Asian Primate Classification

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In the foreseeable future there is little likelihood of achieving consensus on the number of Asian primate genera and species, and their subspecific composition. There is a more realistic hope of reaching agreement on the number of recognizable subspecies. The latter objective is more urgent because in order to reliably assess generic and specific numbers, it is essential that effective conservation measures are implemented for as many subspecies as possible. This cannot be comprehensively accomplished until their validity is assessed and they are satisfactorily established and defined. The Asian primate classification that we present is the outcome of electronic communication among the co-authors after a workshop, which was especially convened to attempt to determine the number of recognizable primate subspecies and to identify potentially recognizable subspecies. The generic and specific arrangement is a compromise that does not necessarily reflect the individual views of the co-authors: 183 subspecies in 77 species in 16 genera. The 31 subspecies allotted a low credibility rating are almost balanced by the 22 scientifically unnamed populations that may warrant subspecific status.

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INTRODUCTION

An initial draft of this consensual classification of the extant Asian nonhuman primates was prepared by participants at a workshop convened in Orlando, Florida, USA, from 25-29 February 2000. Probably at least half of the current content of the compilation, results from further taxonomic research and extensive e-mail exchanges among the co-authors after the workshop. It is therefore not merely a report of the proceedings of that meeting, but a contemporary classification. Influential in convening the workshop was the imminent publication of a global primate classification by Colin Groves (2001a). His classification has attracted particular attention (and some apprehension) because of his open conversion to the phylogenetic species concept of Cracraft (1983). Cracraft's (1983) rationale is debatable, but the inevitable outcome of his specific concept—an increase in recognized species—is a desirable reversal of the regrettable trend from about 1920 to 1980, when specific recognition was excessively restrained, with correspondingly reckless subspecific recognition. The biological species concept (Mayr, 1942) has no bearing on asexual organisms, and has severe limitations in its application to other organisms (Groves, 2001a; Mallet, 1995). Endless time and effort can be expended on discussing the species concept, and devising yet further modifications and variations on proposed specific definitions. Such debates have great merit in encouraging more objective reasoning about evolution and taxonomy, but, in the meantime, human predation and destruction of habitat continue to erase the subject species. Time is against us. In compiling this comprehensive list of Asian nonhuman primates, we prioritized the discrimination of taxa and distinct populations warranting independent conservation efforts over attempting to settle their specific or subspecific hierarchical status. Different species concepts produce diverse subspecific aggregations, so it is futile to contemplate a definitive taxonomic system.

We acknowledge our obligation to provide a consensus on Asian primate specific numbers. Unsurprisingly, this exposed among the authors divergent, possibly irreconcilable views on the species concept, perhaps strengthening our claim to have compiled a taxonomy which reflects the diversity of scientific opinion. Such discord came to the forefront in tackling the genus *Trachypithecus*, and readers who relish taxonomic wrangles are especially referred to the discussions under *T. francoisi ebenus* and *T. obscurus phayrei*. The division of species between the genera *Semnopithecus* and *Trachypithecus* reveals a fascinating dichotomy between genetic and morphological evidence and, as taxonomy cannot supply an incontrovertible resolution of this issue, it presents yet another consolation to those who fear we are attempting to impose on them the definitive classification.

METHODS AND RESULTS

We list genera, species and subspecies alphabetically, except that nominate subspecies precede other recognized subspecies (Table I).

We rank the primate populations at 3 grades of taxonomic confidence:

A. A scientifically named species or subspecies (including taxa subject to nomenclatural or hierarchical uncertainty) whose recognition we unreservedly endorse.

B. A scientifically unnamed population for which there is credible evidence that separate taxonomic recognition might be warranted.

C. A scientifically named species or subspecies (excluding taxa subject only to nomenclatural or hierarchical uncertainty) whose recognition is doubtful and requires further investigation.

We hope that the eventual outcome of this compilation will be to obviate the necessity for the grade C category, either by the promotion of a grade C taxon to grade A, or by its relegation to the synonymy of a grade A taxon. Sadly, we fear that, because some populations may become extinct before their credentials are confirmed or refuted, it may never be possible to entirely abolish the grade B category.

For definitions of the categories of threat in Table I, see Eudey (1998). In Summary Statistics we compare our list of taxa with that of Eudey (1998).

Kalimantan only denotes the Indonesian section of Borneo. References to west, central, east Kalimantan, etc., do not necessarily refer to the similarly named Indonesian political regions, but instead to nebulous geographic divisions of Kalimantan as a whole. Similarly, our geographic subdivisions of Java and Sumatra do not necessarily follow local political boundaries.

We employ the following conventions to clarify such variation in the use of compass point terms:

(1) Directional adjectives incorporated in the name of a political region are capitalized and unabbreviated, e.g. East Java (i.e. the province of East Java).

(2) Informally employed directional adjectives are abbreviated with capital letters followed by a period (N S E W C NE SW NC, etc.), e.g. E. Java (i.e. the eastern part of Java).

Full bibliographic references to the first publication of the genera and taxa of lower rank listed here are in Corbet and Hill (1992). We reference only publications since 1992, or those we suspect were erroneously referenced in Corbet and Hill (1992).

Finally, summary statistics on the number of genera, species and subspecies are in Table II, while statistics on proposed specific and subspecific changes are in Tables III and IV.

Table I. Asian primate taxa. Common name, grade of taxonomic credibility, geographic distribution and category of threat are indicated for each taxon

Common name	Taxon	Taxonomic credibility/ distribution	*Category of threat

Family Loridae Gray, 1821
Subfamily Lorinae

Jenkins (1987) noted that Gray (1821), the author of the family-group name, Loridae, established the stem as "Lor-," rather than "Loris-." Jenkins' (1987) reversion to the original spelling is followed here, but Schwartz *et al.* (1998) have requested the International Commission on Zoological Nomenclature to conserve the prevalent subsequent amendment to Lorisidae. The Commission welcomes, and is guided by comments on this request.

Genus *Loris*
É. Geoffroy
Saint-Hilaire, 1796

Loris É. Geoffroy Saint-Hilaire, 1796 is a junior synonym of *Tardigradus* Boddaert, 1785 which in turn is a junior homonym of *Tardigradus* Brisson, 1762 (a genus of sloth). A consequence of the proposal to reject the scientific nomenclature in the non-binomial Brisson (1762) (Gentry, 1994) is that it will remove the senior homonym. Gentry *et al.* (1994) have therefore requested the International Commission on Zoological Nomenclature to suppress *Tardigradus* Boddaert, 1785 for the purposes of priority, but not for the purposes of homonymy. The Commission welcomes, and is guided by comments on this request.

1.	Mysore slender loris	*L. lydekkerianus lydekkerianus* Cabrera, 1908	(A) India (S. Karnataka) DD

The recogniton of two species of *Loris* follows Groves (1998).

2.	Highland slender loris	*L. lydekkerianus grandis* Hill and Phillips, 1932	(A) Sri Lanka (highland north-central dry zone)

Groves (1998) found museum material of *Loris tardigradus nordicus* Hill, 1933 to be indistinguishable from that of *L. lydekkerianus grandis*, but Groves (*in litt.*) accepted that a field worker might be able to discriminate live individuals. Helga Schulze (*in litt.* to A. A. E.) reported little external

variation in free-living "*L. t. nordicus*," apart from yellow or dark ear pigmentation. At its type locality, Mousakande, Gammaduwa, the long muzzle and heart-shaped face of *L. l. grandis* seemed distinct. A possible explanation, however, is that Mousakande may lie near the subspecific boundary between *L. l. grandis* and *L. l. nycticeboides*. Conservation concerns might justify recognizing *L. t. nordicus* as a credibility grade C taxon but, considering *L. l. grandis* also closely resembles *L. l. lydekkerianus* (Groves, 1998), the recognition of *L. t. nordicus* requires further substantiation. *Loris lydekkerianus grandis* is not on the Red List. The status of *L. tardigradus nordicus* is: EN A1c.

3. Malabar slender loris	*L. lydekkerianus malabaricus* Wroughton, 1917	(A) S. India (Malabar coast)	DD
4. Horton Plains slender loris	*L. lydekkerianus nycticeboides* Hill, 1942	(A) C. Sri Lanka (high plains)	EN A1c
5. Red slender loris	*L. tardigradus* (Linnaeus, 1758)	(A) SW. Sri Lanka	EN A1c

Genus *Nycticebus*
É. Geoffroy Saint-Hilaire, 1812

Groves (1971) considered *Nycticebus pygmaeus* cranially intermediate between *N. coucang* and *Loris tardigradus*. The recognizability of *Nycticebus* as a separate genus deserves further investigation.

6. Bengal or northern slow loris	*N. bengalensis* (Lacépède, 1800)	(A) Burma, Cambodia, S. China, NE. India, Laos, Thailand (north of the Isthmus of Kra), Vietnam	DD

The recogniton of *Nycticebus bengalensis* as a species follows Groves (1998).

7. Greater Slow loris	*N. coucang coucang* (Boddaert, 1785)	(A) Indonesia (North Natuna Island, Sumatra), peninsular Malaysia, Thailand (south of the isthmus of Kra)	LR/1c

8.	Javan slow loris	*N. coucang javanicus* É. Geoffroy Saint-Hilaire, 1812	(A) Indonesia (Java)	DD
9.	Bornean slow loris	*N. coucang menagensis* Trouessart, 1897	(A) Brunei, Indonesia (Bangka, Belitung [formerly Billiton], Kalimantan, Tawi Tawi), Malaysia (Sabah, Sarawak)	DD
10.	Pygmy slow loris	*N. pygmaeus* Bonhote, 1907	(A) E. Cambodia, S. China, Laos, Vietnam	VU A1cd

Nycticebus pygmaeus includes *N. intermedius* Dao, 1960 (from Hoa Binh, Vietnam) as a junior synonym (Groves, 2001a).

		N. pygmaeus population(s)	(B) Cambodia, Laos, Vietnam	NE

Duckworth *et al*. (1999) accepted that there are >2 species of loris in Laos.

Family Tarsiidae Gray, 1825
Genus *Tarsius* Storr, 1780

Field surveys and analogy with other nocturnal primates suggest tarsier taxonomic diversity has been underestimated (MacKinnon and MacKinnon, 1980). Morphological evidence splits extant tarsiers into two distinct phenetic groups: a Philippine-Western group (from the Philippines and the Greater Sunda Islands, respectively), and an Eastern group (from Sulawesi). Their status as true cladistic groups remains unconfirmed because the long internal branch linking tarsiers to other primates obscures character polarity (Groves, 1998; Musser and Dagosto, 1987). Preliminary genetic analysis indicates an unresolved trichotomy among the Philippine, Western and Eastern tarsiers, with a divergence possibly dating to the middle Miocene (Shekelle *et al*., 2001). In the system proposed by Goodman *et al*. (1998) for phylogenetic classification from DNA and fossil evidence, this level of divergence would signify at least generic separation for each of the three groups.

Groves (1998) contemplated that the Sulawesi tarsiers might be generically separable as *Rabienus* Gray, 1821. Groves (2001b), however, now perceives that the bushy and more extensive tail-tuft of *Lemur tarsier* Erxleben,

1777, the type species of *Tarsius* by absolute tautonymy, contradicts its widely assumed junior synonymy with *Simia syrichta* Linnaeus, 1758 and suggests senior synonymy with *L. spectrum* Pallas, 1779. *Macrotarsus* Link, 1794 (a senior homonym of *Macrotarsus* Clark, 1941) with type species, *M. Buffoni* [=*L. tarsier*] and *Rabienus*, with type species, *L. spectrum*, thus become subjective junior synonyms of *Tarsius*, leaving *Cephalopachus* Swainson, 1835 with type species, *T. bancanus*, available for the *syrichta-bancanus* group.

11. Western tarsier	*T. bancanus bancanus* Horsfield, 1821	(A) Indonesia (Bangka, lowland southeast Sumatra from the Sunda Strait approximately to the Musi River; implausibly reported in Java)	LR/1c
12. Bornean tarsier	*T. bancanus borneanus* Elliot, 1910	(A) Brunei, Indonesia (Kalimantan), Malaysia (Sabah, Sarawak)	DD

A single subspecies of tarsier, *Tarsius bancanus borneanus* is recognized for the whole island of Borneo. Given the difficulty in detecting taxonomic diversity in museum specimens of nocturnal mammals, and the propensity of other Bornean mammals to show regional variation, Borneo is a priority area for future tarsier surveys and further taxonomic research.

13. Natuna tarsier	*T. bancanus natunensis* Chasen, 1940	(C) Indonesia (Serasan, **[?] Subi**, South Natuna Islands)	DD

Hill (1955) recognized *Tarsius bancanus natunensis* as a poorly defined subspecies, perhaps synonymous with *T. b. borneanus*. Groves (2001a) synonymised them, and museum specimen variation seemed insignificant to Niemitz (1984), but an inadequate basis for judgement, according to Musser and Dagosto (1987).

14. Belitung tarsier	*T. bancanus saltator* Elliot, 1910	(C) Indonesia (Belitung)	DD

Hill (1955) recognized *Tarsius bancanus saltator* as a poorly defined subspecies, perhaps synonymous with *T. b. bancanus*. Groves (2001a) recognized it, but museum specimen variation seemed insignificant to Niemitz (1984), and an inadequate basis for judgement, according to Musser and Dagosto (1987).

15. Diana's tarsier	*T. dianae* Niemitz, Nietsch, Warter and Rumpler, 1991	(A) Indonesia (northern areas of C. Sulawesi, from Lore Lindu National Park to Luwuk)	LR/cd

Tarsius dianae is distributed from its type locality at Kamarora, west to the Palu river, north as far as Maranatale (Shekelle, in press; Shekelle *et al.*, 1997), and east to near Luwuk (Nietsch and Burton, in Shekelle *et al.*, 2001). Tarsiers from Marantale (a few kilometers from Labuan Sore, the type locality of *Tarsius fuscus dentatus* Miller and Hollister, 1921) responded in kind to playback of the duet call from Kamarora. Shekelle *et al.* (1997) also found that many morphological characters purportedly diagnostic of *T. dianae* were broadly distributed in tarsier populations throughout Central and North Sulawesi. They concluded that *T. dianae* is probably a junior synonym of *T. dentatus* and recommended further surveys near Labuan Sore (see also under *T. tarsier*).

16. Peleng tarsier	*T. pelengensis* Sody, 1949	(A) Indonesia (Peleng Island and possibly other islands of the Banggai Island chain, Central Sulawesi)	DD

The recogniton of *Tarsius pelengensis* as a species follows Groves (2001a). Comparisons of spectrograms made from recordings of the duet calls of Peleng tarsiers and *T. dianae* show broad similarities with subtle variation (Nietsch and Burton, in Shekelle *et al.*, 2001).

17. Pygmy tarsier, or Mountain tarsier	*T. pumilus* Miller and Hollister, 1921	(A) Indonesia (Latimodjong Mountains, 3°30'S 120°05'E, 2200 m, South Sulawesi; Mt. Rorekatimbu, 2200 m; Rano Rano, 1800 m, Central Sulawesi)	DD

In 2000, Maryanto and Yani (in press) achieved the first confirmed sighting of *Tarsius pumilus* since 1930, by catching the third known specimen (an adult female now at the MZB, Cibinong, Indonesia) in a rodent trap at 2200 m on Mt. Rorekatimbu in Lore Lindu National Park. It differs from *T. tarsier*, and matches the description of *T. pumilus* in many respects (M. S., personal observation). M. S. has a tissue sample from which he hopes to obtain DNA sequence data for comparison with other sequences in his data set. Recent field surveys have failed to rediscover *T. pumilus* at its type locality, Rano Rano (1°30'S 120°28'E), and adjacent areas of the Napu valley (Shekelle, in press; Shekelle *et al.*, 1997), but given its recent discovery on Mt. Rorekatimbu, this may be due to the cryptic behavior of *T. pumilus*, rather than its absence in that area.

18. Sangihe tarsier	*T. sangirensis* Meyer, 1897	(A) Indonesia (Greater Sangihe Island, North Sulawesi)	DD

The recogniton of *Tarsius sangirensis* as a species follows Feiler (1990), Shekelle *et al.* (1997) and Groves (1998, 2001a).

