

Linzer biol. Beitr.	51/1	21-31	26.07.2019
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# **A revision of Palaearctic and Oriental *Scymbalium* and *Micrillus***

## **IV. The fauna of Cambodia**

### **(Coleoptera, Staphylinidae, Paederinae)**

Volker ASSING

**A b s t r a c t :** Records of one species of *Scymbalium* ERICHSON, 1839 and seven species of *Micrillus* RAFFRAY, 1873 are reported from Cambodia. Three of them are described and illustrated: *Micrillus rossianus* nov.sp. of the *M. badius* group, *M. variceps* nov.sp. of the newly established *M. variceps* group, and *M. bispinosus* nov.sp. of the *M. coloratus* group. Including these additions, the Cambodian fauna is currently composed of one *Scymbalium* and nine *Micrillus* species and thus more diverse than that of any other country in the Oriental region.

**K e y w o r d s :** Coleoptera, Staphylinidae, Paederinae, *Scymbalium*, *Micrillus*, Oriental region, Cambodia, taxonomy, new species, species groups, new records.

## **Introduction**

According to recent revisions (ASSING 2013, 2018), *Scymbalium* ERICHSON, 1839 and *Micrillus* RAFFRAY, 1873 included three and 28 revised species, respectively. The generic affiliations of numerous additional unrevised species from the Australian and Afrotropical regions currently assigned to *Scymbalium* (see ASSING 2013) have not been clarified.

Up until very recently, not a single species of *Scymbalium* or *Micrillus* had been reported from Cambodia, primarily because no material from this country had been available. In recent years, collecting activity in Cambodia has increased significantly. In particular, a field trip conducted to Cambodia in May 2018 by Walter Rossi (Università dell'Aquila), specialist of Laboulbeniales, yielded an amazing number of paederine specimens, among them one new species of *Scymbalium* and seven species of *Micrillus*, three of them newly described, three previously described, and one unnamed (ASSING 2018).

The present study is primarily based on material collected during another field trip conducted by Walter Rossi in November 2018. This material again included three undescribed and several previously described species. Supplementary Cambodian material was found in the National Museum of Natural History, Prague.

## Material and methods

The material treated in this paper is deposited in the following public institutions and private collections:

MNB ..... Museum für Naturkunde Berlin (J. Frisch, J. Willers)

NMP ..... National Museum of Natural History, Praha (J. Hájek)

cAss ..... author's private collection

cFel ..... private collection Benedikt Feldmann, Münster

The morphological studies were conducted using a Stemi SV 11 microscope (Zeiss), a Discovery V12 microscope (Zeiss), and a Jenalab compound microscope (Carl Zeiss Jena). The images were created using a digital camera (Nikon Coolpix 995), Axiocam ERc 5s, and Picolay software.

Body length was measured from the anterior margin of the mandibles (in resting position) to the posterior margin of the abdominal segment VIII, the length of the forebody from the anterior margin of the mandibles to the posterior margin of the elytra, head length from the anterior margin of the frons to the posterior margin of the head, the length of the pronotum along the middle, elytral length at the suture from the apex of the scutellum to the posterior margin of the elytra (at the sutural angles), and the length of the aedeagus from whatever structure forms the apex to the base of the aedeagal capsule. The "parameral" side (i.e., the side where the sperm duct enters) is referred to as the ventral, the opposite side as the dorsal aspect.

