

New *Makicula* Novák, 2012 species from the Oriental Region (Coleoptera: Tenebrionidae: Alleculinae: Alleculini)

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Abstract. A new species of Alleculine genus *Makicula* Novák, 2012 are described as follows: *Makicula gialaiica* sp. nov. from Vietnam, *Makicula huahinica* sp. nov. and *Makicula wiangica* sp. nov. both from Thailand, *Makicula miranda* sp. nov. from Laos and *Makicula lawaica* sp. nov., and *Makicula terrificica* sp. nov., all from peninsular Malaysia. New species are described, illustrated and compared with closest species of the genus. List of all known species of the genus *Makicula* Novák, 2012 is added.

INTRODUCTION

Novák (2012) described the new genus of comb clawed beetles *Makicula* Novák, 2012 with the type species *Makicula phoupaneica* Novák, 2012 from northern Laos. In the present, we know nine species (Novák 2012, 2021) living in Indochina, further two (Novák 2012, 2020) are known from southeastern parts of the Palaearctic Region (Yunnan Province in China). Further seven species are presently described as new as follows: *Makicula gialaiica* sp. nov. from Vietnam (Gia Lai Province), *Makicula huahinica* sp. nov. and *Makicula wiangica* sp. nov. both from Thailand (Hua Hin resp. Chiang Rai Provinces), *Makicula miranda* sp. nov. from Laos (Phongsaly Province) and *Makicula lawaica* sp. nov. and *Makicula terrificica* sp. nov., all from peninsular Malaysia (Kelantan and Pahang States). List of all known species is added.

New species are described, illustrated and compared with the closest species.

MATERIAL AND METHODS

Two important morphometric characteristics used for the descriptions of species of the subfamily Alleculinae, the 'ocular index' dorsally (Campbell & Marshall 1964) and 'pronotal index' (Campbell 1965), are used in this paper as well. The ocular index equals $(100 \times \text{minimum dorsal distance between eyes}) / (\text{maximum width of head across eyes})$. The pronotal index is calculated as $(100 \times \text{length of pronotum along midline}) / (\text{width across basal angles of pronotum})$.

'Type material' information is taken from recent locality labels.

In the list of type material, a slash (/) separates data in separate rows.

The following collection codes are used:

MHMB collection of Naturhistorisches Museum, Basel, Switzerland;

NMTJ collection of National Museum, Tokio, Japan;

SMNS collection of Staatliches Museum für Naturkunde, Stuttgart, Germany;

VNPC private collection of Vladimír Novák, Praha, Czech Republic;

ZSMG collection of Zoologische Staatssammlung, München, Germany.

Measurements of body parts and corresponding abbreviations used in text are as follows: AL - total antennae length, BL - maximum body length, EL - maximum elytral length, EW - maximum elytral width, HL - maximum length of head (visible part), HW - maximum width of head, OI - ocular index dorsally, PI - pronotal index dorsally, PL - maximum pronotal length, PW - pronotal

width at base, RLA - ratios of relative lengths of antennomeres 1-11 from base to apex ($3=1.00$), RL/WA - ratios of length / maximum width of antennomeres 1-11 from base to apex, RLT - ratios of relative lengths of tarsomeres 1-5 respectively 1-4 from base to apex ($1=1.00$).

Other abbreviations are used as follows: bf- black frame; hb- handwritten black; yl- yellow label;

Measurements were made with Olympus SZ 40 stereoscopic microscope with continuous magnification and with Soft Imaging System AnalySIS. Snapshots were taken by using camera Canon EOS 550 D and Canon Macro Photo Lens MP-E and software Helicon Focus 7.7.5.

TAXONOMY

genus *Makicula* Novák, 2012

Type species: *Makicula phoupaneica* Novák, 2012.

Makicula gialaiica sp. nov.

(Figs. 1-7)

Type locality. Vietnam, Gia-lai Province, Plei-ku.

Type material. Holotype (♂): yl: VIETNAM: Plei-ku / Prov. Gia-lai Kontum / 12.-16 [hb].10.1979, (SMNS); Paratypes: (1 ♀): same data as holotype, (SMNS); (2 ♀♀): same data as holotype, but 16./17.10.1979, (SMNS, VNPC). The types are provided with a printed red label: '*Makicula / gialaiica* sp. nov. / HOLOTYPE [or PARATYPE] / V. Novák det. 2022'.