	T. sangirensis population	(B) Indonesia (Siau Island and possibly other islands of the Sangihe Island chain, North Sulawesi)	NE

The isolated island population of tarsiers on Siau may warrant separate taxonomic status. The Sangihe Island chain are a string of volcanic islands that connect northern Sulawesi and Greater Sangihe Island, 200 km from the northern tip of Sulawesi, and their presence or absence on these islands should be investigated.

19. Philippine tarsier	*T. syrichta syrichta* (Linnaeus, 1758)	(A) Philippines (Samar)	DD

Dagosto and Gebo (1998) suggested, "Data Deficient (DD) may be the most appropriate conservation category for this species."

20. Mindanao tarsier	*T. syrichta carbonarius* Heude, 1899	(C) Philippines (Mindanao)	DD

Groves (2001a) recognized no subspecies for *Tarsius syrichta*. Hill (1955) recognized *T. s. carbonarius* as a poorly defined subspecies, perhaps synonymous with *T. s. syrichta*. Museum specimen variation seemed insignificant to Niemitz (1984), but an inadequate basis for judgement, according to Musser and Dagosto (1987).

21.	Bohol tarsier	*T. syrichta fraterculus* Miller, 1910	(C) Philippines (Bohol)	DD

Groves (2001a) recognized no subspecies for *Tarsius syrichta*. Hill (1955) recognized *T. s. fraterculus* as a poorly defined subspecies, perhaps synonymous with *T. s. syrichta*. Museum specimen variation seemed insignificant to Niemitz (1984), but an inadequate basis for judgement, according to Musser and Dagosto (1987).

		T. syrichta population	(B) Philippines (Basilan, possibly extending to Sulu Archipelago)	NE

The isolated tarsier population on Basilan may warrant separate taxonomic status. Tarsiers are recorded from Basilan but not, to our knowledge, from the Sulu archipelago. The Sulu archipelago is a possible dispersal corridor for tarsiers between Borneo and the Philippines, and their presence or absence on these islands should be investigated.

		T. syrichta population	(B) Philippines (Dinagat)	NE

Heaney (in Musser and Dagosto, 1987) believed a single male *Tarsius syrichta* from Dinagat might be distinct.

		T. syrichta population	(B) Philippines (Leyte)	NE

The isolated tarsier population on Leyte may warrant separate taxonomic status.

		T. syrichta population	(B) Philippines (Siargao)	NE

The isolated tarsier population on Siargao may warrant separate taxonomic status.

22. Makassar tarsier	*T. tarsier* (Erxleben, 1777)	(A) Indonesia (the SW. peninsula, north to the Tempe depression, South Sulawesi)	LR/nt

Two major problems beset Eastern tarsier taxonomy. The first is that *Tarsius spectrum*, the name usually used for Eastern tarsiers, proves to be a junior synonym of *T. tarsier*, and therefore unavailable. The second is that *T. spectrum* currently includes an evidently heterogeneous assemblage of tarsier populations. These issues are further complicated by the inadequate comparison with other Sulawesi taxa of *T. dianae* in the original description, making it possibly a junior synonym of either *T. dentatus* or *T. pelengensis*. The immediate priority is to resolve these nomenclatural issues and classify known populations as accurately as possible. An accurate primary taxonomy for the tarsiers of Sulawesi and surrounding island chains will require substantial field and laboratory research.

The bushy and more extensive tail-tuft of the holotype of *Lemur tarsier* Erxleben, 1777 contradicts its widely assumed junior synonymy with *Simia syrichta* and suggests senior synonymy with *L. spectrum* Pallas, 1779 (Groves, 2001b). M. S. notes that the tail, if reliably illustrated by Buffon, is insufficiently hirsute for an Eastern, but too hirsute for a Western tarsier. Preserved specimens can lose, but not gain hair. The hirsute tail and presence of fur on the true ankle (tibia-tarsal joint) precludes its identity as a Philippine tarsier, indicated by the naked tarsus. The relatively smaller eyes and apparently mottled pelage also indicates an Eastern tarsier. Western and Philippine tarsiers have shorter, smoother fur. If accurately figured, the skull appears that of an Eastern tarsier. The cranium of Eastern tarsiers, in superior aspect, extends behind the orbits as a roughly parallel-sided oblong, with some post-orbital constriction. In Philippine tarsiers, and especially in Western tarsiers, the orbits supplant the space available for post-orbital constriction, and appear to reduce both the length and rectangularity of the cranium. In Western and Philippine tarsiers, but not in Eastern tarsiers, orbital flare superiorly exceeds the cranial height. We therefore accept Groves' (2001b) recognition of the priority of *L. tarsier*, with type locality Makassar, over its junior synonym, *L. spectrum*.

It is essential to unequivocally relate the name *Tarsius tarsier* to an extant population of tarsiers and establish its relationship to other taxa. Makassar, today, is a large metropolis lacking conspicuous tarsier populations. Shekelle *et al*. (2001), however, reported a unique acoustic morph at

Bantimurung in a protected area about 35 km NE of Makassar. Nietsch and Burton (in Shekelle *et al*., 2001) reported this same acoustic morph and another one at Tanjung Bira, about 130 km SE of Makassar. Local informants indicate that tarsier populations may still exist along urban riverbanks closer to the center of old Makassar than either Bantimurung or Tanjung Bira, but it is not yet known whether these tarsiers are of the Bantimurung form, the Tanjung Bira form, or possibly an as yet unknown form. Given the apparent loss of the holotype of *T. tarsier* and absence, to our knowledge, of other museum specimens from Makassar, this situation can only be resolved by further field work.

Of the other Sulawesi tarsier taxa, *Tarsius dentatus* is confirmed only from its type locality (Miller and Hollister, 1921); *T. pumilus* from two sites in addition to the type locality (Maryanto and Yani, in press; Musser and Dagosto, 1987); and *T. pelengensis* and *T. sangirensis* from scattered sites on Peleng and Greater Sangihe Island, their respective type localities (Shekelle, in press; Shekelle *et al*., 1997; Musser and Dagosto, 1987). Conversely the known distribution of *T. dianae*, now appears to extend in a broad swath across northern parts of central Sulawesi from the type locality at Kamarora, in Lore Lindu National Park (Niemitz *et al*., 1991), north to Marantale (Shekelle, in press; Shekelle *et al*., 1997), and into the eastern Sulawesi peninsula almost to Luwuk. Nietsch and Burton (in Shekelle *et al*., 2001), however, found acoustic similarities between *T. dianae* and the tarsiers of Peleng, raising the slight possibility that *T. pelengensis* is a senior synonym. The available evidence indicates *T. dianae* and *T. tarsier* are parapatric, with *T. dianae* improbably bisecting *T. tarsier* into a north and a south Sulawesi population.

A possible solution to this problem would be to refer the northern population to *Tarsius sangirensis,* but this underplays the morphological divergence of Sangihe tarsiers (Feiler, 1990; Groves, 1998, 2001a; Shekelle, in press; Shekelle *et al*., 1997). Moreover, preliminary genetic analysis indicates that *T. sangirensis* is the genetic out-group of tarsiers from other regions of Sulawesi in the data set, including, the Togian Islands (including Batudaka and Malenge Islands) and from eight north and central Sulawesi localities around Tomini Bay, viz. Kamarora, Marantale, Tinombo, Sejoli (near the N Sulawesi/C Sulawesi border), Libuo (near Bumbulan/Marissa), Molibagu, Ratatotok and Batuputih. In this analysis, genetic distance from *T. sangirensis* does not decrease as these populations approach the tip of the northern peninsula (Shekelle *et al*., 2001). The northern Sulawesi tarsier populations are therefore clearly not referable to *T. sangirensis*.

The alternative approach of referring the northern population to *Tarsius dentatus*, also has complications. From the map accompanying H.C. Raven's field notes, Bynum *et al*. (1997) estimated the coordinates of "Laboean Sore,"

the type locality of *T. dentatus*, as 0°37'S 120°03'E. "Laboean," now spelt "Labuan" or "Labuhan," means a harbour. A beach named Labuan Sore ("evening anchorage") exists near Marantale. No local forest survives, so Shekelle *et al.* (1997) surveyed tarsiers in a small arable area just south of Marantale (0°36'S 120°02'E). Analysis of the duet call and field playback tests established this population as the same acoustic group as Kamarora tarsiers. *T. dentatus* therefore appears synonymous with *T. dianae*, and thus probably unavailable for the northern Sulawesi tarsiers. Labuan Sore, however, is known to be at or near a faunal boundary. Fooden (1969) noted the affinities with *Macaca hecki* of three juvenile *M. tonkeana* from Labuan Sore. Bynum *et al.* (1997) studied hybridization among wild macaques in the region and re-examined the museum specimens concluding that (1) the Labuan Sore museum specimens collected in 1916 show indications of being hybrids, (2) the current faunal boundary appears to be south of Labuan Sore, centered along the Tawaeli-Toboli Road, and (3) the boundary was probably further to the north when Raven collected, but has been drawn south by the presence of the Tawaeli-Toboli Road, which was constructed from 1925–1930. To the north of Marantale, Shekelle *et al.* (1997) detected yet another tarsier acoustic morph at Tinombo, and subsequent surveys by Stefan Merker (pers. comm.) detected the Tinombo morph as far south as Ampibabo, just 18 km north of Marantale, leaving little scope for the presence of a third morph. Therefore, the greatest likelihood is that *Tarsius dentatus* will ultimately be assigned to either *T. dianae* or to the Tinombo acoustic morph. Resolution of this issue is critical for the taxonomy of Eastern tarsiers to progress without potentially adding to the taxonomic confusion by naming a new taxon for which a senior synonym possibly exists.

The link between the modern population of tarsiers at Marantale and tarsiers from Kamarora appears strong, given the acoustic evidence, but the link between the modern population at Marantale and the historical population at Labuan Sore is less clear. The priority is to locate as precisely as possible from Raven's field notes where the holotype of *Tarsius dentatus* was collected, and ideally to obtain from that locality acoustic and/or other evidence of identity. Failing that, the holotype requires identification from its geographic relationship with extant populations. Tarsier populations between Marantale and Ampibabo remain uninvestigated, and further surveys in that region could be instructive. Should Labuan Sore prove to straddle the faunal boundary, there is a slim chance that *T. dentatus* could be shown to be invalid based upon the hybrid rule (International Code of Zoological Nomenclature, Article 23.8). Proof that *T. dentatus* is an invalid name, however, will precariously depend on detecting hybrid skin or skull characters in the holotype from which acoustic traits, for example, cannot be retrieved. Failing all else, stability of tarsier nomenclature would then probably

better be served by assigning *T. dentatus* arbitrarily, if necessary, preferably by consensus, to one population or another.

In reality, the biogeographic pattern of Eastern tarsiers probably resembles that of other Sulawesi mammals, such as the several parapatric macaque taxa, but species' numbers and their distributional limits remain unclear. The onus is on field surveys, as museum material is inadequate to resolve the issue (Groves, 1998; Musser and Dagosto, 1987). In the meantime we provisionally retain these scientifically unnamed populations in *Tarsius tarsier*.

T. tarsier population	(B) Indonesia (Gorontalo to Tanjung Panjang, North Sulawesi)	NE

MacKinnon and MacKinnon (1980) reported hearing near Gorontalo a call similar to the spectrograms of duet calls they recorded at Libuo (their "Panua"). Shekelle *et al.*'s (1997) discovery of distinct acoustic populations at Sejoli and Tinombo indicates MacKinnon and MacKinnon (1980) wrongly assumed this population extends to the isthmus of Palu. Tarsiers from Libuo responded in kind to playback of the duet calls of other tarsiers from the same region, but not to those from other Sulawesi regions.

T. tarsier population	(B) Indonesia (Gorontalo to Manado, North Sulawesi)	NE

Tarsiers from Gorontalo to Manado responded in kind to playback of the duet calls of other tarsiers from the same region, but not to those from other Sulawesi regions (Shekelle, in press; Shekelle *et al.*, 1997).

T. tarsier population	(B) Indonesia (Palu Valley, W. Central Sulawesi)	NE

Spectrograms of short duet fragments recorded by Niemitz (1984) at 800 m elevation "from the Dumoga area near Marena" strongly resemble those recorded by MacKinnon and MacKinnon (1980) in the Palu Valley, Central Sulawesi. This acoustic morph appears distinct from *Tarsius dianae* and other known acoustic morphs, and the altitude discredits its identification as *T. pumilus*. It is provisionally delimited from *T. dianae* by the Palu River. Surveys by Stefan Merker and M. S. in November 2001 relocated this acoustic morph at Gimpu, north of the Lariang River, and west of its north-south tributary, the Meweh River. Further surveys by Stefan Merker

(personal communication) located it on the south side of the Lariang River and on the east side of the Meweh River. Given the presence of *T. dianae* in the Lake Lindu basin (Stefan Merker, personal communication), the boundary between the Palu acoustic morph and *T. dianae* is unlikely to be as straightforward as the major river or mountain range barriers suggested by Shekelle (in press) as perhaps typical for Sulawesi tarsier taxa.

	T. tarsier population	(B) Indonesia (Near Sejoli, border of North and Central Sulawesi)	NE

Tarsiers near Sejoli responded in kind to playback of the duet calls of other tarsiers from the same region, but not to those from other Sulawesi regions (Shekelle, in press; Shekelle *et al.*, 1997). A single spectrogram of poor quality from this locality shows some obvious similarities with recordings made at Libuo, thus raising the possibility of a strong affinity between the Sejoli and Gorontalo acoustic morphs (M. S. unpublished data).

Selayar tarsier	*T. tarsier* population	(B) Indonesia (Selayar, South Sulawesi)	NE

Groves (2001a) segregated the three known museum specimens of the Selayar Island tarsier as *Tarsius* sp., distinguished from *T. pelengensis*, *T. sangirensis* and *T. tarsier* by their long fingers, long toothrow, high-crowned upper second incisor and upper canine. Their duet calls recorded by Nietsch and Burton (2002) indicated separate species status. Shekelle (unpublished data) surveyed these tarsiers in September 2001, capturing three animals. All three captured animals have distinctively furred tails, the fur being sparser than tarsiers from Bantimurung and other parts of Sulawesi, but not quite like *T. sangirensis*. One of the three animals has much paler pelage colour than any other tarsier in Shekelle's data set.

	T. tarsier population	(B) Indonesia (Buton Islands and SE. peninsula, South Sulawesi)	NE

Nietsch and Burton (2002) reported three unique acoustic forms from SE Sulawesi. Spectrograms suggest that tarsiers from Buton, Muna and Kabaena are closely allied to tarsiers from the SE peninsula, perhaps forming three subspecifies of a new species.

T. tarsier population	(B) Indonesia (Near Tinombo, south to Ampibabo, Central Sulawesi)	NE

Tarsiers near Tinombo responded in kind to playback of the duet calls of other tarsiers from the same region, but not to those from other Sulawesi regions (Shekelle, in press; Shekelle *et al.*, 1997).

Togian tarsier	*Tarsius* sp.	(B) Indonesia (Togian Islands, Central Sulawesi) NE

Tarsiers on the Togian Islands responded in kind to playback of the duet calls of tarsiers from all other tested Sulawesi regions, which did not respond in kind. Nietsch and Niemitz (1993) believed Togian tarsiers might prove to have the simplest duet pattern of all examined taxa. Nietsch (in Shekelle *et al.*, 2001) is preparing to describe them as a new species. The Togian population forms a robust, isolated genetic subset, individuals of which share a three base-pair deletion in the 12s mtDNA gene, among other synapomorphies (Shekelle *et al.*, 2001).The population near Luwuk on the eastern peninsula between Peleng and Togian is acoustically referable to *Tarsius dianae* (Nietsch and Burton, in Shekelle *et al.*, 2001), but tarsiers on the eastern headland remain uninvestigated.

Family Cercopithecidae Gray, 1821

Subfamily Cercopithecinae

Genus *Macaca* Lacépède, 1799

23. Stumptailed, or bear macaque	*M. arctoides* I. Geoffroy Saint-Hilaire, 1830	(A) E. Bangladesh, N. Burma, Cambodia, SW. China, E. India (southeast of the Brahmaputra river), Laos, northernmost West Malaysia, Thailand.	VU A1cd

Commonly dated to 1831, *Macaca arctoides* was first published in abstract by I. Geoffroy Saint-Hilaire (1830). Genetic evidence from mitochondrial DNA and Y-chromosome DNA indicates that *M. arctoides* originated from the hybridization of *M. assamensis/thibetana*-like males with *M. fascicularis*-like females (Tosi *et al.*, 2000, 2003).