## Results

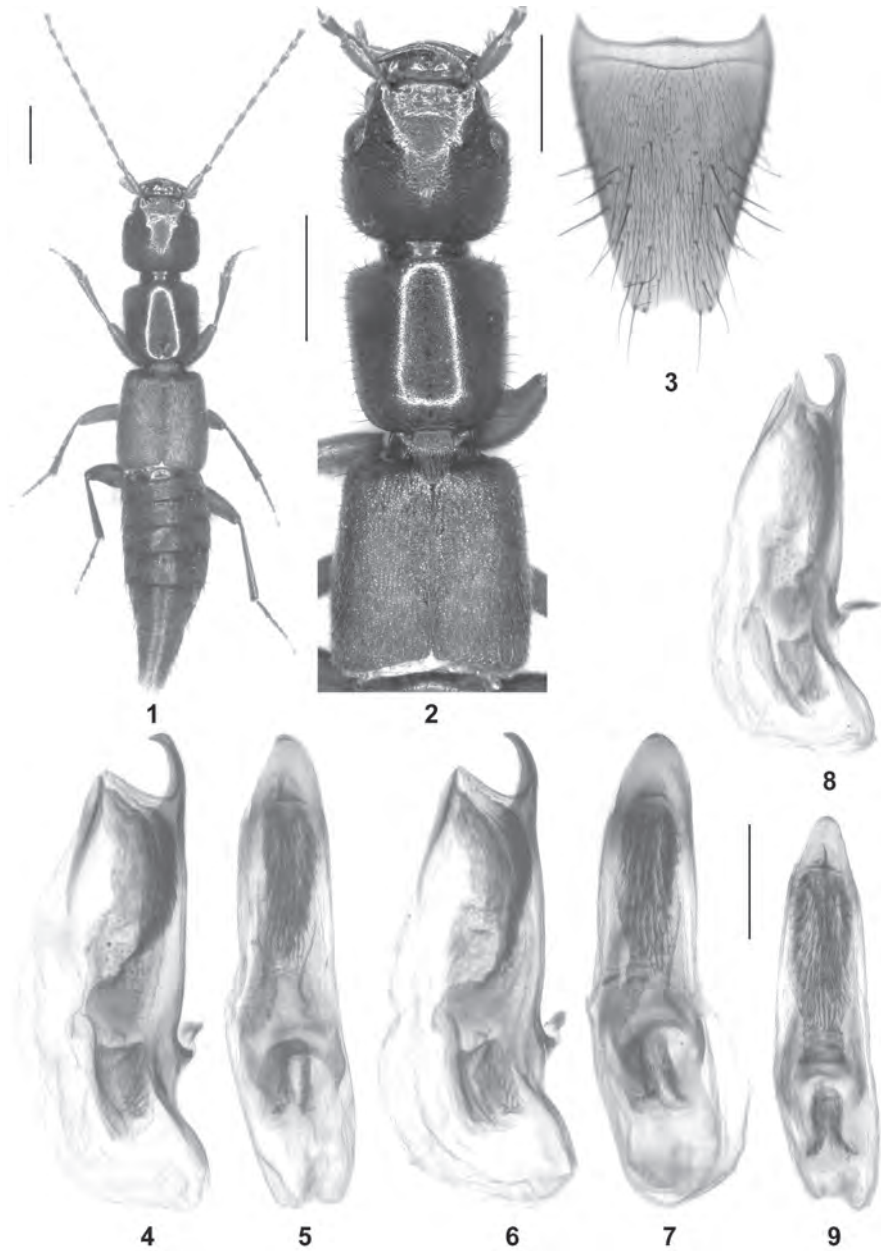
Aside from the recently described *Scymbalium rossii*, the material examined since the latest contribution contained seven *Micrillus* species. In total, the Cambodian fauna is currently composed of one species of *Scymbalium* (the only "true" *Scymbalium* outside the West Palaearctic region) and nine species of *Micrillus*, two of the *M. badius* group, one of the *M. suturalis* group, two of the *M. coloratus* group, one of the *M. variceps* group, and three of the *M. aegyptiacus* group. Thus, the Cambodian *Scymbalium* and *Micrillus* fauna is significantly more diverse than the faunas of India or China, or that of any other country in the Oriental and Palaearctic regions.