Description of holotype. Habitus as in Fig. 1, body large, elongate, *leptura* shaped, matte, from pale reddish brown to dark reddish brown, dorsal surface with pale setation, punctuation and fine microgranulation, BL 12.74 mm. Widest near elytral humeri; BL/EW 3.43.

Head (Fig. 2) as long as wide, through the eyes a little wider than anterior margin of pronotum, distinctly narrower than base of pronotum. Dorsal surface with fine microgranulation, long, pale setae and dense punctuation, punctures medium sized. Posterior part dark reddish brown, anterior part reddish brown. Clypeus dark reddish brown with yellow apex, wide and transverse, half heart shaped, excised in middle of apex. Dorsal surface with small punctures, long, pale setation and fine microgranulation, matte. Mandibles reddish brown with darker sides and apex, glabrous, shiny, with microgranulation and pale setae in sides. HW 1.70 mm; HW/PW 0.69; HL (visible part) 1.69 mm. Eyes large, transverse, excised, space between eyes narrow, distinctly narrower than diameter of one eye; wider than length of antennomere 2; slightly wider than length of antennomere 1; OI equal to 29.96.

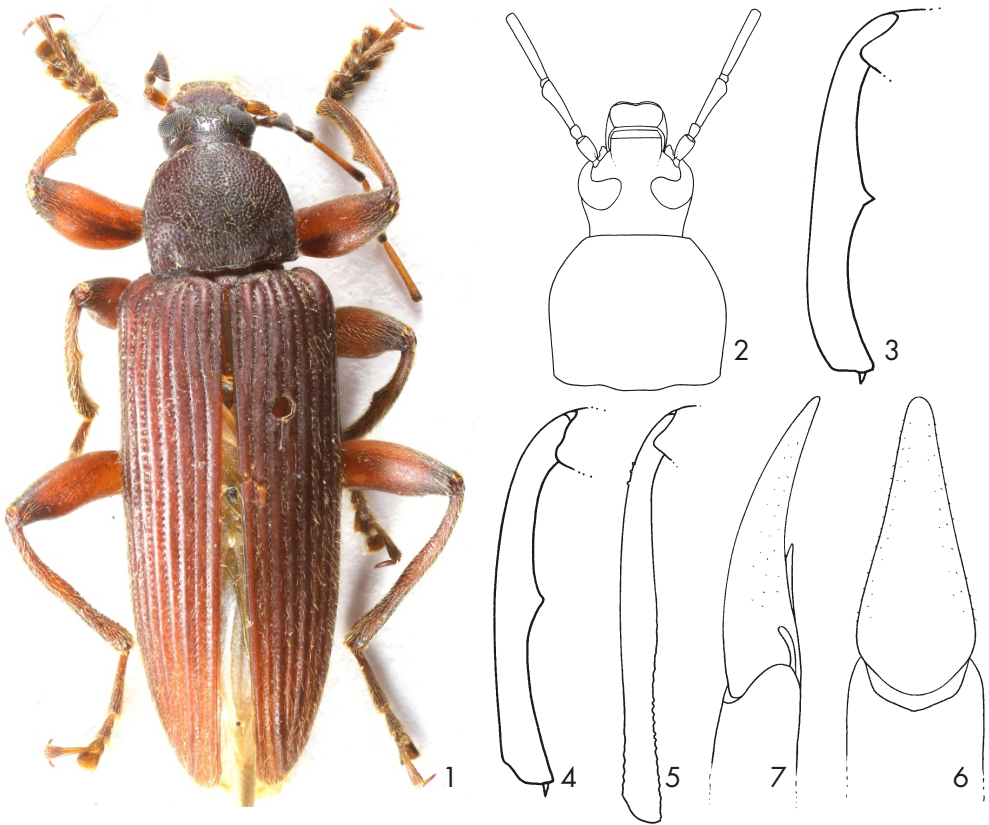
Antenna. Antennomeres long and narrow, antennomeres 1 and 2 brown, antennomere 3 dark reddish brown, antennomeres 4-6 pale reddish brown with dark reddish brown apex. Surface with short, pale setation, microgranulation and small punctures. Antennomere 2 shortest, antennomeres 4-6 longer than antennomere 3.