24. Eastern Assamese macaque	*M. assamensis assamensis* McClelland, 1840	(A) N. and E. Burma, China (W. Guangxi and SW. Yunnan), NE. India (from great bend of the Brahmaputra river), N. Laos, NW. Thailand, N. Vietnam.	VU A1cd
25. Western Assamese macaque	*M. assamensis pelops* Hodgson, 1841	(A) Bhutan, NE. India (as far east at the great bend of the Brahmaputra river), C. Nepal.	VU A1cd

The subspecies recognized for *Macaca assamensis* are those recognized by Fooden (1982). Hoelzer *et al.* (1993) detected two distinct mtDNA clades in *M. assamensis*. One clade was undoubtedly *M. a. assamensis*, the other was thought to be, but unconfirmed as *M. a. pelops*.

26. Taiwan macaque	*M. cyclopis* Swinhoe, 1863	(A) Taiwan	VU A1cd
27. Common long-tailed macaque	*M. fascicularis fascicularis* (Raffles, 1821)	(A) Indonesia (Java, Kalimantan, Sumatra, Lesser Sunda Islands from Bali to Timor), Brunei, Cambodia, S. Laos, Malaysia, SC. Philippines, S. Thailand, S. Vietnam, and many smaller islands associated with these land masses.	LR/nt

The subspecies recognized for *Macaca fascicularis* are those recognized by Fooden (1995).

28. Dark-crowned long-tailed macaque	*M. fascicularis atriceps* Kloss, 1919	(A) SE. Thailand (Khram Yai Island)	DD
29. Burmese long-tailed macaque	*M. fascicularis aurea* I. Geoffroy Saint-Hilaire, 1830	(A) S. Bangladesh, S. Burma, WC. Thailand	LR/nt

Commonly dated to 1831, *Macaca fascicularis aurea* was first published in abstract by I. Geoffroy Saint-Hilaire (1830).

30. Con Son long-tailed macaque	*M. fascicularis condorensis* Kloss, 1926	(A) Vietnam (Con Son)	DD
31. Simeulue long-tailed macaque	*M. fascicularis fusca* Miller, 1903	(A) Indonesia (Simeulue Island)	DD
32. Karimunjawa long-tailed macaque	*M. fascicularis karimondjawae* Sody, 1949	(A) Indonesia (Karimunjawa Island and probably Kemujan Island)	DD
33. Lasia long-tailed macaque	*M. fascicularis lasiae* (Lyon, 1916)	(A) Indonesia (Lasia Island)	DD
34. Philippine long-tailed macaque	*M. fascicularis philippinensis* I. Geoffroy Saint-Hilaire, 1843	(A) Philippines (Balabac, Culion, Leyte, Luzon, NE. Mindanao, Mindoro, Palawan, Samar)	LR/nt
35. Maratua long-tailed macaque	*M. fascicularis tua* Kellogg, 1944	(A) Indonesia (Maratua Island)	DD
36. Nicobar long-tailed macaque	*M. fascicularis umbrosa* Miller, 1902	(A) India (Katchall Island, Great Nicobar Island, Little Nicobar Island)	DD
37. Japanese macaque	*M. fuscata fuscata* (Blyth, 1875)	(A) Japan (including Honshu, Kyushu, Shikoku)	DD
38. Yaku macaque	*M. fuscata yakui* Kuroda, 1941	(C) Japan (Yaku)	EN B1 + 2cde

Morphological and genetic data cannot currently distinguish the Yaku population from other populations of *Macaca fuscata* (Nozawa *et al.*, 1996).

39. Heck's macaque	*M. hecki* (Matschie, 1901)	(A) Indonesia (Northern peninsula of Sulawesi from just north of Palu to Gorontalo)	LR/nt

40.	Northern pigtail macaque	*M. leonina* (Blyth, 1863)	(A) E. Bangladesh, Burma, Cambodia (inferred), China (SW. Yunnan), India (E. Assam and Meghalaya), S. Laos, Thailand (to the Isthmus of Kra), S. Vietnam	VU A1cd

Groves' (2001a) separation of *Macaca leonina* from *M. nemestrina* is supported by genetic data (Evans *et al*., 1999; Morales and Melnick, 1998; Tosi *et al*., 2000) and sexual swelling distinctions (Gippoliti, 2001). Differences in tail carriage, however, signal confidence levels (Bernstein, 1970). The tail in free-living *M. leonina* is normally pendulous. A. A. E. (*in litt*.) saw arching over the back only in low status or highly stressed animals (fatally disembowelled by a hunting dog).

41.	Moor macaque	*M. maurus* Schinz, 1825	(A) Indonesia (SW. peninsula of Sulawesi, south of the Tempe depression)	EN A1cd, B1 + 2cde
42.	Indian rhesus macaque	*M. mulatta mulatta* (Zimmermann, 1780)	(A) E. Afghanistan (perhaps locally extinct), Bangladesh, Bhutan, N. peninsular India (as far east as the Brahmaputra valley), Nepal, N. Pakistan	LR/nt

Macaca mulatta mulatta includes as junior synonyms, the morphologically similar *Macacus rhesus villosus* True, 1894 (from Lolab, Kashmir) and *Macaca mulatta mcmahoni* Pocock, 1932 (from Kootai, Pakistan). In the most authoritative review to date, Fooden (2000) concluded that no *M. mulatta* subspecies are recognizable. We esssentially follow his conclusion, but Melnick *et al*. (1993) detected two distinct (western and eastern) mitochondrial DNA clades, apparently abutting near the Brahmaputra valley. Some widespread species (notably ungulates) lack both clear morphological subspecific differences, and associated geographic differentiation in mitochondrial DNA. Species with extreme female philopatry on the other hand, such as macaques and other mammals, show clear mtDNA subdivisions across their range. *M. mulatta*, lacks clear external or cranial subspecific

differences (Fooden, 2000), but a western clade represented by populations in Pakistan and north India differs significantly in mtDNA from an eastern group of populations from Burma to south-east China. This latter group are themselves more closely related in mtDNA to two other species, *M. cyclopis* and *M. fuscata*, than they are to their conspecifics in the west. Thus, *M. mulatta* is paraphyletic with respect to mtDNA and these two island macaque species.

Autosomal genes also tend to show a west-east split, but the boundaries differ from those defined by mtDNA. In the case of the IRBP intron #3 gene, *Macaca mulatta* specimens from SE China cluster with *M. cyclopis* and *M. fuscata*, while individuals from north India and Burma form a second distinct clade. The C4 "long" intron #9 gene relationships are less clear; while the SE China specimens cluster with *M. cyclopis*, other *M. mulatta* specimens do not form a well-defined clade. These data suggest that while both the nuclear and mitochondrial DNA relationships may reflect the actual historical branching pattern among *M. mulatta, M. cyclopis* and *M. fuscata*, the autosomal genes also reflect subsequent gene flow among *M. mulatta* populations after *M. cyclopis* and *M. fuscata* were isolated. The autosomal molecular relationships are further complicated by the more limited resolution obtained from these slower evolving genes (Melnick *et al*., 1993; Morales and Melnick, 1998; Tosi, 2000; Tosi *et al*., 2000, 2003).

With respect to Y-chromosome genes, all of *Macaca mulatta* are found in a single clade, but this clade also includes all *M. fascicularis* populations north of the Isthmus of Kra (Thailand). Within this clade there is also some internal separation of the north India *M. mulatta* samples. The other *M. fascicularis* (south of the Isthmus of Kra and on those islands sampled) form a monophyletic clade distinct not only from the rest of its conspecifics, but from other species in the so-called *M. fascicularis* species group. This split of *M. fascicularis* is in sharp contrast to the mtDNA phylogenies, where the species is monophyletic and distinct from *M. mulatta*. The most logical explanation of the parahyletic relationship among *M. fascicularis* Y-chromosome haplotypes and the monophyletic relationship of *M. fascicularis* mtDNA haplotypes is that there has been significant introgression into the *M. fascicularis* range by *M. mulatta* males (Tosi *et al*., 2002). While this Y-chromosome introgression is extensive, there seems to be only minor morphological evidence of hybridization (Fooden, 1997).

Although mitochondrial, Y-chromosome, and autosomal DNA data distinguish a western *Macaca mulatta* clade, its southern and eastern geographic limit is uncharted, and the interrelationships farther east are far from clear. The available eastern samples from Burma and SE China are probably as mutually distinct as they are from the western haplotypes, but it would be premature to treat them as subspecies, although subspecies or species can be

based on haplotype distribution and other molecular data (Cracraft, 1989). Zhang and Shi's (1993) data on *M. mulatta* mtDNA variation in China are limited, but they indicate: (1) the genetic distances between the two sampled specimens from Hainan island and the rest of China are larger than the genetic distance between any of the other Chinese haplotypes and their Indian sample; (2) their southeastern sampled population (from Fujian) is distinct; and (3) their northernmost sampled population (one specimen from Henan) is also relatively distinct. The rest of the samples form a geographically central cluster.

Zhang and Shi (1993) discriminate ≥6 groups, but only four appear significant: the Hainan group, the Fujian group, the northern group, and the rest of Chinese *Macaca mulatta*, combined with populations in eastern Burma and north Vietnam. Their Indian sample falls between these others and those from Hainan and Fujian. They claim that the northernmost Chinese population (which they subspecifically recognize as *M. m. tcheliensis*) is not only fairly distinct, but its small isolated distribution and low population size make it the most precarious *M. mulatta* population. An unbalanced classification, however, would result unless its recognition was accompanied by that of *M. m. sanctijohannis*, and probably that of *M. m. lasiota*, *M. m. siamica* and *M. m. vestita*.

In summary, the molecular differences identified among *M. mulatta* populations (Melnick *et al.*, 1993; Morales and Melnick, 1998; Tosi, 2000; Tosi *et al.*, 2000; 2002, 2003; Zhang and Shi, 1993) are alone not consistent enough to conclusively define any subspecies. Therefore, pending further genetic research, we recognize the following subspecies only as credibility grade C taxa:

43. West Chinese Rhesus Macaque	*M. mulatta lasiota* Gray, 1868	(C) China (SE. Qinghai, W. Sichuan, NE. Yunnan)	DD

Macaca mulatta lasiota is possibly synonymous with *M. m. sanctijohannis*, if not with *M. m. mulatta*.

44. South Chinese rhesus macaque	*M. mulatta littoralis* (Elliot, 1909)	(C) China (Fujian, Guangdong, far E. Guangxi)	DD

Macaca mulatta littoralis is possibly synonymous with *M. m. sanctijohannis*, if not with *M. m. mulatta*.

45. Insular Chinese rhesus macaque	*M. mulatta sanctijohannis* (Swinhoe, 1867)	(C) China (Hainan, islands around Hong Kong, Wanshan islands)	DD

Macaca mulatta sanctijohannis includes *Pithecus brevicaudus* Elliot, 1913 (from Mount Wuzhi, Hainan, China) as a junior synonym, and may be synonymous with *M. m. mulatta*.

46. Indochinese rhesus macaque	*M. mulatta siamica* Kloss, 1917	(C) Burma, China (Anhui, NW Guangxi, Guizhou, Hubei, Hunan, C. and E. Sichuan, W. and SC. Yunnan), Laos, N. Thailand, N. Vietnam	DD

Macaca mulatta siamica is possibly synonymous with *M. m. sanctijohannis*, if not with *M. m. mulatta*.

47. North Chinese rhesus macaque	*M. mulatta tcheliensis* Milne-Edwards, 1870	(C) China (Hebei, N. Henan and S. Shanxi)	DD

Macaca mulatta tcheliensis is possibly synonymous with *M. m. sanctijohannis*, if not with *M. m. mulatta*.

48. Tibetan rhesus macaque	*M. mulatta vestita* Milne-Edwards, 1892	(C) China (SE. Tibet and NW. Yunnan)	DD

Macaca mulatta vestita is possibly synonymous with *M. m. sanctijohannis*, if not with *M. m. mulatta*.

49. Sundaland Pig-tailed macaque	*M. nemestrina* (Linnaeus, 1766)	(A) Indonesia (Bangka, Sumatra), Malaysia (peninsular), S. Thailand (south of the Isthmus of Kra)	VU A1cd
	M. nemestrina population(s)	(B) Brunei, Indonesia (Kalimantan), Malaysia (Sabah, Sarawak)	NE

Populations of the highly polymorphic *Macaca nemestrina* are paraphyletic with respect to *M. leonina*, *M. pagensis* and the Sulwesi macaque species (Evans *et al*., 1999, 2003; Tosi, 2000; Tosi *et al*., 2000). Evans *et al*. (1999) found NE. Bornean *M. nemestrina* consistently distinct in mtDNA

from other sampled Bornean and Sumatran *M. nemestrina*. Subsequent data suggest Bornean *M. nemestrina* mtDNA lineages are more closely related to one another than to those on Sumatra (Evans *et al.*, in press). Bornean and Sumatran *M. nemestrina* inconsistently diverge in mtDNA, y-DNA and autosomal DNA (Evans *et al.*, 2003; Tosi *et al.*, 2003) so we provisionally treat Bornean *M. nemestrina* as a separate geographical population requiring further taxonomic study.

50. Crested black macaque	*M. nigra* (Desmarest, 1822)	(A) Indonesia (N. peninsula of Sulawesi, E. of Mt. Padang and the Dumoga River to the northern tip)	EN A1acd
51. Dumoga-Bone macaque	*M. nigrescens* (Temminck, 1849)	(A) Indonesia (N. peninsula of Sulawesi, from Gorontalo to the boundary with *M. nigra*)	LR/cd
52. Booted macaque	*M. ochreata ochreata* (Ogilby, 1841)	(A) Indonesia (SE. peninsula of Sulawesi)	DD
53. Muna-Butung macaque	*M. ochreata brunnescens* (Matschie, 1901)	(A) Indonesia (Buton Islands, SE. Sulawesi)	VU C1

While the lack of fixed morphological or genetic differences indicates subspecific divergence (Groves, 1980, 2001a), *Macaca ochreata ochreata* and *M. o. brunnescens* are significantly distinct at a number of autosomal microsatellite DNA loci (Evans *et al.*, 2003). Their sexual swellings may also differ (Stallman and Froehlich, 2000).

54. Pagai macaque	*M. pagensis pagensis* Miller, 1903	(A) Indonesia (North Pagai, South Pagai and Sipura islands of the Mentawai archipelago)	CR A2cd

Genetic data consistently support *Macaca pagensis* as a monophyletic clade, distinct from *M. nemestrina* (Evans *et al.*, 1999; Tosi *et al.*, 2000). If the *M. leonina* clade is elevated to the species level, then the *M. pagensis* clade should similarly be elevated.

55. Siberut macaque	*M. pagensis siberu* Fuentes and Olson, 1995	(A) Indonesia (Siberut Island in the Mentawai archipelago)	CR A2cd

We agree with Groves (1996) that, although mistakenly believing the name already published, Fuentes and Olson (1995) authored *Macaca pagensis siberu*. They inadvertently validated it by citing the adequate description in Whitten and Whitten (1982).

56. Dark-bellied bonnet macaque	*M. radiata radiata* (É. Geoffroy Saint-Hilaire, 1812)	(A) S. India (from the N. end of the W. Ghats, the Manjra Plateau, and the N. end of the Velokonda range in the E. Ghats, southwards to the Palni Hills and the Shevaroy Hills).	LR/1c
57. Pale-bellied bonnet macaque	*M. radiata diluta* Pocock, 1931	(A) S. India (from Pondicherry on the east to Allepey on the west, southwards to Cape Comorin)	LR/1c

The subspecies recognized for *Macaca radiata* are those recognized by Fooden (1981).

58. Lion-tailed macaque	*M. silenus* (Linnaeus, 1758)	(A) SW. India (W. Ghats)	EN B1 + 2c,C2a
59. Common toque macaque	*M. sinica sinica* (Linnaeus, 1771)	(A) Sri Lanka (except range of *M. s. aurifrons*)	VU A1c
60. Pale-fronted toque macaque	*M. sinica aurifrons* Pocock, 1931	(A) SW. Sri Lanka	VU A1c

The subspecies recognized for *Macaca sinica* are those recognized by Fooden (1979).

