

# A New Genus of Elateriform Beetles (Coleoptera, Polyphaga) from the Middle–Late Jurassic of Karatau

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**Abstract**—A new coleopteran genus, *Anacapitis* gen. nov., comprising *A. karataviensis* sp. nov., *A. incertus* sp. nov., and *A. oblongus* sp. nov., is described from the Karabastau Formation of the Karatau locality (southern Kazakhstan, Middle–Late Jurassic) in the infraorder Elateriformia. The systematic position of the new genus within the suborder Polyphaga is discussed.

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**Key words:** Coleoptera, Polyphaga, Elateriformia, new taxa, Middle–Late Jurassic, Karatau, Kazakhstan.

## INTRODUCTION

Various Jurassic and Cretaceous localities contain abundant and diverse representatives of a beetle group of uncertain taxonomic position within Coleoptera. The Karatau locality (Kazakhstan) is particularly rich in species of this group, which is here one of the dominant groups of beetles. Although this group is represented by numerous fossils, often excellently preserved and showing many structural details, its taxonomic affinity remains uncertain. The structure of the prothorax and procoxal cavities suggests that they belong to the suborder Polyphaga: their propleura form muscle apodemes and are not visible externally and their metepisterna do not reach the mesocoxal pits. Ponomarenko (1983) characterized this group as being very isolated, pointing out that these species differ from Dascilloidea in having rows of punctures on the elytra, from Scirtoidea in the aedeagal parameres being free, and from Elateroidea in the presence of a transverse suture on the metasternum. It is possible that this group includes *Pelto-syne*, which is considered to be one of the most primitive genera of Polyphaga (Ponomarenko, 1983). Despite the sufficiently clear difference between these beetles and other fossil Polyphaga from a number of localities, no suprageneric taxon has been created for them. Recently, similar fossil beetles have been described from several localities in China and placed in modern families; those from the Jungar Basin in Xinjiang were assigned to the Elateridae (Zhang, 1997) and from the Daohugou locality, to the Chrysomelidae (Zhang, 2003).

Within the suborder Polyphaga, beetles from the new genus *Anacapitis*, described below, are most similar to representatives of the infraorder Elateriformia, with which they share the pronotum with acute extended posterior angles, the procoxal cavities broadly

open posteriorly, the filiform antennae not forming a club, the prosternal process fitting into the mesosternal groove, the metasternum with a paracoxal suture, the excavated metacoxae, and the metafemora entering excavations in the metacoxae. Within the Elateriformia, they are most similar to representatives of the Cebrionoidea and Dascilloidea in the shape of the pronotum (with the extended posterior angles and the emarginate anterior margin). The prosternal process of *Anacapitis* enters the mesosternal groove, which clearly distinguishes *Anacapitis* from representatives of the Byrrhoidea and Cantharoidea, both lacking such mechanism of articulation between the prothorax and mesothorax. With reference to the body structure, they resemble Cebrionoidea and Dascilloidea. The spherical shape of the coxae is shared by *Anacapitis* with representatives of the superfamilies Cebrionoidea (except for the Artematopodidae and Brachypsectridae, both having the coxae transverse and the trochantins exposed), Buprestoidea, and Dryopoidea, which all differ in having the trochantins exposed. The new genus has a transverse suture on the metasternum, as in many Buprestoidea, Dascilloidea, and Dryopoidea. The medially touching, excavated metacoxae with femoral plates resemble those of the Cebrionoidea. The number of the visible abdominal sternites, five, also suggests an affinity to the Cebrionoidea and distinguishes the new genus from the Cantharoidea, which have a larger number of abdominal segments, and from Buprestoidea, which have the two basal abdominal sternites fused. The prognathous head of *Anacapitis oblongus* makes it superficially similar to representatives of the Byrrhoidea, Cantharoidea, and Dascilloidea. The preserved part of the antenna of *A. karataviensis* is filiform; this character occurs in almost every subfamily of the Elateriformia. Thus, in the structure of the prosternum and metacoxae, species of the new genus are most similar to

