

## Study of Asian Strongyliini (Coleoptera, Tenebrionidae)

### IV. Three Species-groups of the Genus *Strongylium* from Southeast Asia

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**Abstract** This is the fourth part of the study of the Asian Strongyliini and deals with three species-groups of the genus *Strongylium*, the *S. gravidum* group, the *S. insigne* group, and the *S. rufifemoratum* group. Nine species belonging to the first, four to the second and two to the third are newly described: *S. sabahense* sp. nov., *S. keningauense* sp. nov., *S. sulawesienne* sp. nov., *S. mindanaoense* sp. nov., *S. kalimantanense* sp. nov., *S. crockerense* sp. nov., *S. miyakei* sp. nov., *S. palawanense* sp. nov., *S. taoi* sp. nov.; *S. cochinchinense* sp. nov., *S. sabahinsigne* sp. nov., *S. wiseetingum* sp. nov., *S. wallacei* sp. nov.; *S. rufifemoratum* sp. nov., *S. kimanisense* sp. nov.

This paper is the fourth part of my study concerning the Asian Strongyliini and deals with three species-groups of the genus *Strongylium*.

In his monograph, MÄKLIN (1864) described *S. gravidum* and its three relatives from Southeast Asia. FAIRMAIRE (1881) described one species of their ally from a small island of the Bismarck Archipelago. Later, GEBIEN (1913, 1921) and PIC (1917) described two species each from the Philippines and Sumatra, respectively. MÄKLIN also described a distinct species, *S. insigne* from "India orientalis" in the same paper.

In the course of the present study, I have found many new members of the above species-groups, together with the other one related to *S. insigne* in the tenebrionid beetle collections of mine and my entomological friends, and also in the materials preserved in the Muséum National d'Histoire Naturelle, Paris, the Natural History Museum, London, the Természettudományi Múzeum, Budapest, and the National Science Museum (Nat. Hist.), Tokyo. Thus, I am going to revalue the species described in the past, to clarify past confusions, and to describe several new species.

I wish to express my heartfelt appreciation to Dr. Claude GIRARD and M<sup>lle</sup> Jeanne CHARBONNEL, Muséum National d'Histoire Naturelle, Paris, Messrs. Malcolm KERLEY and Martin J. D. BRENDELL, the Natural History Museum, London, Dr. Ottó MERKL, Természettudományi Múzeum, Budapest, Mr. Kiyoshi ANDO, Ehime University, and Mr. Stanislav BEČVÁŘ, Czech Academy of Sciences, for their invaluable support. Appreciations are also due to Messrs. Seiji MORITA and Kaoru SAKAI in Tokyo, for taking photographs inserted in this paper. Finally, my deepest thanks should be expressed to

Dr. Shun-Ichi UENO, National Science Museum (Nat. Hist.), Tokyo, for his constant guidance of my taxonomic studies.

Depositories of the holotypes to be designated are given in the text.

### 1. Species-group of *S. gravidum* MÄKLIN, 1864

The members of this species-group are characterized by the body ovate and strongly convex above, with pronotum rather transverse, longitudinally impressed in the middle, elytra with a pair of tubercles near the base, and depressed in an inverted V- or Y-shape between them, male anal sternite concave in the apical portion, whose apex is truncate or emarginate, and male legs modified, *e.g.*, protibia curved ventrad, with ventral face gouged in the apical portion and metatibia more or less flattened and twisted. The male genitalia of these members are mostly simply elongated fusiform, and not useful for distinguishing the species. Instead, the male anal sternites are so much differentiated that their shape furnishes a sound basis for classification.

In his monograph, MÄKLIN (1864) described four related species and included them in the "9th division": *S. binodosum* from "Celebes" (Sulawesi), *S. gravidum* from Borneo, "Amboina" (Ambon Island), Ceram and the Philippines, *S. vollenhoveni* from Sumatra, and *S. maculosum* from Java. Later, FAIRMAIRE described *S. tuberipenne* from "I. du duc d'York" of the Bismarck Archipelago in 1881. GEBIEN described two species, *S. elegantissimum* in 1913 and *S. bakeri* in 1921, both from the Philippines. PIC also described two in 1917, *S. violaceicolle* and *S. medanense*, both from Sumatra, and erected the subgenus *Gibbosostongylium* for the latter. In his study of the Papuan Strongyliini, KASZAB (1977) erected the genus *Holostrongylium* and transferred *S. gravidum* to it.

#### *Strongylium gravidum* MÄKLIN, 1864

(Figs. 8, 32, 42–43)

*Strongylium gravidum* MÄKLIN, 1864, Mon. *Strongylium*, 364.

*Original description.* "Ovale, sat convexum, posterius magis declive, supra plerumque obscure cupreum, parum nitidum, subtus viridi-aeneum aut magis viridicyaneum, antennis tarsisque nigris; pronoto transverso, in medio leviter rotundato et apicem versus angustato, sat confertim ruguloso-punctato, longitudinaliter latius impresso et in disco foveis duabus latis, at obsoletis notato, linea marginali elevata postice leviter sinuata; elytris pone scutellum bituberculatis et deinde transversim profundius impressis, admodum profunde punctato-striatis, punctis suturam et apicem versus multo subtilioribus, interstitiis intermediis parum obliquis. Longit. 11–14 m. m.; Latit. hum. 4.5–5.7 m. m."

*Redescription.* Head somewhat transversely elliptical, closely and finely punctate, finely haired in anterior half; clypeus transverse, gently bent downwards in front, with short transverse impression before fronto-clypeal border, which is very weakly ar-

uate posteriad and clearly sulcate; genae before eyes obliquely raised, with obtuse outer margins; frons somewhat T-shaped, rather steeply inclined forwards; eyes somewhat reniform, rather strongly convex laterad, obliquely and roundly inlaid into head, diatone about 1/7 times the width of an eye diameter; vertex with a somewhat rhombical impression between eyes. Antennae reaching humeri, feebly thickened towards apices, 6 apical segments more or less dilated towards each apex, ratio of the length of each segment from basal to apical: 0.55, 0.2, 0.77, 0.69, 0.67, 0.66, 0.55, 0.45, 0.37, 0.36, 0.39.

Pronotum slightly less than 1.3 times as wide as long, subparallel-sided in basal 3/5, though very weakly sinuate before base, rounded in apical 2/3; apex nearly straight, bordered in a wide V-shape and ridged; base feebly bisinuous, nearly straightly bordered and ridged; sides rather steeply declined to lateral margins, which are rimmed, and visible in apical 2/5; front angles rounded, hind angles almost rectangular; disc moderately though not evenly convex, longitudinally grooved, with a pair of impressions at basal 1/3; surface weakly micro-shagreened, irregularly punctate, each puncture with a microscopic bent hair, often intermixed with smaller (about 1/4 times in diameter) punctures among them. Scutellum somewhat pentagonal, elevated, feebly convex though very slightly, longitudinally impressed in the middle; surface micro-shagreened, sparsely scattered with microscopic punctures, each with a minute hair.

Elytra slightly more than twice as long as wide, 3.6 times the length and 1.45 times the width of pronotum, subparallel-sided in basal 2/3 though very feebly narrowed at basal 1/3; dorsum rather strongly convex, highest at basal 1/4, with a pair of tubercles, depressed in an inverted Y-shape between them; disc grooved with rows of punctures, the grooves often interrupted by transverse ridges, the punctures deep and somewhat longitudinally ovate; intervals gently convex, very weakly micro-shagreened, scattered with microscopic punctures, each with a microscopic bent hair, very weakly, transversely micro-aciculate; 2nd interval noticeably flattened; humeri gently swollen; apices weakly projected posteriad, obviously dehiscent and acuminate.

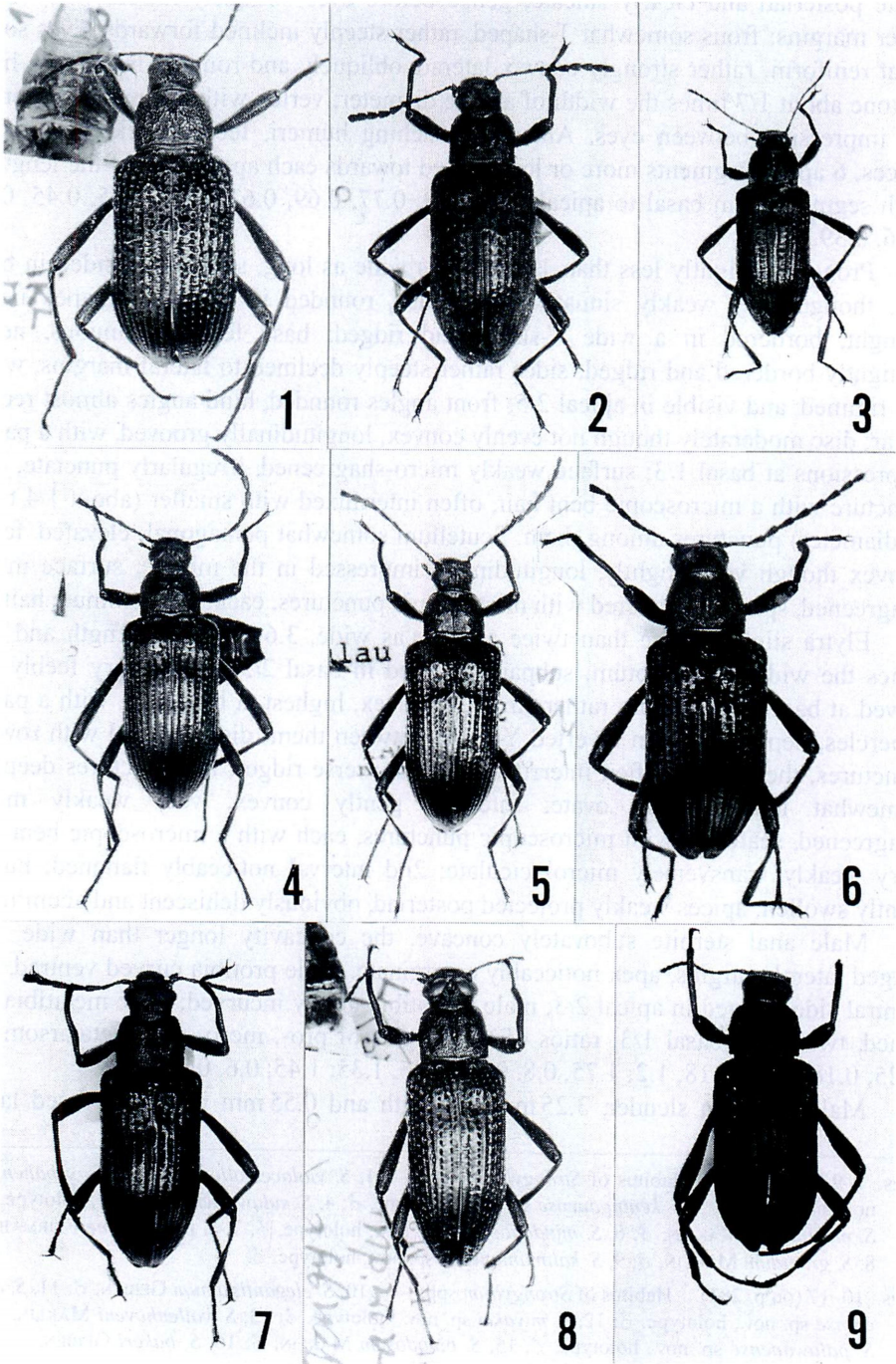
Male anal sternite subovately concave, the concavity longer than wide, with ridged lateral margins, apex noticeably emarginate. Male protibia curved ventrad, with ventral side gouged in apical 2/3; male mesotibia gently incurved; male metatibia flattened, twisted at basal 1/3; ratios of the lengths of pro-, meso- and metatarsomeres: 0.25, 0.18, 0.18, 0.18, 1.2; 1.75, 0.8, 0.55, 0.45, 1.35; 1.45, 0.6, 0.43, 1.38.