## Genus *Scymbalium* ERICHSON, 1839

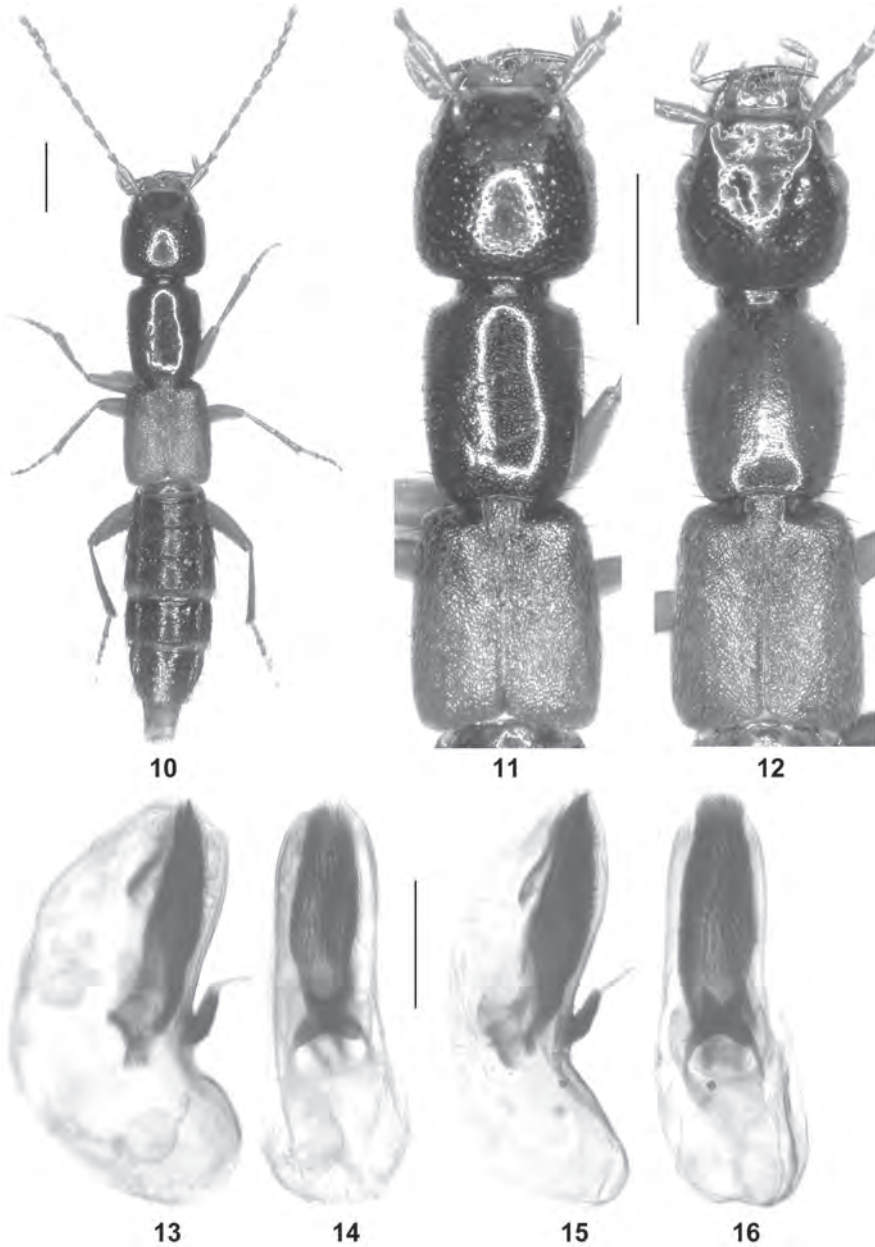
### *Scymbalium rossii* ASSING, 2018

**Material examined:** Cambodia: 1♂, 2♀♀, Kampong Chhnang prov., Rolea B'ier distr., Toulkrolanh vill., 12°14'N, 104°40'E, light trap, 7.XI.2018, leg. Rossi (cAss).

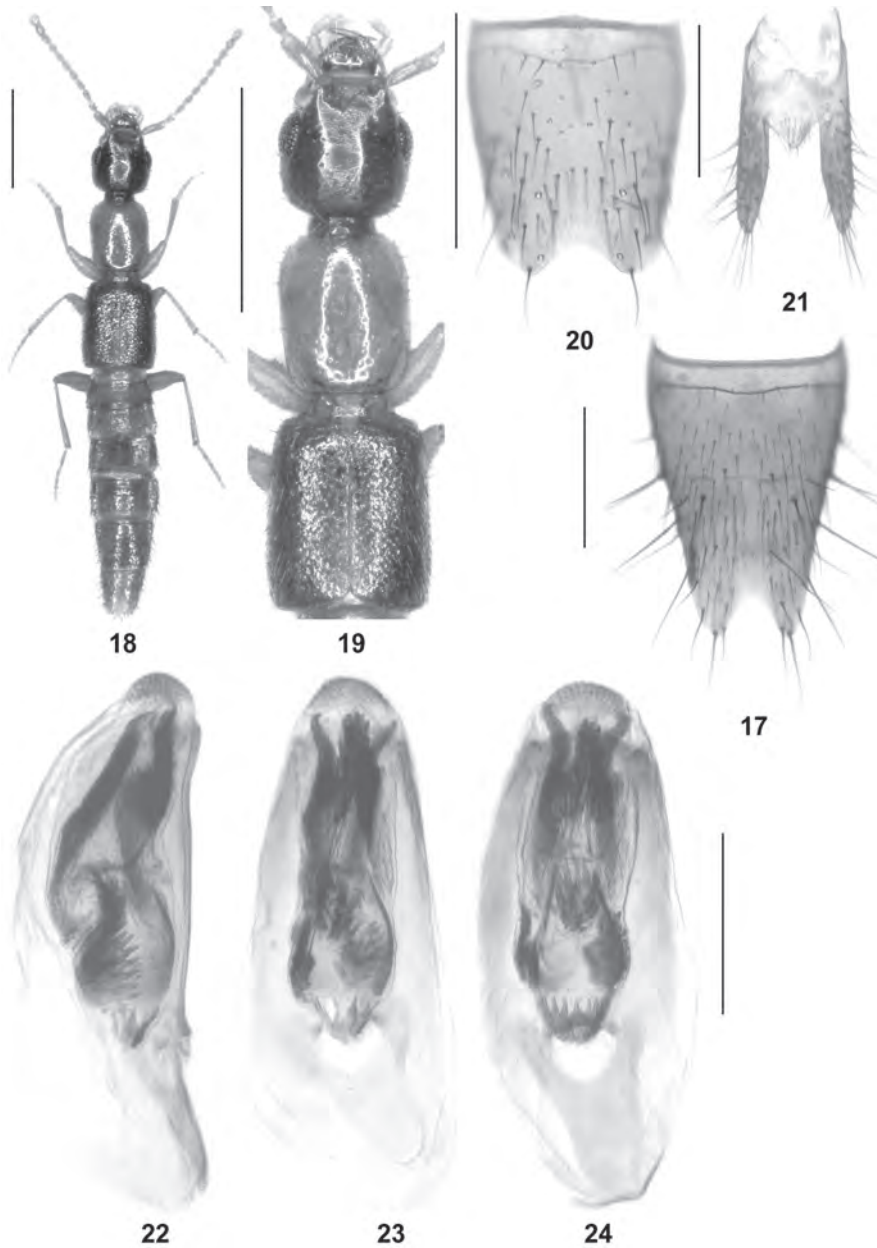
**Comment:** This species was previously known only from the type locality, Toul Ompel in Kampong Chhnang province, Cambodia (ASSING 2018).