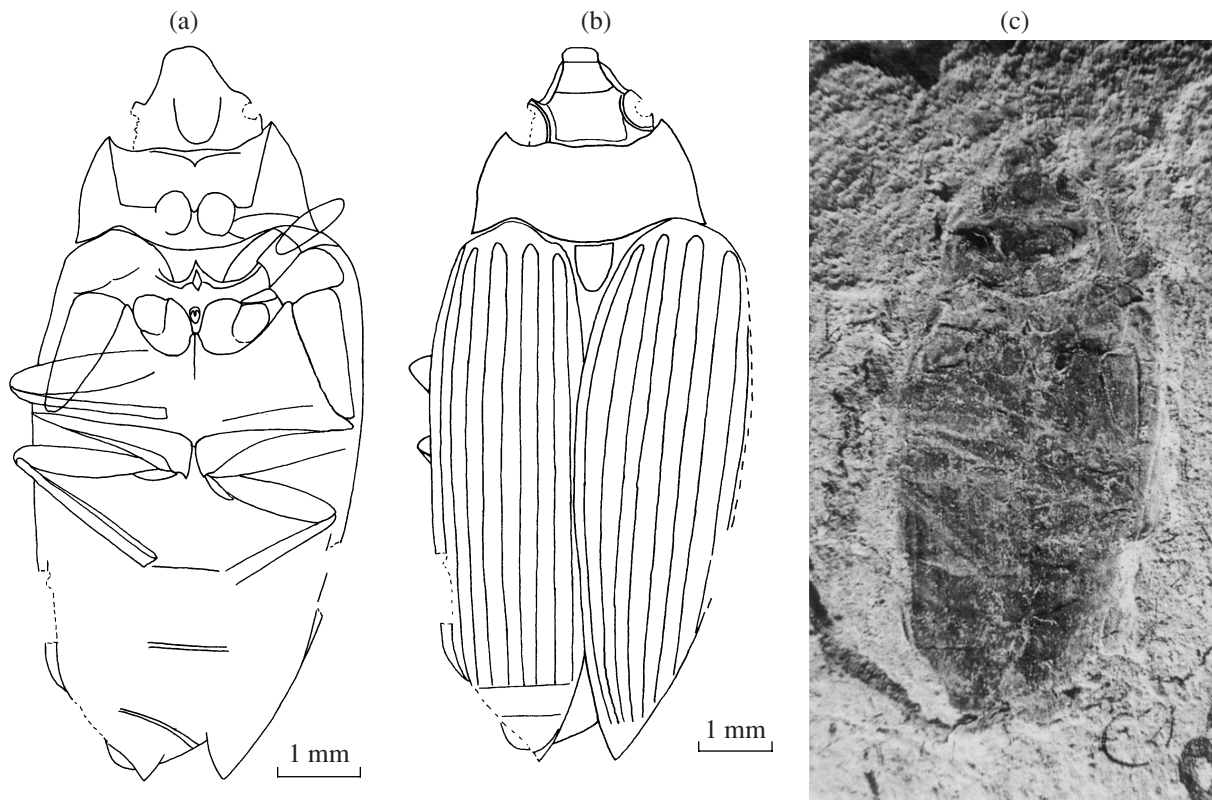


Fig. 1. *Anacapitis oblongus* sp. nov., holotype PIN, no. 2997/2509: (a) ventral view; (b) dorsal view; and (c) general view.

the Cebriionoidea. At the same time, they share a few primitive characters with the Dryopoidea and Dascilloidea. Because the taxonomic structure of this group remains uncertain, these taxa are described below as Elateriformia incertae sedis.

All the specimens described come from the Karabastau Formation of the Karatau Range near the village of Mikhailovka (southern Kazakhstan, Chimkent Region, Chayan District) and are deposited in the collection of the Paleontological Institute of the Russian Academy of Sciences (PIN). The age of the Karabastau Formation is estimated as Callovian to Oxfordian–Kimmeridgian (Polyansky and Doludenko, 1978; Kirichkova and Doludenko, 1996).