61. Tibetan macaque	*M. thibetana* Milne-Edwards, 1870	(A) EC. China	LR/cd

62. Tonkean macaque	*M. tonkeana* Meyer, 1899	(A) Indonesia (E. peninsula of Central Sulawesi, E. of the Bongka River)	LR/nt
	M. tonkeana population	(B) Indonesia (Central Sulawesi, W. of the Bongka River)	LR/nt

Froehlich *et al.* (1998) indicated that the purported type locality of *Macaca tonkeana* is erroneous and that the name should be restricted to the population east of the Bongka River. Both mtDNA and microsatellite data distinguish the west-bank population, but no fixed genetic and/or morphological distinguishing features have been established (Evans *et al.*, 2001, 2003). The names, *Papio hypomelas* Matschie, 1901 and/or *P. tonsus* Matschie, 1901 may be available for this population (Groves, 2001a). *Cynopithecus togeanus* Sody, 1949 from Malenge Island is perhaps unavailable because it may be a hybrid population, human-introduced from both sides of the Bongka (Froehlich *et al.*, 1998). In the event of future taxonomic recognition of the west-bank population, it should not be as a subspecies of *M. maurus* which is monophyletic and diagnosably distinct in mtDNA and autosomal microsatellite DNA from all other Sulawesi populations (Evans *et al.*, 2001).

Subfamily Colobinae Blyth, 1863 (1825)

Article 11.7.1.1 of the fourth edition of the International Code of Zoological Nomenclature allows the type genus of a family-group name to be identified by inference from the stem. This elaboration, introduced in the third edition (1985), enables reassignment of the authorship of the family-group name, Colobinae (conserved in 1982 by Opinion 1202) to its first instigator. Citation of the author and date as Blyth, 1863 (1825) is recommended by the Code to indicate that, under the provisions of Article 40.2, it has priority over both Presbytina Gray, 1825 and Semnopithecidae Owen, 1843. The latter names are available to any zoologist who considers their type genera assignable to family-groups which exclude *Colobus* Illiger, 1811.

Genus *Nasalis*
É. Geoffroy Saint-Hilaire, 1812

63. Stripe-naped proboscis monkey	*N. larvatus larvatus* (von Wurmb, 1784)	(A) Brunei, Indonesia (Kalimantan, except possibly NE.), Malaysia (Sabah, Sarawak, except C. Sarawak)	EN A2c, C1 = 2a
64. Plain-naped proboscis monkey	*N. larvatus orientalis* Chasen, 1940	(C) Indonesia (NE. Kalimantan)	NE

Nasalis larvatus was craniometrically reviewed by Groves (1970), but his skull sample excluded Sabah, Sarawak, south Kalimantan and most of the potential geographic distribution of *N. l. orientalis*. The cap and nuchal hair tract of this putative subspecies are reportedly less distinct than usual, the head and neck colour accordingly more uniform, and the crown "more cinnamon and less chocolate in colour." The back is paler, "almost uniformly orange-cinnamon" with a much restricted "grizzled brown area on the fore part of the back." The venter is "more deeply and evenly rufous," with the central abdomen "almost as deeply coloured as the rufous throat." An adult female was dorsally "much paler, yellower and less red" than any typical female. The absence of such a population remains unproven. Baron Victor von Plessen collected Chasen's (1940) three type specimens (preserved at the Museum Zoologicum Bogoriense, Cibinong, Indonesia) at Salimbatu, near Tanjungselor, Kalimantan. The prime of von Plessen's collection is at the American Museum of Natural History, New York. If it includes further *N. larvatus* specimens from relevant localities, their conformity with Chasen's (1940) description, and regional individuality might be confirmed or refuted (D. B.-J.).

Genus *Presbytis*
Eschscholtz, 1821

For species (other than the following ones) formerly assigned to *Presbytis*, see under *Semnopithecus* and *Trachypithecus*.

65. Javan grizzled surili	*P. comata* (Desmarest, 1822)	(A) Indonesia (W. Java)	EN A1c C2a

Presbytis comata was previously known as *Simia aygula* Linnaeus, 1758 (a senior synonym, suppressed in 1986 by Opinion 1400, of *Simia fascicularis* Raffles, 1821), or as *P. mitrata* Eschscholtz, 1821 (see below, under *P. melalophos*). The possibility that the southwestern population is distinct, deserves further investigation.

66. Raffles' banded surili	*P. femoralis femoralis* (Martin, 1838)	(A) Malaysia (Johor, marginal area of adjacent Pahang), Singapore	LR/nt

Presbytis femoralis femoralis includes *P.australis* Miller, 1913 (from Jemaluang, Johor, Malaysia) as a junior synonym. Pelage colour, acoustic differences and evidence of sympatry between *P. f. batuana* and *P. siamensis paenulata* determine *P. femoralis*, *P. melalophos* and *P. siamensis* as separate species (Brandon-Jones, 1999). Their close alliance is indicated by mitochondrial, Y-chromosome, and autosomal DNA sequences (Zain, 2000). In a mtDNA phylogeny for example, *P. f. robinsoni* (from Perak, Malaysia) and *P. s. siamensis* (from Terengganu, Malaysia) cluster as part of an unresolved polytomy with *P. f. femoralis* (from Johor), *P. m. mitrata* and *P. s. natunae* at the base of the clade. Their average 2% sequence divergence in ND3 and ND4 mitochondrial genes resemble intraspecific sequence divergences in *P. comata*, *P. hosei* (from Sabah, Malaysia) and *P. thomasi*. In these genes *P. rubicunda* (from Sabah) shows about 4% sequence divergence from *P. comata* and *P. thomasi*, while *P. hosei* shows about 6% divergence from *P. comata*, *P. rubicunda* and *P. thomasi*. Phylogenies based on nuclear genes show less resolution, but the five former *P. melalophos* subspecies still segregate from others. Their average nuclear IRBP-intron 3 sequence divergence is 0.02%, while the interspecific average is 0.76%, and intraspecific average 0.06%. Their average Y-chromosome (TSPY and SRY) sequence divergence is 0.05%, while the interspecific average is 0.31%, and intraspecific average 0.10% (Zain, 2000).

67. North Sumatran banded surili	*P. femoralis batuana* Miller, 1903	(A) Indonesia (Batu Islands and NC. Sumatra)	DD

Presbytis femoralis batuana is referable to *P. femoralis* on pelage colour, but to *P. melalophos* or *P. siamensis* on vocalization. It includes *P. aygula margae* Hooijer, 1948 (from Serdang, Sumatra, Indonesia) as a junior synonym (Brandon-Jones, 1999).

68. Bornean banded surili	*P. femoralis chrysomelas* (Müller, 1838)	(A) Brunei, Indonesia (W. Kalimantan), Malaysia (coastal Sarawak)	DD

Martin (1838) validated the nomen nudum, *Semnopithecus femoralis* [Gould], 1828 in a journal issue internally dated, but not unequivocally

published in August 1838. It probably predates *S. chrysomelas* Müller, 1838, published on 1 October 1838 (Medway, 1977). Groves (2001a) elevated *Presbytis femoralis chrysomelas* to specific rank with *P. f. cruciger* as a subspecies, but a more compelling case can be made for treating *P. f. cruciger* as a distinct species, while retaining *P. f. chrysomelas* as a subspecies of *P. femoralis* (Brandon-Jones, 1999).

69. Tricolored surili	*P. femoralis cruciger* (Thomas, 1892)	(A) Indonesia (N. central Kalimantan), Malaysia (W. Sabah and C. Sarawak)	DD

Presbytis femoralis cruciger includes *P. arwasca* Miller, 1934 (also from Miri, Sarawak, Malaysia) as a junior synonym. A reassessment by Brandon-Jones (1999) indicates that the latter was based on individuals intermediate with *P. f. chrysomelas* which has a parallel attenuated geographic distribution to the northwest of that of *P. f. cruciger*.

70. East Sumatran banded surili	*P. femoralis percura* Lyon, 1908	(C) Indonesia (EC. Sumatra)	DD

Presbytis femoralis percura resembles, and may be synonymous with *P. f. femoralis* (Brandon-Jones, 1999).

71. Robinson's banded surili	*P. femoralis robinsoni* Thomas, 1910	(A) Peninsular Thailand and adjacent areas of Malaysia	DD
	P. (?)*femoralis* population	(B) Malaysia (SE. Sabah)	NE

A probably congeneric white monkey occurs in the Danum Valley Conservation Area and the surrounding Ulu Segama Forest Reserve in southeast Sabah. Adults and infants are reportedly wholly white-pelaged, with pigmented eyes, face and exposed subcaudal skin. Their average group size (including infants and juveniles) of 3.5, ranging to six, is less than that for *Presbytis hosei sabana* or *P. rubicunda*. White monkeys are rarely seen away from these species, which seldom associate with one another. Individuals consorting with a *P. h. sabana* group, matched them in facial pigmentation, but their alarm calls resemble neither those of *P. hosei* nor *P. rubicunda*. This perhaps indicates a derivation from *P. femoralis cruciger* (Brandon-Jones, 1999).

| 72. | Javan fuscous surili | *P. fredericae* (Sody, 1930) | (A) Indonesia (C. Java) | DD |

Presbytis fredericae is possibly referable to *P. comata.* Nijman (1997; 2001) believed even its subspecific credibility was undermined by his finding that Ceringin, Linggo and Mt. Sawal specimens, although dorsally only slightly darker than *P. comata*, approached *P. fredericae* in their darker ventral pelage colour. All known specimens from Gunung Slamat, Gunung Cupu/Simembut, Gunung Lawu, Pagilaran and Mt. Prahu, however, conform with *P. fredericae* in pelage colour, despite Nijman's (1997, 2001) claim for "considerable" dorsal colour variation on the Dieng mountains (which include Linggo, Pagilaran and Mt. Prahu). The evidently intermediate specimens near Linggo (7°06'S 109°35'E), where typical *P. fredericae* also occurs (Nijman, 1997), and at Mt. Ciremay (7°00'S 108°25'E), Mt. Sawal (7°12'S 108°16'E) and Ceringin (c. 7°21'S 108°30'E), merely delineate its geographic boundary with *P. comata*. It is morphologically no less distinct from *P. comata* than is *P. femoralis* from *P. thomasi*, or *P. frontata* from *P. hosei* (Brandon-Jones, 1999). If *P. fredericae* falls, then so should *P. thomasi* and *P. hosei*.

| 73. | White-fronted surili | *P. frontata* (Müller, 1838) | (A) Indonesia (E. and central Kalimantan), Malaysia (E. Sarawak) | DD |

Presbytis frontata includes *P. nudifrons* Elliot, 1909 (from Bejalong, Sarawak, Malaysia) as a junior synonym (Brandon-Jones, 1999).

| 74. | Hose's grizzled surili | *P. hosei hosei* (Thomas, 1889) | (A) Malaysia (coastal N. Sarawak) and possibly Brunei | DD |

Possibly referable to *Presbytis comata*, *P. hosei hosei* was distinguished from *P. h. everetti* as a sexually monochromatic subspecies, now probably extinct (Brandon-Jones, 1997). The possibility should be investigated that a small area of distribution of this subspecies survives in Brunei.

| 75. | Miller's grizzled surili | *P. hosei canicrus* Miller, 1934 | (A) Indonesia (E. central Kalimantan) | DD |

Presbytis hosei canicrus is possibly referable to *P. comata* and, with its only known protected area, the Kutai National Park largely destroyed by timber concessions, illegal settling, industrial development and fire, leaving an estimated 5% of forest intact (Meijard and Nijman, 2000), possibly extinct.

76. Everett's grizzled surili	*P. hosei everetti* (Thomas, 1893)	(A) E. Brunei, Indonesia (N. Kalimantan), Malaysia (W. Sabah and NE. Sarawak)	DD

Presbytis hosei everetti was distinguished from *P. h. hosei* as a sexually dichromatic subspecies, possibly referable to *P. comata* (Brandon-Jones, 1997).

77. Crested or Saban grizzled surili	*P. hosei sabana* (Thomas, 1893)	(A) Malaysia (E. Sabah)	DD

Presbytis hosei sabana is possibly referable to *P. comata* (Brandon-Jones, 1997, 1999).

78. Yellow-handed mitered surili	*P. melalophos melalophos* (Raffles, 1821)	(A) Indonesia (SW. Sumatra)	LR/nt

Presbytis melalophos melalophos includes *Semnopithecus sumatranus* Müller and Schlegel, 1841 and *S. sumatranus* var. *aurata* Müller and Schlegel, 1841 (both from Gunung Talakmau, Sumatra, Indonesia) as junior synonyms (Brandon-Jones, 1999).

79. Bicolored mitered surili	*P. melalophos bicolor* Aimi and Bakar, 1992	(A) Indonesia (SE. part of C. Sumatra)	NE

Presbytis melalophos bicolor is referable to *P. melalophos* on vocalization, but to *P. femoralis* or possibly *P. siamensis* on pelage colour (Brandon-Jones, 1999).

80. Depigmented mitered surili	*P. melalophos mitrata* Eschscholtz, 1821	(A) Indonesia (SE. Sumatra)	NE

Presbytis melalophos mitrata includes *P. fusco-murina* Elliot, 1906 (from Telukbetung, Sumatra, Indonesia) and *Pithecus femoralis fluviatilis* Chasen, 1940 (from Muaradua, Sumatra, Indonesia) as junior synonyms (Brandon-Jones, 1999).

81. Ferruginous mitered surili	*P. melalophos nobilis* Gray, 1842	(A) Indonesia (inland SW. Sumatra)	NE

The type locality of *Presbytis melalophos nobilis* was amended from Indrapura (Chasen, 1940) to Solok. *Semnopithecus ferrugineus* Schlegel, 1876

(from Batang Singalang, Sumatra, Indonesia) is a junior synonym. Indrapura specimens are referable to *P. m. melalophos* (Brandon-Jones, 1999).

82. Golden-bellied Mentawai surili	*P. potenziani potenziani* (Bonaparte, 1856)	(A) Indonesia (North Pagai, South Pagai and Sipura islands of the Mentawai archipelago)	VU A1c + 2c B1 + 2ac

The overwhelming evidence for assigning *Presbytis potenziani* to *Presbytis* (rather than *Trachypithecus*) was comprehensively reviewed by Brandon-Jones (1993).

83. Sombre-bellied Mentawai surili	*P. potenziani siberu* (Chasen and Kloss, 1928)	(A) Indonesia (Siberut Island in the Mentawai archipelago)	VU A1c + 2c B1 + 2ac
84. Maroon red surili	*P. rubicunda rubicunda* (Müller, 1838)	(A) Indonesia (SE. and possibly E. central Kalimantan)	LR/lc
85. Red-naped red surili	*P. rubicunda carimatae* Miller, 1906	(A) Indonesia (S. Kalimantan, Karimata Island)	NE

Presbytis rubicunda carimatae provisionally includes *Pygathrix rubicunda rubida* Lyon, 1911 (from Batudjurung, Kalimantan, Indonesia) as a junior synonym (Brandon-Jones, 1999).

86. Orange-backed red surili	*P. rubicunda chrysea* Davis, 1962	(A) Malaysia (E. Sabah)	DD
87. Orange-naped red surili	*P. rubicunda ignita* Dollman, 1909	(A) Malaysia (N. Sarawak) and probably W. Brunei	NE
	P. rubicunda population	(B) Indonesia (NE. Kalimantan), Malaysia (W. Sabah and possibly S. Sarawak), possibly E. Brunei	NE

The subspecies, *Presbytis rubicunda ignita* and especially *P. r. chrysea* are fairly well defined, but otherwise subspeciation in *P. rubicunda* is difficult to assess, and very dependent on which characters are considered diagnostic.

Paw colour has previously been accorded probably undue emphasis. A truly maroon population occurs in both SE. (*P. r. rubicunda*) and E. Kalimantan which, judging by specimens from intervening localities, appears discontinuous. This and the affinities of the S. Sarawak population require further investigation (D. B.-J.).