**Figs 1-9:** *Micrillus rossianus* (1-7) and *M. badius* (8-9): (1) habitus; (2) forebody; (3) male sternite VIII; (4-9) aedeagus in lateral and in ventral view. Scale bars: 1-2: 1.0 mm; 3: 0.5 mm; 4-9: 0.2 mm.



**Figs 10-16:** *Micrillus variceps* (10-11, 13-14): holotype; 12, 15-16: male paratype): (10) habitus; (11-12) forebody; (13-16) aedeagus in lateral and in ventral view. Scale bars: 10-12: 1.0 mm; 13-16: 0.2 mm.



**Figs 17-24:** *Micrillus variceps* (17) and *M. bispinosus* (18-24): (17, 20) male sternite VIII; (18) habitus; (19) forebody; (21) abdominal segments IX-X; (22-24) aedeagus in lateral and in ventral view. Scale bars: 18-19: 1.0 mm; 17, 20-21: 0.5 mm; 22-24: 0.2 mm.

## Genus *Micrillus* RAFFRAY, 1873

### *Micrillus badius* group

The *M. badius* group currently includes four species, two of which are present in Cambodia. Except for *M. virgatus*, the aedeagus is subject to very little interspecific variation (aside from its absolute size).

### *Micrillus virgatus* ASSING, 2018

**Material examined:** Cambodia: 4♂♂, 5♀♀, Kampong Chhnang prov., Rolea B'ier distr., Toulkrolanh vill., 12°14'N, 104°40'E, light trap, 7.XI.2018, leg. Rossi (cAss); 11♂♂, 15♀♀, Kampong Chhnang prov., Phum Toul Ompel, shore of branch of Tonle Sap Lake, 12°14'N, 104°41'E, 4+7.XI.2018, leg. Rossi (cAss); 4♂♂, 1♀, Kampong Chhnang prov., Rolea B'ier distr., Toekchenh vill., 12°08'N, 104°38'E, light trap, 6.XI.2018, leg. Rossi (cAss).

**Comment:** This recently described species appears to be rather common in Cambodia and has also been reported from one locality in Thailand (ASSING 2018).

### *Micrillus rossianus* nov.sp. (Figs 1-7)

**Type material:** Holotype ♂: "CAMBODIA - Kampong Chhnang prov., Rolea B'ier distr., Toekchenh vill., 12°07'36"N, 104°38'05"E, light trap, 6.XI.2018, leg. W. Rossi / Holotypus ♂ *Micrillus rossianus* sp. n., det. V. Assing 2019" (cAss). Paratypes: 1♂: same data as holotype (cAss); 2♂♂, 1♀: "CAMBODIA - Kampong Chhnang prov., Rolea B'ier distr., Toulkrolanh vill., 12°13'31"N, 104°39'50"E, light trap, 7.XI.2018, leg. W. Rossi" (cAss).

