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THE ASIAN SPECIES OF *GALERITULA* STRAND (COLEOPTERA, CARABIDAE)

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Very few attempts have been made to study the relatively few Asian species of *Galeritula*. All these species have been described individually, by separate authors, who usually had very few specimens of each.

Heller (1923:65) was the first to attempt the characterization of species groups when he described *szetschwana* from China. However, the characters he used to divide the Asian species of *Galeritula* into two groups are very variable (posterior constriction of pronotum more or less well developed, and margins of pronotum parallel or divergent behind the constriction), as will be seen below. The failure of this system is evidenced by Heller's separation of *peregrina* Dohrn and *birmanica* Bates into different groups, even though these species were considered synonymous by Andrewes a few years earlier (1919:480).

In 1949 Jeannel assigned the Asian species of *Galeritula* (together with a few African forms) to a new genus, *Galeritella*.

Finally, in 1963, Jedlicka presented a revision of the species found on the Asian Continent. According to this author (1963:474) it is very difficult to separate some species morphologically, since most of them are very similar; Jedlicka separated the species, as did most earlier authors, solely on the basis of color. As pointed out later in this paper, the coloration is a very variable character in *G. orientalis* and for this reason this species has been described several times (eight names are available for *orientalis*). The fact that such variation occurs can, however, only be observed in large series of specimens. No author has yet had many specimens on which to base his studies.

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In the course of my present work on the Neotropical species of *Galeritula*, I have been able to study many types as well as undetermined material of Asian species in the British Museum (Natural History), London, and the Muséum National d'Histoire Naturelle, Paris. In addition, several other museums have provided specimens for identification. Study of this relatively rich collection of 138 specimens has revealed some very interesting facts, and has produced many new distributional records. All this has led to a study of the Oriental species and their relationships, which is reported here.

SOURCES OF MATERIAL, METHODS AND ACKNOWLEDGMENTS

The present study is based on material from the following collections (abbreviations as used in the text) :

British Museum (Natural History), London (BM) ; Mr. Jacques Nègre's collection, Versailles (JN) ; Institute of Zoology, Polish Academy of Sciences, Warsaw (IZ) ; Museum of Comparative Zoology, Cambridge, Mass. (MCZ) ; Muséum National d'Histoire Naturelle, Paris (MNHN) ; Academy of Natural Sciences, Philadelphia (ANSP), and Senckenberg Museum, Frankfurt am Main (SMF).

The measurements of the specimens have been made with a microruler in the microscope ocular. Comparison is made between measurements of parts of the beetles (expressed in the descriptions by ratios) as follows: *Head* — width/length (width taken at the widest point, including the eyes; length taken from apex of clypeus to constriction behind the eyes, not including the neck); length of eyes/length of occiput (the measurement of the occiput is made parallel to the longitudinal axis of the body, from posterior margin of eye to beginning of neck). *Pronotum* — width/length (width taken at widest point; length along the median line). *Elytra* — width/length (width at widest point; length from base to apex, along suture). Total length of specimens has been measured from the tip of mandibles to apex of elytra, excluding the pygidium.

I am greatly indebted to the curators of the above mentioned collections, without whom this study would have been impossible; special thanks are due to the Evolutionary Biology Committee at Harvard University, which provided the funds for my European studies in June 1964. I am also grateful to Professor P. J.

Darlington, Jr., Dr. E. G. MacLeod and Dr. R. W. Taylor for having read and criticized the manuscript.

GALERITULA Strand, 1936

Galerita Fabricius, 1801, Syst. Eleuth., 1:214 [type, by subsequent designation (Latreille, 1810, Consid. Gen.:426) *Carabus americanus* Linnaeus, 1758]; Jedlicka, 1941, Versuch einer Monographie der Truncatipennen . . . pp. 12, 25 [notes on Asian species]. Not *Galerita* Gouan, 1770.

Galeritula Strand, 1936, Fol. Zool. Hydrobiol., 9:168 [new name for *Galerita* Fabricius, 1801]; Basilewsky, 1963, Ann. Mus. Roy. Afr. Centr., 8°, Sci. Zool., 120:5, 6, 7, 23 [genus restricted to Neotropical species]; Jedlicka, 1963, Ent. Abh. Mus. Dresden, 28:474-475 [revision of continental Asian species].

Galeritina Jeannel, 1949, Faun. Emp. Franç., 11:1058 [new name for *Galerita* Fabricius, 1801].

Galeritella Jeannel, 1949, Faun. Emp. Franç., 11:1058 [type, by original designation, *Galerita orientalis* Schmidt-Goebel, 1846]; Basilewsky, 1963, Ann. Mus. Roy. Afr. Centr., 8°, Sci. Zool., 120:8, 63-64 [revision of African species]. *NEW SYNONYMY*.

Galericeps Jeannel, 1949, Faun. Emp. Franç., 11:1058, 1062 [type, by original designation, *Galericeps pheropsophoides* Jeannel, 1949]; Basilewsky, 1963, Ann. Mus. Roy. Afr. Centr., 8°, Sci. Zool., 120:63, 64 [proposed synonymy with *Galeritella*].