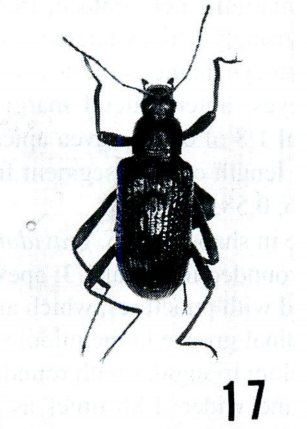
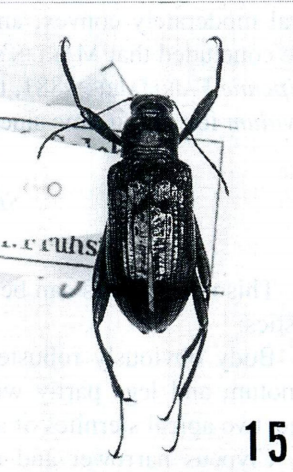
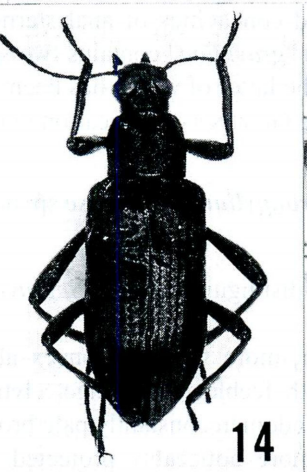
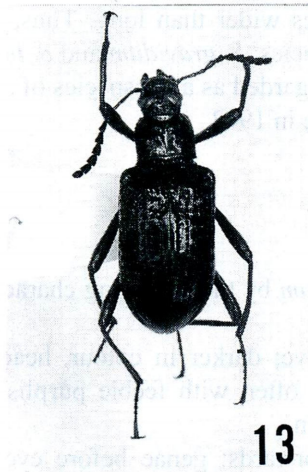
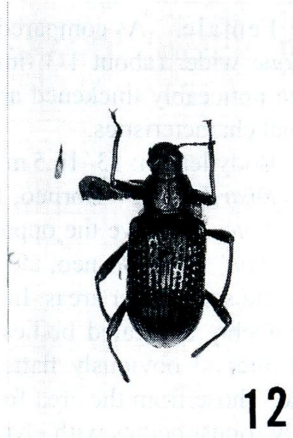
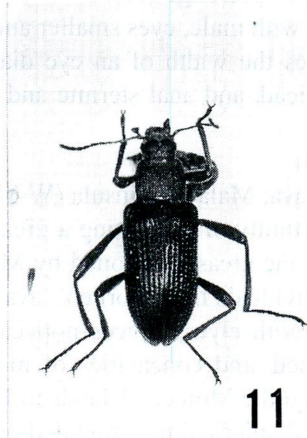
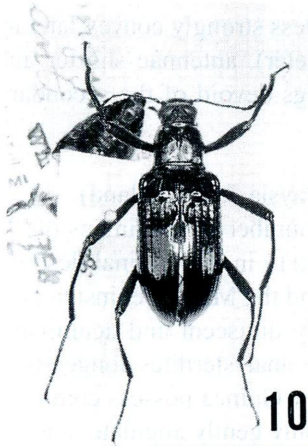
Male genitalia slender, 3.25 mm in length and 0.55 mm in width; fused lateral

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Figs. 1–9 (on p. 282). Habitus of *Strongylium* spp. — 1, *S. violaceicolle* PIC, ♂; 2, *S. sabahense* sp. nov., holotype, ♂; 3, *S. keningauense* sp. nov., holotype, ♂; 4, *S. sulawesiense* sp. nov., holotype, ♂; 5, *S. maculosum* MÄKLIN, ♂; 6, *S. mindanaoense* sp. nov., holotype, ♂; 7, *S. tuberipenne* FAIRMAIRE, ♂; 8, *S. gravidum* MÄKLIN, ♂; 9, *S. kalimantanense* sp. nov., holotype, ♂.

Figs. 10–17 (on p. 283). Habitus of *Strongylium* spp. — 10, *S. elegantissimum* GEBIEN, ♂; 11, *S. crock-erense* sp. nov., holotype, ♂; 12, *S. miyakei* sp. nov., holotype, ♂; 13, *S. vollenhoveni* MÄKLIN, ♂; 14, *S. palawanense* sp. nov., holotype, ♂; 15, *S. binodosum* MÄKLIN, ♂; 16, *S. bakeri* GEBIEN, ♂; 17, *S. taii* sp. nov., holotype, ♂.





lobes 1.2 mm in length with apex prolonged and acutely pointed.

**Female.** As compared with male, eyes smaller and less strongly convex laterad, diatone wider (about 1/3 times the width of an eye diameter), antennae shorter and more noticeably thickened apicad, and anal sternite and legs devoid of the secondary sexual characteristics.

Body length: 13–16.5 mm.

**Distribution.** Borneo, Java; Malay Peninsula (W Malaysia & S Thailand).

**Notes.** I have the opportunity of examining a great number of specimens of "*S. gravidum*" from Borneo, etc., the areas mentioned by MÄKLIN in his original description and some other areas. Individuals from Borneo, Java and the Malay Peninsula possess feebly elongated bodies with elytral apices noticeably dihiscent and acuminate, 2nd interval obviously flattened, and concavities of male anal sternites longer than wide. Those from the area from the Molucca Islands to New Guinea possess comparatively robust bodies with elytral apices almost rounded or only gently angulate, 2nd interval moderately convex, and concavities of anal sternites wider than long. Thus, I have concluded that MÄKLIN's "*gravidum*" contains two species: *S. gravidum* and *S. tuberipenne* FAIRMAIRE, 1881, the latter of which has been regarded as a subspecies of *S. gravidum* for a long time since GEBIEN's classification made in 1943.

### *Strongylium sabahense* sp. nov.

(Figs. 2, 26)

This new species can be distinguished from *S. gravidum* by the following characteristics:

Body obviously robuster, more strongly convex above; darker in colour, head, pronotum and legs partly with feeble violet tinge, elytra often with feeble purplish tinge, two apical sternites of abdomen constantly pale brown.

Clypeus narrower and more noticeably projected forwards; genae before eyes more longitudinal, with outer margins more obtuse; frons more noticeably raised between eyes; eyes shorter, less strongly convex laterad, more obliquely inlaid into head, diatone 1/4 times the width of an eye diameter; vertex with a rather parabolical impression at the middle close to eyes, antero-lateral margins of the impression weakly ridged. Antennae reaching basal 1/8 of elytra, seven apical segments of antennae more distinctly widened; ratio of the length of each segment from basal to apical: 0.65, 0.2, 0.8, 0.75, 0.7, 0.7, 0.7, 0.62, 0.6, 0.58, 0.57.

Pronotum almost the same in shape as in *S. gravidum*, 1.33 times as wide as long, subparallel-sided in basal 2/3, rounded in apical 1/3; apex with more noticeably widely triangular margin; disc scattered with punctures, which are similar in size to those in *S. gravidum*, with clearer longitudinal groove in the middle, and a pair of oblique impressions behind the middle. Scutellum triangular with rounded apex.

Elytra obviously shorter and wider, 1.86 times as long as wide, 3.37 times the length and 1.65 times the width of pronotum, subparallel-sided, though feebly con-

stricted at basal 3/7, and slightly widened in apical 1/3; dorsum more strongly convex, highest at basal 1/4, depressed in an inverted V-shape in basal 1/4, more distinctly tuberculate at basal 1/8 on each side; disc with rows of ovate punctures; intervals more noticeably micro-shagreened, sericeous and micro-aciculate; 1st interval obviously convex, weakly and transversely wrinkled; apices constantly rounded, neither dehiscent nor acuminate.

Male anal sternite more widely and shallowly concave, the concavity with margins gently ridged, apex shallowly emarginate; male legs similar to those of *S. gravidum*; ratios of the lengths of pro-, meso- and metatarsomeres: 0.27, 0.18, 0.15, 0.15, 1.2; 1.75, 0.78, 0.55, 0.38, 1.4; 1.28, 0.4, 0.37, 1.38.

Male genitalia obviously shorter though slightly bolder, about 2.7 mm in length, 0.53 mm in width; fused lateral lobes about 1.2 mm in length, with longitudinal groove comparatively distinct, and apex less noticeably prolonged.

Body length: 13.5–17.5 mm.

Holotype: ♂, nr. Keningau, Sabah, northern Borneo, 15–IV–1988, M. ITO leg. (NSMT). Paratypes: 1 ex., 15–III–1988, 1 ex., 11–IV–1988, 1 ex., 18–IV–1988, 1 ex., 19–IV–1988, 1 ex., 10–IV–1989, 1 ex., 30–V–1989, same locality and collector as for the holotype; 1 ex., nr. Keningau, Sabah, 26–III–1992, no collector's name; 2 exs., Crocker Range, 1,000–1,400 m alt., nr. Keningau, 11–15–V–1988, 1 ex., Crocker Range, 1,000–1,400 m alt., 21–25–V–1988, N. KOBAYASHI leg.; 1 ex., Kimanis Road, nr. Keningau, 3–V–1944, 1 ex., Kimanis Road, nr. Keningau, 5–V–1994, no collector's name; 1 ex., nr. Keningau, 9–V–1994, no collector's name; 4 exs., Mt. Kinabalu, 8–V–1903, J. WATERSRADT leg.; 2 exs., Mt. Trus Madi, 1,200–1,500 m alt., Sabah, V–1995, D. BOUCHARD leg.; 1 ex., Mt. Penriosen, III–1994, J. HORÁK leg. (BC).

### *Strongylium keningauense* sp. nov.

(Figs. 3, 27, 48)

This new species can be distinguished from *S. gravidum* by the following characteristics:

Body comparatively short, with narrower fore body; coloration almost the same as in *S. gravidum*, except for antennae, whose 3rd (5th in some individuals) to 7th segments are distinctly pale yellow and 4 apical ones black.

Clypeus more strongly bent downwards in front; genae narrower, with outer margins obtusely rounded; frons somewhat widely Y-shaped; eyes less strongly convex laterad, more narrowly and obliquely inlaid into head, diatone about 1/4 times the width of an eye diameter. Antennae reaching slightly behind humeri, 3rd to 5th segments slender, 6 apical segments flattened, those except terminal ones dilated towards each apex and clavate, terminal ones somewhat quadrate, ratio of the length of each segment from basal to apical: 0.7, 0.2, 0.98, 0.78, 0.67, 0.68, 0.62, 0.56, 0.47, 0.47, 0.6.

Pronotum almost of the same shape as in *S. gravidum*, 1.23 times as wide as long; disc more noticeably grooved in the middle, more frequently punctate.

Elytra 2.1 times as long as wide, 4.37 times the length and 1.52 times the width of pronotum, widest at apical  $3/7$ ; dorsum slightly more convex, more noticeably depressed in an inverted Y-shape in basal  $2/7$ , more distinctly tuberculate at basal  $1/7$  on each side; disc more clearly grooved with rows of punctures; intervals more noticeably micro-shagreened, micro-aciculate, and transversely wrinkled; apices constantly dehiscent and acuminate.

