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Review of the genus *Scarelus* Waterhouse from Sumatra and Malaysia (Coleoptera: Lycidae)



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With 11 figures

Summary

The present paper deals with newly collected *Scarelus* species from Sumatra and Malaysia, 8 species are treated, 4 of them are new to science (*Scarelus brastagiensis* sp. n., *S. riedeli* sp. n., *S. sanguineus* sp. n., and *S. schawalleri* sp. n.). The other known species from Malaysia and Sumatra are redescribed, a further species from the Philippines is added. The male genitalia and other morphological characters are illustrated.

Zusammenfassung

Die vorliegende Arbeit befaßt sich mit neu gesammelten *Scarelus*-Arten aus Sumatra und Malaysia. 8 Arten werden behandelt, 4 davon neu beschrieben (*Scarelus brastagiensis* sp. n., *S. riedeli* sp. n., *S. sanguineus* sp. n. und *S. schawalleri* sp. n.). Die anderen Arten aus Malaysia und Sumatra werden wiederbeschrieben, eine weitere Art von den Philippinen wird angefügt. Männliche Kopulationsorgane und andere morphologische Merkmale sind abgebildet.

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1. Introduction

The genus *Scarelus* (WATERHOUSE 1878) is a well defined genus and it contains at present 15 species occurring in Burma, on the Malay Peninsula, Sunda Islands and the Philippines. The representatives of the genus *Scarelus* are small slender species with pronotum divided by one longitudinal carina only and elytra with two (Fig. 1) or three longitudinal costae. Compared with other representatives of the family Lycidae the congeners have very long antennae, at least reaching the apex of elytra but often much longer.

The following contribution has been accomplished on the basis of material collected on Sumatra and in Malaysia in recent years. This group is seldom represented in collections and most species are only known from types or from very limited series.

The genus *Scarelus* was recently treated by KASANTSEV (1992). He described *Scarelus corporaali* from Sumatra, synonymized two *Scarelus* species described by PIC and designated lectotypes for all of PIC's species deposited in the Museum of Natural History in Paris. Unfortunately he did not give any redescription and these species are known only from very short and unsatisfactory descriptions of PIC (1911a, 1911b, 1912, 1942). The male genitalia without any other characters do not enable the sure identification in all cases. Only future study of types will enable sure identification of all species described by PIC.

Abbreviations employed for the depositories of material are listed below:

SMNS = Staatliches Museum für Naturkunde (Stuttgart);

ZIW = Zoological Institute PAN (Warszawa);

LMB = Collection of author.

Acknowledgments

I am very grateful to Dr. W. SCHAWALLER (Stuttgart) and Dr. S. A. SLIPINSKI (Warszawa) for loans of material in their charge.

2. Genus *Scarelus* Waterhouse, 1878

2.1. Redescription of the genus

Small, slender species, uniformly testaceous, black or with variable extension of lighter humeral part of elytra and dark apex of elytra.

Head small, free, shortly pubescent, surface slightly shiny, with fine structure, frons convex, eyes small, antennal tubercles inconspicuous, divided by a shallow depression, antennal cavities very close to each other, separated only by a narrow cranial bridge. Mouthparts heading downwards, maxillae, labium and both palpi extremely tiny. Mandibles stout, internal margin of mandibles without any teeth. Mouth cave of round shape, at the point of the mandible attachment slightly emarginate and reaching to the margin of the eyes. Labium and maxillae clearly visible without dissecting, tiny. Labium reaching from the gular margin of the mouth opening to 1/3 of the opening's diameter, maxillae reaching to 1/2. Labial palpi 2-segmented, maxillary palpi 4-segmented, both palpi stoutest at apical segments. Labrum projecting forwards, triangular. Antennae long, reaching over elytral apex by 0.5 to 5 antennal segments, covered with dense recumbent pubescence, mostly slightly com-