In the revision of the Carabidae from Madagascar, Jeannel divided the pantropical genus *Galerita* into several genera. The new generic groups were based on the following characters: "la forme de la dent labiale et . . . évolutions divergentes de la sculpture élytrale" (1949: 1057). As I have already mentioned in the introduction to this paper, only the Asian forms (which together with some species from Africa and Madagascar have been separated by Jeannel and subsequent authors as *Galeritella*) will be discussed here.

The mouthparts of *G. orientalis* (Fig. 1), type species of *Galeritella*, have been compared with those of *americana* (Fig. 2), the type species of *Galeritula*, and also with other Neotropical species of the genus. No important difference seems to be present, not even in the "dent labiale," the character stressed by previous authors. The same is true for all the other species found in Asia that I have been able to study in detail.

The second character mentioned by Jeannel (1949: 1058), the elytral structure, really seems to be of importance, but no consistent difference between American and Asian species could be

found, as noted by Jeannel himself (1949: 1058, “. . . a développé la même sculpture élytrale”)!

More recently, Basilewsky (1963: 7-8, 63-64) added new characters, which should also be analyzed. He characterized *Galeritella* as having “. . . une membrane apicale transparente aux élytres,” and a more voluminous aedeagus, the latter very often with “partie terminale individualisée” (the latter, however, only in the African species).

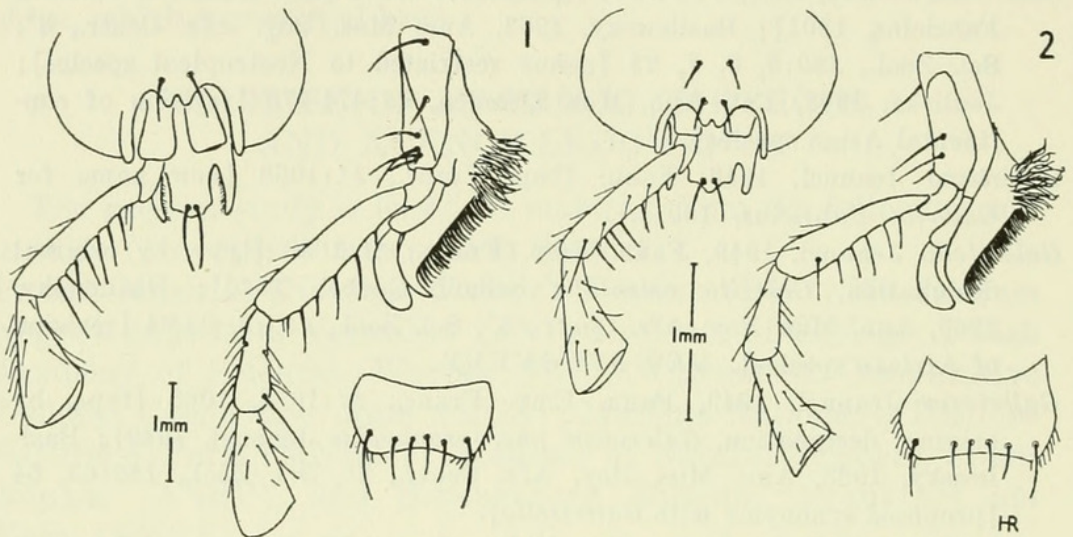


Fig. 1. *Galeritula orientalis*, ♂ from Jabalpur (MCZ), mouthparts.

Fig. 2. *G. americana*, ♂ from Trinidad (MCZ), mouthparts.

As to the first character, Asian species have a membranous apical margin on the elytra (for a width of less than 0.1 mm). This membrane is much less developed in Neotropical species, but it can be found with high magnification and careful examination.

As part of this paper, I have measured and studied the genitalia of the Oriental species which were available (Figs. 4-8). Although the relative size of the aedeagus really seems to be larger in these than in most Neotropical species, it seems also to be true that the Oriental species are larger insects than the average Neotropical species, so that insofar as my investigation goes, the size of aedeagus seems to be directly related to the size of the species. I have not studied the genitalia of any African species of *Galeritella*; however, Basilewsky (1963: 64 and fig. 28) indicates that the African species have a less well developed aedeagus, and this seems to agree with the average smaller size of the African species.

Figure 3 represents the linear regression for total length of aedeagus against total length of specimen in 25 species of *Galeritula* (21 Neotropical, 4 Oriental) and indicates clearly that the size of aedeagus is related to the size of species. Since material available for dissection is not always present in desirable quantities, I have represented in Figure 3 the size of