88. Malayan pale-thighed surili	*P. siamensis siamensis* (Müller and Schlegel, 1841)	(A) C. and NE. peninsular Malaysia, adjacent areas of Thailand	LR/lc

Previously referred to either *Presbytis melalophos* or *P. femoralis*, *P. s. siamensis* includes *P. nubigena* Elliot, 1909 (from Melaka, Malaysia) and *P. ruhei* Knottnerus-Meyer, 1933 (purportedly from Songkhla, Thailand) as junior synonyms. For doubts on the recognizability of *P. siamensis* as a species, see under *P. f. femoralis*. For those accepting Chasen's (1940) recognition of two Malayan subspecies, *P. dilecta* Elliot, 1909 (from Selangor, Malaysia) is the correct name for the paler-thighed more widespread population (Brandon-Jones, 1999).

89. Riau pale-thighed surili	*P. siamensis cana* Miller, 1906	(A) Indonesia (Batam, Galang and Kundur islands of the Riau archipelago; adjacent regions of Sumatra)	NE

Presbytis siamensis cana includes *P. catemana* Lyon, 1908 (from the Kateman estuary, Sumatra, Indonesia) as a junior synonym.

90. Natuna pale-thighed surili	*P. siamensis natunae* (Thomas and Hartert, 1894)	(A) Indonesia (North Natuna Island)	NE

91. Mantled pale-thighed surili	*P. siamensis paenulata* (Chasen, 1940)	(A) Indonesia (NE. part of C. Sumatra)	NE

92. Bintan pale-thighed surili	*P. siamensis rhionis* Miller, 1903	(C) Indonesia (Bintan Island in the Riau archipelago)	NE

Presbytis siamensis rhionis is very similar to, and may be synonymous with *P. s. siamensis*.

| 93. | Sumatran grizzled surili | *P. thomasi* (Collett, 1893) | (A) Indonesia (N. Sumatra) | LR/nt |

Possibly referable to *Presbytis comata*, *P. thomasi* includes *P. thomasi nubilus* Miller, 1942 (from Blangnanga, Sumatra, Indonesia) as a junior synonym. The possibility that the northwestern population is distinct deserves further investigation. Molecular data sometimes cluster this species with *P. comata* or with *P. rubicunda*. If *P. comata* and *P. rubicunda* are distinguished as different species, then *P. thomasi* should similarly be classified as a separate species. These three species tend to cluster together separate from other species in this genus (Morales *et al.*, in prep.; Zain, 2000; Zain *et al.*, in prep.).

Genus *Pygathrix*
É. Geoffroy Saint-Hilaire, 1812

Illiger's (1811) inclusion of *Simia nictitans* Linnaeus, 1776 in his genus *Lasiopyga*, enabled Elliot (1913) to appropriate the generic name for the guenons. Elliot's (1913) action followed the then legitimate nomenclatural practice of construing Geoffroy's (1812) creation of a separate genus (*Pygathrix*) for *Simia nemaeus* Linnaeus, 1771 as a type species fixation for *Lasiopyga*, by elimination of all but one of the originally included nominal species (Palmer, 1904). Nowadays, the International Code of Zoological Nomenclature (Article 69) demands a formal type species designation. The genus *Lasiopyga* (whose name, like *Pygathrix*, means "hairy buttocks") was so clearly intended for the douc, then principally diagnosed by the (artificial) absence of ischial callosities in the sole known specimen, that its type species was self-evident to most nineteenth century mammalogists and the minority who employed it, treated it as monotypic. D[esmarest] (1846), however, specified: "l'espèce type est la *Guenon Douc*," and identified "le *Douc*" as *Simia nemaeus* Lin. (Desmarest, 1848). This type species designation might be disqualified on the technicality that the type species can only indirectly be nominally established but, in view of the possibility that other more correct such type species designations exist, we recommend, in the interests of nomenclatural stability, that the International Commission on Zoological Nomenclature uses its plenary powers to suppress *Lasiopyga* Illiger, 1811, as a potential senior synonym of *Pygathrix* É. Geoffroy Saint-Hilaire, 1812 (D. B.-J.).

| 94. | Red-shanked douc | *P. nemaeus nemaeus* (Linnaeus, 1771) | (A) S. Laos, C. Vietnam | EN A1cd |

95. Gray-shanked   *P. nemaeus cinerea* (A) SC. Vietnam   DD
    douc   Nadler, 1997

It is likely that *Presbytis nemaeus moi* Kloss, 1926 (from Lang Bian, Vietnam) derives from the southern tip of an intergradation boundary between *Pygathrix n. cinerea* and *P. nigripes*, and is therefore arguably a senior synonym of *P. nemaeus cinerea*, rather than a junior synonym of *P. nigripes*. Their relative seniority partly depends on the weighting attributed to the various diagnostic pelage characters advanced by Kloss (1926). Such nomenclatural issues require resolution before a potential junior synonym becomes entrenched in the literature. The Latin adjectival species-group name (spelt "*cinereus*" in the original description) is amended to *cinerea* to accord in feminine gender with the generic name. Groves (2001a) raised *P. nemaeus cinerea* to specific rank but, despite genetic evidence of its distinctiveness (Christian Roos, *in litt*. to A. A. E.), we provisionally retain it as a subspecies. A particularly puzzling aspect of the relative geographic distributions of the three *Pygathrix* taxa is that, except to the east, *P. n. cinerea* seems surrounded by *P. n. nemaeus* populations which, to the south, are almost detached from the bulk of *P. n. nemaeus* distribution, and narrowly divide *P. n. cinerea* from *P. nigripes* (Lippold and Vu, 2000).

96. Black-shanked   *P. nigripes*   (A) E. Cambodia,   EN
    douc   (Milne-Edwards,   SW. Vietnam   A1cd
                      1871)

We follow Brandon-Jones (1984, 1996) and Groves (2001a) in recognizing *Pygathrix nigripes* as a species. It is one of few cercopithecid species to be cranially diagnosable (Brandon-Jones, 1984).

Genus *Rhinopithecus*
Milne-Edwards,
1872

Groves (1970) and Brandon-Jones (1984, 1996) recognized *Rhinopithecus* as a subgenus only of *Pygathrix*. Its generic status advocated by Jablonski and Peng (1993) and Jablonski (1998) was undermined by their divergent conclusions on the sister taxa relationship of the included species, indicating deficiencies in phylogenetic analyses. Jablonski (1998) ignored the intergeneric morphology of *R. avunculus* discerned by Jablonski and Peng (1993). Neither work supplied a generic diagnosis. Wang *et al*. (1997), however, found strong reciprocal monophyly in mtDNA between *Rhinopithecus* and *Pygathrix*. We therefore tentatively follow Groves (2001a) in accepting *Rhinopithecus* as a genus.

97. Tonkin snub-nosed monkey	*R. avunculus* Dollman, 1912	(A) Central N. Vietnam	CR C1, E
98. Yunnan snub-nosed monkey	*R. bieti* Milne-Edwards, 1897	(A) China (Hengduan Mountains, Yunnan)	EN C2a

The specific status of *Rhinopithecus bieti* is now generally accepted.

99. Guizhou snub-nosed monkey	*R. brelichi* Thomas, 1903	(A) China (Fanjing Mountain, Guizhou)	EN C2b
100. Moupin golden snub-nosed monkey	*R. roxellana roxellana* (Milne-Edwards, 1870)	(A) China (Ganssu and western Sichuan)	VU C2a
101. Hubei golden snub-nosed monkey	*R. roxellana hubeiensis* Wang *et al.*, 1994	(C) China (Shennongjia, Hubei)	VU C2a
102. Qinling golden snub-nosed monkey	*R. roxellana qinlingensis* Wang *et al.*, 1994	(C) China (Qinling Mountains, Shaanxi)	VU C2a

There are discrepancies between the two descriptions of both *Rhinopithecus roxellana hubeiensis* and *R. r. qinlingensis* supplied by Wang *et al.* (1994, 1998). Geographic variation in *R. roxellana* requires more methodical assessment.

Genus *Semnopithecus*
Desmarest, 1822

Overwhelming evidence segregates into *Semnopithecus* Desmarest, 1822 more than half of the species formerly amassed in *Presbytis* Eschscholtz, 1821 (Brandon-Jones, 1984, 1993, 1999; Corbet and Hill, 1992; Groves, 2001a). A consensus divides *Semnopithecus* into at least two species groups, but their species composition and hierarchical status remain disputed. The recognition here of one of them as a third genus *Trachypithecus* (advocated by Pocock, 1935), highlights a major discrepancy between genetic and morphological evidence. Vocal analysis indicates natural hybridization between *Semnopithecus johnii* and *S. entellus* (Hohmann, 1988) with which *S. johnii* and *S. vetulus* genetically affiliate (Zhang and Ryder, 1998), but they affiliate with *Trachypithecus* in cranial morphology, neonatal pelage colour and sexually dichromatic pubic integument. These close resemblances led Brandon-Jones (1995a) to recognize *T. poliocephalus* as a subspecies of *S.*

johnii, contending they are remnants of a single species fragmented by deforestation induced by a cool dry glacial climate (Brandon-Jones, 1996). Subspecies of one species cannot be generically separated. The mitochondrial cytochrome-*b* gene sequences seem unsynchronized with this morphological variation, but accord with Brandon-Jones' (1995a, 1996) inference from morphological, biogeographic and climatological evidence that *Semnopithecus* post-glacially diverged from *Trachypithecus*. Where genetic and morphological evidence irresolvably conflict, the interests of field and institutional specimen identification, and consistent taxonomic treatment of extant and fossil taxa are best served by granting precedence to morphology. In this instance, a possible solution is to retain *Trachypithecus* (perhaps as a morphological subgenus) in *Semnopithecus*. The option of isolating *S. johnii* and *S. vetulus* in their own genus *Kasi* Reichenbach, 1862 resolves none of these issues.

103.	Bengal langur	*S. entellus entellus* (Dufresne, 1797)	(A) W. Bangladesh (probably introduced), India (S. West Bengal, S. Bihar, S. Chhatisgarh, Jharkhand, NE. Maharashtra, Orissa)	LR/nt
104.	Satpura langur	*S. entellus achates* (Pocock, 1928)	(A) India (N. Chhatisgarh, Gujarat, W. Karnataka, Madhya Pradesh, W. Maharashtra, SE. Rajasthan)	LR/nt

Semnopithecus entellus achates may be a junior synonym of *Cercopithecus albo-cinereus* Desmarest, 1822 (Brandon-Jones, 1999). Based on individuals probably intermediate with *S. e. hypoleucos* and *S. e. priam*, [*Pithecus e.*] *elissa* Pocock, 1928 (from Nagarhole, Karnataka, India) is a junior synonym.

105.	Dark-armed Himalayan langur	*S. entellus ajax* (Pocock, 1928)	(A) India (N. Himachal Pradesh, S. Jammu & Kashmir) and NE. Nepal.	LR/nt

| 106. | Deccan langur | *S. entellus anchises* Blyth, 1844 | (A) India (N. Andhra Pradesh, NE. Karnataka, SE. Maharashtra) | DD |

The boundary between *Semnopithecus entellus anchises* and *S. e. entellus*, roughly along the Andhra Pradesh northern border, probably coincides with the change from backward-directed tail carriage in the south, to forward-looped in the north (Roonwal *et al.*, 1984).

| 107. | Dark-armed Malabar Langur | *S. entellus dussumieri* I. Geoffroy Saint-Hilaire, 1842 | (A) India (SW. Karnataka, W. Kerala) | DD |

Semnopithecus entellus dussumieri which includes *Pithecus entellus iulus* Pocock, 1928 (from Jog Falls, Karnataka, India) as a junior synonym, is one of two subspecies decanted into a distinct species, *S. hypoleucos* by Brandon-Jones (1984). Groves (2001a) ventured further, and recognized seven species previously assigned to *S. entellus*.

| 108. | Lesser hill langur | *S. entellus hector* (Pocock, 1928) | (A) India (S. Uttaranchal, NE. Uttar Pradesh and probably N. West Bengal) and S. Nepal | LR/nt |
| 109. | Dark-legged Malabar langur | *S. entellus hypoleucos* Blyth, 1841 | (A) India (S. Karnataka and probably NE. Kerala) | DD |

Semnopithecus entellus hypoleucos which includes [*Pithecus e.*] *aeneas* Pocock, 1928 (from Makut, Karnataka, India) as a junior synonym, is one of two subspecies decanted into a distinct species, *S. hypoleucos* by Brandon-Jones (1984).

| 110. | Coromandel gray langur | *S. entellus priam* Blyth, 1844 | (A) India (S. Andhra Pradesh, Tamil Nadu and probably SE. Karnataka) | DD |

Semnopithecus entellus priam includes as a junior synonym, *Pithecus entellus priamellus* Pocock, 1928, known only from the holotype (from

Sharnelli Estate, Nelliampathy Plateau, Kerala, India), probably intermediate with *S. e. dussumieri*. Above 1500 m in the High Wavy Mountains (9°32'N 77°25'E), Hutton (1949) twice saw a troop of about twenty gray monkeys of an unfamiliar type with a black nape and white venter, inhabiting a hill named after them, "Samba-Manthi." In behavior, they resembled the local *S. e. priam*, but in smaller size, *Macaca silenus* (i.e. a head and body length of about 46-58 cm, instead of 58-63 cm). Their plaintive *cheep-cheep* recalled that of a lost domestic chick. Hutton's (1949) friend had seen them at the northern end of the Anaimalai Hills (c. 10°30'N 77°00'E). These localities are outside the known range of *S. e. dussumieri* whose nape is not black, and to the southeast of the type locality of *P. e. priamellus* whose holotype has, if anything, a purer yellowish white nape than typical *S. e. priam*. Although both *S. e. priam* with *S. johnii* tend to be palest, rather than darkest on the nape, and more variation might be expected from such relatively large troops, they may be hybrid, or albinistic *S. johnii*.

| 111. | Pale-armed Himalayan langur | *S. entellus schistaceus* Hodgson, 1841 | (A) W. Bhutan, China (S. Tibet), India (Himachal Pradesh, SW. Jammu & Kashmir, Sikkim, Uttaranchal), Nepal, N. Pakistan and possibly NE. Afghanistan | LR/nt |

Semnopithecus entellus schistaceus includes *Presbytis lania* Elliot, 1909 (from Chumbi valley, Tibet, China) and [*P ithecus*]*entellus achilles* Pocock, 1928 (from Gurkha, Nepal) as junior synonyms.

| 112. | Southern gray langur | *S. entellus thersites* (Blyth, 1848) | (C) India (S. Tamil Nadu), E. and N. Sri Lanka | VU A1cd |

Semnopithecus entellus thersites is very similar to, and may be synonymous with *S. e. priam*.

| 113. | Nilgiri black langur | *S. johnii* (Fischer, 1829) | (A) India (S. Karnataka, E. Kerala, SW. Tamil Nadu) | VU A1d, B1 + 2c, C2a |

The apparent absence of a pale rump patch perhaps subspecifically separates southern *Semnopithecus johnii* (Brandon-Jones, 1995a).

114. Southern purple-faced langur	*S. vetulus vetulus* (Erxleben, 1777)	(A) SW. Sri Lanka	EN A1cd

Brandon-Jones (in Phillips, 1981) and Napier (1985) rationalized the replacement of *Cercopithecus senex* Erxleben, 1777 with *C. vetulus*.

115. Highland purple-faced langur, bear monkey	*S. vetulus monticola* (Kelaart, 1850)	(A) C. Sri Lanka	EN A1cd
116. Western purple-faced langur	*S. vetulus nestor* Bennett, 1833	(A) W. Sri Lanka	EN A1cd
117. Northern purple-faced langur	*S. vetulus philbricki* (Phillips, 1927)	(A) NC. and N. Sri Lanka	EN A1cd

Semnopithecus vetulus philbricki includes *Presbytis senex harti* Deraniyagala, 1954 (from Tunukkai, Sri Lanka) as a junior synonym.

Genus *Simias*
Miller, 1903

Groves (1970), Brandon-Jones (1984, 1996) and Corbet and Hill (1992) subsumed *Simias* into *Nasalis*. We here provisionally (in D. B.-J.'s case, reluctantly) follow Groves (2001a) in treating *Simias* as a genus, but note that the genus *Macaca* would have to be subdivided, if subjected to Jablonski's (1998) generic diagnosis of *Simias* ("a small body size, a naked, vestigial pigtail, dichromatic pelage, dark facial skin, and a monogamous social structure in some groups").