**Etyymology:** This species is dedicated to Walter Rossi (L'Aquila), whose material the present study is largely based on and who collected all the new species.

**Description:** Large species; body length 9.0-10.3 mm; length of forebody 5.1-5.3 mm. Habitus as in Fig. 1. Coloration: body pitchy-reddish with the abdomen sometimes darker; legs pale-brown with the tibiae usually somewhat darker; antennae reddish with the apices of the apical antennomeres whitish-yellow (owing to very dense pale pubescence).

Head (Fig. 2) approximately as broad as long or weakly transverse, of subquadrate shape, and weakly convex in cross-section; integument dorsally with dense and fine punctation bearing short to moderately long, fine, pale, and sub-erect setae, and with scattered macropunctures bearing long and black erect setae in lateral and anterior dorsal portions; median and anterior dorsal portions with sparse micropunctation; interstices with fine transverse microsculpture. Eyes 0.5-0.7 times as long as postocular region in dorsal view. Antenna long and very slender, nearly 4 mm long; antennomeres IV-X distinctly oblong, of gradually decreasing length, and decreasingly oblong; IV approximately three times as long as broad; X less than twice as long as broad. Maxillary palpus slender, apical palpomere of slender conical shape, slightly more than half as long as maxillary palpomere III.

Pronotum (Fig. 2) approximately 1.05 times as long as broad and approximately as broad as head; lateral margins straight, weakly converging posteriad in dorsal view; posterior margin broadly and weakly concave; punctation very fine and dense; on either side of middle with dorsal series each composed of 4-7 macropunctures; midline with or without very indistinct and narrow impunctate median band; interstices without microsculpture.

Elytra (Fig. 2) approximately as long as pronotum, or nearly so; punctation extremely



fine, extremely dense, and somewhat asperate, rendering the surface matt. Hind wings fully developed. Protarsomeres I-IV distinctly dilated. Metatarsomere I slightly longer than the combined length of II and III.

Abdomen (Fig. 1) approximately as broad as elytra; tergites with very fine and extremely dense micropunctuation bearing short and pale depressed pubescence and with macropunctures bearing very long black setae at posterior margins and on disc; posterior margin of tergite VII with palisade fringe; tergite X and sternite IX very small; posterolateral processes of segment IX approximately three times as long as tergite X.

♂: posterior excision of sternite VIII concave (Fig. 3); aedeagus (Figs 4-7) 0.80-0.85 mm long, symmetric, and weakly sclerotized; internal sac with dark membranous structure, but without spine-shaped sclerites.

**Comparative notes:** *Micrillus rossianus* is currently the largest known representative of the genus. It is additionally distinguished from the sympatric *M. virgatus* by darker coloration (especially of the legs), denser and more distinct punctuation of the pronotum, and by a smaller aedeagus with a differently shaped apex and without a rod-shaped structure in the internal sac. The new species differs from *M. badius* (MOTSCHULSKY, 1858) (India, Myanmar) and *M. nepalensis* (ASSING, 2013) (Nepal) by larger size, a broader and less oblong pronotum with denser and more distinct micropunctuation (*M. badius*: pronotum approximately 1.1 times as long as broad), shorter elytra (*M. badius*: elytra longer than pronotum), and a larger aedeagus (*M. badius* and *M. nepalensis*: aedeagus approximately 0.7 and 0.6 mm long, respectively). For comparison, the aedeagus of *M. badius* is illustrated in Figs 8-9. For figures of *M. nepalensis* see ASSING (2013).

**Distribution and natural history:** The known distribution is confined to two localities in Cambodia. All the type specimens were collected at light traps together with several other *Micrillus* species, including *M. virgatus*.

### ***Micrillus suturalis* group**

The *M. suturalis* group comprises two species, one of which is distributed in Cambodia.

### ***Micrillus kongi* ASSING, 2018**

**Material examined:** Cambodia: 40 exs., Siem Reap, 13°21'N, 103°51'E, 20 m, at halogen light, 7-11.XI.2002, leg. Kočárek (NMP, cAss); 3♂♂, 1♀, Kampong Chhnang prov., Rolea B'ier distr., Toulkrolanh vill., 12°14'N, 104°40'E, light trap, 7.XI.2018, leg. Rossi (cAss); 2♂♂, Kampong Chhnang prov., Phum Toul Ompel, shore of branch of Tonle Sap Lake, 12°14'N, 104°41'E, 4.+7.XI.2018, leg. Rossi (cAss); 22♂♂, 30♀♀, Kampong Chhnang prov., Rolea B'ier distr., Toekchenh vill., 12°08'N, 104°38'E, light trap, 6.XI.2018, leg. Rossi (cAss, cFel, MNB).