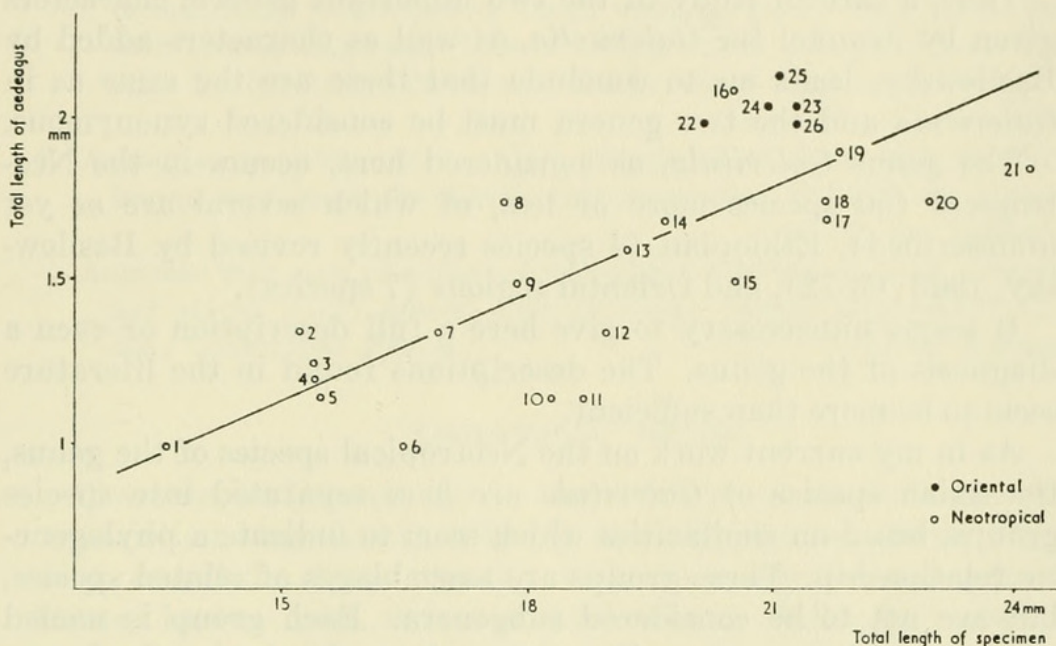


Fig. 3. *Galeritula* species showing linear regression for total length of aedeagus against total length of specimen. 1, *gracilis* Brullé; 2, *unicolor* Latreille and Dejean; 3, *palustris* Liebke; 4, *striata* Klug; 5, *microcostata* Darlington; 6, *lacordairei* Dejean; 7, *coeruleipennis* Chaudoir; 8, *collaris* Dejean; 9, *ruficollis* Dejean; 10, *melanarthra* Chaudoir; 11, *nigra* Chevrolat; 12, *tucumana* Liebke; 13, *americana* Linnaeus; 14, *occidentalis* Olivier; 15, *orbigny* Lucas; 16, *championi* Bates; 17, *brasiliensis* Dejean; 18, *bruchi* Liebke; 19, *carbonaria* Mannerheim; 20, *corumbana* Liebke; 21, *ventricosa* Lucas; 22, *orientalis* Schmidt-Goebel, from India; 23, same species from Japan; 24, *carinifrons* Schaufuss; 25, *feae* Bates; 26, *toreuta* Andrewes.

aedeagus in relation to the specimen it comes from, rather than taking mean size of aedeagus against mean size of species in each case. Although variation of aedeagus is not large, in species where I have studied larger series (see for example "22" and "23" in Figure 3, which represent two different sized specimens of the same species, from different localities), it must be kept in mind that the points in Figure 3 do not represent the species, but only one specimen each.

The linear regression for this character shows very clearly that there is no place to objectively draw a line between Oriental and Neotropical species.

As to the apex of genitalia, the aedeagus of Neotropical species shows a large range of variation which includes forms very similar to those of the Asian and African ones.

Thus, a careful study of the two important generic characters given by Jeannel for *Galeritella*, as well as characters added by Basilewsky, leads me to conclude that these are the same as in *Galeritula* and the two genera must be considered synonymous.

The genus *Galeritula*, as considered here, occurs in the Neotropical (50 species more or less, of which several are as yet undescribed), Ethiopian (4 species recently revised by Basilewsky, 1963: 63-72), and Oriental regions (7 species).

It seems unnecessary to give here a full description or even a diagnosis of the genus. The descriptions found in the literature seem to be more than sufficient.

As in my current work on the Neotropical species of the genus, the Asian species of *Galeritula* are here separated into species groups, based on similarities which seem to indicate a phylogenetic relationship. These groups are assemblages of related species, but are not to be considered subgenera. Each group is named after the oldest species. The Oriental species can easily be assigned to two groups, as will be seen below. The African species, although related to Oriental and Neotropical ones, seem to constitute other, distinct groups, as do the Neotropical species.

Key to species

1. Legs black2
 Legs red or yellowish-brown3
2. Head and pronotum more elongate; carinulae-interstices much deeper than carinae-carinulae-interstices; carinae not very high; 21.8 mm; continental species *feae* Bates
 Head and pronotum less elongate; carinulae-interstices as deep as carinae-carinulae-interstices; carinulae very thin; carinae higher; 21.0-22.0 mm; Java *toreuta* Andrewes
3. Legs completely red; 17.5 mm; India *indica* Chaudoir
 Legs with yellow femora and brownish tibiae; apices of femora darkened4
4. Head with shorter occiput (roughly as long as diameter of one eye); carinae usually less well developed; pubescence in carinae-carinulae-interstices dense, formed by two irregular rows of hairs; head red, elytra usually bluish5