RLA(1-6): 0.54 : 0.27 : 1.00 : 1.54 : 1.56 : 1.58.

RL/WA(1-6): 1.77 : 1.29 : 4.07 : 6.04 : 7.74 : 7.83.

Maxillary palpus rather matte, dark brown, with pale setae, microgranulation and very small punctures. Base of palpomere 2 and apex of palpomere 2 and 3 pale brown. Palpomeres 2 and 3 distinctly narrowest at base and widest at apex, ultimate palpomere widely triangular.

Pronotum (Fig. 2) dark reddish brown, matte, convex, almost as long as wide, widest near middle, distinctly narrower than elytra in humeri. Disk with shallow impression near middle of base and oblique impressions from both sides of base between middle and posterior angles.



Figs. 1-7. *Makicula gjalaiica* sp. nov. (holotype): 1- habitus; 2- head and pronotum; 3- protibia; 4- mesotibia; 5- metatibia; 6- apical piece of aedeagus, dorsal view; 7- apical piece of aedeagus, lateral view.

Dorsal surface with pale setae, microgranulation and dense punctuation, punctures medium sized. PL 2.34 mm; PW 2.47 mm; PI equal to 94.74. Border lines very narrow, margins conspicuous from dorsal view. Lateral margins slightly arcuate near middle, base finely bisinuate. Anterior margin straight, anterior and posterior angles obtuse.

Elytra. Reddish brown, narrow, elongate, slightly convex, matte, widest near humeri. Dorsal surface with pale setation. EL 8.71 mm; EW 3.72 mm; EL/EW 2.34. Elytral striae with rows of medium sized, coarse punctures, intervals between punctures in rows almost narrower than diameter of punctures. Elytral intervals slightly convex, with very fine microgranulation.

Scutellum. Reddish brown with sides darker, pentagonal, matte, with fine microgranulation and long, pale setae.

Elytral epipleura well-developed, reddish brown, with large punctures in basal part and long, pale setae, distinctly narrowing to ventrite 1, then relatively narrow and parallel in apical part.

Legs (Figs. 3-5). Long, reddish brown, dorsal surface with pale setation, fine microgranulation and very small punctures. Apex of femora and tarsi brown. Protibiae with thorn in middle of inner side and excised apical half of inner side (as in Fig. 3), mesotibiae with thorn in the middle of inner side (as in Fig. 4), metatibiae excised in middle of inner side (as in Fig. 5). Protarsomeres 1-4,

mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.64 : 0.71 : 0.94 : 1.45 (protarsus), 1.00 : 0.47 : 0.37 : 0.66 : 1.12 (mesotarsus), 1.00 : 0.46 : 0.39 : 0.62 (metatarsus).

Tarsal claws relatively large, both protarsal claws with 38 visible teeth.

Ventral side of body reddish brown, with pale setae. Abdomen dark reddish brown, shiny, with very small punctures and microgranulation. Ventrites 1-4 with denser and longer pale setation than in ultimate ventrite.

Aedeagus (Figs. 6, 7) large and strong. Basal piece ochre yellow, shiny, strong, rounded laterally and narrowing in dorsal view. Apical piece short, roundly triangular dorsally, beak or hook shaped from lateral view. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 4.06.

Female. Body slightly wider, tibiae without thorns, normally shaped, space between eyes slightly wider than diameter of one eye, distinctly wider than in male. Protarsomeres narrower and protarsal claws shorter with only 12 visible teeth.

Measurements of female body. BL 11.72 mm; HL 1.53 mm; HW 1.55 mm; OI 34.93; PL 1.97 mm; PW 2.64 mm; PI 74.62; EL 8.21 mm; EW 3.82 mm; AL 8.08 mm; AL/BL 0.69; HW/PW 0.59; BL/EW 3.07; EL/EW 2.15.

RLA(1-11): 0.70 : 0.26 : 1.00 : 1.29 : 1.32 : 1.34 : 1.39 : 1.35 : 1.31 : 1.14 : 0.98.