Male anal sternite parabolically concave, with apex truncate and weakly emarginate; male legs similarly modified to those in *S. gravidum*, viz. protibia bent ventrad, with ventral surface gouged in apical  $3/5$ , mesotibia weakly and evenly bent inwards, metatibia flattened, and twisted at basal  $2/5$ ; ratios of the lengths of pro-, meso- and metatarsomeres: 0.25, 0.2, 0.2, 0.2, 1.2; 1.25, 0.65, 0.45, 0.35, 1.37; 1.32, 0.56, 0.42, 1.38.

Male genitalia somewhat slender fusiform, almost straight in lateral view, feebly constricted at the border between basal piece and lateral lobes, 2.6 mm in length and 0.5 mm in width; fused lateral lobes about 1 mm in length, with longitudinal groove in apical  $3/5$ , and sharply pointed apex.

Body length: 11.7–14.5 mm.

Holotype: ♂, Crocker Range, 1,000–1,400 m alt., nr. Keningau, Sabah, northern Borneo, 1~5-V-1988, N. KOBAYASHI leg. (NSMT). Paratypes: 1 ex., Mt. Merinjak, Sarawak, 26-V-1914, G. E. BRYANT leg. (NHML); 1 ex., nr. Keningau, 7-IV-1988, M. ITO leg.; 1 ex., Keningau, 25-V-1992, M. ITO leg.; 1 ex., Kuching, northern Borneo, 24-IV-1989, Y. WADA leg.

***Strongylium sulawesiense* sp. nov.**

(Figs. 4, 28)

This new species can be distinguished from *S. gravidum* by the following characteristics:

Body robuster, more strongly convex above; almost piceous, head, scutellum and elytra with dark greenish tinge, pronotum with feeble purplish tinge.

Head narrower, more closely and finely punctate; clypeus longer and more noticeably bent downwards; genae before eyes noticeably raised with subrectangular outer margins; frons T-shaped; eyes less strongly convex laterad, more obliquely inlaid into head, diatone about  $1/5$  times the width of an eye diameter; vertex with a parabolical impression at the middle just behind eyes, antero-lateral margins of the impression weakly ridged. Antennae noticeably longer, reaching basal  $1/3$  of elytra, 8 apical segments more or less flattened, elongated and feebly dilated apicad, ratio of the length of each segment from basal to apical: 0.5, 0.2, 0.75, 0.73, 0.76, 0.77, 0.78, 0.75, 0.72, 0.74, 0.76.

Pronotum almost of the same shape as in *S. gravidum*, 1.28 times as wide as long, subparallel-sided in basal  $3/5$ , very slightly sinuous near base, rounded in apical  $2/5$ ; apex with more noticeably widely triangular margin; base more thickly rimmed; disc



scattered with punctures, which are smaller and more closely set than in *S. gravidium*. Scutellum obviously linguiform, feebly concave in middle, weakly micro-shagreened, sparsely scattered with microscopic punctures.

Elytra obviously wider, twice as long as wide, slightly less than 4 times the length and 1.64 times the width of pronotum, subparallel-sided, though feebly constricted at basal 1/3, and slightly widened in apical 1/3; dorsum more strongly convex, highest at basal 1/3, depressed in an inverted Y-shape in basal 1/4, more distinctly tuberculate at basal 1/9 on each side; disc grooved with rows of ovate punctures, which are more closely set; intervals rather evenly convex, more noticeably micro-shagreened, rather noticeably sericeous and micro-aciculate, rather frequently scattered with microscopic punctures, each with a bent microscopic hair; 2nd interval obviously not flattened; apices rather noticeably projected posteriad, but not acuminate.

Male anal sternite more widely concave, the concavity with margins more noticeably ridged in lateral portions, with apex weakly emarginate; male legs almost similar to those of *S. gravidium*, though the metatibia is more noticeably flattened and twisted; ratios of the lengths of pro-, meso- and metatarsomeres: 0.26, 0.2, 0.18, 0.21, 1.2; 1.8, 0.7, 0.58, 0.42, 1.5; 1.5, 0.7, 0.53, 1.53.

Male genitalia slightly bolder, about 3.3 mm in length, 0.59 mm in width; fused lateral lobes about 1.2 mm in length, with shallow longitudinal groove, and apex less noticeably prolonged.

Body length: ca. 15.5 mm.

Holotype: ♂, Rante Pao, S Sulawesi, Indonesia, 10-II-1985, M. TAO leg. (NSMT).

### *Strongylium mindanaoense* sp. nov.

(Figs. 6, 30)

This new species resembles *S. gravidium* MÄKLIN, but can be distinguished from the latter by the following characteristics:

Body robuster and more noticeably convex above; coloration and lustre of each surface almost the same as in *S. gravidium*. Head narrower, more closely and finely punctate; clypeus a little longer, more noticeably depressed in basal portion, transverse impression before fronto-clypeal border indistinct; genae smaller, with rounded outer margins; frons obviously steeply inclined forwards; eyes smaller, less strongly convex laterad, noticeably obliquely inlaid into head; vertex with impression more obsolete. Antennae noticeably slenderer, reaching behind humeri, 4th to 10th segments dilated to each apex, ratio of the length of each one from basal to apical: 0.58, 0.2, 0.82, 0.97, 0.87, 0.86, 0.88, 0.87, 0.85, 0.82, 0.79.

Pronotum 1.25 times as wide as long, more noticeably narrowed apicad; disc more closely and finely punctate; apex and base more thickly bordered. Scutellum more elongate, sublinguiform, micro-shagreened, and sparsely scattered with microscopic punctures.

Elytra wider, 1.86 times as long as wide, 3.56 times the length and 1.56 times the

width of pronotum; dorsum more strongly convex, highest at basal 3/10, more noticeably tuberculate at basal 1/8, a little more clearly depressed in an inverted Y-shape between the tubercles; disc with rows of punctures, which are more elongate and closely set; intervals less noticeably convex, feebly micro-shagreened, more frequently scattered with microscopic punctures, each with a microscopic hair, and somewhat transversely, microscopically wrinkled; 2nd interval less noticeably flattened; apices not acuminate but rounded.

Male anal sternite remarkably, widely concave, the concavities being 1.2 times as wide as long, with apex gently emarginate; male protibia more strongly bent ventrad, ventral side more noticeably gouged in apical 2/3; male metatibia more strongly flattened and twisted; ratios of the lengths of pro-, meso- and metatarsomeres: 0.27, 0.2, 0.21, 0.22, 1.2; 1.35, 0.61, 0.52, 0.39, 1.37; 1.26, 0.53, 0.41, 1.38.

Male genitalia similar to those of *S. gravidum* though slightly bolder, about 2.3 mm in length, 0.4 mm in width, gently curved in lateral view, feebly constricted at the articulated part of basal piece and lateral lobes; fused lateral lobes 0.8 mm, with longitudinal groove in apical 3/4.

Body length: 12–16 mm.

Holotype: ♂, Tandag, Surigao, Mindanao Is., Philippines, IV–1983, native collector (NSMT). Paratypes: 13 exs., same data as for the holotype; 11 exs., same locality, V–1983, native collector; 1 ex., Mt. Apo, S Mindanao, VII–1985, no collector's name; 1 ex., Mt. Apo, no further data; 1 ex., Mt. Apo, 31–III–1978, K. SUGINO leg.; 1 ex., Mt. Apo, 12~18–V–1978, T. MIZUNUMA leg.; 1 ex., Impalutao, Impasugong, Mindanao Is., IV–1984, no collector's name (BC).

### *Strongylium kalimantanense* sp. nov.

(Figs. 9, 33)

This new species resembles *S. gravidum* MÄKLIN, but can be distinguished from the latter by the following characteristics:

Body comparatively short and wide; purplish coppery, with head rather noticeably cyaneous; dorsal surface noticeably sericeous. Head narrower, more closely punctate; clypeus longer, more noticeably bent downwards in front; genae more oblique, with outer margins more obtuse; frons less steeply inclined forwards; eyes less strongly convex laterad, more obliquely inlaid into head, diatone about 1/6 times the width of an eye diameter. Antennae slightly slenderer, reaching behind humeri, ratio of the length of each segment from basal to apical: 0.5, 0.2, 0.79, 0.63, 0.5, 0.48, 0.5, 0.43, 0.39, 0.36, 0.35.

Pronotum almost of the same shape as that of *S. gravidum*, though denticulate at the middle of lateral margins, 1.26 times as wide as long; disc noticeably micro-shagreened, more coarsely and sparsely punctate. Scutellum triangular, with sides feebly produced, micro-shagreened, more sparsely, minutely punctate.

Elytra 1.86 times as long as wide, 3.48 times the length and 1.46 times the width

of pronotum, subparallel-sided; dorsum more strongly convex, though less noticeably depressed between tubercles, which are less noticeable; disc with rows of punctures, which are larger and more elongate; intervals more noticeably convex (especially 3rd interval), though the 2nd interval is flattened, noticeably micro-shagreened, scattered with microscopic punctures, which are slightly transverse; apices neither dehiscent nor aciculate, but roundly produced posteriad.

Male anal sternite gently, semicircularly concave, with apex only slightly emarginate; male protibia weakly bent ventrad, with ventral surface only slightly gouged in middle, mesotibia very weakly and evenly bent inwards, metatibia more noticeably flattened in basal half, and twisted at the middle; ratios of the lengths of pro-, meso- and metatarsomeres: 0.25, 0.2, 0.2, 0.2, 1.2; 2.3, 1.2, 0.8, 0.48, 1.53; 2.17, 0.75, 0.5, 1.39.

Male genitalia elongated fusiform, almost gently and evenly curved, 2.3 mm in length and 0.4 mm in width; fused lateral lobes about 0.85 mm in length, with longitudinal groove in apical 3/5, and prolonged apex.

Body length: ca. 13 mm.

Holotype: ♂, Pontianak, Borneo, no further details (MNHNP). Paratypes: 1 ex., Keningau, Sabah, Borneo, 14-V-1989, 1 ex., same locality, 3-VI-1989, M. ITO leg.

*Strongylium crockerense* sp. nov.

(Figs. 11, 35, 46-47)

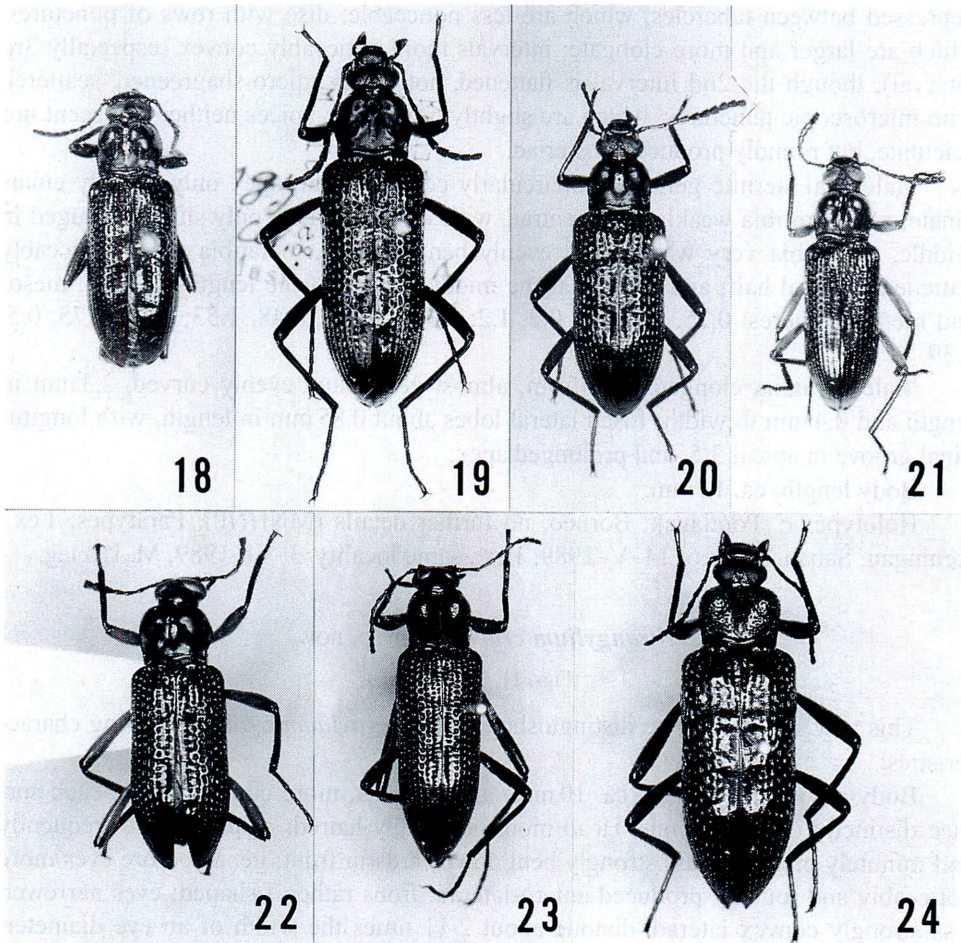
This new species can be distinguished from *S. gravidum* by the following characteristics:

Body obviously smaller (ca. 10 mm) and robuster, more convex above; each surface distinctly dark cyaneous. Head more noticeably haired; clypeus more frequently and minutely punctate, less strongly bent downwards in front; genae before eyes more noticeably and roundly produced antero-laterad; frons rather T-shaped; eyes narrower, less strongly convex laterad, diatone about 2/11 times the width of an eye diameter; vertex less noticeably impressed in the middle. Antennae more slender, feebly thickened apicad, reaching basal 1/6 of elytra, ratio of the length of each segment from basal to apical: 0.65, 0.2, 0.8, 0.7, 0.68, 0.56, 0.53, 0.5, 0.39, 0.37, 0.47.

Pronotum more transverse, 1.29 times as wide as long, widest slightly before the middle; disc more noticeably convex, more coarsely rugoso-punctate.

Elytra shorter, 1.85 times as long as wide, 3.53 times the length and 1.44 times the width of pronotum, widest at base, feebly sinuous at basal 3/8; dorsum more convex, highest at basal 1/4; disc with rows of punctures, which are clearer and more closely set; intervals more noticeably micro-shagreened, micro-aciculate, and microscopically punctate, 2nd interval not so much flattened as in *S. gravidum*; apices neither dehiscent nor acuminate, but rounded.

Male anal sternite semicircularly concave, with apex slightly bilobed; male protibia feebly curved ventrad, with ventral side slightly gouged in middle; male



Figs. 18–24. Habitus of *Strongylium* spp. — 18, *S. cochinchinense* sp. nov., holotype, ♀; 19, *S. insigne* MÄKLIN, ♂; 20, *S. sabahinsigne* sp. nov., holotype, ♂; 21, *S. wiseetingum* sp. nov., holotype, ♀; 22, *S. wallacei* sp. nov., holotype, ♀; 23, *S. rufifemoratum* sp. nov., holotype, ♂; 24, *S. kimanisense* sp. nov., holotype, ♂.

mesotibia feebly curved inwards; metatibia gouged in basal 3/4, weakly twisted at the middle; ratios of the lengths of pro-, meso- and metatarsomeres: 0.23, 0.15, 0.18, 0.18, 1.2; 1.78, 0.67, 0.61, 0.42, 1.57; 1.38, 0.62, 0.39, 1.43.

Male genitalia obviously short fusiform, almost straight in lateral view, feebly constricted at the border between basal piece and lateral lobes, 2.6 mm in length and 0.6 mm in width; fused lateral lobes nib-shaped, about 1.3 mm in length, longitudinally grooved in apical 3/4, with less acutely pointed apex.

Body length: 10–11 mm.

Holotype: ♂, Kimanis Road, nr. Keningau, Sabah, northern Borneo, 3-V-1994, no collector's name (NSMT). Paratypes: 1 ex., same data as for the holotype; 1 ex., same locality, 5-V-1994, no collector's name; 2 exs., Mt. Trus Madi, 1,200–1,500 m alt., Sabah, V-1995, D. BOUCHARD leg.

*Strongylium miyakei* sp. nov.

(Figs. 12, 36)

This new species also resembles *S. gravidum* MÄKLIN, but can be distinguished from the latter by the following characteristics:

Body obviously robuster and more strongly convex above, darker in colour, often with feeble purplish tinge, especially so on elytra. Clypeus simply inclined forwards; genae before eyes slightly narrower, more strongly produced forwards, with obtusely angular outer margins; frons more strongly ridged between eyes; eyes shorter, less strongly convex laterad, more obliquely inlaid into head, diatone slightly less than 1/5 times the width of an eye diameter; vertex medially with a rhombical impression. Six apical segments of antennae lost in the holotype (male), ratio of the length of each segment from basal to apical: 0.62, 0.2, 0.7, 0.6, 0.6, —, —, —, —, —, —.

Pronotum somewhat barrel-shaped, 1.26 times as wide as long, widest slightly before the middle; apex with more widely triangular margin; disc scattered with smaller punctures, and devoid of a pair of impressions behind the middle. Scutellum obviously narrower and linguiform.

Elytra obviously shorter, 1.87 times as long as wide, 3.74 times the length and 1.58 times the width of pronotum, subparallel-sided, though feebly narrowed at basal 3/7; dorsum more strongly convex, highest at basal 1/3, more distinctly tuberculate at basal 1/7 on each side, depressed in an inverted V-shape in basal 2/7; disc with rows of elongated punctures; intervals more noticeably micro-shagreened and micro-aciculate, 1st intervals rather noticeably convex; apices constantly rounded, neither dehiscent nor acuminate.

Male anal sternite parabolically concave, though the concavity is narrower and shallower, and not ridged as in *S. gravidum*, with simply truncated apex; male legs similar to those in *S. gravidum*; ratios of the lengths of pro-, meso- and metatarsomeres (the last two being lost in the type material): 0.23, 0.18, 0.18, 0.18, 1.2; —, —, —, —, —; —, —, —, —.

Male genitalia obviously smaller and shorter, about 2.5 mm in length, 0.38 mm in width; fused lateral lobes about 0.8 mm in length, with longitudinal groove comparatively indistinct, and apex less noticeably prolonged.

Body length: 12.5–14.5 mm.

Holotype: ♂, Fraser's Hills, Malay Peninsula, 27-III-1976, Y. MIYAKE leg. (NSMT). Paratypes: 1 ex., Kedah Peak, Malay Peninsula, 20-III-1928, H. M. PENDLEBURY leg., 1 ex., 22-III-1928, 2 exs., 25-III-1928, 2 exs., 27-III-1928, 1 ex., 29-III-1928, 1 ex., 30-III-1928, same locality and collector; 2 exs., Kedah, 28-III-

1967, H. T. PAGDEN leg.; 1 ex., Larut Hills, Perak, 6-II-1932, H. M. PENDLEBURY leg.; 1 ex., Larut Hills, 27-IV-1938, no collector's name; 1 ex., Pahang, VI-VII-1917, no collector's name; 1 ex., Khao Luang, Nakon Sri Tamarat, Thailand, 15-III-1922, H. M. PENDLEBURY leg.; 3 exs., 26-III-1922, 1 ex., 27-III-1922, 1 ex., 1922, same locality and collector as the preceding; 2 exs., Penag, coll. F. BATES, 2 exs., Malay Peninsula, H. C. ROBINSON, 1907-48, 6 exs., Penang, (Lamb.) [sic], coll. PASCOE, no further data; 1 ex., Cameron Highlands, 17-18 miles, Pahang, 11-III-1976, K. SAKAI leg.; 1 ex., Tanah Rata, Cameron Highlands, 31-III-1976, Y. MIYAKE leg.; 1 ex., Keningau, 1-22-IV-1988, M. ITO leg.; 3 exs., Perak, Malacca, W. DOHERTY leg.; 1 ex., Betong, Gunung Candun Vill., Yala Dist., S Thailand, 25-III-22-IV-1993, J. HORÁK leg., 1 ex., Cameron Highlands, III-IV-1994, no collector's name (BC).

*Strongylium palawanense* sp. nov.

(Figs. 14, 38)

This new species also resembles *S. gravidum* MÄKLIN, but can be distinguished from the latter by the following characteristics:

Body robuster; elytra with dim brassy lustre; each surface rather noticeably clothed with microscopic hairs. Head narrower, more closely punctate; clypeus with short transverse impression before fronto-clypeal sulcus less distinct; genae before eyes with outer margins more angulate; frons more steeply inclined forwards; eyes less strongly convex laterad, more noticeably obliquely inlaid into head, diatone about 1/6 times the width of an eye diameter. Antennae shorter and more distinctly clavate, reaching humeri, ratio of the length of each segment from basal to apical: 0.63, 0.2, 0.98, 0.73, 0.72, 0.71, 0.68, 0.56, 0.46, 0.44, 0.45.

Pronotum almost of the same shape as that of *S. gravidum*, 1.2 times as wide as long, disc micro-shagreened, obviously more frequently punctate. Scutellum obviously linguiform, micro-shagreened and microscopically punctate.

Elytra slightly less than twice as long as wide, 3.78 times the length and 1.48 times the width of pronotum; dorsum more noticeably convex, more noticeably depressed in an inverted Y-shape in basal 1/4, more distinctly tuberculate at basal 1/9 on each side; disc grooved with rows of punctures, which are finer and more closely set; intervals more distinctly micro-shagreened, more noticeably, transversely wrinkled; apices rather noticeably dehiscent and angulate.

Male anal sternite concave, about 1.2 times as long as wide, with apex only feebly emarginate; ventral side of male protibia gouged in apical 2/5, though less distinctly; male metatibia more noticeably twisted; ratios of the lengths of pro-, meso- and metatarsomeres: 0.25, 0.2, 0.21, 0.22, 1.2; 1.35, 0.7, 0.55, 0.38, 1.5; 1.45, 0.6, 0.38, 1.4.

Body length: 13.5-14.5 mm.

Holotype: ♂, S Palawan, Philippine Isls., no further detailed data (MNHN). Paratypes: 1 ex., Palawan Is., no further detailed data; 1 ex., Brookes Point, Palawan

Is., 1973, R. RODRIGUEZ leg. (NHML).

*Strongylium taoi* sp. nov.

(Figs. 17, 41)

This new species can be distinguished from *S. gravidum* by the following characteristics:

Body obviously robuster, more strongly convex above; darker in colour, with brassy lustre.

Head more closely, minutely punctate; clypeus narrower, more distinctly projected apicad; genae before eyes more strongly raised, with angulate outer margins; frons less steeply inclined forwards; eyes less strongly convex laterad, slightly more obliquely in-laid into head, diatone slightly less than 1/5 times the width of an eye diameter; vertex medially with an impunctate impression. Antennae rather slender, though 7 apical segments are more or less thickened towards each apex, ratio of the length of each segment from basal to apical: 0.5, 0.2, 0.75, 0.68, 0.6, 0.57, 0.48, 0.42, 0.39, 0.38, 0.37.

Pronotum almost of the same shape as in *S. gravidum*, 1.25 times as wide as long, widest slightly before the middle; apex straight and more clearly bordered in a V-shape; base more clearly bordered; disc less coarsely scattered with smaller punctures, with clearer medial groove, and a pair of vague impressions at basal 1/3. Scutellum triangular with rounded apex, gently elevated, weakly concave in medial portion, with lateral margins scattered with microscopic punctures.