118. Pagai pig-tailed snub-nosed monkey	*S. concolor concolor* Miller, 1903	(A) Indonesia (North Pagai, South Pagai and Sipura islands of the Mentawai archipelago)	EN A1cd
119. Siberut pig-tailed snub-nosed monkey	*S. concolor siberu* Chasen and Kloss, 1928	(A) Indonesia (Siberut Island in the Mentawai archipelago)	EN A1cd
	Genus *Trachypithecus* Reichenbach, 1862		

Groves' (2001a) view that *Trachypithecus* is the "plesiomorphic rump" resulting from the exclusion of the more apomorphic *Presbytis* and *Semnopithecus*, contrasts with Brandon-Jones' (1995a, 1996) interpretation of most *Trachypithecus* species as a monophyletic, but ramifying "ring species" (first effectively recognized by Pocock, 1928, but with no specified polarity) emanating from the SW. Javan population. The "plesiomorphic" condition of this Javan and the other surviving remnants (such as *T. delacouri*, *T. francoisi* and *S. johnii*) of a species pre-glacially continuous from Java to southern India, might explain their remarkable cranial resemblance to *Colobus angolensis ruwenzorii*, but the possibility that *Trachypithecus* is synonymous with *Colobus* (sensu stricto) deserves rigorous refutation, and is a further cause for reservations over the generic recognition of *Trachypithecus* (see under *Semnopithecus*).

120. Spangled ebony leaf monkey	*T. auratus auratus* (É. Geoffroy Saint-Hilaire, 1812)	(A) Indonesia (Bali, Bangka, Belitung, N. Java, SE. Kalimantan, Lombok, Riau-Lingga archipelago, Serasan and S. Sumatra)	VU A1c B1 + 2cd

Brandon-Jones (1995a) recognized two Indonesian subspecies for *Trachypithecus auratus*: *T. a. mauritius* from SW. Java and *T.a. auratus* from Bali, Lombok and the rest of Java. Subsequent examination of skin, AMNH. 102903 from Kalianda, south Sumatra and especially of skin, USNM.115674 from Pulau Sugi, Riau archipelago, has convinced D. B.-J. that *Simia cristata* Raffles, 1821 (from Bengkulu, Sumatra, Indonesia) is a junior synonym of *T. a. auratus*. Specimens from south Kalimantan, as far north as Sankulirang Bay on the east coast, are referable to *T. a. auratus* which includes *Presbytis cristata pullata* Thomas and Wroughton, 1909 (from Batam, Riau archipelago, Indonesia), *P. vigilans* Miller, 1913 (from Serasan, Natuna Islands, Indonesia), *Pithecus pyrrhus sondaicus* Robinson and Kloss, 1919 (from Cibodas, Java, Indonesia) and *P. p. kohlbruggei* Sody, 1931 (from Sendang, Bali, Indonesia) as junior synonyms.

121. West Javan ebony leaf monkey	*T. auratus mauritius* (Griffith, 1821)	(A) Indonesia (SW. Java)	EN B1 + 2ab
122. Frosted ebony leaf monkey	*T. auratus pyrrhus* (Horsfield, 1823)	(C) Indonesia (SE. Java)	NE

Brandon-Jones (1995a) noted that specimens from SE. Java are paler than elsewhere in the species' range and that the east Javan orange morphs, of which both the *Cercopithecus auratus* and *Semnopithecus pyrrhus* type specimens are examples, appear to divide into a northern darker and a southern paler population whose geographic boundary coincides with that of pelage colour variation in the melanic morph. The holotype of *C. auratus* probably derives from the northern section, while the southern section includes the restricted type locality of *S. pyrrhus*. MtDNA data do not support the subspecific recognition of *Trachypithecus auratus pyrrhus* (Rosenblum *et al.*, 1997).

123.	Barbe's leaf monkey	*T. barbei barbei* (Blyth, 1847)	(A) SW. continental NE Thailand, adjacent Burma

Trachypithecus barbei barbei includes *Pithecus pyrrhus atrior* Pocock, 1928 (see Khajuria and Agrawal, 1979) (from Ye, Burma) and *Presbytis melamera* Elliot, 1909 (probably from Thakahta, Burma) as junior synonyms. Pocock (1928) initially assigned this subspecies to the heavily lumped "*P. pyrrhus*" which included *T. auratus*, *T. barbei*, *T. obscurus* and *T. villosus*. On later splitting the species, Pocock (1935) allocated *P. p. atrior* to "*T. phayrei*." Finally and most influentially, but unduly influenced by its spangled nape and dark circum-oral skin pigment, Pocock (1939) referred it to *T. villosus*. Pocock (1935) admitted that its black whiskers, pale tail and general pelage colour showed a "baffling" resemblance to "*T. phayrei*." These latter characters seem less subject to individual variation, and the geographically variable spangled nape quite possibly derives from intergradation with *T. barbei argenteus*. Evidence of hybridisation with *T. villosus* is tenuous, and the adjunct geographic distribution of *T. b. barbei* is atypical of a clinally intergrading subspecies. Evidence for its intergradation at Mulayit Taung, Burma with *T. b. holotephreus* is more compelling. The parallel chromatic divergence of *T. b. barbei* and *T. obscurus* from their probable common progenitor, *T. b. holotephreus* might preferably be expressed by treating all three as separate species, with *T. b. argenteus* a subspecies of *T. holotephreus* (D. B.-J., in prep.).

124.	Silver gray leaf monkey	*T. barbei argenteus* (Kloss, 1919)	(A) W. continental NE Thailand

Trachypithecus barbei argenteus is arguably a junior synonym of *Presbytis crepuscula wroughtoni* Elliot, 1909 but, as the former has an unequivocal type locality, while the latter probably derives from Ban Nalè, Laos, at its contact zone with *T. b. holotephreus* (Brandon-Jones, 1995b),

nomenclatural stability is best served by synonymizing *P. c. wroughtoni* with *T. b. holotephreus*.

| 125. | Ash gray leaf monkey | *T. barbei holotephreus* (Anderson, 1879) | (A) SE. Burma, S. China, N. Laos, NW. Thailand, N. Vietnam | NE |

Trachypithecus barbei holotephreus includes *Presbytis crepuscula* Elliot, 1909 (from Mulayit Taung, Burma) and *Presbytis crepuscula wroughtoni* Elliot, 1909 as junior synonyms. Wang *et al.* (1997) found a 7.76% sequence divergence, unattributable to PCR contamination, between a specimen from Hekou, Yunnan, China and one from Xishhuangbanna, Yunnan, China. This approaches their respective 8.22 and 8.62% divergences from *T. f. francoisi*. There is no known morphological basis for taxonomically separating these populations.

| 126. | White-rumped black leaf monkey | *T. delacouri* (Osgood, 1932) | (A) NC. Vietnam | CR A1d, C2a |

We follow Brandon-Jones (1984, 1995a, 1996) and Groves (2001a) in recognizing *Trachypithecus delacouri* as a species. Its pelage colour is amongst the most distinctive of all anthropoid species (Brandon-Jones, 1995a).

| 127. | White-sideburned black leaf monkey | *T. francoisi francoisi* (Pousargues, 1898) | (A) S. China, N. Vietnam | VU A1cd C2a |
| 128. | Wulsin's black leaf monkey | *T. francoisi ebenus* (Brandon-Jones, 1995) | (A) SE. Laos, WC. Vietnam | DD |

The taxa, *Trachypithecus delacouri*, *T. f. francoisi*, *T. f. ebenus*, *T. f. hatinhensis*, *T. laotum*, *T. p. poliocephalus* and *T. p. leucocephalus* are undoubtedly closely related, but flout conventional clinal subspecific geographic variation. Their aggregation into species depends on the weighting attached to different characters (Brandon-Jones, 1995a). Christian Roos (*in litt.* to D. B.-J.) believed genetic data (including sequences from several *T. f. francoisi* in European zoos) supported the recognition of at least three species: *T. delacouri*, *T. francoisi* and *T. l. laotum* with subspecies, *T. l. ebenus* and *T. l. hatinhensis*. Genetically, *T. p. poliocephalus* was only subspecifically distanced from *T. francoisi*, but Roos favoured its specific recognition. The genetic distance between *T. francoisi* and *T. laotum* exceeded that, for example,

between *Colobus angolensis*, *C. guereza* and *C. polykomos*. *T. f. ebenus*, *T. f. hatinhensis* and *T. laotum* were genetically close, especially *T. f. ebenus* and *T. f. hatinhensis* which were barely separable, even subspecifically. Roos (2000) sequenced a 576 basepair fragment of the mitochondrial cytochrome b gene.

A 1998 survey identified only *T. laotum* in Khammouan Limestone NBCA, Laos but, in 1999, *T. f. ebenus* was reported in its southern extremity. A troop of at least 15 *T. f. hatinhensis* was seen in Nakai-Nam Theun NBCA in 1998. In Hin Namno NBCA, some individuals showed head pelage features tending towards *T. f. hatinhensis* (Duckworth *et al.*, 1999), the directly adjacent subspecies in Vietnam (Nadler, 1998). Most conformed with *T. f. ebenus* (Duckworth *et al.*, 1999) which in 1998, was detected in adjacent Vietnam, immediately south of where *T. f. hatinhensis* occurs (Nguyen and Pham, 1998). This evidence implies parapatry (rather than sympatry) with probable, but unconfirmed intergradation at (sub)specific boundaries. By usual taxonomic criteria, this vindicates the recognition of *T. f. ebenus*.

The arrangement into species followed here better reflects pelage colour variation than Roos' arrangement based on genetic evidence. As there is no clear indication that either line of evidence is superior at this taxonomic level, the basis of the arrangement can be arbitrarily selected. In this case, the choice can be governed by established usage, and ease of specimen identification. Groves' (2001a) solution is to treat all the above taxa as separate species, with the exception of *Trachypithecus p. leucocephalus* which as here, is treated as a subspecies of *T. poliocephalus*. D. J. M., however, is reluctant to accept this "default category" (when in doubt, rank it a species) in species recognition. He cites the east Javan orange morph of *T. auratus*, probably distinguished from the melanic morph by a single, as yet unidentified gene mutation, as a variant which might still be considered a distinct taxon, if recognized on pelage colour alone. Pelage colour, however, is the chief diagnostic character of many species, such as *Presbytis rubicunda* and *T. obscurus*, whose specific status is now taken for granted (see also under *T. obscurus phayrei*).

| 129. | Bar-headed black leaf monkey | *T. francoisi hatinhensis* (Dao, 1970) | (A) SE. Laos, C. Vietnam | EN A1cd |
| 130. | Golden leaf monkey | *T. geei* (Ali and Santapau, 1956) | (A) Bhutan, India (NW. Assam) | EN A1acd, C2a |

Although undoubtedly closely related, we regard *Trachypithecus geei* as a species distinct from *T. pileatus*. Gee's (1956) description predates that by Khajuria (1956b), but the (inadvertently) included scientific name can be

deemed unavailable on the grounds that the sketch map and its caption are in handwriting reproduced in facsimile (International Code of Zoological Nomenclature, Article 9.1). The editors, however, whose names are printed on the wrapper of the journal number which includes Gee's (1956) paper, and who reiterated the name "of this new species" in a postscript they appended, (inadvertently) satisfy the provisions of Article 13 of the Code in relation to Gee's (1956) description, and are here considered the authors of the species-group name.

| 131. | White-browed black leaf monkey | *T. laotum* (Thomas, 1921) | (A) C. Laos | DD |
| 132. | Reid's dusky leaf monkey | *T. obscurus obscurus* (Reid, 1837) | (A) Peninsular Malaysia (except the N. coast) into Thailand (possibly to 10°00'N) | LR/lc |

The yellowish brown infant designated by Elliot (1913) as its lectotype potentially makes *Simia maura* Schreber, 1774 a senior synonym of *Trachypithecus obscurus* or, less probably, *T. barbei*. *S. maura* has been (erroneously) employed for the Javan leaf monkey since 1899 (e.g. by Osgood, 1932). We recommend, in the interests of nomenclatural stability, that the International Commission on Zoological Nomenclature use its plenary powers to suppress *S. maura* Schreber, 1774.

| 133. | Tarutao dusky leaf monkey | *T. obscurus carbo* (Thomas and Wroughton, 1909) | (A) Thailand (Tarutao Island and possibly coast further north) | NE |

The principal reviews of subspeciation in *Trachypithecus obscurus* are by Chasen (1935) and Pocock (1935). Pocock (1935) was published while Chasen (1935) was in press, so neither benefited from recourse to the other's work. Pocock (1935) recognized *T. o. carbo*, but implied that had it been compared with the marginally paler *T. o. halonifer* rather than the significantly paler *T. o. obscurus*, *T. o. carbo* might not have been discriminated. It includes the topotypical *Presbytis corvus* Miller, 1913 as a junior synonym.

| 134. | Dark-bellied dusky leaf monkey | *T. obscurus corax* Pocock, 1935 | (C) Peninsular Burma, N. peninsular Thailand | NE |

Trachypithecus obscurus corax, which may be synonymous with either subspecies, was distinguished from *T. o. flavicauda* by its blackish grey, rather

than brownish grey ventral trunk, and from *T. o. smithi* by its darker pelage colour. Pocock (1935) referred to it specimens from Banlaw, Kadan Kyun and Tenasserim Town (Burma) and one from 12°50'N in Thailand. The latter specimen appears intermediate with *T. o. smithi*. Pocock (1935) suggested that BM.1955.1561 from Yao Yai Island (c. 8°00'N 98°35'E), tentatively referred to *T. o. flavicauda* by Hill (1960), might represent a new subspecies, dorsally less black than *T. o. corax*. Chasen (1935) assessed some Yao Yai skins as "precisely intermediate" between *T. o. flavicauda* and *T. o. smithi*. Weitzel *et al*. (1988) assigned probably the same three specimens to *T. o. flavicauda*. In an "unusual" one, "the cape and adjoining part of the dorsal line" are almost as blond as the cap (Chasen, 1940). BM.1955.1547 from Ban Nong Kok (8°06'N 98°52'E) on the adjacent mainland also shows signs of partial albinism, complicating their subspecific determination. ZD.1955.1546 from Ban Kok Klap (8°53'N 99°17'E) is predominantly albinistic (Robinson and Kloss, 1915). Pocock's (1939) doubts that the distribution of *T. o. corax* would cut into that of *T. o. smithi* led him to synonymize it with *T. o. flavicauda*, but the presence of a *T. o. corax*-like specimen on Yao Yai strengthens the impression that there may be a subspecies in the lower Tenasserim valley and outer Mergui archipelago whose distribution shadows that of *T. o. smithi*. The boundary between the two subspecies may bisect Zadetkyi Kyun, the origin of the sole confirmed specimen of *T.o. sanctorum*. This might explain the differences between this holotype and that of *T. o. corax*, or the former may be an individual variant. Either way, there is a case for relegating *T. o. corax* to the synonymy of *T.o. sanctorum*.

| 135. | Blond-tailed dusky leaf monkey | *T. obscurus flavicauda* (Elliot, 1910) | (C) S. peninsular Thailand, possibly adjacent Malaysia | NE |

Page precedence no longer has nomenclatural significance, but Pocock (1935) was apparently the first reviser to determine the priority of *Trachypithecus obscurus sanctorum* over the simultaneously published, perhaps synonymous *T. o. flavicauda* (International Code of Zoological Nomenclature, Article 24). Other factors conspire to debilitate *T. o. flavicauda* as a subspecific name. The blond cap and tail indicate the holotype may be partially albinistic (see under *T. o. corax*). Its type locality, Trang (7°30'N 99°40'E, Thailand), in an area where the distributions of *T. o. obscurus*, *T. o. halonifer* and possibly other subspecies may meet, makes it potentially intermediate. Chasen (1935, 1940) claimed that *T. o. flavicauda* replaces *T. o. smithi* between Trang and the Isthmus of Kra (10°25'N). *T. o. flavicauda* is more convincingly a senior synonym of *T. o. smithi*. In view of the uncertainty, however, nomenclatural stability might best be served by relegating *T. o. flavicauda* to the synonymy of *T. o. obscurus*.