#### SYSTEMATIC PALEONTOLOGY

Order Coleoptera

Suborder Polyphaga

Infraorder Elateriformia

Elateriformia incertae sedis

**Genus *Anacapitis* Yan, gen. nov.**

**Etymology.** From the Latin *anas* (duck) and *caput* (head).

**Type species.** *Anacapitis oblongus* sp. nov.

**Diagnosis.** Head prognathous; labrum well developed, broadly attached, visible from above; clypeus and frons separated by suture. Gular plate wide. Antennal bases situated close to anterior margins of eyes. Eyes large, ovate. Antennae filiform, not received in grooves on prosternum, second antennomere very small. Pronotum transverse, weakly emarginate anteriorly, rounded laterally, with pointed anterior angles and posterior angles extending posterad and slightly laterad. Procoxae spherical, not touching, posteriorly open; protrochantins concealed. Prosternal process triangular, with apex rounded, fitting in mesosternal groove. Mesocoxae large, slightly transversely ovate, with external trochantin, separated at midlength by short metasternal process. Metasternum trapeziform; paracoxal suture interrupted before longitudinal suture at distance of one-third of its width; laterally, terminating short of reaching border of metasternum. Metepisterna large, not reaching mesocoxal cavities. Metacoxae transverse, touching, with well-developed femoral plates. Femora usually twice as wide as tibiae. Tibiae slightly longer than femora, gradually widening towards apex. Metatarsus five-segmented; tarsomeres cylindrical, almost as wide as tibia, without lobes or spines; claws simple. Elytra with deep, thin striae, fused in pairs near elytron base, without rows of punctures. Abdomen with five visible segments; center of

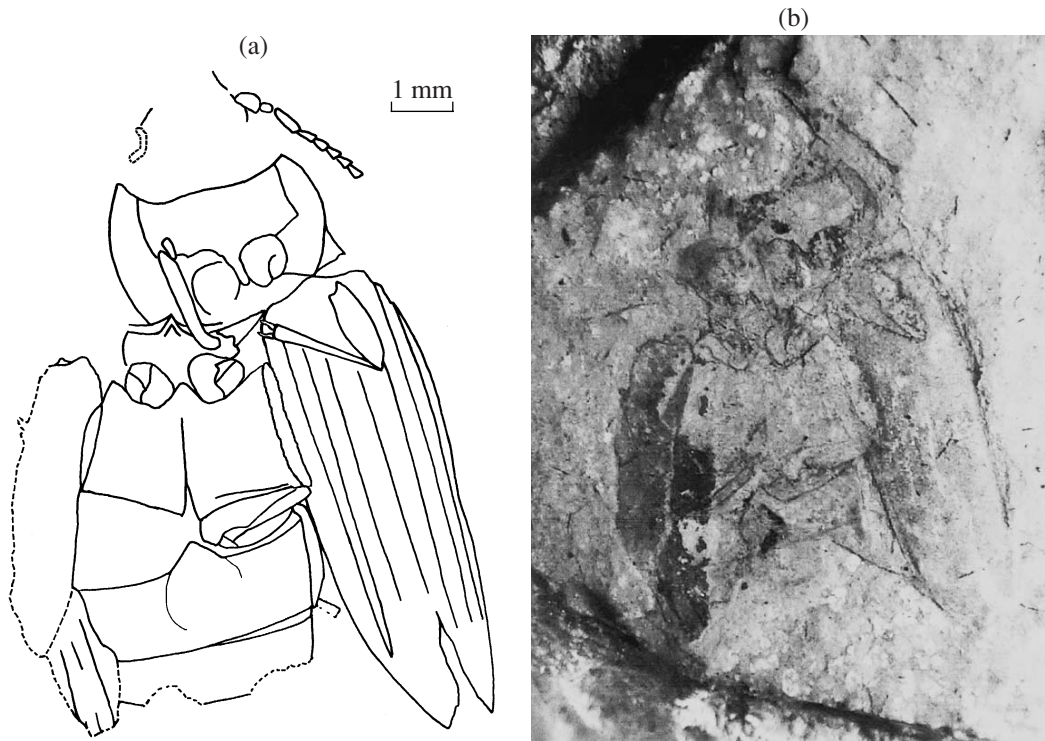


Fig. 2. *Anacapitis karataviensis* sp. nov., holotype PIN, no. 2066/2842: (a) details of structure; (b) general view. Scale bar, 1 mm.

first visible ventrite with convex area. Body uniformly covered with short hairs.

**C o m p o s i t i o n.** Three new species.

*Anacapitis oblongus* Yan, sp. nov.