- Head with longer occiput (longer than diameter of one eye); carinae usually well developed; pubescence in carinae-carinulae-interstices less dense, formed by a single row of hairs; head, pronotum and elytra black (or sometimes very dark fuscous) 6
5. Pronotum dark brown; head completely red on superior face; hind wings reduced; 20.0 mm; India *ruficeps* Chaudoir
Pronotum varying from completely red, through red with dark margins, to completely dark brown or black; when completely dark brown, head with frontal ridge and sides of occiput much darkened; hind wings fully developed; 18.5-22.0 mm; India to Japan, Sumatra to Flores
..... *orientalis* Schmidt-Goebel
6. Antennae completely rufous; head, pronotum and elytra dark brownish; humeri very poorly developed, wingless species; 19.5-21.0 mm; Celebes *carinifrons* Schaufuss
Antennae with apex of scape and segments 2-4 darkened; head, pronotum and elytra black; humeri well developed (wings dimorphic?); 21.0 mm; Continental species *batesi* Andrewes

"ORIENTALIS" Group

Characterized mainly by the shape of pronotum, with posterior constriction very basally placed, not well defined; basal angles very rounded; elytra usually with very conspicuous pilosity, formed by two more or less parallel rows of rufous hairs in each carinae-carinulae-interstice.

Three species are known: *orientalis* Schmidt-Goebel, *indica* Chaudoir and *ruficeps* Chaudoir.

GALERITULA ORIENTALIS (Schmidt-Goebel, 1846)

(Figs. 1, 3-5, 9)

Galerita orientalis Schmidt-Goebel, 1846, Faunula Coleopterorum Birmaniae, pp. 26-27 [types, ♂ and ♀, "birmesische Provinzen," Prague Museum; not examined]; Andrewes, 1923, Trans. Ent. Soc. London: 8 [redescription].

Galerita nigripennis Chaudoir, 1861, Bull. Soc. Nat. Moscow, 34(1):557 [types, ♂ and ♀, "Indes Orientales," Muséum National d'Histoire Naturelle, Paris; not located]. *NEW SYNONYMY*.

Galerita japonica Bates, 1873, Trans. Ent. Soc. London: 304 [types, Nagasaki, Yokohama; British Museum (Natural History), not located]; Chaudoir, 1877, Bull. Soc. Nat. Moscow, 52(1):255 [synonym of *nigripennis*?]. *NEW SYNONYMY*.

Galerita peregrina Dohrn, 1880, Stett. Ent. Zeit., 41:291 [types, Hong Kong, Stettin Museum; not examined]. *NEW SYNONYMY*.

Galerita ruficeps; Bates [nec Chaudoir], 1889, Ann. Mus. Civ. Genova, 27:109 [Bhamo, Burma].