Elytra obviously shorter, about twice as long as wide, 4 times the length and 1.54 times the width of pronotum, subparallel-sided, though feebly constricted at basal 3/8; dorsum more strongly convex, highest at basal 1/4, depressed in an inverted Y-shape in basal 2/9, more distinctly tuberculate at basal 1/9 on each side; disc punctato-striate, the striae often interrupted by transverse ridges in antero-lateral portions, the punctures being smaller and closely set; intervals more noticeably micro-aciculate and often wrinkled; 2nd interval not flattened but gently convex; apices neither dehiscent nor acuminate, only slightly and roundly produced posteriad.

Male anal sternite parabolically concave, though the concavity is narrower and shallower, and not so clearly ridged as in *S. gravidum*, with apex weakly emarginate; male legs similar to those of *S. gravidum*, though the metatibiae are not so remarkably flattened and also not so distinctly twisted as in those of *S. gravidum*; ratios of the lengths of pro-, meso- and metatarsomeres: 0.25, 0.16, 0.18, 0.18, 1.2; 1.23, 0.68, 0.64, 0.48, 1.6; 1.36, 0.66, 0.55, 1.5.

Male genitalia lost in the type material.

Body length: ca. 13.5 mm.

Holotype: ♂, Sampuraga, Sulawesi, Indonesia., 29-X-1985, M. TAO leg. (NSMT).

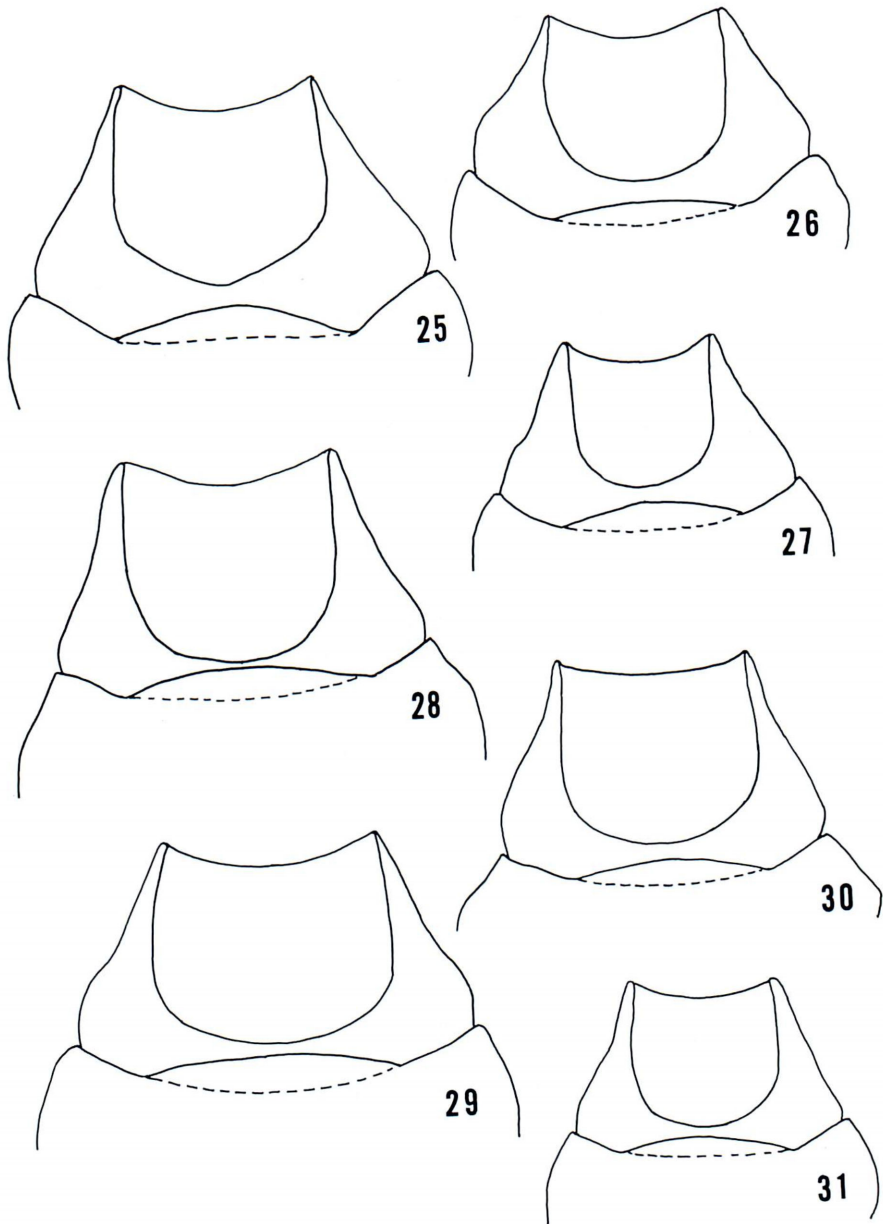




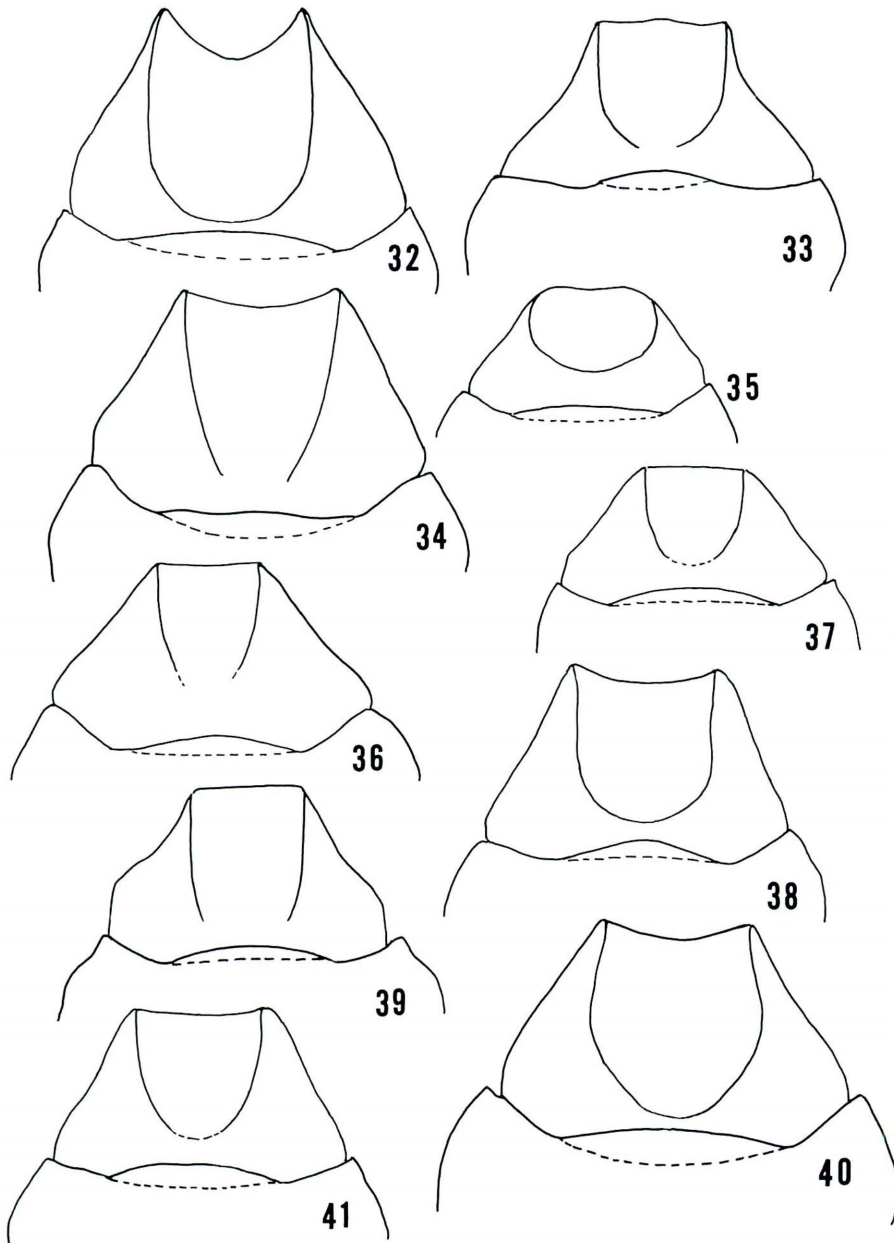
- flattened and noticeably clavate; 11.7–14.5 mm; Borneo . . . . .  
 . . . . . *S. keningauense* sp. nov.
- 7( 6 ) Antennae not modified, gradually thickened apicad, wholly brownish black.
- 8(11) Body mostly larger, somewhat slenderly triangular and less remarkably convex above.
- 9(10) Elytral apices in male more noticeably produced posteriad and more distinctly bilobed; anal sternite narrower; 15.5 mm; Sulawesi . . . . .  
 . . . . . *S. sulawesienne* sp. nov.
- 10( 9 ) Elytral apices in male less noticeably produced posteriad and less distinctly bilobed; anal sternite narrower; 13–17 mm; Java . . . . .  
 . . . . . *S. maculosum* MÄKLIN.
- 11( 8 ) Body comparatively small, bold and remarkably convex above.
- 12(13) Body robust, dorsal surface often with dark bluish tinge; 12–15 mm; Mindanao Is. . . . . *S. mindanaoense* sp. nov.
- 13(12) Body not so robust, dorsal surface coppery or brassy; 12–15 mm; Molucca Isls., New Guinea; N Queensland . . . . . *S. tuberipenne* FAIRMAIRE.  
 a. Body slightly wider; dorsal surface less strongly metallic, dark coppery; Buru Is., Ambon Is., Ceram Is.  
 b. Body slightly narrower; dorsal surface more strongly metallic, noticeably coppery or brassy; New Guinea, N Queensland.
- 14( 1 ) Male anal sternite obviously not widely and/or only shallowly concave in apical portion.
- 15(16) Dorsal surface not metallically shining but sericeous, purplish coppery; elytral tubercles indistinct, inter-tubercular space simply depressed; 13 mm; Borneo . . . . . *S. kalimantanense* sp. nov.
- 16(15) Dorsal surface gently metallically shining, dark greenish to dark coppery; elytral tubercles distinct, inter-tubercular space noticeably depressed in an inverted V or Y-shape.
- 17(18) Elytral apices dehiscent and acuminate; 13–16.5 mm; Borneo, Java, the Malay Peninsula (West Malaysia & S Thailand) . . . . . *S. gravidum* MÄKLIN.
- 18(17) Elytral apices neither dehiscent nor acuminate.
- 19(20) Dorsal surface strongly metallically shining; elytral intervals almost flattened [probably annectant to the species-group of *S. dorsocupreum*\*]; 15–17 mm; Philippine Isls. (Luzon Is.) . . . . . *S. elegantissimum* GEBIEN.
- 20(19) Dorsal surface not strongly metallically shining; elytral intervals more or less

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\* The species-group of *S. dorsocupreum* might be a relative of this species-group in having almost the same outline of the bodies, though the bodies of the latter are more slender, strongly and metallically shining, with elytral intervals not convex. It contains the following species described in the past: *S. dorsocupreum* FAIRMAIRE, 1903, *S. schenklingi* GEBIEN, 1913, *S. baudoni* ARDOIN, 1973, *S. yukae* MASUMOTO, 1996, *S. jae* MASUMOTO, 1996, *S. yasuhikoi* MASUMOTO, 1996, etc. Further details will be given on another occasion.



Figs. 25–31. Male anal sternites. — 25, *S. violaceicolle* Pic; 26, *S. sabahense* sp. nov.; 27, *S. keningauense* sp. nov.; 28, *S. sulawesiense* sp. nov.; 29, *S. maculosum* sp. nov.; 30, *S. mindanaoense* sp. nov.; 31, *S. tuberipenne* sp. nov.