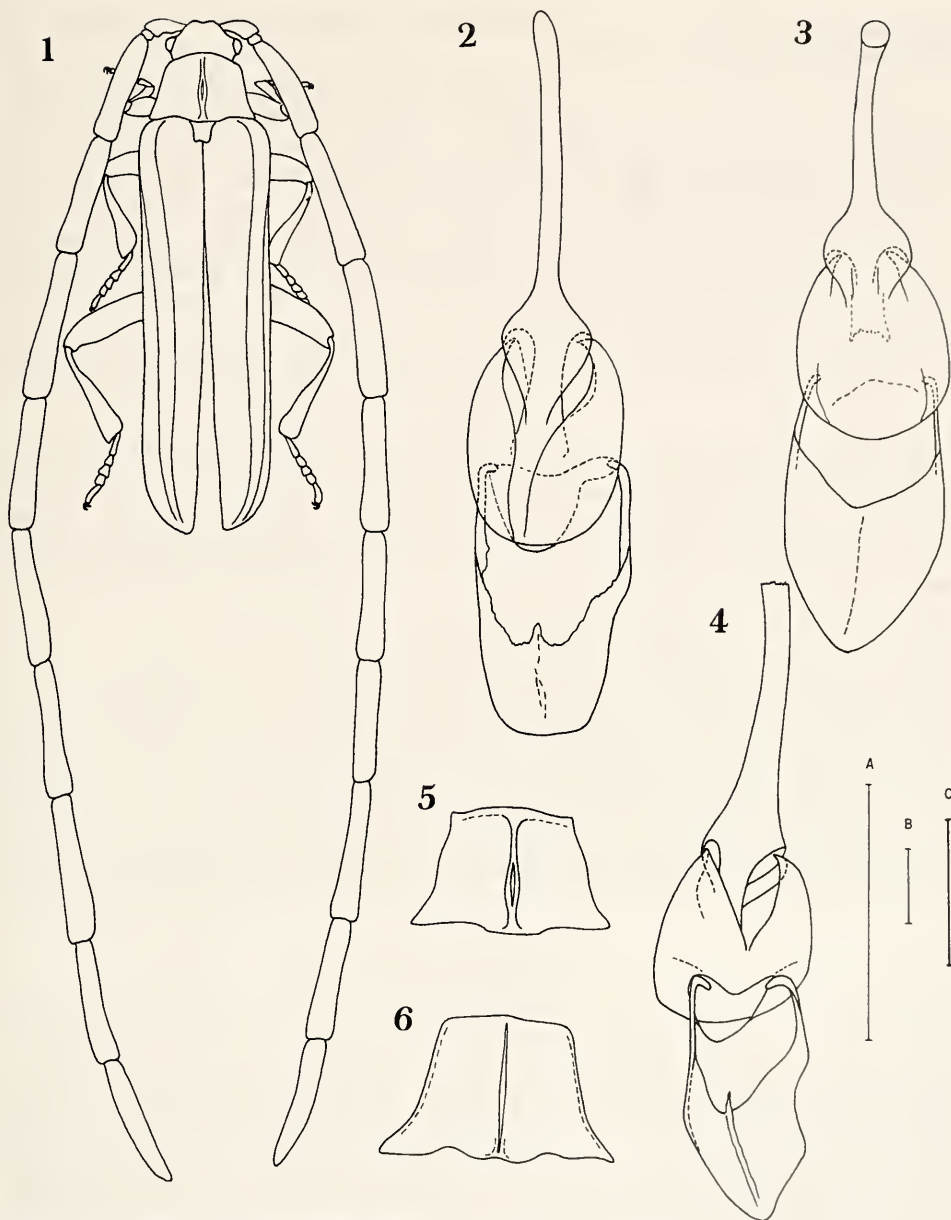


Fig. 1. *Scarelus crudus*, general view.

Figs 2-4. *Scarelus* spp., male genitalia. - 2. *S. brastagiensis* sp. n.; - 3. *S. riedeli* sp. n.; - 4. *S. sanguineus* sp. n.

Figs 5-6. *Scarelus* spp., pronotum. - 5. *S. sanguineus* sp. n.; - 6. *S. brastagiensis* sp. n. - Scales: 0.5 mm; A: Figs 2-4, - B: Fig. 1, - C: Figs 5-6.

pressed, only *S. schawalleri* sp. n. with antennae not compressed, degree of compression of antennal segments correlates with total length of antennae. First antennal segment pear-shaped, broadly cut at apex, segment 2 very short, transversal, only very scarcely pubescent, segments 3-10 nearly uniform in length and shape, slender,

apical segment the longest one, narrowed to the apex, pointed. Mandibles stout, quite long, slightly curved, shining.

