed last year in Iwate Prefecture]. Jap. J. Appl. Zool., 8 (3) : 154-158. (in Japanese).
1936c [Distribution of the wheat gall midge]. Nosan Ihô, No. 45 : 56-57. (in Japanese).
1937a [Notes on the wheat gall midges]. Jap. J. Appl. Zool., 9 (3, 4) : 180-184. (in Japanese).
1937b [Notes on the soy bean stem gall midge]. Jap. J. Appl. Zool., 9 (6) : 266-273. (in Japanese).
1937c [Damages caused by the wheat gall midges and ear germination]. Agr. & Hort., 12 (5) : 1336-1338. (in Japanese).
1939 [Occurrence of *Sitodiplosis moselana* (Géhin) in Central China]. Science, 9 (11) : 408-409. (in Japanese).
Yuasa, H. & Kumazawa, T.
1937 [Distribution and host plants of the soy bean pod gall midge]. Botany & Zoology, 5 (8) : 1561-1562. (in Japanese).
1938 A new gall midges from Nippon (Diptera, Cecidomyidae). J. pharm. Soc. Jap., 58 : 204-206.

Yukawa, J.
1967a Studies on the Japanese gall midges I, with special reference to the tribe Micromyini from Kyushu Island (Diptera : Cecidomyiidae). J. Fac. Agr. Kyushu Univ., 14 (2) : 183-202.
1967b A new species of the genus *Heterogenella* from Kyushu, Japan (Diptera : Cecidomyiidae). Kontyû, 35 (1) : 22-24.
1967c Some new or little known species of non-gall making Cecidomyiidae from Hiko-san. Mushi, 41 (4) : 63-70.
1967d [On the falling of fruit galls on *Aucuba japonica* Thunb.]. Makunagi, 2 : 7-8. (in Japanese).
1968a Studies on the Japanese gall midges II, two new and a known species of the genus *Camptomyia* from Kyushu (Diptera : Cecidomyiidae). Mushi, 41 (11) : 143-148.
1968b Gall-midges from Formosa and Hong Kong (Diptera, Cecidomyiidae). Kontyû, 36 (3) : 250-254.
Zetterstedt, J. W.
1850 Diptera Scandinaviae disposita et descripta, 9. Lund. pp. 3669-3701.
1851 Diptera Scandinaviae disposita et descripta, 10. Lund. P. 3769.