Figs. 32-41. Male anal sternites. — 32, *S. gravidum* MÄKLIN; 33, *S. kalimantanense* sp. nov.; 34, *S. elegantissimum* GEBIEN; 35, *S. crockerense* sp. nov.; 36, *S. miyakei* sp. nov.; 37, *S. vollenhoveni* MÄKLIN; 38, *S. palawanense* sp. nov.; 39, *S. binodosum* MÄKLIN; 40, *S. bakeri* GEBIEN; 41, *S. taoi* sp. nov.

- convex.
- 21(22) Body smaller (10–11 mm); dorsal surface dark cyaneous; pronotum remarkably strongly rugoso-punctate, male genitalia short fusiform; Borneo . . . . .  
 . . . . . *S. crockerense* sp. nov.
- 22(21) Body larger (more than 11 mm); dorsal surface not dark cyaneous; pronotum not coarsely punctate but irregularly so, male genitalia slender.
- 23(26) Elytra with 1st interval obviously convex.
- 24(25) Pronotum more closely punctate; elytra wider, with rows of punctures more elongate, and not closely set, apices more noticeably, roundly produced posteriad; 12.5–14.5 mm; Malay Peninsula (W Malaysia & S Thailand); Borneo . . . . . *S. miyakei* sp. nov.
- 25(24) Pronotum less closely punctate; elytra narrower, with rows of punctures less elongate, and more closely set, apices less noticeably produced posteriad; 12–13 mm; Sumatra . . . . . *S. vollenhoveni* MÄKLIN.
- 26(23) Elytra with 1st interval not obviously convex.
- 27(28) Dorsal surface noticeably micro-shagreened and transversely finely wrinkled; 13.5–14.5 mm; Palawan Is. . . . . *S. palawanense* sp. nov.
- 28(27) Dorsal surface neither micro-shagreened nor transversely finely wrinkled.
- 29(30) Body narrower; male antennae slenderer; male legs less noticeably modified; 12–15 mm; Sulawesi . . . . . *S. binodosum* MÄKLIN.
- 30(29) Body wider; antennae thicker; legs more noticeably modified.
- 31(32) Eyes larger; pronotum more noticeably narrowed apicad, more closely punctate; elytra with rows of punctures more closely set; male anal sternite more noticeably, more widely concave (though not wider than long); 12–14 mm; Philippine Is. (Luzon Is.) . . . . . *S. bakeri* GEBIEN.
- 32(31) Eyes smaller; pronotum less noticeably narrowed apicad, less closely punctate; elytra with rows of punctures less closely set; male anal sternite less noticeably, somewhat parabolically concave; ca. 13.5 mm; Sulawesi . . . . .  
 . . . . . *S. taoi* sp. nov.

## 2. Species-group of *Strongylium insigne* MÄKLIN, 1864

The members of this species-group are easily distinguishable from other *Strongylium* species by the pronotum with a pair of distinctly large tubercles, whose inner sides are produced inwards and emarginate at the middle. That the male genitalia are remarkably elongate and complicated in shape may also be one of the important features of this group.

MÄKLIN (1864) described *S. insigne* from “India orientalis” as a distinct species. FAIRMAIRE described two species, *S. gibbicolle* in 1893 and *S. forcipicolle* in 1900, both from Borneo, though they were regarded by GEBIEN (1943) as junior synonyms of *S. insigne*.

I am going to redescribe MÄKLIN’s species and to describe four new relatives.

*Strongylium insigne* MÄKLIN, 1864

(Figs. 19, 49–50)

*Strongylium insigne* MÄKLIN, 1864, Mon. *Strongylium*, 332.*Strongylium gibbicolle* FAIRMAIRE, 1893, Not. Leyden Mus., **15**: 62.*Strongylium forcipicolle* FAIRMAIRE, 1900, Bull. Soc. ent. Fr., **1900**: 45.

*Original description.* "Elongatum, subcylindricum, viridi-aeneum, nitidum, pronoto postice elytrisque obscure cupreis, antennis tarsisque nigris, femoribus basin versus rufis; pronoto longitudine haud latiori, lateribus modice rotundato et ante angulos posticos lateraliter nonnihil productos leviter sinuato, postice subtilissime punctato, longitudinaliter impresso et tuberculis duobus maximis, valde elevatis, in disco fere conniventibus et apice intus emarginatis munito; elytris longe ultra medium profunde et fortiter, paulo ante apicem subtilius obsoleteusque punctato-striatis. Longit. 19 m. m.; Latit. hum. 6 m. m."

*Redescription.* Darkly copper-coloured, ventral surface, lateral margins of elytra, apical portions of femora, and tibiae dark blue, femora (except for apical portions) reddish brown, antennae, mouth parts and tarsi brownish black, head, scutellum and major parts of elytra brassy and dimly shining, pronotum feebly sericeous. Elongated fusiform; rather strongly convex, though gently flattened longitudinally.

Head subhexagonal, weakly micro-shagreened, closely, finely punctate; clypeus semicircular, noticeably bent downwards in front, with a short transverse impression before fronto-clypeal sulcus, which is widely V-shaped and rather deeply sulcate; genae noticeably raised, with outer margins obtusely angulate; frons somewhat Y-shaped, gently inclined forwards, with a remarkably longitudinal impression medially; eyes large and transverse, strongly convex laterad, obliquely inlaid into head, diatone about 1/6 times the width of an eye diameter. Antennae feebly thickened towards apex, reaching basal 1/6 of elytra, ratio of the length of each segment from basal to apical: 0.63, 0.2, 0.91, 0.77, 0.75, 0.72, 0.68, 0.62, 0.57, 0.51, 0.52.

Pronotum 1.15 times as wide as long, widest at the middle; apex gently produced apicad, triangularly raised; base clearly bordered, bisinuously ridged; sides gently produced laterad, gently sinuate before base, with lateral margins bordered with sparsely punctured grooves and finely rimmed; front angles rounded, hind angles rather acutely angulate; disc feebly micro-shagreened, rather frequently scattered with microscopic punctures, with a pair of distinctly large tubercles, whose inner sides are produced inwards and semicircularly emarginate at the middle, area between two tubercles longitudinally excavated. Scutellum triangular, weakly micro-shagreened, sparsely scattered with microscopic punctures.

Elytra 2.38 times as long as wide, 4 times the length and 1.33 times the width of pronotum, widest at basal 1/5; dorsum quadri-undulate, though the posteriormost undulation is indistinct, with a pair of swellings at basal 1/10, area between them weakly depressed; disc with rows of mostly rounded punctures, those in inner and posterior portions being smaller and rather closely set, those in antero-lateral portions larger,

sparsely set and forming foveae; basal margin ridged due to strong punctation of basal portions of 5 inner rows; intervals gently raised, weakly micro-shagreened, with 3rd intervals distinctly convex at swelling parts; humeri slightly swollen; apices gently dehiscent.

Male anal sternite without peculiarities; legs medium-sized for the members of the genus *Strongylium*, male protibia with ventral face weakly gouged in apical half; male meso- and metatibiae weakly curved dorsad; ratios of the lengths of pro-, meso- and metatarsomeres: 0.38, 0.24, 0.22, 0.2, 1.2; 1.92, 0.96, 0.68, 0.48, 1.34; 2.34, 0.89, 0.47, 1.35.

Male genitalia remarkably slender and modified, 6.3 mm in length and 0.78 mm in width, basal piece oblong-ovate; fused lateral lobes extremely slender, 2.65 mm in length.

Body length: 17–21 mm.

*Distribution.* “India orientalis”, Borneo.

***Strongylium cochinchinense* sp. nov.**

(Fig. 18)

This new species resembles *S. insigne* MÄKLIN, 1864, but can be distinguished from the latter by the following characteristics:

Body slightly smaller (16.5 mm) and robuster; head, pronotum, scutellum and elytra black, ventral surface dark blue, 4 basal segments of antennae and legs reddish brown, 7 apical segments of antennae and mouth parts dark brown; dorsal surface metallicly shining, ventral surface moderately shining and partly alutaceous; each surface almost glabrous.

Head less closely punctate; clypeus less noticeably projected forwards, fronto-clypeal border more clearly sulcate; genae less distinctly produced antero-laterad; frons wider; eyes less strongly convex laterad, diatone about 1/4 times the width of an eye diameter. Antennae feebly clavate, reaching base of elytra, ratio of the length of each segment from basal to apical: 0.7, 0.2, 0.65, 0.61, 0.59, 0.56, 0.55, 0.53, 0.5, 0.49, 0.47.

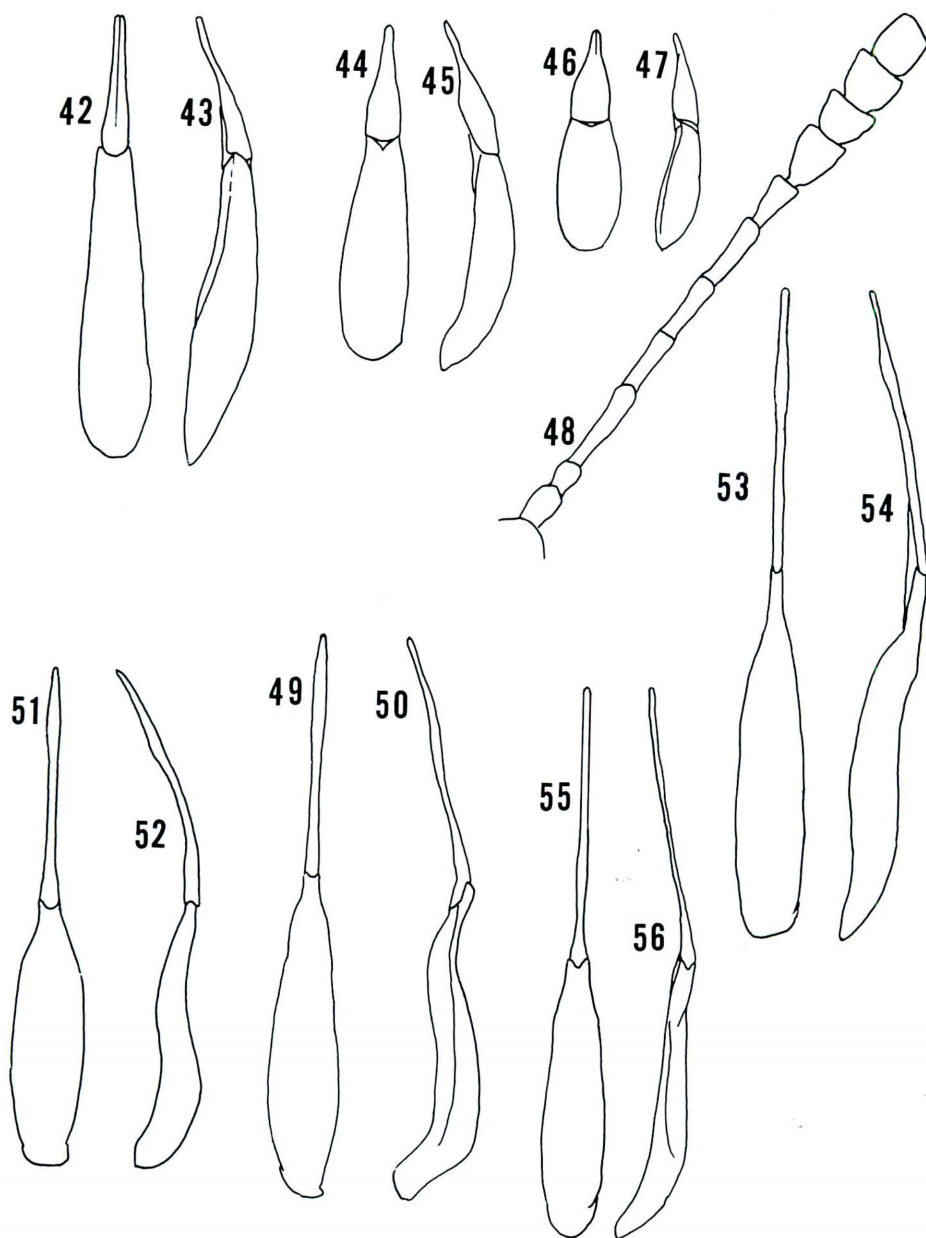
Pronotum slightly more than 1.2 times as wide as long, rather polished and more clearly scattered with microscopic punctures; disc less noticeably concave in the middle, with a pair of tubercles less strongly convex.