Pronotum trapezoidal, flat, the posterior margin wider than the frontal one, the disc with one longitudinal carina with very deep and narrow depression in the middle (Figs 5–6). Frontal margin slightly rounded, lateral margins convex, posterior angles acutely projecting. Posterior margins nearly straight. Scutellum flat, trapezoidal, shiny, scarcely pubescent, usually emarginate at apex.

Elytra flat, with two or three longitudinal costae, first one less conspicuous or nearly missing. Costae connected by transversal costae, elytra densely pubescent. Bottom part of elytral margin black in whole length in all studied species. Legs slender, compressed, densely pubescent.

Two types of male genitalia are present. The first has the aedeagus long and widened in basal part (Figs 2–4, 7–8), the second has the aedeagus shortened and pointed (Figs 9–11).

Remark: Costae on elytra are often a conservative character within Lycidae. In the case of *Scarelus* a remarkable variability in building of elytral costae has been found. There were 4 costae present in the ancestor of *Scarelus* according to present knowledge. Generally three costae (homologous with costae 1, 2 and 4 in primitive condition) are present but the first one can be in fact missing and only discontinuities of transversal costae show the place where the costa probably was in the course of evolution (*Scarelus schawalleri*, *S. crudus*, probably also *S. bicostatus* which I have not seen). In many cases the first costa is present in humeral half of elytron but very inconspicuous in apical one and in all known species the first costa is much weaker than costa 2 and 4. Costa 3 is detectable in humeral portion of elytra; it is fused with costa 4 which is much stouter in humeral part. In the specimen of *Scarelus umbrosus* even independent existence of rudiment of costa 3 was found. Four costae are present, in *Paratelius* Kasantsev, 1992 and similarly as in congruency with *Scarelus* species costa 1 and 3 is much weaker than costa 2 and 4 and the first mentioned ones are nearly undetectable in apical part of elytra (specimen from Kalimantan, coll. author).

2.2. Geographical distribution

The bulk of the *Scarelus* species are restricted to the Great Sunda Islands and southeastern part of the Asian continent (KLEINE 1926b, 1932a, 1932b), a single species is known also from the Philippines (KLEINE 1926a). Four species are known from Asian mainland (*S. umbrosus*, *S. inapicalis*, *S. riedeli* and *S. orbatus*). *S. orbatus* is known only from Singapore island but the occurrence of this species on the Malayan Peninsula is nearly sure because of lack of any effective barrier separating the Asian mainland and Singapore island. The genus *Scarelus* is particularly species-rich on Sumatra, five species are known from this area and the discovery of additional species can be expected. Three species are known from northern Sumatra, two species from the area of Bukittinggi (former Fort de Kock). *S. corporaali* and *S. sumatrensis* were collected in lower elevation (550–850 m), all other Sumatran species were collected in mountainous regions between 1300 and 2000 m. Lycidae generally and especially *Scarelus* species seem to have very low vagility. The species of the genus *Scarelus* were collected without exceptions in the lowest stratum of tropical forests and they are very slowly moving and only seldom and slowly flying animals. A system of isolated volcanos and mountain chains in combination with ecological characteristics probably supports the isolation of small populations.

Three species are known from Kalimantan. All records refer to the mountains in the northwest, two species are recorded from Mt. Kinabalu, one from Mt. Matang. A single species, *S. longicollis*, is known from Java.

Only one species, *Scarelus crudus*, is known from the Philippines. According to KLEINE (1926a), it occurs on Luzon and Mindanao only. The record from Leyte is the first from the Visayas. The specimen collected on Palawan corresponds morphologically to specimens from other Philippine Islands and differs in darker coloration of pubescence. It is the only *Scarelus* species with such an extensive area. This occurrence is very interesting especially regarding quite the different spectrum of Lycidae species on Palawan and the rest of the Philippines. The locality data of *S. crudus* show a very wide ecological valency. Specimens from Mindanao were collected in a mountain forest at an elevation of 1600 m, the specimens from Palawan and Leyte were collected in lowland tropical forests (100–300 m).

Geographical distribution partially corresponds to groups of species based on type of male genitalia. The *Scarelus orbatus* group is restricted to Singapore, Sumatra and Java. The *S. umbrosus* group is more widespread which corresponds to symplesiomorphic characters present in this group of species. This group is distributed all over the area of the genus *Scarelus*.