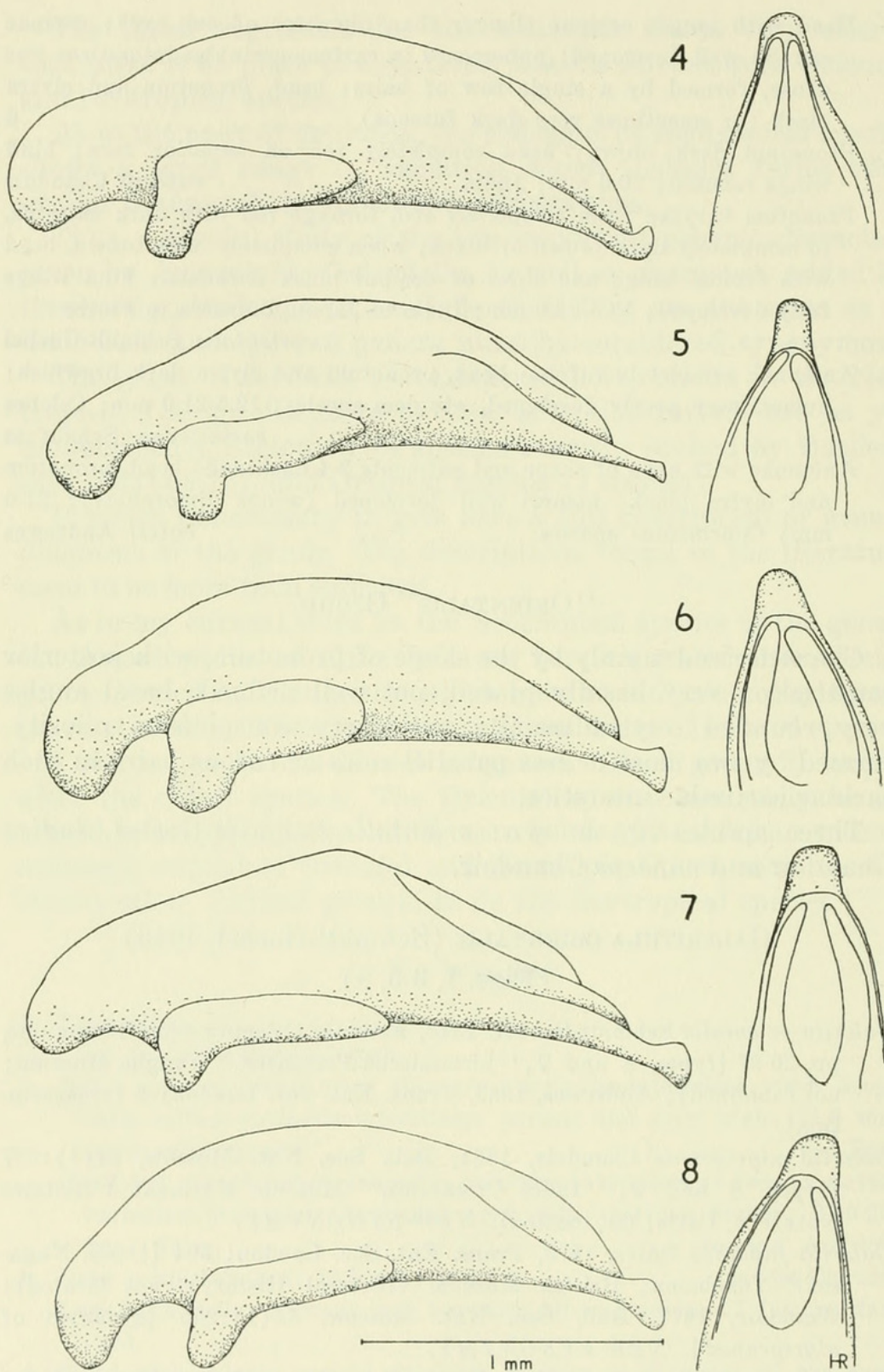


Fig. 4, *Galeritula orientalis*, from Tsushima (SMF C13907), aedeagus; Fig. 5, *G. orientalis* from Jabalpur (MCZ), aedeagus; Fig. 6, *G. carinifrons*, from Bonthain (IZ), aedeagus; Fig. 7, *G. feae*, from Lambok (SMF C13910), aedeagus; Fig. 8, *G. toreuta*, from Radeng (MCZ), aedeagus.

Galerita birmanica Bates, 1892, Ann. Mus. Civ. Genova, 32:385 [*G. ruficeps*; Bates, 1889; types, Bhamo, Burma, Genova Museum; not examined].

Galerita szetschwana Heller, 1923, Ent. Blaett., 19:65 [type, "Omisien, Szeschuan," Dresden Museum; not examined]. *NEW SYNONYMY*.

Galerita formosana Kano, 1930, Trans. Nat. Hist. Soc. Formosa, 20:29, fig. 3 [types, 2 ♀, Taihoku, Urai; Kano collection; not examined]. *NEW SYNONYMY*.

Redescription: Head varying from completely black to completely red, with intermediates where head is red with black frontal ridge and black sides of occiput (typical *peregrina*); pronotum also varying from completely black or bluish (*peregrina*) to completely red (*szetschwana*), with intermediates which have more or less developed black margins (*japonica*, *nigripennis* and *formosana*); elytra blue, sometimes very dark, almost black; antennae and mouthparts rufous; femora yellow with black apices; tibiae and tarsi rufous; inferior side dark brown, almost black on abdomen.

Head longer than wide (1.07) with relatively small eyes; occiput as long as eyes; surface punctate-rugose, with few yellow hairs, mainly in posterior half.

Pronotum wider than head (1.25), slightly longer than wide (1.03); widest slightly in front of the middle; not much narrowed anteriorly or posteriorly; posterior constriction very basal, sides varying from slightly convergent to slightly divergent behind the constriction; surface convex, densely punctate-rugose.

Elytra much wider than pronotum (1.7); 1.73 times as long as wide, almost parallel, slightly widened in posterior half; carinae strong, carinulae very thin, sometimes almost erased; carinulae-interstices with very shallow row of punctures; carinae-carinulae-interstices with dense rufous pilosity, disposed in two somewhat irregular rows. Always fully winged.

Measurements: length, 18.6-22.0 mm; width, 5.9-7.3 mm.

Specimens examined (96): **India**: Kerala, Wallardi, Travancore (10 ♂, 4 ♀, MNHN); Madras, Nilgiri Hills (6 ♂, 7 ♀, MCZ, BM); Madhya Pradesh, Jabalpur, 480 m (3 ♂, 1 ♀, MCZ); Maharashtra, Nagpur (1 ♀, MCZ); Assam, Patkai Mts. (1 ♂, BM). **Burma**: Bhamo (2 ♂, 7 ♀, BM, MNHN); Tenasserim (1 ♀, BM); Kachin Hills, Malikha Valley, 300-750 m (1 ♀, BM); no locality (1 ♀, SMF C13899). **Vietnam**: Hoabinh (4 ♂, 2 ♀, BM, MNHN, IZ); Lactho (1 ♂, MNHN); Ha Ciang (1 ♀, MNHN); Tuyenkwan (1 ♀, MNHN); Hue (1 ♀, BM); Phuc-son (2 ♀, SMF C13900); Long Chuyan (1 ♀, BM). **Hong Kong** (1 ♀, BM). **China**: Kwangsi, Kweiling (1 ♂, MCZ); Liuchow (1 ♂,