Elytra obviously shorter, 2.1 times as long as wide, 3.3 times the length and a little more than 1.3 times the width of pronotum; dorsum quadri-undulate, with a pair of swellings less distinct; disc with rows of smaller and somewhat ovate punctures; intervals less noticeably raised, more closely, finely scattered with microscopic punctures.

Ratios of the lengths of pro-, meso- and metatarsomeres: 0.28, 0.2, 0.2, 0.2, 1.2; 1.36, 0.72, 0.59, 0.27, 1.34; 1.6, 0.8, 0.49, 1.48.

Body length: 16.5 mm.

Holotype: ♀, Cochinchina, S Vietnam, A. BREBOIN leg., coll. Dr. J. L. VAUTHIER,



Figs. 42-56. Male genitalia (42-47 & 49-56) and antenna (48). — 42-43, *S. gravidum* MÄKLIN, 42, dorsal view, 43, lateral view; 44-45, *S. tuberipenne* FAIRMAIRE, 44, dorsal view, 45, lateral view; 46-47, *S. crockerense* sp. nov., 46, dorsal view, 47, lateral view; 48, *S. keningauense* sp. nov., 49-50, *S. insignis* MÄKLIN, 49, dorsal view, 50, lateral view; 51-52, *S. sabahinsigne* sp. nov., 51, dorsal view, 52, lateral view; 53-54, *S. rufifemoratum* sp. nov., 53, dorsal view, 54, lateral view; 55-56, *S. kimanisense* sp. nov., 55, dorsal view, 56, lateral view.

1908 (MNHNP).

*Strongylium sabahinsigne* sp. nov.

(Figs. 20, 51–52)

This new species resembles *S. insigne* sp. nov., but can be distinguished from the latter by the following characteristics:

Body obviously smaller (ca. 14 mm) and slightly robuster; coloration almost the same as in *S. insigne*.

Head less convex above; clypeus more widely flattened in basal portion, with transverse impression shorter though clearer, fronto-clypeal border more clearly, finely sulcate; genae more oblique, with outer margins more obtuse; frons more gently inclined forwards, devoid of longitudinal groove, punctures sparser and more irregular; eyes more strongly convex laterad, obliquely, more roundly inlaid into head, diatone obviously larger, about 1/4 times the width of an eye diameter; vertex with somewhat ovate impression in the middle, noticeably depressed posteriad. Antennae shorter and rather claviform, reaching humeri, 7 apical segments flattened and thickened, ratio of the length of each segment from basal to apical: 0.55, 0.2, 0.8, 0.63, 0.59, 0.48, 0.52, 0.5, 0.5, 0.48, 0.54.

Pronotum 1.15 times as wide as long, widest at apical 2/5; apex feebly bilobed, more noticeably reflexed; base more thickly bordered and ridged, feebly bisinuous; sides more noticeably produced laterad, feebly sinuate before base, steeply declined to lateral margins, which are finer though clearly rimmed; front angles rounded, hind angles rectangular; disc more noticeably micro-shagreened, more frequently scattered with microscopic punctures, with a pair of distinctly large tubercles, which are slightly more separated from each other, their inner sides being transversely impressed and less noticeably emarginate at the middle. Scutellum obviously larger and wider, rather noticeably depressed anteriorly in middle, micro-shagreened, more sparsely scattered with microscopic punctures.

Elytra obviously shorter, 2.2 times as long as wide, 4 times the length and 1.5 times the width of pronotum, widest slightly before basal 1/3; dorsum more noticeably quadri-undulate, though the posteriormost undulation is indistinct, with a pair of more distinct swellings at basal 1/8, area between them more noticeably depressed; disc with rows of rounded punctures, those in inner and posterior portions small and closely set, those in antero-lateral portions large and sparsely set and often forming foveae; basal margin weakly ridged due to the fact that the punctures of 5 inner rows are strong and close to base; intervals somewhat irregularly convex and often transversely ridged in basal 2/3, scattered with microscopic punctures, each with a microscopic hair which is more noticeable; 3rd interval more distinctly convex at basal swelling; humeri slightly more noticeable due to more strong punctures of 5th rows; apices more noticeably dehiscent and acuminate.

Male anal sternite without peculiarities; legs without modification; ratios of the



lengths of pro-, meso- and metatarsomeres: 0.3, 0.22, 0.2, 0.2, 1.2; 1.38, 0.65, 0.58, 0.37, 1.27; 1.7, 0.64, 0.36, 1.37.

Male genitalia obviously shorter, 5.5 mm in length, 0.8 mm in width, basal piece oblong-ovate; fused lateral lobes almost of the same shape as in *S. insigne*, 2.5 mm in length.

Body length: ca. 14 mm.

Holotype: ♂, nr. Keningau, Sabah, N Borneo, 5-IV-1992, no collector's name (NSMT). Paratypes: 1 ex., Keningau, V-1992, M. ITO leg.; 1 ex., Kimanis Rd., nr. Keningau, 5-V-1994, no collector's name.

*Strongylium wiseetingum* sp. nov.

(Fig. 21)

Purplish blue, head and inner portions of elytra dark blue, lateral margins of elytra cyaneous, antennae, mouth parts, tibiae, tarsi, etc., black with feebly brownish tinge, femora brownish yellow; head feebly, sericeously shining, pronotum rather strongly shining, elytra moderately shining, ventral surface rather alutaceous; each surface almost glabrous. Elongated fusiform, longitudinally convex.

Head subdecagonal, weakly micro-shagreened, rather closely, finely punctate, each puncture with a microscopic short hair; clypeus transversely subpentagonal, feebly inclined forwards in basal portion, moderately bent downwards in front, fronto-clypeal border clearly sulcate, widely V-shaped in medial half, bent forwards in each lateral 1/4; genae oblique, gently raised towards outer margins, which are rounded; frons rather widely Y-shaped, gently inclined forwards; eyes somewhat reniform, rather strongly convex laterad, obliquely, roundly inlaid into head, diatone about 1/3 times the width of an eye diameter; vertex medially with a longitudinal impression. Antennae reaching base of elytra, feebly thickened apicad, 7 apical segments gently flattened, ratio of the length of each segment from basal to apical: 0.6, 0.2, 0.6, 0.56, 0.52, 0.48, 0.51, 0.49, 0.44, 0.42, 0.59.

Pronotum 1.2 times as wide as long, widest at the middle; apex rimmed, very feebly bilobed anteriorly; base arcuately bordered in medial half, ridged and moderately bisinuous; sides almost vertically declined to lateral margins, which are gently produced laterad, though slightly sinuate before base, and rimmed; front angles rounded, hind angles subrectangular; disc scattered with small punctures, with a pair of large tubercles, whose inner sides are gently produced inwards and feebly emarginate at the middle, area between tubercles longitudinally excavated. Scutellum subcordate, very weakly micro-shagreened, rather frequently scattered with microscopic punctures along lateral margins.

Elytra somewhat cuneiform, 2.2 times as long as wide, 3.6 times the length and 1.4 times the width of pronotum; dorsum tri-undulate, the posteriormost undulation being the deepest, with a pair of low swellings at basal 1/8 before the anteriormost undulation, area between them weakly depressed; disc with rows of punctures, the punc-

tures in inner and posterior portions grooved, small and rather closely set, those in antero-lateral portions large, sparsely set and forming somewhat longitudinal foveae; base ridged due to strong punctures of 1st to 5th rows; intervals feebly convex, weakly micro-shagreened, scattered with microscopic punctures, and microscopically wrinkled; humeri very weakly swollen; apices slightly dehiscent.

Legs medium-sized for the members of the genus; ratios of the lengths of pro-, meso- and metatarsomeres: 0.29, 0.22, 0.23, 0.2, 1.2; 2.05, 0.63, 0.57, 0.38, 1.26; 1.64, 0.61, 0.47, 1.4.

Body length: ca. 13 mm.

Holotype: ♀, Chiang Mai, N Thailand, 1988, no further data (NSMT). Paratypes: 1 ex., Vientiane, Laos, VII-1963, A. BAUDON leg., 1 ex., Phou Khao Khouai, Vientiane, Laos, J. RONDON leg., 1 ex., Ban Van Eua, Laos Centre, 15-V-1956, J. RONDON leg. (MNHNP); 1 ex., Siam, MOUHOT leg., coll. F. BATES (NHML); 1 ex., Ko Chang Is., W coast of Thailand, 14~15-V-1990, S. & E. BEČVÁŘ leg. (BC).

*Strongylium wallacei* sp. nov.

(Fig. 22)

This new species resembles the preceding, *S. wiseetingum* sp. nov., from Thailand and Laos, but can be distinguished from the latter by the following characteristics:

Body robuster; head, scutellum and elytra dark golden green, pronotum cyaneous purple; head, scutellum and elytra metallic though feebly sericeous, pronotum somewhat marbled with dim lustre.

Head wider, more distinctly micro-shagreened; clypeus more strongly bent downwards; eyes more strongly convex laterad, more deeply, obliquely inlaid into head, diameter about 1/5 times the width of an eye diameter. Antennae more noticeably thickened apicad, each segment more distinctly dilated to each apex, ratio of the length of each segment from basal to apical: 0.45, 0.2, 0.62, 0.5, 0.45, 0.45, 0.42, —, —, —, —, —.

Pronotum 1.2 times as wide as long; sides more noticeably produced laterad, with lateral margins more clearly bordered and rimmed; disc less distinctly micro-shagreened and more finely punctate, with tubercles obviously larger, more widely excavated in basal portion. Scutellum triangular, micro-shagreened, scattered with microscopic punctures, and noticeably, transversely aciculate.

Elytra slightly more than 2.2 times as long as wide, 3.4 times the length and 1.3 times the width of pronotum; dorsum quadri-undulate, though the posteriormost undulation is indistinct, more irregularly, transversely wrinkled; disc punctato-striate, the striae being indistinct in antero-lateral portions, the punctures not so elongate as in *S. wiseetingum* but almost rounded, those in inner and posterior portions small and rather closely set, those in antero-lateral portions large and coarse, more distinctly and irregularly forming foveae than in *S. wiseetingum*; base more noticeably ridged; intervals more noticeably convex, those in antero-lateral portions somewhat transversely connected by ridges with one another; humeri more noticeably swollen; apices the same as

those of *S. wiseetingum*.

Legs almost the same as in *S. wiseetingum*; ratios of the lengths of pro-, meso- and metatarsomeres: 0.3, 0.2, 0.23, 0.25, 1.2; 1.57, 0.8, 0.63, 0.37, 1.36; 1.8, 0.75, 0.46, 1.38.

Body length: ca. 13.5 mm.

Holotype: ♀, Penang, Malay Peninsula, WALLACE leg., coll. F. BATES, 81–19, no further data (NHML).