**E t y m o l o g y.** From the Latin *oblongus* (elongated).

**H o l o t y p e.** PIN, no. 2997/2509, positive impression of entire well-preserved beetle; legs and antennae largely missing; southern Kazakhstan, Karatau locality; Middle–Late Jurassic, Karabastau Formation.

**D e s c r i p t i o n** (Figs. 1a, 1b). The head is relatively large, as long as the pronotum, occupies the entire anterior emargination of the latter, widest at the eye level, gradually narrows towards the apex. The eyes are large, ovate, with a large longitudinal diameter, as long as one-third of the visible length of the head. The antennal bases are positioned near the anterior eye margins, in depressions, which extend from the apex of each eye to the apex of the clypeus. The frons is long, almost half as long as the head, gradually narrowing towards the rounded apex. The labrum is transverse, half as long as the clypeus. The pronotum is approximately twice as wide and 0.2 times as long as the elytra, with a distinct undulating sculpture; the anterior emargination of the pronotum is shallow, at most one-fifth as long as the pronotum. The prosternal process is wide, triangular, half as long as the procoxae. The mesosternum is short, with a relatively small, pointed mesosternal process and a prosternal groove. The mesocoxae are

ovate; in the middle region, they abruptly narrow and are relatively densely spaced. The metatrochanters are large, extending to one-quarter of the length of the metafemora. The metafemora are thickened, twice as wide as the metatibiae. The metatibiae show narrow rounded bases and slightly oblique apices, three times as wide as the bases. The inner surface of the metatibia with a carina, which extends for four-fifths of the tibial length, obsolete near the tibia base. The elytron is long, with its base rounded and its apex pointed. In the right elytron, nine striae are visible; in the left elytron, there are eight; the striae are fused in pairs near the elytron base.

**M e a s u r e m e n t s,** in mm: body length, 16; pronotum length, 3; elytron length, 11.

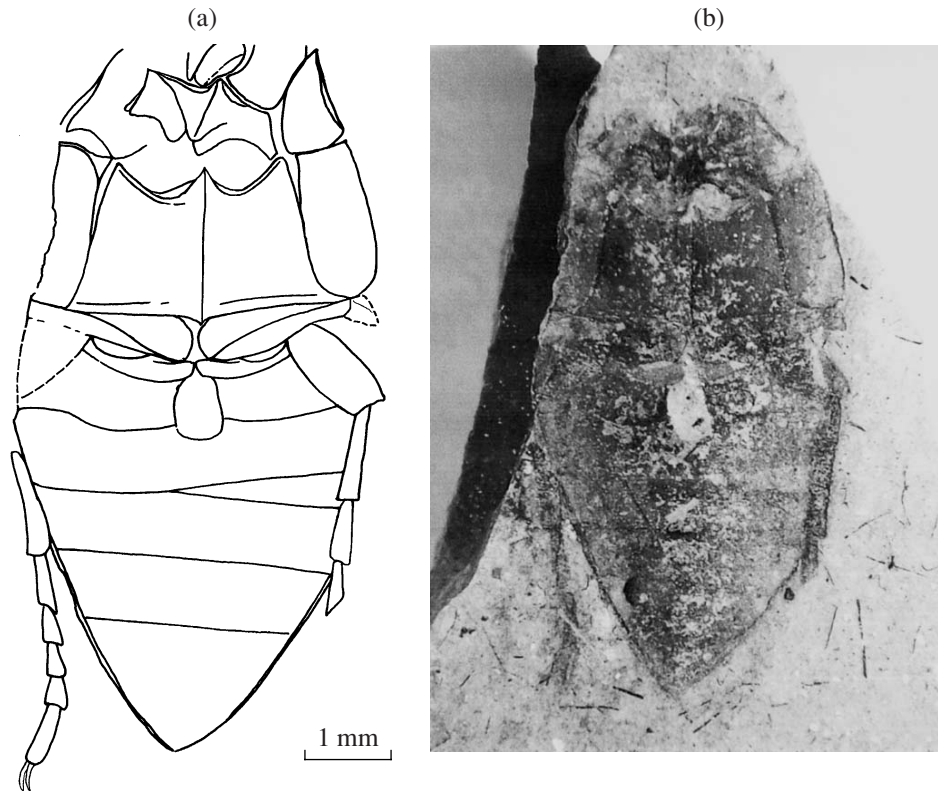
**M a t e r i a l.** Holotype.