**Comment:** This species has only been recorded from Cambodia, where it is apparently rather common.

### ***Micrillus variceps* group**

This new species group currently includes only *Micrillus variceps* (see description below). It is characterized by undilated protarsomeres I-IV, moderately large body size, moderately dense punctuation of the head, a relatively slender pronotum with dense micropunctuation and a discal row composed of 6-8 macropunctures on either side of

midline, very dense punctation of the abdomen, a rather large and deep posterior excision of the male sternite VIII, and a nearly symmetric aedeagus with a weakly sclerotized ventral process and with a large and long dark membranous structure, but without sclerotized spines in the internal sac.

***Micrillus variceps* nov.sp. (Figs 10-17)**

**Type material:** Holotype ♂: "CAMBODIA - Siem Reap province, N Siem Reap city,, 13°26'29"N, 103°52'25"E, light trap, 12-13.XI.2018, leg. W. Rossi / Holotypus ♂ *Micrillus variceps* sp. n., det. V. Assing 2019" (cAss). Paratypes: 1♂, 1♀: "CAMBODIA - Kampong Chhnang prov., Phum Toul Ompel, shore of branch of Tonle Sap Lake, 12°14'N, 104°41'E, 4.+7.XI.2018, leg. W. Rossi" (cAss); 2♀♀: "CAMBODIA - Kampong Chhnang prov., Kampong Chhnang env., Toul Ompel, 12°14'14"N, 104°41'15"E, light trap, 19+21.V.2018, leg. W. Rossi" (cAss); 2♀♀: "CAMBODIA - Banteay Meanchey prov., Mean Chey University campus, 13°34'45"N, 102°55'44"E, light trap, 1.XI.2018, leg. W. Rossi" (cAss); 1♀: "CAMBODIA - Kampong Chhnang prov., Rolea B'ier distr., Toulkrolanh vill., 12°13'31"N, 104°39'50"E, light trap, 7.XI.2018, leg. W. Rossi" (cAss).

**Etymology:** The specific epithet (Latin, adjective) alludes to the remarkably variable size and shape of the head.

**Description:** Body length 7.0-8.5 mm; length of forebody 4.0-4.7 mm. Habitus as in Fig. 10. Coloration variable: head dark-brown to black; pronotum reddish to black; elytra reddish with the anterior portion more or less distinctly and more or less extensively infusate; abdomen reddish with the discs of tergites III-VI slightly darker, to blackish with the apex (segments VII-X) reddish to reddish-brown; legs pale-reddish; antennae reddish.

Head (Figs 11-12) of very variable shape, relatively larger in larger than in smaller specimens, 1.0-1.1 times as long as broad, broadest across or behind eyes, with lateral margins behind eyes weakly diverging, subparallel, or smoothly curving towards posterior constriction; punctation moderately dense and moderately coarse; median and anterior dorsal surface sparsely punctate or impunctate; interstices with fine transverse microsculpture. Eyes distinctly shorter than postocular region, strongly convex in small-headed and weakly convex in large-headed specimens. Antenna 3.1-3.3 mm long; antennomeres IV approximately 2.5 times as long as broad, V-X of gradually decreasing length and decreasingly oblong, and X weakly oblong. Apical palpomere of maxillary palpus of slender conical shape, approximately half as long as maxillary palpomere III.

Pronotum (Figs 11-12) slender, 1.17-1.24 times as long as broad and 0.85 (large specimens) to 0.97 times (small specimens) as broad as head, weakly tapering posteriad; punctation fine and dense, on either side of midline with a dorsal series composed of 6-8 coarser punctures; midline narrowly impunctate; interstices without microsculpture.

Elytra (Figs 11-12) 0.87-0.90 times as long as pronotum; punctation very dense, fine, and somewhat asperate. Hind wings fully developed. Protarsomeres I-IV not dilated. Metatarsomere I slightly longer than the combined length of II and III.

Abdomen (Fig. 10) narrower than elytra; punctation dense and fine, somewhat less dense on tergites VII and VIII; interstices with fine transverse microsculpture; posterior margin of tergite VII with palisade fringe; tergite X and sternite IX small; postero-lateral processes of segment IX circular in cross-section and nearly three times as long as tergite X.