### Key to the Species of the Species-group of *Strongylium insigne*

- 1(4) Body obviously larger in size (more than 16.5 mm).
- 2(3) Pronotum wider, less strongly swollen, rather polished and more noticeably scattered with microscopic punctures; elytra obviously shorter, with rows of smaller and somewhat ovate punctures, two basal swellings less distinct, and apices almost rounded; legs entirely dark reddish brown; 16.5 mm; Cochinchina . . . . . *S. cochinchinense* sp. nov.
- 3(2) Pronotum narrower, more strongly swollen, feebly sericeous and less noticeably scattered with microscopic punctures; elytra obviously longer, with rows of mostly rounded punctures, two basal swellings more distinct, apices more noticeably produced posteriad and slightly dehiscent; major basal parts of femora dark reddish brown, apical parts of femora, tibiae and tarsi black, and partly with cyaneous lustre; 17–21 mm; “India orientalis”; Borneo . . . . .  
. . . . . *S. insigne* MÄKLIN
- 4(1) Body obviously smaller in size (less than 14 mm).
- 5(6) Eyes larger; vertex noticeably depressed posteriad; pronotum with base thickly bordered, two tubercles rather widely separated from each other; elytra with intervals more irregularly convex, apices more noticeably produced posteriad; 14 mm; Borneo . . . . . *S. sabahinsigne* sp. nov.
- 6(5) Eyes smaller; vertex moderately inclined posteriad; pronotum with base comparatively thinly bordered, two tubercles more approximated with each other; elytra with intervals less irregularly convex, apices less noticeably produced posteriad.
- 7(8) Pronotum with 2 tubercles obviously smaller, less widely excavated in basal portion; elytral punctures oblong and not coarse; intervals moderately convex and not transversely ridged; ca. 13 mm; Thailand; Laos . . . . .  
. . . . . *S. wiseetingum* sp. nov.
- 8(7) Pronotum with 2 tubercles obviously larger, more widely excavated in basal portion; elytral punctures coarser and rounded; intervals in antero-lateral portions noticeably, transversely ridged and connected with one another; 13.5 mm; Penang (Malay Peninsula) . . . . . *S. wallacei* sp. nov.

### 3. Species-group of *Strongylium rufifemoratum* sp. nov.

The members of this species-group resemble those of the *insigne* group in having the pronotum with a pair of large tubercles, but can be distinguished from them by the inner edges of the tubercles neither produced inwards nor emarginate at the middle. That the elytral apices are dehiscent and acuminate might also be an important feature. Close relationship to the *insigne* group seems proved by their appearance and also by the features of their male genitalia.

In this paper, I am going to describe two new members of this species-group, *S. rufifemoratum* sp. nov. from the Malay Peninsula, Borneo and Sumatra, and *S. kimanisense* sp. nov. from Borneo.

#### *Strongylium rufifemoratum* sp. nov.

(Figs. 23, 53–54)

Brownish black with dark bluish tinge, posterior portion of head brassy, elytra with major portions brassy, lateral margins purplish or violet, and punctures golden cyaneous, femora reddish brown, head and elytra gently metallicly shining, pronotum moderately shining. Rather elongate; longitudinally convex.

Head subdecagonal, very slightly micro-shagreened, frequently punctate; clypeus semicircular with apex widely arcuate, raised on each side, gently inclined forwards in basal 2/3, then rather noticeably bent downwards in front, with a short transverse impression in front of fronto-clypeal sulcus, which is deep and widely arcuate posteriad; genae rather large, subrhombical, noticeably raised, with outer margins obtuse; frons T-shaped, rather steeply inclined forwards, almost impunctate; eyes large, somewhat reniform, roundly convex laterad, rather obliquely inlaid into head, diatone 1/9 times the width of an eye diameter; vertex with an obsolete impression at the middle; occiput gently swollen. Antennae rather slender, reaching basal 1/4 of elytra, ratio of the length of each segment from basal to apical: 0.38, 0.2, 0.89, 0.92, 0.55, 0.55, 0.52, 0.47, 0.53, 0.39, 0.48.

Pronotum somewhat short barrel-shaped, 1.2 times as wide as long, widest slightly before the middle; apex almost straight and raised, strongly bordered in a wide V-shape; base bisinuous and raised, also bisinuously bordered; sides steeply declined to lateral margins, which are gently produced laterad and finely rimmed; front angles almost rounded, hind angles feebly angular; disc rather polished, frequently scattered with punctures of two different sizes, with a pair of large swellings before the middle, whose inner sides are not produced inwards, though longitudinally grooved in the middle. Scutellum linguiform, feebly convex, micro-shagreened, triangularly depressed in antero-medial portion, sparsely scattered with microscopic punctures, irregularly aciculate.

Elytra elongated triangular, about 2.5 times as long as wide, 3.8 times the length and 1.35 times the width of pronotum, widest at basal 1/5; dorsum slightly tri-undu-

late, with a pair of low swellings at basal 1/8; disc with rows of rounded punctures, those in inner and posterior portions small and closely set, those in antero-lateral portions large and sparsely set, forming foveae; intervals weakly micro-shagreened, microscopically punctate, each puncture with a minute hair, mostly gently convex, those in antero-lateral portions often transversely ridged and connected with one another; 2 inner intervals being flattened in medial portions; base raised due to strongly impressed punctures of 5 inner rows close to base; humeri gently swollen; apices produced posteriad, dehiscent and acuminate.

Male anal sternite with gently emarginate apex; legs slender as those of the members of the species-group; male protibiae very weakly bent outwards at apical 4/7, very feebly gouged in apical 1/3; male mesotibiae curved dorsad in apical halves; male metatibiae almost straight; ratios of the lengths of pro-, meso- and metatarsomeres: 0.28, 0.21, 0.23, 0.25, 1.2; 2.63, 1.2, 0.78, 0.47, 1.39; 2.63, 0.9, 0.6, 1.38.

Male genitalia very long, 7.4 mm in length, 0.6 mm in width, feebly curved in lateral view, basal piece somewhat elongated fusiform; fused lateral lobes extremely slender, about 3 mm in length.

Body length: 17–22 mm.

Holotype: ♂, Penang, Malay Peninsula, “(Lamb.)”, coll. PASCOE, no further data (NHML). Paratypes: 1 ex., Sarawak, Borneo, “76–24”; 1 ex., Borneo, coll. F. BATES, 81–19; 1 ex., W Sumatra (MNHNP); 1 ex., Catchment Area, nr. Jitra, Kedah, Malay Peninsula, 6–IV–1928, ex F. M. S. Museum, B. M., 1955–354; 1 ex., Matang, Sarawak, XÁNTUS leg. (TMB).

### *Strongylium kimanisense* sp. nov.

(Figs. 24, 55–56)

Dark brassy, ventral surface partly dark coppery, antennae, mouth parts, and tarsi brownish black; dorsal surface feebly, metallicly shining, ventral surface moderately shining though partly alutaceous; each surface almost glabrous. Rather elongate; longitudinally convex.

Head subdecagonal, very feebly micro-shagreened, closely scattered with small punctures, those in posterior portion becoming coarser and often fused with one another; clypeus semicircular, gently inclined forwards, then rather strongly bent downwards in front, with a transverse impression before fronto-clypeal border, which is widely arcuate and clearly sulcate; genae oblique, rather strongly raised, with rounded outer margins; frons Y-shaped, gently inclined forwards; eyes large, noticeably convex laterad, obliquely, roundly inlaid into head, diatone about 1/4 times the width of an eye diameter; vertex longitudinally impressed at the middle. Antennae subfiliform, reaching basal 1/6 of elytra, ratio of the length of each segment from basal to apical: 0.7, 0.2, 1.0, 0.8, 0.66, 0.62, 0.63, 0.61, 0.52, 0.51, 0.53.

Pronotum rather trapezoidal, 1.33 times as wide as long; apex straight and widely triangularly ridged; base bisinuously bordered, with the margin ridged and bisinuously;

sides steeply declined to lateral margins, which are produced in apical 2/3, sublinearly convergent towards base in basal 1/3; front angles rounded, hind angles subrectangular; disc feebly micro-shagreened and rather strongly, irregularly punctate, the punctures intermixed with far smaller ones, longitudinally grooved at the middle, with a pair of large mammary tubercles slightly before the middle, whose inner sides are very feebly hollowed at the middle, and also with a pair of somewhat transverse impressions close to base. Scutellum short linguiform, feebly convex, weakly micro-shagreened, sparsely scattered with fine punctures in posterior portion.

Elytra 2.3 times as long as wide, 4.2 times the length and 1.45 times the width of pronotum; dorsum penta-undulate, though the posteriormost is indistinct, with a pair of swellings at basal 1/8, area between them being depressed; disc with rows of ovate punctures, those in inner portion small and closely set, those in outer portions sparsely set, becoming larger and forming foveae; intervals gently raised, basal portions of 2nd, 3rd and 5th rather distinctly convex, those in antero-lateral portions sometimes transversely ridged and connected with one another, very feebly micro-shagreened, irregularly micro-reticulate, scattered with microscopic punctures, each with a minute short hair; base ridged due to strong punctures of 2nd to 4th rows in basal portion; 5th and 6th rows connected with each other and distinctly impressed close to base; humeri without peculiarities; apices produced apicad, dehiscent and acuminate.

Male anal sternite feebly emarginate; legs medium-sized for the members of the genus; male protibiae with ventral sides weakly gouged and haired in apical halves; ratios of the lengths of pro-, meso- and metatarsomeres: 0.25, 0.2, 0.22, 0.22, 1.2; 1.82, 0.79, 0.63, 0.39, 1.38; 1.9, 0.73, 0.42, 1.39.

Male genitalia extremely slender, 6.35 mm in length and 0.65 mm in width; basal piece subfusiform, 3.15 mm in length; fused lateral lobes needle-like, 3.2 mm in length.

Body length: ca. 22 mm.

Holotype: ♂, Kimanis Rd., nr. Keningau, Sabah, Borneo, 5-V-1994, K. KUME & M. ITO leg. (NSMT). Paratype: 1 ex., Pontianak, W Borneo, 1906, coll. OBERTHUR (MNHNP).

*Notes.* The present new species resembles the preceding one, *S. rufifemoratum* sp. nov., but can be distinguished from the latter by the body wider and darker in colour, with eyes distinctly larger and strongly convex laterad, pronotal tubercles noticeably larger with the inner sides obviously hollowed at the middle, and elytra with the penta-undulate dorsum.

## 要 約

益本仁雄：アジア産ナガキマワリ族 (*Strongyliini*) の研究. IV. 東南アジアのナガキマワリ属 (*Strongylium*) の3種群について. — アジア産ナガキマワリ族の研究の第4回として, 東南アジアに分布するナガキマワリ属の *gravidum* 種群, *insigne* 種群, および *rufifemoratum* 種群について取り上げた. これらの種群には, 従来から誤認や取扱いの混乱がみられ, また未知の点

が多かった。本研究において、既知種の再検討とともに、第1の群では9新種、第2の群では4新種、第3の群では2新種を記載した。なお、これまでニューギニアおよびその周辺の島じまのみから知られていた *Strongylium tuberipenne* FAIRMAIRE, 1881 が、オーストラリア（北部クイーンズランド）にまで分布していることがわかった。

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### New Synonymy in the Genus *Strongylium* (Coleoptera, Tenebrionidae, Strongyliini) Described by FAIRMAIRE and PIC

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In the course of my study on the Asian Strongyliini, I had the opportunity of examining type specimens of the species described by FAIRMAIRE and PIC preserved in the Muséum National d'Histoire Naturelle, Paris. The following new synonyms were confirmed in the course of this study.