136.	Cantor's dusky leaf monkey	*T. obscurus halonifer* (Cantor, 1845)	(A) Malaysia (Dayang Bunting Island, Langkawi Island, Penang Island, adjacent mainland), perhaps marginally into Thailand	NE

Chasen (1935, 1940) referred the Langkawi Island population to *Trachypithecus obscurus carbo*, and believed *T. o. halonifer* endemic to Penang Island, Malaysia. The Langkawi population, however, is closer to *T. o. halonifer* in its paler forearm and faintly bronzed brownish dorsal colour (Hill, 1960; Pocock, 1935). It is variable but, on balance, probably referable to *T. o. halonifer*. Chasen (1935, 1940) considered specimens from Narathiwat (6°26'N 101°50'E) in Thailand, to the Dindings and the Malaysian States of Kedah, Perak, Perlis and Terengganu, intermediate between *T. o. obscurus* and *T. o. halonifer*, whereas Pocock (1935) assigned specimens from some of the same localities to *T. o. obscurus*. Pocock (1935) regarded one from Ban Kachong (7°33'N 99°47'E), Thailand, as intermediate between *T. o. obscurus* and *T. o. flavicauda*. Napier (1985) noted another such specimen from Laem Pho (c. 6°57'N 101°16'E), but the former specimen may be intermediate with *T. o. halonifer* and the latter with *T. o. styx*. Weitzel *et al.* (1988) allocated specimens from Khao Luang (8°31'N 99°47'E) to both subspecies. Hill (1960) agreed with Chasen (1935) that Kedah and Perlis specimens approach *T. o. halonifer* in their darker back, arm and tail. Groves (2001a) classified Perlis specimens as *T. o. flavicauda*.

137.	Phayre's dusky leaf monkey	*T. obscurus phayrei* (Blyth, 1847)	(A) E. Bangladesh, W. Burma, India (S. Assam, Mizoram, Tripura)	NE

Pocock (1935, 1939) acknowledged that the northern subspecies of "*Trachypithecus phayrei*," such as *T. obscurus shanicus*, differ from *T. o. obscurus* only in being dorsally more uniform brown, with less contrastingly coloured occipital hair, and the leg and tail barely paler than the body. The pretext for treating "*T. phayrei*" as a species was merely that these same characters distinguish "its southern races" (*T. barbei holotephreus* and presumably *T. b. barbei*) from the northern subspecies of *T. obscurus*. Unless these latter subspecies (e.g. *T. o. halonifer*) are separated as a distinct species (leaving *T. obscurus* geographically disjunct to its north and south), or three species are

recognized, this is a spurious basis for species recognition. Pocock (1928) believed *T. villosus germaini* only subspecifically distinct from *T. v. villosus*, which it linked "through a form…named *margharita*" (sic) with *T. b. holotephreus* and *T. o. phayrei*. On appreciating the absence of intergradation between *T. obscurus* and *T. villosus* in the Malay Peninsula, and between *T. b. argenteus* and *T. v. germaini* where their ranges meet at Lat Bua Khao, Thailand (Kloss, 1919), Pocock (1935, 1939) abandoned this aggregation of *T. auratus*, *T. barbei*, *T. obscurus* and *T. villosus* into one species. His retreat from their insightful interpretation as effectively a "ring species" was probably precipitated by the misidentification and false locality information which discredited the recognition of *T. v. margarita* (see under *T. v. margarita*).

Populations in a "ring species" intergrade parapatrically at subspecific boundaries, but can no longer be classifiable as a single species if they geographically loop back on one another to become sympatric populations. Pelage colour may then be the only recourse in defining species limits. Under such circumstances, the soft option is to be guided exclusively by sympatry and to recognize as species only demonstrably sympatric populations. This, however, entails surrendering their classification to the vagaries of climate and topography, without objectively evaluating speciation in the studied organism. Their taxonomy becomes subordinated to the climate and terrain confronting the organism, with little relationship to anything intrinsic to the organism itself. In contrast to the parapatry between most *Semnopithecus* taxa, *Presbytis* and especially *Trachypithecus* provide examples of populations looping back on one another in the course of their dispersal. This has induced an uneven taxonomic treatment of the three genera, where modern systematists have been reluctant to recognize more than two species for the genus *Semnopithecus*. An identical approach to *Presbytis* or *Trachypithecus* would involve recognizing sympatric subspecies. Sympatry in peninsular Malaysia dictates that two disparate termini of the *Trachypithecus* "ring species," *T. auratus* and *T. obscurus*, must rank as distinct species. Sympatry between *T. obscurus* and *T. pileatus* in Bangladesh and India precludes their synonymy, but the degree to which the remaining populations are split and the subspecific allocations between such divisions are debatable. If species recognition were minimized then, to avoid the recognition of two central Thailand sympatric subspecies, *T. b. argenteus* would have to be referred to *T. obscurus*. This would leave *T. geei* and *T. pileatus* referable to *T. auratus*, only if regarded as a geographically disjunct species. There is no inherent imperative to recognize "*T. phayrei*" as a species, and the arrangement followed here better reflects geographic variation in pelage colour, the most comprehensively documented taxonomic character in *Trachypithecus* (D. B.-J., in prep.).

| 138. | Zadetkyi dusky leaf monkey | *T. obscurus sanctorum* (Elliot, 1910) | (A) Burma (Zadetkyi Kyun) | NE |

Elliot's (1910) identification as *Trachypithecus obscurus flavicauda* of USNM.124084 from Buda Island, only 50 km north of Zadetkyi Kyun, led Pocock (1935) to suspect *T.o. sanctorum* is synonymous. USNM.124084, however, is distinctly paler with pale greyish yellow, rather than pale greyish brown legs. *T. o. sanctorum* which approaches *T. o. halonifer* in dark pelage is known only from the holotype, seen neither by Chasen (1935) nor Pocock (1935). It probably includes *T. o. corax* as a junior synonym. Other Zadetkyi Kyun specimens are required to preclude *T. o. flavicauda* and/or *T. o. smithi* as its junior synonym.

| 139. | Phangan dusky leaf monkey | *T. obscurus seimundi* (Chasen, 1940) | (A) Thailand (Phangan Island and probably adjacent mainland) | NE |

Chasen (1935) deferred describing *Trachypithecus obscurus seimundi* because its limbs match those of *S. o. halonifer*, while it dorsally resembles *S. o. carbo*, with a less black frontal tract. It is conceivably synonymous with *T. o. styx*.

| 140. | Shan dusky leaf monkey | *T. obscurus shanicus* (Wroughton, 1917) | (A) E. Burma | NE |

The reasons for referring *Trachypithecus obscurus phayrei* to *T. obscurus* also apply to *T. o. shanicus*.

| 141. | Smith's dusky leaf monkey | *T. obscurus smithi* (Kloss, 1916) | (A) N. peninsular Thailand | NE |

Chasen (1935, 1940) perceived *Trachypithecus obscurus smithi* (which was evidently inadvertently omitted from his check-list) as replacing *T. o. flavicauda* (with which it may be synonymous) north of the Isthmus of Kra (10°25'N), but inconsistently assessed as intermediate, specimens from considerably further south at Ban Nong Kok (8°06'N 98°52'E) and Nakhon Si Thammarat (8°26'N 99°58'E). The latter is probably a loose reference to the intermediates which occur at Khao Wang Hip (c. 8°12'N 99°43'E) (Pocock, 1935). Chasen's (1935) claim that specimens of both subspecies occur at Chumphon (c. 10°26'N 99°15'E) is difficult to reconcile with this evidence

of intergradation further south, but perhaps explicable by the local presence of a mainland enclave of *T. o. seimundi*. The Khao Luang, Khao Wang Hip and Surat Thani specimens may be intermediate between *T. o. obscurus* and *T. o. seimundi*.

| 142. | Perhentian dusky leaf monkey | *T. obscurus styx* (Kloss, 1911) | (C) Malaysia (E. Perhentian Island and probably the adjacent coast) | NE |

Pocock (1935) could find no "reliable" pelage character to distinguish *Trachypithecus obscurus styx* from *T. o. carbo*. They are, however, on opposite sides of the Malay Peninsula, and separated by *T. o. obscurus* and/or *T. o. halonifer*. Alternatively, *T. o. styx* and *T. o. halonifer* may be geographically contiguous and perhaps synonymous, splitting "*T. o. obscurus*" into two populations, with *T. o. flavicauda* available as a possible name for the Thai one.

| | *T. obscurus* population | (B) NW. Burma | NE |

Wroughton (1915) determined a skin without skull, BM.1937.9.10.15 from Yin (22°47'N 94°42'E) on the east bank of the Chindwin River, Burma as "*Presbytis* sp." Shortridge (in Wroughton, 1916) suggested it had probably been collected on the west bank at Kin (22°46'N 94°41'E) where *Trachypithecus obscurus phayrei* was fairly plentiful. He collected three specimens there, but saw none on the east bank. Beyond the cultivated west bank the hill ranges were covered with scrub jungle intermixed with larger trees. Along the east bank the scrub jungle was denser, but further inland the much-cultivated terrain levelled out. Pocock (1928) attributed the differences between two specimens "from Yin" to individual variation. Grease or preservatives may have discoloured the pale orange venter and the golden-brown dorsal pelage of BM.1937.9.10.15, but they so strikingly contrast with the moderate individual variation in the three Kin specimens, that it possibily represents a distinct taxon. It may be no coincidence that the Chindwin River approximately marks the western margin of the central Burmese dry zone at this latitude.

| 143. | Blond-bellied capped leaf monkey | *T. pileatus pileatus* (Blyth, 1843) | (A) W. Burma, India (Manipur, Meghalaya, Nagaland) | EN A1cd, C2a |
| 144. | Buff-bellied capped leaf monkey | *T. pileatus brahma* (Wroughton, 1916) | (C) India (NE. Assam) | EN A1cd, C2a |

Trachypithecus pileatus brahma is known only from the holotype, and may be synonymous with *T. p. pileatus*.

145.	Orange-bellied capped leaf monkey	*T. pileatus durga* (Wroughton, 1916)	(A) Bangladesh, W. Burma, India (C. Assam)	EN A1cd, C2a
146.	Shortridge's capped leaf monkey	*T. pileatus shortridgei* (Wroughton, 1915)	(A) NE. Burma and SW. China	EN A1cd, C2a

Similarity in pelage colour and evidence of intergradation make a case for transferring *Trachypithecus pileatus shortridgei* to *T. barbei* (or to "*T. holotephreus*," if *T. barbei* is excluded) (D. B.-J., in prep.).

147.	Tenebrous capped leaf monkey	*T. pileatus tenebricus* (Hinton, 1923)	(A) India (NC. Assam)	EN A1cd, C2a
148.	Cat Ba hooded black leaf monkey	*T. poliocephalus poliocephalus* (Trouessart, 1911)	(A) Vietnam (Cat Ba Island)	CR A2cd C2ab, D

Trachypithecus poliocephalus poliocephalus morphologically resembles *Semnopithecus johnii*. They were treated as conspecific by Brandon-Jones (1995a).

149.	White-headed black leaf monkey	*T. poliocephalus leucocephalus* Tan, 1957	(C) S. China	CR A2cd, C2a

Brandon-Jones (1995a) believed *Trachypithecus poliocephalus leuco-cephalus* might only be an albinistic population of *T. f. francoisi*. Its genetic divergence convinced Wang *et al.* (1997) it is an evolutionary significant unit (ESU), meriting conservation.

150.	Griffith's silver leaf monkey	*T. villosus villosus* (Griffith, 1821)	(A) Brunei, Indonesia (N. Kalimantan, N. Sumatra), Malaysia (W. peninsular, Sabah, N. Sarawak)	DD

The type locality of *Simia villosa* is merely "one of the East Indian islands." Based on pelage colour, D. B.-J. considers it most likely the island was Penang (Malaysia) but, as there is no confirmation the species ever occurred on Penang, he provisionally restricts it to the adjacent Malaysian mainland. Specimens from there match the illustration. It is conceivably a junior synonym of *Trachypithecus a. auratus* but, if synonymized, another

neglected name, *Semnopithecus rutledgii* Anderson, 1879, of unknown type locality, will have to replace it. *S. rutledgii* cannot be suppressed because Khajuria (1955, 1956a) determined it and (perhaps unwisely) employed it as a senior synonym of *Pygathrix ultima* Elliot, 1910. Peninsular Malaysian *T. v. villosus* mtDNA clusters with *T. a. auratus* samples from Java and southern Sumatra (Indonesia) (Rosenblum *et al*., 1997) but, although all *T. villosus* subspecies could be referred to *T. auratus*, the subspecies *T. v. villosus* is recognizable on external characters. The detailed geographic distribution of pelage colour variation, especially in Borneo, requires further review. Some central Bornean specimens are remarkably like *T. v. germaini*, while north Bornean skins more resemble *T. v. margarita*, so we reject Groves' (2001a) opinion that the Indochinese subspecies are specifically separable.

| 151. | Germain's silver leaf monkey | *T. villosus germaini* (Schlegel, 1876) | (A) Cambodia, S. continental Thailand, SW. Vietnam | DD |

Semnopithecus germaini Schlegel, 1876 predates *S. germaini* Milne-Edwards, 1877. Schlegel's (1876, pp. 30, 32, 54, and in the index) consistent omission of the first *i* from the epithet can hardly be construed as a misprint. Milne-Edwards (1877) also omitted it, but both authors included internal evidence that the epithet commemorates one of the paralectotype collectors, (Rodolphe) Germain. Nevertheless, they may have dropped the *i* as a deliberate latinization. A minority of authors (e.g. Pocock, 1935) have employed the original spelling. Most regarded the addition of the first *i* as a justified emendation (International Code of Zoological Nomenclature, Article **32.3.2**). In the interests of nomenclatural stability, the emendation is here retained. *Presbytis cristata caudalis* Dao, 1977 (probably from Cambodia or SW. Vietnam) may be based on specimens intermediate between *Trachypithecus villosus germaini* and *T. v. margarita*, but Groves (2001a) likens it to USNM specimens from "Hainan" (an evidently erroneous locality) and Ban Nong Kho (13°07'N 101°04'E), Thailand, which are referable to *T. v. germaini* (D. B.-J., personal observation).

| 152. | Elliot's silver leaf monkey | *T. villosus margarita* (Elliot, 1909) | (A) S. Laos, NE. Thailand, S. Vietnam | DD |

Allen and Coolidge (1940) claimed to have typical *Trachypithecus villosus germaini* specimens from Ban Me Thuot (=Lac Giao, 12°40'N 108°03'E), Vietnam; and Pocock (1935) adopted Osgood's (1932) opinion that the sole confirmed specimen of *T. v. margarita* was "essentially the same animal and quite distinct from *crepusculus*." Pocock (1935) did note a resemblance between the holotype and one specimen labelled "Lao Bao" (probably in

reality from Mimot, Cambodia), and to two young specimens from "Cambodia or Cochin China." One of these juveniles has an original vellum label inscribed "in muntibus Cam in prov. Chaudoc" (=Chau Phu, 10°42'N 105°07'E), and both probably come from the western part of the Cambodian-Vietnamese frontier area. Osgood (1932) misidentified (D. B.-J., personal observation) *T. v. margarita* FMNH.38014 and 38015 from Ban Phon, Laos, as "*Pithecus pyrrhus argenteus*." FMNH.46519-46522 from Lac Giao; USNM. 258229 from Trang Bôm arboretum (10°57'N 107°01'E), Vietnam; USNM. 300018 from Ban Sahng Kaw, Koekpue, Sakon Nakhon; and USNM.307717, simply labelled Sakon Nakhon (17°10'N 104°09'E), Amphur Phu Pan, Thailand, are all referable to *T. v. margarita* (D. B.-J., personal observation). *T. v. margarita* evidently ranges from there to its type locality at Lang Bian (12°03'N 108°27'E), Vietnam.

Family Hylobatidae Gray, 187

Genus *Bunopithecus*
Matthew and Granger, 1923

The fossil type of *Bunopithecus sericus* does not appear congeneric (Groves, 2001a), so hoolocks may require a new generic name. Zhang (1997) could not resolve the 3-way split among *Bunopithecus*, *Hylobates* and *Symphalangus*, but Roos and Geissmann (2001) concluded that the molecular distances between the 4 gibbon genera compare with or exceed those that separate *Homo* and *Pan*. Takacs *et al.*'s (in prep.) mtDNA analysis of all recognized gibbon species also strongly supports the distinction of 4 reciprocally monophyletic gibbon clades that correspond exactly to the 4 proposed gibbon genera.