2.3. Relationships to other genera

The related genus *Paratelius* Kasantsev, 1992 is easy recognizable. The only characters separating it from the genus *Scarelus* Waterhouse, 1878 (four costae on each elytron) is evidently a symplesiomorphy shared with *Atelius* Waterhouse, 1878. The presence of the long bristles on the elytra connect *Paratelius* and *Scarelus*. Also the structure of male genitalia and general appearance support very close relationship of *Paratelius diversicornis* with all *Scarelus* species. Only future analysis of more characters on more extensive material can solve the relationship of genera within the Ateliinae.

3. Species list

3.1. *Scarelus brastagiensis* sp. n. (Figs 2, 6)

Type material: Holotype ♂, Sumatra (N), Brastagi, Gunung Sibayak, 1450–1900 m, 19.–23. II. 1991, leg. BOCÁK (LMB). — Paratypes: 3 ♂♂, same data as holotype (LMB, SMNS).

Name derivation: This species is named after the type locality.

Differential diagnosis: *Scarelus brastagiensis* sp. n. is habitually very similar to *S. sumatrensis* Pic. It differs only in the black head and pronotum. The sure identification is possible according to the shape of male genitalia. The median lobe of *S. brastagiensis* is long, rounded at apex and widened in the basal third (Fig. 2), in *S. sumatrensis* it is of simple shape, short and pointed at apex.

Description: Small, slender, body black, basal two fifth of elytra yellowish brown, pronotum sometimes partly brown, mouthparts and claws brown. Head small, with short, brownish pubescence, slightly shiny, with fine surface structure. Antennae long, reaching over elytral apex by 1.5 antennal segments, slightly compressed, with brownish, dense and recumbent pubescence. Antennal segment 2

blackish brown (compared with segments 1 and 3). Pronotum trapezoidal, flat, posterior margin 1.55 times wider than the frontal one, the disc with one longitudinal carina with very deep and narrow depression in the middle (Fig. 6). Posterior angles acutely projecting. Elytra 3.55 times longer than wide at humerus, with three longitudinal costae, first costa less conspicuous, especially near the apex, third costa remarkably elevated. Legs of usual form.

Male genitalia as in Fig. 2.

Length: 5.6–6.6 mm. Width at humera: 1.3–1.55 mm.

Variability: The colour of the pronotum varies from entirely black to nearly brown, especially the posterior part of the disc has a tendency to be lighter than other parts of the pronotum.

3.2. *Scarelus sanguineus* sp. n. (Figs 4–5)

Type material: Holotype ♂, Sumatra (W), Gunung Singgalang, S of Bukittinggi, 1300 m, 14.–16. II. 1991, leg. BOČÁK (LMB).

Name derivation: The species name is referring to the colour of elytra.

Differential diagnosis: *Scarelus sanguineus* sp. n. is the only Sumatran species with whole elytra reddish brown. The combination of the coloration, shape of male genitalia and the length of antennae characterize this species.

Description: Small, slender, body black, only elytra reddish brown. Head small, distance between eyes 2.1 times longer than eye diameter. Antennae long and slender, reaching over apex of elytra by a bit more than two segments. Segment 2 of the same colour as the others, matt, shortly pubescent. Pronotum trapezoidal, divided by conspicuous longitudinal carina, central areola short, extremely narrow, occupying only about 30% of the length of carina (Fig. 5). Disc covered with short pubescence, shiny. Scutellum without emargination at the apex, covered with dense pubescence. Elytra parallel, 3.85 times longer than width at humerus, each elytron with three longitudinal costae, the first and second inconspicuous in apical part, third elevated and distinct in whole length. Transversal costae partly covered by dense red pubescence, areolae transversal, bottom of areolar fields shiny, elytral costae matt. Legs slender, compressed, densely pubescent.

Male genitalia as in Fig. 4.

Length: 6.7 mm. Width at humera: 1.4 mm.

3.3. *Scarelus sumatrensis* Pic, 1912 (Fig. 9)

= *Scarelus gracilicornis* Pic, 1942: KASANTSEV, 1992

Material examined: 2 ♂♂, Sumatra (W), Batang Palupuh Nature Reserve (25 km of Bukittinggi), 15. II. 1991, leg. BOČÁK (LMB); – 1 ♂, Sumatra (Z.W.K.), Boekit Gabah, leg. LUCHT, IV. 1919 (ZIW).