MCZ); Wuchow (1 ♀, MCZ); *Kiangsu*, Nanking (1 ♀, MCZ); *Tschekiang*, Ning-Po (1 ♀, BM); *Szechuan*, Chungking (1 ♀, MCZ); Kwanshien (1 ♂, SMF C13901); no locality (2 ♂, 2 ♀, BM). **Japan:** Kyoto (1 ♂, SMF C13902, 1 ♀, MNHN); Tokyo (1 ♂, SMF C13903, 1 ♀, MNHN); Saga, Kiushu (2 ♂, SMF C13904, 1 ♀, MNHN); Yuyama (1 ♂, MCZ); Kobe (1 ♂, SMF C13905, 1 ♀, ANSP); Tsushima (3 ♂, SMF C13906-13907); Hiogo (1 ♀, SMF C13908); Osaka (1 ♀, SMF C13909); no locality (3 ♂, MNHN). **Indonesia:** *Sumatra*, Manna (1 ♂, 1 ♀, BM); *Java*, Pelabuhan Ratu (2 ♂, MCZ, MNHN); Buitenzorg (1 ♀, MNHN); no locality (1 ♂, BM); *Sunbawa* (1 ♂, MNHN); *Flores* (1 ♂, MNHN).

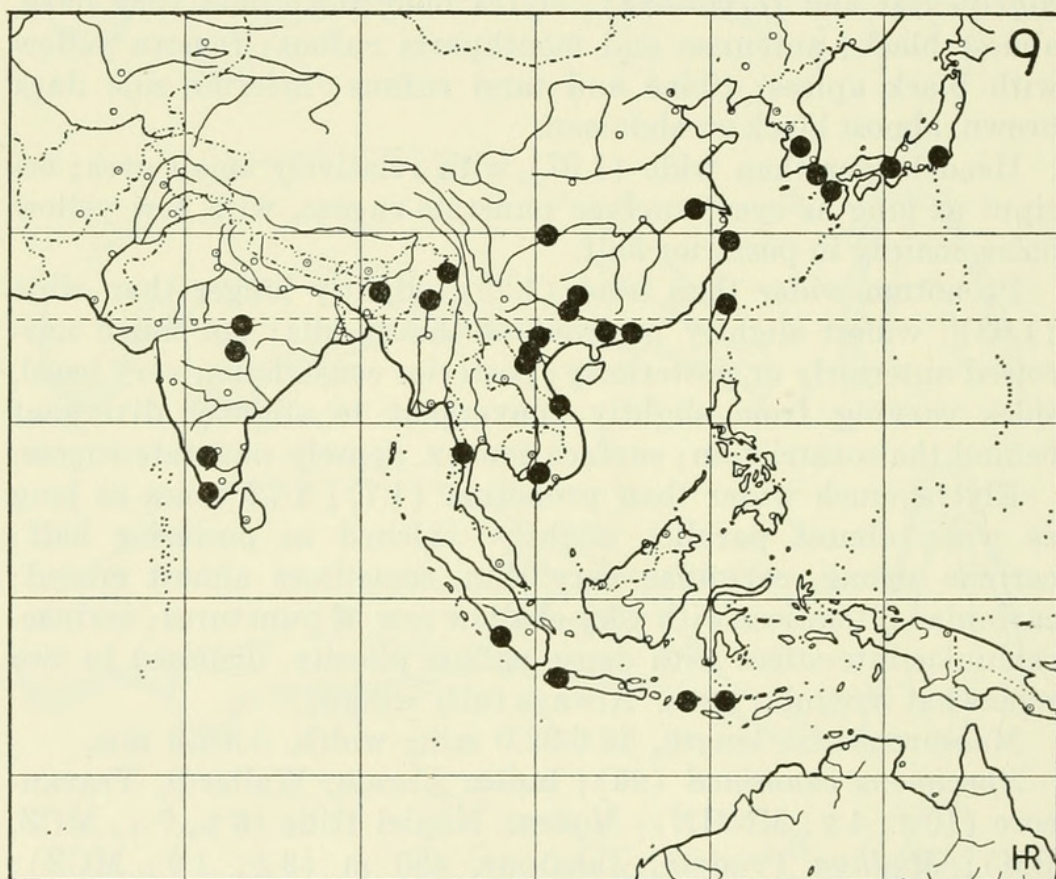


Fig. 9. *Galeritula orientalis*, distribution.

According to the literature, the species is also known from Korea and from Taiwan (*Formosa: formosana*); it was unknown from Indonesia. Its distribution is thus much wider than that of any of the other Asian species (Fig. 9).

The large number of synonyms of this species is due to the variability of the color pattern, which, when only a few specimens are studied (as in all the previous work), seems quite constant. Study of larger series, however, shows that these characters have very little, if any, specific value. With respect to color and pattern, there seems to be no geographic variation in *orientalis*.