153.	Western hoolock	*B. hoolock hoolock* (Harlan, 1834)	(A) Bangladesh, W. Burma, India (Assam)	EN A1cd
154.	Eastern hoolock	*B. hoolock leuconedys* (Groves, 1967)	(A) Burma (east of Chindwin River), China (W. Yunnan)	EN A1cd
		Genus *Hylobates* Illiger, 1811		
155.	Mountain agile gibbon	*H. agilis agilis* F.Cuvier, 1821	(A) Indonesia (W. Sumatra)	LR/nt
156.	Bornean agile gibbon	*H. agilis albibarbis* Lyon, 1911	(A) Indonesia (SW. Kalimantan, between the Kapuas and Barito Rivers)	LR/nt

Hylobates agilis albibarbis is referable to *H. agilis* on vocalization, but to *H. agilis* or *H. muelleri* on pelage colour (Marshall and Sugardjito, 1986; Weitzel *et al*., 1988). Groves (2001a) isolated it as a separate species.

157.	Lowland agile gibbon	*H. agilis unko* Lesson, 1829	(C) Indonesia (E. Sumatra), peninsular Malaysia, adjacent Thailand	LR/nt

Hylobates agilis unko has been distinguished from *H. a. agilis* only by its higher ratio of dark to pale pelage colour morphs, leaving individuals of unknown provenance indeterminate. Further research is desirable.

158.	Mentawai gibbon	*H. klossii* (Miller, 1903)	(A) Indonesia (Mentawai Islands)	VU A1c + 2c B1 + 2ac
159.	Malayan white-handed gibbon	*H. lar lar* (Linnaeus, 1771)	(A) Peninsular Malaysia, possibly adjacent Thailand	LR/nt

The distinguishing features of the *Hylobates lar* subspecies require more methodical documentation.

160.	Carpenter's white-handed gibbon	*H. lar carpenteri* Groves, 1968	(A) E. Burma, W. Laos, N. Thailand	LR/nt
161.	Central white-handed gibbon	*H. lar entelloides* I. Geoffroy Saint-Hilaire, 1842	(A) SE. Burma, C. and S. Thailand	LR/nt

A body weight increase in wild *Hylobates lar* from the Isthmus of Kra (Geissmann, 1993) possibly indicates the local presence of an additional *H. lar* taxon.

162.	Sumatran white-handed gibbon	*H. lar vestitus* Miller, 1942	(A) Indonesia (N. Sumatra)	LR/nt
163.	Yunnan white-handed gibbon	*H. lar yunnanensis* Ma and Wang, 1986	(C) China (SW. Yunnan)	CR C2a, D

Hylobates lar yunnanensis closely resembles, and is probably synonymous with *H. l. carpenteri*.

164.	West Javan silvery gibbon	*H. moloch moloch* (Audebert, 1797)	(A) Indonesia (W. Java)	CR A1cd C2a

165.	Central Javan silvery gibbon	*H. moloch pongoalsoni* Sody, 1949	(C) Indonesia (C. Java)	CR A1cd C2a

Andayani *et al.* (2001) identified two distinct *Hylobates moloch* lineages: a "western" lineage, represented by the largest remaining natural population in Gunung Halimun National Park, and a "central" lineage, consisting of smaller, more isolated populations in and around the Gunung Masigit/Simpang/Tilu complex, Gunung Gede/Pangrango, and Gunung Slamet. If confirmed by other genetic data, these two lineages may be subspecifically distinguishable.

166.	Müller's gray gibbon	*H. muelleri muelleri* Martin, 1840	(A) Indonesia (SE. Kalimantan, east of the Barito River)	LR/nt

The probable date of publication is indicated by Blyth's (1843) report that Martin (1840) was discontinued "from the failure of the publishers, in 1840" after the ninth number (a review of the Colobinae).

167.	Abbott's gray gibbon	*H. muelleri abbotti* Kloss, 1929	(A) Indonesia (W. Kalimantan, north of the Kapuas River), Malaysia (W. Sarawak)	LR/nt
168.	Northern gray gibbon	*H. muelleri funereus* I. Geoffroy Saint-Hilaire, 1850	(A) Brunei, Indonesia (NE. Kalimantan), Malaysia (Sabah, NE. Sarawak)	LR/nt
		H. muelleri population	(B) Indonesia (CE. Kalimantan)	

Apart from north Vietnam, gibbon distribution in Borneo is most inadequately documented. Marshall and Sugardjito's (1986, fig. 4) map illustrates the coastal bias in available information, and indicates there may be a distinct taxon resembling *Hylobates muelleri abbotti*, but with a black cap and black tips to the digits. It is similarly distributed to *Presbytis hosei canicrus*, but possibly traverses the island to intergrade with *H. m. abbotti* and *H. m. funereus* in eastern Sarawak. An area of hybridization between *H. agilis* and *H. muelleri* exists on one part of the Barito (Chivers and Burton, [1991]), but it remains unsubstantiated that the rest of the Barito and Kapuas river system acts as a faunal barrier. The lack of pelage color variation at all localities to the southwest of Riam (1°50'S 111°54'E), Kalimantan, and near uniformity

of 17 specimens from Parit, but variation in four from Riam (Marshall and Sugardjito, 1986), suggests that Riam may lie on a contact zone between the two species. The area between Riam and the Kapuas River is gibbon terra incognita and could conceivably accommodate the southern section of a central Bornean population of a *H. m. funereus* with black hands and toes. Hose (1893) is chiefly responsible for the fallacy that Bornean gibbons show great individual pelage colour variation. A more considered interpretation, substantiated by Marshall and Sugardjito's (1986) map, is that Hose's residence at Marudi lies at an area of intergradation. Some apparently random variation does occur, but the most notable case of a *H. m. abbotti* occurring in a *H. m. funereus* stronghold is that of a specimen whose locality was thought to be the river Seliman in Sabah, Malaysia. "Sliman," however, is not its locality, but the name of its collector employed by the Sarawak museum. The "13th mile" associated with the specimen (Marshall and Sugardjito, 1986) indicates it was collected 21 km along a road from Kuching, probably to the southwest where *H. m. abbotti* would be expected to occur. The other specimens of *H. m. abbotti* near the Kalimantan-Sabah border may therefore genuinely indicate intergradation, which could radically alter the known pattern of Bornean gibbon distribution.

169.	Pileated gibbon	*H. pileatus* Gray, 1861	(A) W. Cambodia, SW. Laos, SE. Thailand	VU A1cd + 2cd
		Genus *Nomascus* Miller, 1933		
170.	Tonkin black crested gibbon	*N. concolor concolor* (Harlan, 1826)	(A) China (C. Yunnan), N. Vietnam (between Black and Red River)	EN A1cd C2a
171.	West Yunnan black crested gibbon	*N. concolor furvogaster* (Ma and Wang, 1986)	(C) China (W. Yunnan, between Salween and Mekong River)	CR A2cd, B2a

Nomascus concolor furvogaster closely resembles, and may be synonymous with *N. c. concolor*. Its diagnostic features were derived from a female still in subadult pelage colour (Geissmann, 1995).

172.	Central Yunnan black crested gibbon	*N. concolor jingdongensis* (Ma and Wang, 1986)	(C) China (C. Yunnan, between Mekong and Black River)	CR C2b

Female *Nomascus concolor jingdongensis* differ from those of the possibly synonymous *N. c. concolor* in being pale golden yellow, rather than pale brownish or greyish yellow; having a grey-white, rather than black face ring; and a short-tailed tadpole-shaped crown patch, instead of a posteriorly-elongated diamond-shaped one.

| 173. | Laotian black crested gibbon | *N. concolor lu* (Delacour, 1951) | (C) NW. Laos (Bokeo Province) | EN A1c |

Most of N. Laos separates *Nomascus concolor lu* from the remarkably similar and possibly synonymous *N. c. concolor*. They are distinguished by an individually variable trait in *N. c. lu* conceivably acquired by hybridization with the geographically intervening *N. l. leucogenys* (Geissmann, 1989).

| 174. | Eastern black crested gibbon | *N*. sp. cf . *nasutus nasutus* (Kunckel d'Herculais, 1884) | (A) NE. Vietnam (east of the Red River) | CR D |

Nomascus sp. cf . *nasutus hainanus* and an uniquely pelage-coloured captive female (Geissmann, 1989) are considered specifically distinct from *N. concolor* in vocalization (Geissmann, 1995, 1997) and mtDNA (Takacs, in prep.). The captive black juvenile holotype of *Hylobates nasutus* of unrecorded sex may be the corresponding male or juvenile female mainland morph. Its purported locality ("au voisinage de la baie d'Along") and that of the female ("hinterland of Hon Gai") are arguably synonymous. If the holotype locality is false, the scientific name may be a junior synonym of *N. concolor*, and would then be unavailable for this population.

| 175. | Hainan black crested gibbon | *N*. sp. cf . *nasutus hainanus* (Thomas, 1892) | (A) China (Hainan Island) | CR D |
| | | *N*. sp. cf . *nasutus* population | (B) NE. Vietnam (Cao Bang and Hoa Binh Provinces) | NE |

This population has yet to be distinguished from "*Hylobates* (*Nomascus*) *hainanus*" to which Groves (2001a) referred it. It is provisionally separated as a mainland population.

| 176. | Northern white-cheeked crested gibbon | *N. leucogenys leucogenys* (Ogilby, 1840) | (A) China (S. Yunnan), N. Laos, NW. Vietnam | EN A1cd + 2cd |
| 177. | Southern white-cheeked crested gibbon | *N. leucogenys siki* (Delacour, 1951) | (A) S. Laos, C. Vietnam | DD |

Corbet and Hill (1992) synonymised *Nomascus leucogenys siki* with *N. gabriellae*. Geissmann (1995) advocated its referral to *N. leucogenys*, while mitochondrial DNA evidence convinced Zhang (1997) it is a distinct species.

178. Yellow-cheeked crested gibbon	*N. gabriellae* (Thomas, 1909)	(A) S. Laos, S. Vietnam, E. Cambodia	VU A1cd + 2cd
	Genus *Symphalangus* Gloger, 1841		
179. Sumatran siamang	*S. syndactylus syndactylus* (Raffles, 1821)	(A) Indonesia (Sumatra)	LR/nt
180. Malayan siamang	*S. syndactylus continentis* Thomas, 1908	(C) Peninsular Malaysia	LR/nt

Dental dimensions indicate *Symphalangus syndactylus continentis* may be slightly smaller than *S. s. syndactylus*. No body weights of wild-reared Malay Peninsula specimens are available, and no other distinguishing characters have been detected.

Family Hominidae Gray, 1825

Subfamily Ponginae Elliot, 1913

Genus *Pongo* Lacépède, 1799

181. Sumatran orangutan	*P. abelii* Lesson, 1827	(A) Indonesia (N. Sumatra)	CR A2bcd

The germ of the recent appreciation that there may be 2 species of orangutan, and conflicting views on their nomenclature were summarised by Weitzel *et al*. (1988). Courtenay *et al*. (1988) and Groves *et al*. (1992) stressed that the Bornean population should not be presumed homogeneous. Southwest Bornean orangutan skulls are fairly distinct from those of Sabah and northwest Borneo and, to some extent, approach those of Sumatra. Similarly, southwest Bornean orangutans share more dental traits with Sumatran ones than do those from north of the Kapuas River (Uchida, 1998). Boestani and Smits (1994) considered the dermatoglyphics of Sumatran and East Kalimantan orangutans specifically distinct. Molecular data indicates a prolonged separation between the two island populations (Chemnick and Ryder, 1994; Janczewski *et al*., 1990; Ryder and Chemnick, 1993; Xu and Arnason, 1996; Zhi *et al*., 1996), but it is possible that most or all of the sampled Bornean specimens derive from the northwestern population. Muir

et al. (1995) believed their preliminary DNA results from a Bornean population (presumably from Tanjung Puting in southwest Borneo) and a single Sumatran individual contradicted this separation.

182.	Western Bornean orangutan	*P. pygmaeus pygmaeus* (Linnaeus, 1760)	(A) Indonesia (W. Kalimantan, north of the Kapuas River), Malaysia (W. Sarawak)	EN A2cd
183.	Southern Bornean orangutan	*P. pygmaeus wurmbii* (Tiedeman, 1808)	(C) Indonesia (SW. Kalimantan, between the Kapuas and Barito Rivers)	EN A2cd

Pongo pygmaeus wurmbii has been diagnosed only craniometrically (Groves, 2001a) but, from the above evidence, there may be a case for promoting it to a species, with *P. abelii* as a subspecies. In any event, the type locality of *P. p. pygmaeus* requires unequivocal identification, to preclude the possibility that it is the correct name for the southwestern population.

P. pygmaeus population	(B) Indonesia (E. Kalimantan, south to the Mahakam River), Malaysia (Sabah)	NE

Skulls of the orangutan population from Sabah south to the Mahakam River, proportionally resemble those of *Pongo pygmaeus pygmaeus*, but are very small (Groves, 2001a). Further nomenclatural research is required but, if subspecifically recognizable, this population seems unnamed. *Simia morio* Owen, 1837 and other synonyms Groves (2001a) applied to this population almost certainly all pertain to *P. p. pygmaeus*.

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*CR, critically endangered; DD, data deficient; EN, endangered; LR, lower risk; NE, not evaluated; V, vulnerable.

Table II. Summary statistics for Asian primates (by Linnaean rank)

Linnaean Rank	Total	Net Change from Eudey (1998)
Families	5	0
Genera	16	+3 3 new gibbon genera accepted
Species	77	+6 9 new species accepted, but 3 previous species subsumed
Named taxa	183	+7
Named taxa, here accepted (grade A)	152	
Unnamed suspected new taxa (grade B)	22	+22
Named taxa, lacking credibility (grade C)	31	

Table III. Summary statistics of species-level changes (by genera)

	Elevated or added	Demoted or rejected	Δ	Number of species recognized here	Number of species recognized by Eudey (1998)
Loris	*lydekkerianus*	—	+1	2	1
Nycticebus	*bengalensis javanicus*	—	+2	4	2
Tarsius	—	—	0	7	7
Macaca	*leonina*	*brunnescens*	0	19	19
Nasalis	—	—	0	1	1
Presbytis	—	—	0	10	10
Pygathrix	*nigripes*	—	+1	2	1
Rhinopithecus	—	—	0	4	4
Semnopithecus	From *Trachypithecus: johnii vetulus*	—	+2	3	1
Simias	—	—	0	1	1
Trachypithecus	*barbei villosus*	*cristatus phayrei* To *Semnopithecus: johnii vetulus*	−2	10	12
Bunopithecus	—	—	0	1	1
Hylobates	—	—	0	6	6
Nomascus	sp. cf. *nasutus*	—	+1	4	3
Symphalangus	—	—	0	1	1
Pongo	*abelii*	—	+1	2	1
Total			+6	77	71

Table IV. Summary statistics of subspecific changes (by genera)

	Elevated or added	Demoted or rejected	Δ	Number of taxa recognized here	Number of taxa recognized by Eudey (1998)
Loris		*L. lydekkerianus nordicus*	−1	5	6
Nycticebus			0	5	5
Tarsius	*bancanus borneanus bancanus natunensis bancanus saltator syrichta carbonarius syrichta fraterculus*		+5	12	7
Macaca	*mulatta sanctijohannis*	*mulatta brevicauda mulatta mcmahoni mulatta villosa*	−1	40	41
Nasalis	*larvatus orientalis*		+1	2	1
Presbytis	*melalophos nobilis rubicunda carimatae siamensis cana*	*femoralis margae melalophos fluviatilis rubicunda rubida siamensis catemana thomasi nubila*	−2	29	31
Pygathrix	*nemaeus cinerea*		+1	3	2
Rhinopithecus			0	6	6
Semnopithecus	*entellus achates* From *Trachypithecus: johnii vetulus vetulus vetulus monticola vetulus nestor vetulus philbricki*	*entellus elissa entellus lanius*	+4	15	11
Simias			0	2	2

Trachypithecus	*auratus pyrrhus barbei holotephreus francoisi ebenus pileatus brahma*	*auratus cristatus phayrei crepusculus* To *Semnopithecus: johnii vetulus vetulus vetulus monticola vetulus nestor vetulus philbricki*	36	33	−3
Bunopithecus	*moloch pongoalsoni*		2	2	0
Hylobates	*concolor furvogaster*		14	15	+1
Nomascus			8	9	+1
Symphalangus			2	2	0
Pongo	*pygmaeus wurmbii*		2	3	+1
Total			176	183	+7

ACKNOWLEDGMENTS

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