Redescription: Small, slender species, head testaceous, antennal segments 3–11 black, thorax bicoloured, prothorax, mesosternum and metasternum testaceous, pleurons dark brown to black, apical two fifths of elytra and abdomen black. Legs black, only coxae, trochanters and basal portions of femora of front and middle pairs of legs testaceous. Costae and margins of pronotum and partly costae of elytra dark brown. Head small, distance between eyes 2.2 times longer than eye diameter, antennae long, compressed, reaching over elytral apex by 2.5 segments. Pronotum of

usual shape. Elytra parallel, 3.25 times longer than wide at humerus, three costae developed in whole length, first costa weaker, areolae mostly transverse. Legs of usual form.

Male genitalia as in Fig. 9.

Length: 5.85–6.00 mm. Width at humera: 1.45–1.50 mm.

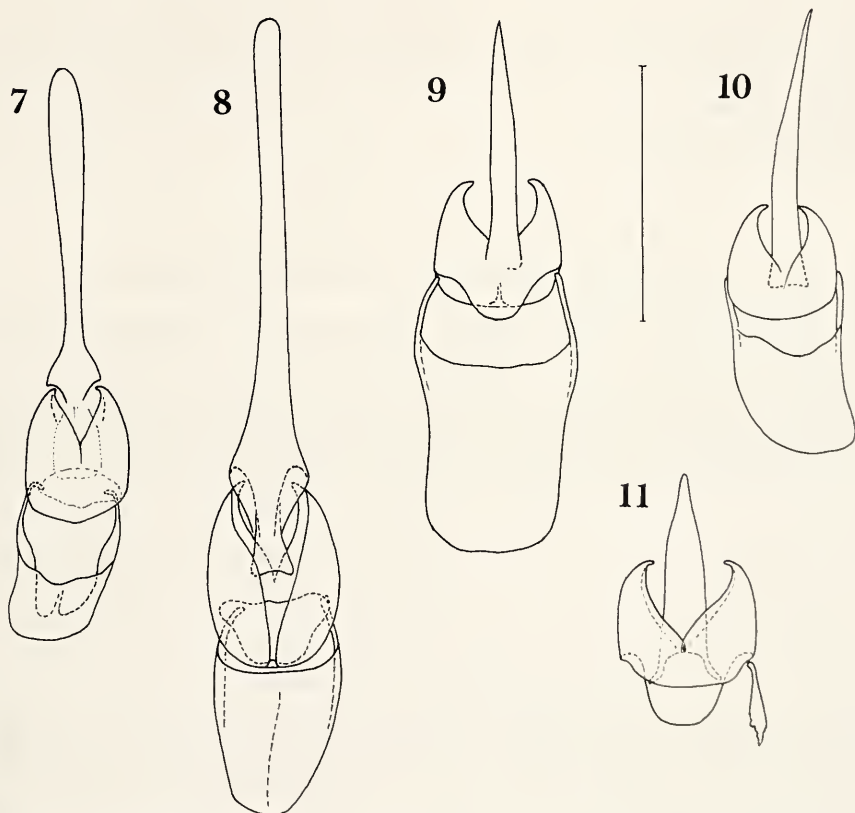
Variability: The extension of black parts of sutura and costae is variable, it seems to be correlated to the extension of the dark parts of the elytra.

Distribution: Sumatra.

3.4. *Scarelus corporaali* Kasantsev, 1992 (Fig. 10)

Material examined: 1 ♂, Indonesia, Sumatra, Prov. Aceh – Selatan, Babahrot, 15.–20. VIII. 1983, leg. KLAPPERICH (SMNS).