♂: posterior excision of sternite VIII rather deep and large (Fig. 17); aedeagus (Figs 13-



16) 0.65-0.70 mm long, compact, nearly symmetric, and weakly sclerotized; internal sac with a large dark membranous structure.

**Comparative notes:** This species is separated from other *Micrillus* species by the characters indicated in the group diagnosis above and by the morphology of the aedeagus. It is additionally distinguished from the syntopic, similarly sized, and sometimes similarly coloured *M. kongi* by a more slender, posteriorly weakly tapering, less densely punctured, and distinctly more glossy pronotum, coarser punctuation of the head, and a much deeper posterior excision of the male sternite VIII.

**Distribution and natural history:** *Micrillus variceps* is currently known from four localities in Siem Reap, Kampong Chhnang, and Banteay Meanchey provinces, Cambodia. Most of the specimens were collected with light traps, together with various other *Micrillus* species.

### ***Micrillus coloratus* group**

The *M. coloratus* group includes three species. Two of them are known only from Cambodia.

### ***Micrillus bispinosus* nov.sp. (Figs 18-24)**

**Type material:** Holotype ♂: "CAMBODIA - Siem Reap province, N Siem Reap city., 13°26'29"N, 103°52'25"E, light trap, 12-13.XI.2018, leg. W. Rossi / Holotypus ♂ *Micrillus bispinosus* sp. n., det. V. Assing 2019" (cAss). Paratypes: 4♂♂, 9♀♀: same data as lectotype (cAss); 1♂, 2♀♀: "CAMBODIA - Kampong Chhnang prov., Rolea B'ier distr., Toekchenh vill., 12°07'36"N, 104°38'05"E, light trap, 6.XI.2018, leg. W. Rossi" (cAss); 9♂♂, 7♀♀: "NW Cambodia, Siem Reap, 13°21'N, 103°51'E, 20 m a.s.l., killed by halogen light reflector, P. Kočárek leg., 7.-11.xi.2002" (NMP, cAss).

**Comment:** All the specimens from NMP were collected post-mortem and are consequently more or less distinctly damaged (legs and antennae partly or completely missing).

**Etymology:** The specific epithet (Latin, adjective) alludes to the pair of sclerotized apical spines in the internal sac of the aedeagus.

**Description:** Body length 4.2-4.9 mm; length of forebody 2.4-2.6 mm. Habitus as in Fig. 18. Coloration: forebody more or less distinctly bicoloured with the head brown to blackish (rarely reddish), the pronotum bright reddish, and the elytra reddish to brown; legs yellowish to reddish-yellow; antennae reddish-yellow to reddish.

Head (Fig. 19) weakly oblong, broadest across eyes, distinctly tapering posteriad behind eyes; dorsal surface with moderately fine and sparse punctuation; median dorsal portion extensively impunctate; interstices with fine transverse microsculpture. Eyes large and distinctly convex, approximately as long as postocular region. Apical palpomere of maxillary palpus slender, slightly less than half as long as maxillary palpomere III.

Pronotum (Fig. 19) slender, 1.20-1.24 times as long as broad and more or less distinctly narrower than head; lateral margins straight, nearly parallel in dorsal view; posterior margin truncate; punctures moderately dense and of variable size; midline broadly impunctate; interstices without microsculpture.

Elytra (Fig. 19) slightly longer than pronotum; punctuation moderately fine and moderately dense; interstices without microsculpture; surface with some shine. Hind

wings fully developed. Protarsomeres I-IV not dilated. Metatarsomere I approximately as long as the combined length of II and III.

Abdomen (Fig. 18) narrower than elytra; tergites with distinct and moderately sparse punctation bearing long and suberect black setae and with interspersed punctures bearing fine pale setae; interstices with transverse microsculpture; posterior margin of tergite VII with palisade fringe; tergite X and sternite IX small; postero-lateral processes of segment IX circular in cross-section and approximately twice as long as tergite X (Fig. 21).

♂: posterior excision of sternite VIII concave and moderately deep (Fig. 20); aedeagus (Figs 22-24) approximately 0.6 mm long, compact, and weakly sclerotized; internal sac with an apical pair of long and strongly sclerotized spines and with additional clusters of small spines.