The present study also included examination of the male genitalia (aedeagus), which seems to be quite constant in most populations of the species. A different aedeagal shape is, however, found in Indian specimens (described originally as *nigripennis* — see Fig. 5). I have tried to correlate this character with others, but have failed. A series of “*nigripennis*” from Travancore (10 ♂, 4 ♀, MNHN; the genitalia unfortunately could not be studied) shows the same color variation as *orientalis* from elsewhere. For this reason, I think it is not advisable to keep *nigripennis* separated from *orientalis*. There is a complete overlap of the two forms in external characters, mainly in color, and I feel that the difference in aedeagi of Indian *orientalis* is due simply to geographic variation.

The possible synonymy of *nigripennis* and *japonica* was pointed out in 1877 by Chaudoir, who could not find any differences between the two species.

GALERITULA INDICA (Chaudoir, 1861)

Galerita indica Chaudoir, 1861, Bull. Soc. Nat. Moscow, 34(1):557 [Holotype, ♂, “Nord de l’Hindostan,” Muséum National d’Histoire Naturelle, Paris; examined].

Only the type specimen of this species seems to be known.

G. indica is very close to *orientalis* but shows a few important differences, and for this reason I consider it separate, at least for the time being. *G. indica* has completely red legs, is a wingless species, and is much smaller than *orientalis* (17.5 mm). More material is essential for a final decision on its status.

GALERITULA RUFICEPS (Chaudoir, 1861)

Galerita ruficeps Chaudoir, 1861, Bull. Soc. Nat. Moscow, 34(1):556-557 [Holotype, ♀, “Nord de l’Hindostan,” Muséum National d’Histoire Naturelle, Paris; examined].

Besides the type, I have seen only 1 ♂ from Harki Dun, India (BM). This species, like *indica*, is very close to *orientalis*, and I keep it separate mainly because of reduction of the wings. More material will eventually show its real status.

"CARINIFRONS" Group

Pronotum usually with better defined posterior constriction; this is situated less basally than in *orientalis* group; basal angles sharp; elytra with pilosity less visible, sometimes absent; species with more restricted distribution, some with reduced wings.

Four species are included: *batesi* Andrewes, *carinifrons* Schaufuss, *feae* Bates and *toreuta* Andrewes.

GALERITULA BATESI (Andrewes, 1923)

Galerita batesi Andrewes, 1923, Trans. Ent. Soc. London: 9 [Holotype, ♀, Karin Cheba, Burma, 900-1100 m; British Museum (Natural History); examined].

Galerita orientalis; Bates [nec Schmidt-Goebel], 1889, Ann. Mus. Civ. Genova, 27:109 [pars].

Galeritula batesi is very close to *carinifrons*, distinguished by very few characters, the main ones having been mentioned in the key. These two species are also close to *feae* and *toreuta*, distinguished mainly by the color of the legs.

A superficial examination of the two types in the British Museum (Natural History) (♀, Karin Cheba; ♂, Teinzo), seems to indicate that they have reduced posterior wings. All other examined specimens have normally developed wings. *G. batesi*, however, does not show any reduction of the humeri. The species may be in the process of losing its wings, a process which has already been finished by its close relative, *carinifrons*, probably independently. Cases of wing dimorphism are not common in the genus: the only cases known to me are those of *africana* Dejean from Africa and *forreri* Bates from Mexico.

G. batesi is known only from the mainland, and has a rather restricted area of distribution.

Examined specimens (6): **Burma:** Bhamo (1 ♂, BM); Teinzo (1 ♂, paratype, BM, 1 ♀, MNHN). **India:** Assam, Shillong region (1 ♂, MNHN); Sylhet, Chandkhira (1 ♀, BM).

GALERITULA CARINIFRONS (Schaufuss, 1887)

(Figs. 3, 6)

Galerita carinifrons Schaufuss, 1887, Hor. Soc. Ent. Ross., 21:103-104 [types, Macassar, South Celebes; Zoologisches Museum der Universität Berlin; not seen].

Redescription: Black-brownish, mouthparts and antennae rufous; legs as in *batesi*.

Head large, longer than wide (1.08), with relatively small eyes; occiput slightly longer than the diameter of one eye; surface moderately punctate-rugose, with yellow hairs.

Pronotum wider than head (1.24), longer than wide (1.11); widest in anterior third, as narrowed anteriorly as posteriorly; constriction well developed, sides parallel behind it; surface convex, densely punctate; covered with yellow hairs.

Elytra 1.7 times as wide as pronotum; 1.77 times as long as wide; carinae and carinulae strong, the latter thinner, slightly closer to each other than to next carinae; carinulae-interstices punctate; carinae-carinulae-interstices with single row of yellow hairs; scutellar carina not joining the first; humeri very much reduced; wingless species.

Measurements: length, 19.5-21.0 mm; width, 6.2-6.9 mm.

Specimens examined (3): **Celebes:** Bonthain (3♂, IZ, MNHN).

Notes: *G. carinifrons* seems to be restricted to the southern part of Celebes. As already mentioned, it is very close to *batesi*. Both are probably derived from a common ancestor. The loss of wings in *carinifrons* is interesting and may be correlated with the restricted distribution.

GALERITULA FEAE (Bates, 1892)

(Figs. 3, 7)

Galerita feae Bates, 1892, Ann. Mus. Civ. Genova, 32:386 [types, Karin Cheba, Burma, 900-1100 m; Genova Museum; not seen].