Redescription: Small slender species, body orange, abdomen light brown, legs orange, tibiae and femora partly darker. Apical part of elytra black, sutural interval dark brown in whole length, antennal segments 3–9 and basal part of segment 10 black, apical part of segment 10 and whole segment 11 orange. Head small, finely, densely pubescent, eyes small, antennae slender, compressed, overlapping the apex of elytra by 2.5 segments. Pronotum flat, middle carina with narrow, deep depres-



Figs 7–11. Male genitalia. — 7. *Scarelus schawalleri* sp. n.; — 8. *S. umbrosus*; — 9. *S. sumatrensis*; — 10. *S. corporaali*; — 11. *S. orbatus*. — Scale: 0.5 mm.

sion in basal part. Posterior angles slightly projected backwards. Elytra parallel, with 3 longitudinal costae, first costa less elevated, especially in basal part of elytra.

Male genitalia as in Fig. 10.

Length: 4.85 mm. Width at humera: 1.25 mm.

Remarks: *Scarelus corporaali* is the only known species with completely orange thorax. In addition, it also has orange apical parts of the antennae. KASANTSEV (1992) stated that it externally differs from *S. sumatrensis* Pic in less conspicuous first costa. This character is very questionable on the specimen I have had at my disposal. The simplest difference is the colour of the apical antennal segment, mesopleuron and metapleuron and the margins of pronotum. It is also possible to use male genitalia (Fig. 10) for safe identification.

3.5. *Scarelus umbrosus* Kleine, 1932 (Fig. 8)

Material examined: 2 ♂♂, Malaysia, Cameroon Highlands, Gunung Beremban, 1.–3. IV. 1990, leg. RIEDEL (SMNS, LMB); – 1 ♂, Pahang F.M.S., Cameroon Highlands, 5500 ft., 21. VI. 1935, leg. PENDLEBURY (ZIW).

Redescription: Small slender species, uniformly black, only elytral sutura, very narrow lateral margins and basal parts of elytral costae 2 and 3 dark brown. Head small, slightly broader than front margin of pronotum, antennae long, reaching over apex of elytra by 2 segments. Pronotum flat, with acutely projected posterior angles, 1.36 times broader at base than its length. Scutellum deeply emarginate at apex. Elytra parallel, with 3 costae on each elytron, first costa slightly weaker but distinctive in whole length. Transversal costae regular and conspicuous. Areolae mostly transversal.

Male genitalia as in Fig. 8.

Length: 6.70–6.80 mm. Width at humera: 1.65 mm.

3.6. *Scarelus schawalleri* sp. n. (Fig. 7)

Type material: Holotype, ♂, N Sumatra, Medan, Kabanjahe, Gunung Sinabung, 7.–10. X. 1990, leg. RIEDEL, 2000 m (SMNS).

Name derivation: The specific name is a patronyme in honour of Dr. W. SCHAWALLER (State Museum of Natural History, Stuttgart).

Differential diagnosis: *Scarelus schawalleri* sp. n. has the shortest antennae in the genus, only slightly longer than the body. It also differs from other representatives of the genus *Scarelus* in having no compressed antennal segments. The shape of the male genitalia shows no relationship to the other similarly coloured species from Sumatra.

Description: Small, slender species, body dark brown to black, pronotum dark testaceous to brown, its margins and carinae brown to black, scutellum darker at apex, apical third of elytra black, the rest testaceous. Head small, slightly broader than front margin of pronotum, mouth parts testaceous, antennae reaching over elytral apex only by less than one segment. Pronotum of usual shape, 1.48 times broader at base than its length. Elytra flat, with 2 distinctive costae on each elytron (costa 2 and 4), first costa inconspicuous, partly missing, second costa more elevated at its base, very weak in apical third of elytron. Fourth costa stout, causing the elytra to be seemingly flat, especially in basal third of elytra. Transversal costae weak, incomplete and irregular. Legs of usual shape.

Length: 4.95 mm. Width at humera: 1.08 mm.

3.7. *Scarelus riedeli* sp. n. (Fig. 3)

Type material: Holotype ♂, Malaysia, Cameroon Highlands, Power station (km 29) 21. IV. 1990, leg. RIEDEL (SMNS). — Paratypes: 3 ♂♂, the same locality data as holotype (SMNS, LMB).

Name derivation: A patronym in honour of Mr. A. RIEDEL, collector of this new species.

Differential diagnosis: *S. riedeli* sp. n. is easily recognizable by the unique shape of the aedeagus.