**Comparative notes:** Based on the morphology of the aedeagus (capsule weakly sclerotized and symmetric; ventral process very short; internal sac with spines of various sizes), the shape of the male sternite VII (posterior excision concave and not very deep), and on the chaetotaxy of the abdomen (pubescence moderately sparse and partly composed of very long dark setae), this species belongs to the *M. coloratus* group, which previously included two species (ASSING 2018). One of them, *M. coloratus* ASSING, 2018, has been recorded from Cambodia, the other, *M. rougemonti* ASSING, 2018, from Sri Lanka. The new species is reliably distinguished from the sympatric *M. coloratus* only by the shape and internal structures of the aedeagus. It differs from the syntopic *M. intermedius* by usually darker elytra, sparser and longer pubescence of the abdomen, the shape of the posterior excision of the male sternite VIII (*M. intermedius*: posterior excision very deep and narrow), and by the completely different shape of the aedeagus. For illustrations of *M. coloratus* and *M. intermedius* see ASSING (2018) and ASSING (2013), respectively.

**Distribution and natural history:** The species is currently known from three localities in Siem Reap and Kampong Chhnang provinces, Cambodia. All the specimens were collected with light traps, together with *M. virgatus*, *M. kongi*, *M. siamensis*, and/or *M. intermedius*.

### ***Micrillus aegyptiacus* group**

This is the most speciose and most widespread of the species groups of *Micrillus*, its currently known distribution ranging from the north of the Afrotropical across the southern Palaearctic into the Oriental region (ASSING 2013, 2018). Three of the eleven revised species have been recorded also from Cambodia.

### ***Micrillus siamensis* ASSING, 2013**

**Material examined:** Cambodia: 25 exs., Siem Reap, 13°21'N, 103°51'E, 20 m, at halogen light, 7-11.XI.2002, leg. Kočárek (NMP, cAss); 3♂♂, 2♀♀, Siem Reap province, N Siem Reap city, 13°26'N, 103°52'E, light trap, 12-13.XI.2018, leg. Rossi (cAss); 7♂♂, 12♀♀, Kampong Chhnang prov., Rolea B'ier distr., Toekchenh vill., 12°08'N, 104°38'E, light trap, 6.XI.2018, leg. Rossi (cAss); 1♂, Kampong Chhnang prov., Phum Toul Ompel, shore of branch of Tonle Sap Lake, 12°14'N, 104°41'E, 4.+7.XI.2018, leg. Rossi (cAss); 1♀, Kampong Chhnang prov., Rolea B'ier distr., Toulkrolanh vill., 12°14'N, 104°40'E, light trap, 7.XI.2018, leg. Rossi (cAss); 1♂, 2♀♀, Banteay Meanchey prov., Mean Chey University campus, 13°35'N, 102°56'E, light trap, 1.XI.2018, leg. Rossi (cAss).

**C o m m e n t :** *Micrillus siamensis* is evidently quite common in Cambodia, but otherwise known only from the type locality in Thailand (ASSING 2013, 2018).

***Micrillus intermedius* (CAMERON, 1936)**

**M a t e r i a l   e x a m i n e d :** Cambodia: 79 exs., Siem Reap, 13°21'N, 103°51'E, 20 m, at halogen light, 7-11.XI.2002, leg. Kočárek (NMP, cAss).

**C o m m e n t :** This species is currently known from Malaysia, Thailand, Laos, and Cambodia (ASSING 2013, 2018).

### Acknowledgements

My thanks are extended to the colleagues indicated in the material section for the loan of material under their care, in particular to Walter Rossi (L'Aquila) for the generous gift of numerous Staphylinidae from Cambodia, this material including all the newly described species. Benedikt Feldmann (Münster) proof-read the manuscript.

### Zusammenfassung

Eine Art der Gattung *Scymbalium* ERICHSON, 1839 und sieben der Gattung *Micrillus* RAFFRAY, 1873 werden aus Kambodscha gemeldet. Drei dieser Arten werden beschrieben und abgebildet: *Micrillus rossianus* nov.sp. aus der *M. badius*-Gruppe, *M. variceps* nov.sp. aus der neu aufgestellten *M. variceps*-Gruppe und *M. bispinosus* nov.sp. aus der *M. coloratus*-Gruppe. Die kambodschanische Fauna umfasst derzeit eine *Scymbalium*- und neun *Micrillus*-Arten. Sie ist damit deutlich artenreicher als die anderer Länder der Orientalis.

### References

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Jahr/Year: 2019

Band/Volume: [0051\\_1](#)

Autor(en)/Author(s): Assing Volker

Artikel/Article: [A revision of Palaearctic and Oriental Scymbalium and Micrillus IV. The fauna of Cambodia \(Coleoptera, Staphylinidae, Paederinae\) 21-31](#)