RL/WA(1-11): 2.80 : 1.41 : 5.22 : 6.46 : 6.58 : 7.32 : 7.59 : 7.71 : 6.83 : 6.85 : 6.50.

RLT: 1.00 : 0.67 : 0.63 : 0.97 : 2.11 (protarsus), 1.00 : 0.41 : 0.40 : 0.84 (metatarsus).

Variability. The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Females (n=3). BL 12.45 mm (11.72-13.48 mm); HL 1.64 mm (1.53-1.82 mm); HW 1.66 mm (1.55-1.85 mm); OI 35.96 (34.93-36.69); PL 2.11 mm (1.97-2.30 mm); PW 2.79 mm (2.62-3.10 mm); PI 76.09 (74.19-79.01); EL 8.69 mm (8.21-9.36 mm); EW 4.02 mm (3.82-4.26 mm).

Differential diagnosis. The most similar species from Vietnam is *Makicula danangica* Novák, 2021.

Makicula gialaiica sp. nov. clearly differs from the similar species *M. danangica* mainly by shape of pronotum (widest near middle of lateral margins as in Fig. 2), by legs almost pale reddish brown or reddish brown and by shape of apical piece of aedeagus (Figs. 6 and 7); while *M. danangica* has pronotum widest in base (as you can see in Novák 2021: 59 - fig. 2), legs are almost dark brown and shape of apical piece of aedeagus is as in Novák 2021: 59 - figs. 5 and 6.

Etymology. Toponymic, named after the type locality Province Gia Lai in Vietnam.

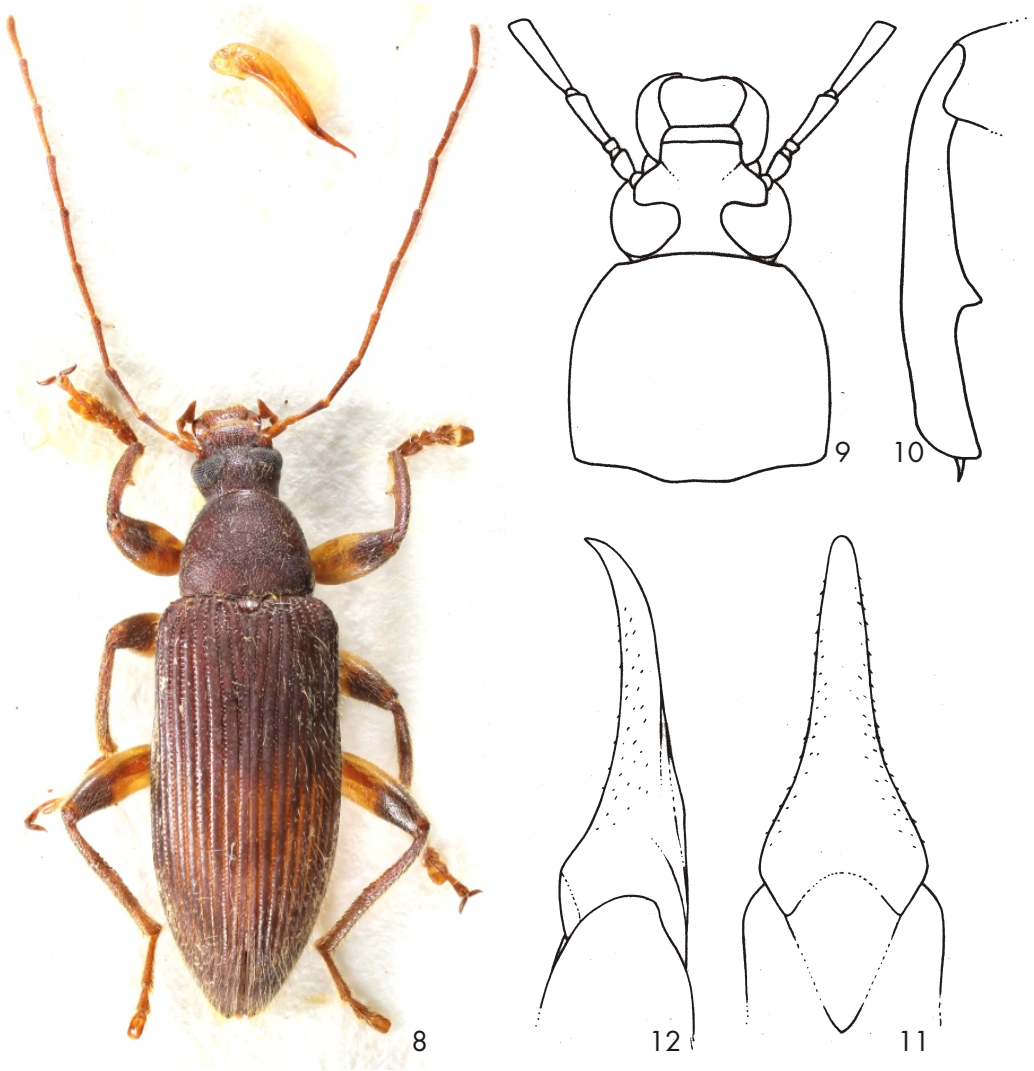
Distribution. Vietnam (Gia Lai Province).