*Anacapitis karataviensis* Yan, sp. nov.

**E t y m o l o g y.** From the locality name, Karatau.

**H o l o t y p e.** PIN, no. 2066/2842, negative impression of a beetle, with much of its head and appendages, and a part of the abdomen, missing; southern Kazakhstan, Karatau locality; Middle–Late Jurassic, Karabastau Formation.

**D e s c r i p t i o n** (Fig. 2). A small, ovate beetle. The scape is approximately 1.3 times as wide and 2.5 times as long as the pedicel. The third antennomere is narrowly ovoid, 2.5 times longer than each of the five more apical antennomeres, 1.25 times as long as the first antennomere. The five more apical antennomeres are



**Fig. 3.** *Anacapitis incertus* sp. nov., holotype PIN, no. 2239/1260: (a) details of structure; (b) general view. Scale bar, 1 mm.

triangular, each only slightly longer than the second antennomere. The pronotum is 0.67 times as long as the visible part of the elytra, rounded; the anterior margin has an evenly concave notch, the depth of which is less than one-sixth of the pronotum length; the posterior angles show distinctly pointed apices. The procoxae are relatively large, approximately one-third as long as the pronotum. The mesosternum is short, half as long as the prosternum, with a short and pointed mesosternal process and a mesosternal groove. The metasternum narrows anteriorly, its length is two-thirds of the width at the posterior margin. The impression includes a femur articulated with the tibia situated near the base of one elytron; the following description refers to this leg (of unknown placement). The femur is thickened, twice as thick as the tibia, with a notched base and a slightly oblique apex. The first tarsomere is short, cylindrical, 0.2 times as long as the tibia. The tibia is only slightly longer than the femur, gradually thickened towards its apex, which bears a pair of spurs, each slightly thickened near its base and abruptly narrowed in its apical half. The elytron is long, attenuated, with a poorly developed humerus and rounded apex, seven visible striae, the sixth and seventh of which are fused near the elytron apex. The center of the first visible sternite for a quarter of its length and two-thirds of its width is occupied by a convex teardrop-shaped area, the pointed apex of which is turned towards the metacoxae. The lat-

eral outlines of the third and fourth ventrites narrow evenly posteriorly. The prosternum, mesosternum, metasternum, and abdominal sternites are sparsely covered with short hairs.

**Measurements** in mm: body length, 9.5; pronotum length, 2.5; elytron length, 7.5; elytron width, 2.8.

**Comparison.** The new species differs from *A. oblongus* in the laterally rounded pronotum, the long prosternal process, the fused elytral striae, and the smaller size.

**Material.** Holotype.

*Anacapitis incertus* Yan, sp. nov.

**Etymology.** From the Latin *incertus* (vague).

**Holotype.** PIN, no. 2239/1260, positive impression of a beetle without head, pronotum, forelegs, and midlegs; southern Kazakhstan, Karatau locality; Middle–Late Jurassic, Karabastau Formation.

**Description** (Fig. 3). The procoxae are almost as long as the mesosternum. The prosternal process reaches the posterior margin of the procoxae, its apex is pointed. The metafemora are evenly thickened, as long as the metatibiae. The metatibiae are gradually thickened apically, without carinae. The first and fifth metatarsomeres are equally long, 1.5 times longer than each of the second, third, and fourth tarsomeres. The claws

are relatively long, half as long as the distal metatarsomere, weakly curved. The abdomen evenly narrows posteriorly beginning from the first ventrite. A convex rectangular area occupies one-sixth of the length of the first visible sternite and extends onto the upper part of the second visible sternite.

**M e a s u r e m e n t s** in mm: length of impression, 14.

**C o m p a r i s o n.** The new species differs from *A. oblongus* in the narrower procoxae, the long and pointed prosternal process, and the shorter metatibiae, lacking carinae. It differs from *A. karataviensis* in the size and shape of the convex area on the first visible abdominal sternite, the shape of the metafemora, and the larger size.

**M a t e r i a l.** Holotype.

#### ACKNOWLEDGMENTS

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