Redescription: Completely black; antennal segments 5-11, brown.

Head large, longer than wide (1.09), with relatively small eyes; occiput slightly longer than the diameter of one eye; posterior half almost impunctate, anterior half deeply punctate-rugose; covered with few brownish hairs.

Pronotum wider than head (1.21), longer than wide (1.12); form and sculpture as in *batesi* and *carinifrons*, sides slightly divergent behind constriction.

Elytra very similar to those of *carinifrons*, 1.78 times as wide as pronotum; 1.7 times as long as wide; carinae and carinulae well developed; carinulae-interstices very deep, sulciform; carinae-carinulae-interstices with a row of hairs; scutellar carina not joining the first; humeri reduced; wingless species.

Measurements: (♂ from Lambok, SMF) length, 21.8 mm; width, 7.15 mm.

Specimens examined (10): **China:** Yunnan (2 ♀, MNHN). **Laos:** Luang Prabang, Pang Bo (1 ♂, BM); Ban Ban (1 ♂, BM); Xieng Khouang (1 ♂, BM). **Vietnam:** Tam Dao (1 ♀, BM). Localities which I have been unable to locate: "British Bootang" (? = Bhutan) (1 ♂, MNHN); "Pedong" (2 ♂, MNHN); Lambok, Sadjang (1 ♂, SMF C13910).

Notes: *G. feae* is a species which seems to be confined to the Continent. (Lambok has not been located. It may, however, be Lombok. If the species really occurs on Lombok, it should also occur on Java, sympatrically with *toreuta*.) It is very similar to *toreuta* from Java. Both are wingless, with very reduced humeri. One of the best characters to distinguish the two seems to be the carinular interstice (see key). These two forms must also stem from a common ancestor, perhaps the same one from which *batesi* and *carinifrons* have been derived.

GALERITULA TOREUTA (Andrewes, 1933)

(Figs. 3, 8)

Galerita toreuta Andrewes, 1933, Treubia, 14:283-284 [holotype, ♀, Idjen Plateau, Java; British Museum (Natural History), examined].

Galerita insulindae Liebke, 1934, Arb. Morph. Tax. Ent., 1:280 [types, Pradjekan, east Java; Deutsches Entomologisches Institut, Berlin; not seen]; Liebke, 1940, Fol. Zool. Hydrobiol., 10:449 [proposed synonymy with *toreuta*].

Galerita fortis Lowerens, 1952, Treubia, 21:228 [type, central Java, Mt. Slamet, Kaligua; Lowerens collection (?); not seen]; Lowerens, 1955, Tijdschr. Ent., 98:56 [proposed synonymy with *toreuta*].

It seems unnecessary to repeat a description of this well described species.

Specimens examined (17): **Indonesia:** Java, Soemberwringin, G. Raoeng (1 ♂, BM, 3 ♂, 1 ♀, MCZ); Tengger, Nongokodjadjar, 1300 m (1 ♀, BM); Idjes Plateau. Kenedeng Mts. (1 ♀, holotype, 1 ♂, BM); Kawie Mts. (4 ♂, 1 ♀, MNHN); Toegoe (1 ♂, MNHN); Malang Romjer (1 ♀, MNHN); Pradjekan (2 ♀, MCZ).

RELATIONSHIPS AND ZOOGEOGRAPHY OF THE ASIAN SPECIES OF GALERITULA

At present the Asian species of *Galeritula* are completely isolated from the other groups of the genus; however, they must be considered as being relicts of what was probably a more widespread genus in the past, extending from Africa to South America.

The relations of the species groups within the genus are very obscure. According to Jeannel, *Galeritula* must have originated in Africa and from there it must have spread to South America and Asia when the continents were connected. No facts seem to support this view. The presence of two primitive genera of the tribe in the New World (*Progaleritina* Jeannel in North and Central America and *Trichognathus* Latreille in South America), and the immense diversification of the Neotropical species of *Galeritula*, in my opinion suggest a New World origin.

The Asian species have a relatively restricted distribution (see Fig. 9, which represents the distribution of *orientalis*. Inclusion of Celebes shows the limits of the distribution of the genus). In the west these species reach India, in the northeast, Japan; only a few forms have invaded the islands southeast of Asia, where they are found from Sumatra to southern Celebes and Flores. The genus is not known from Borneo, perhaps due to insufficient collecting there. Of the island forms, two are endemic to very restricted areas: *toreuta* is found only in Java, and *carinifrons* in southern Celebes. *G. orientalis*, the third species present on the islands, has the widest distribution of all Oriental species, occurring from India and Japan to Sumatra and Flores. It is a fully winged species, while *toreuta* and *carinifrons* are wingless. The two latter species are closely related to *batesi* (winged) and *feae* (wingless) from the mainland. There has probably been one ancestral stock, which through isolation (especially on the Indonesian islands) has given origin to the 4 species.

The other Oriental species form the second Asian group of species, that of *G. orientalis*, which is probably also derived from a single common ancestor. As seen above, the taxonomy of these three species is not yet well understood, since of two of them only the types are known.

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