Description: Head, pronotum, basal third of elytra, prosternum and mesosternum brown. Metasternum except middle longitudinal line and lateral margins brown, pleuron, abdomen, legs and antennal segments 3–11 black. Antennal segments 1 and 2 brown. Apical two thirds of elytra, sutural interval and margins of elytra and legs including coxae and trochanters dark brown to black. Bottom part of head brown, mouth parts testaceous, only mandibles brown. Head small, uniform, antennae long, slender, compressed. Pronotum flat, with strong longitudinal carina, with narrow and deep impression in the middle of its length, posterior angles projected backwards. Elytrae parallel, 3.37 times longer than wide at humerus, with 3 distinct longitudinal costae on each elytron, second and fourth costa stronger in basal third only, transverse costae distinctive, quite regular, areolae mostly transverse. Male genitalia as in Fig. 3.

Length: 5.45–6.00 mm. Width at humera: 1.3–1.5 mm.

Variability: The extension of the brown part of elytra is very variable. It fluctuates from 1/4 to 1/2 of length of elytra. The longitudinal costae can be brown-coloured nearly in their whole length. The bottoms of areolae are darker and these darker areolae can reach even to the scutellum. That is why there is no distinctive border line between dark and light part of elytra.

3.8. *Scarelus orbatius* Waterhouse, 1878 (Fig. 11)

Material examined: 1 ♂, Singapore, Coll. BAKER (ZIW).

Redescription: Small, slender, body testaceous, only eyes black, antennae and legs including coxae remarkably darker. Head small, sparsely pubescent, slightly shining, surface with fine microstructure. Antennae compressed, reaching over elytral apex by 2.5 segments. Pronotum of usual shape, disc matt, microstructured, scutellum emarginate at apex. Three costae developed in whole length of elytra, first costa much weaker, transverse costae obtuse, densely pubescent.

Male genitalia as in Fig. 11.

Length: 4.85 mm. Width at humera: 1.3 mm.

3.9. *Scarelus crudus* Kleine, 1926

Material examined: 4 ♂♂, Philippines, Mindanao, 30 km W of Maramag, 1600 m. 28.–30. XII. 1991, leg. BOLM; — 1 ♂, Leyte, above Visayas State College of Agriculture N Baybay, 27. II. 1991, leg. SCHAWALLER; — 1 ♂, Palawan, Tanabank river, 100 m, 20. XII. 1991, leg. BOLM.

Remark: The specimen from Palawan is brown and all specimens from Visayas and Mindanao are light testaceous, the other characters are identical.

4. Key to the identification of Malayan and Sumatran species of the genus *Scarelus*

- 1 Body and elytra uniformly black, only suture and very narrow external margin of elytra dark brown, aedeagus as in Fig. 8 *S. umbrosus* Kleine
 – At least humera of elytra brown to red 2
 2 Whole elytra purple red or testaceous 3
 – Only humera or basal half of elytra brown or testaceous to orange 4
 3 Elytra purple red, thorax and head black, aedeagus as in Fig. 4 *S. sanguineus* sp. n.
 – Elytra testaceous, thorax and head of the same colour, aedeagus as in Fig. 11
 *S. orbatus* Waterhouse
 4 Antennae short, reaching over the apex of elytra by less than 1 segment, antennal joints not compressed, rounded in cross-section, aedeagus in Fig. 7 *S. schawalleri* sp. n.
 – Antennae longer, reaching over elytral apex by more than one segment, antennal segments always apparently compressed 5
 5 Mesosternum uniformly black, antennae reaching over elytral apex by 1.5 segment, aedeagus as in Fig. 2 *S. brastagiensis* sp. n.
 – At least middle part of mesosternum testaceous to light brown, antennae reaching over the apex of elytra by 2.5 segments 6
 6 Thorax orange, including pleurons, antennal segments 1, 2 and 11 and apical half of segment 10 orange, the others black, apex of aedeagus pointed (Fig. 10)
 *S. corporaali* Kasantsev
 – Only sterna and pronotum testaceous, pleurons dark brown 7
 7 Apex of aedeagus rounded, aedeagus parallel in apical half (Fig. 3), usually only basal third of elytra brown, no distinct border between dark and light part of elytra
 *S. riedeli* sp. n.
 – Apex of aedeagus pointed, aedeagus becoming narrower in apical half (Fig. 9), usually more than basal half of elytra testaceous, the border between dark and light part of elytra distinct *S. sumatrensis* Pic.

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