Makicula huahinica sp. nov.

(Figs. 8-12)

Type locality. Thailand, Hua Hin Province, Khao Hin Lek Phai.

Type material. Holotype (♂): Khao Hin Lek Phai, / Hua Hin, Thailand / 2.VI.2002 / S. Ohmomo leg., (NMTJ). The type is provided with a printed red label: 'Makicula / huahinica sp. nov. / HOLOTYPUS / V. Novák det. 2022'.



Figs. 8-12. *Makicula huahinica* sp. nov. (holotype): 8- habitus; 9- head and pronotum; 10- protibia; 11- apical piece of aedeagus, dorsal view; 12- apical piece of aedeagus, lateral view.

Description of holotype. Habitus as in Fig. 8, body large, elongate, *leptura* shaped, matte, from ochre yellow to dark reddish brown, dorsal surface with pale setation, punctuation and fine microgranulation, BL 12.25 mm. Widest near middle elytra length; BL/EW 3.29.

Head (Fig. 9) approximately as long as wide, through the eyes a little wider than anterior margin of pronotum, distinctly narrower than base of pronotum. Dorsal surface slightly shiny, with fine microgranulation, long, pale setae and dense punctuation, punctures medium sized. Posterior part reddish brown, anterior part little paler. Clypeus pale reddish brown, wide and transverse, half heart shaped, excised in middle of apex. Dorsal surface with small, shallow

punctures, long, pale setae and fine microgranulation, shiny. Mandibles pale reddish brown with darker sides and apex, glabrous, shiny, with microgranulation and pale setae in sides. HW 1.81 mm; HW/PW 0.70; HL (visible part) 1.74 mm. Eyes large, transverse, excised, space between eyes narrow, distinctly narrower than diameter of one eye; wider than length of antennomere 2; approximately as wide as length of antennomere 1; OI equal to 24.66.

Antenna. Long and narrow (AL 9.55 mm, exceeding three quarters body length - AL/BL 0.78). Antennomeres pale reddish brown, antennomeres 3-11 with slightly darker apical part. Surface with short, recumbent, pale setation, microgranulation and small punctures. Antennomere 2 shortest, antennomeres 4-11 longer than antennomere 3.

RLA(1-11): 0.51 : 0.33 : 1.00 : 1.37 : 1.32 : 1.42 : 1.46 : 1.40 : 1.32 : 1.27 : 1.21.

RL/WA(1-11): 2.77 : 1.77 : 4.50 : 7.24 : 9.15 : 9.14 : 8.19 : 7.41 : 7.93 : 7.13 : 6.41.

Maxillary palpus pale reddish brown, slightly shiny, with long, pale setae, microgranulation and very small punctures. Palpomeres 2 and 3 distinctly narrowest at base and widest at apex, ultimate palpomere widely triangular.

Pronotum (Fig. 9) reddish brown, matte, convex, slightly longer than wide, widest near middle, distinctly narrower than elytra in humeri. Disk with shallow unclear impression from both sides of base between middle and posterior angles. Dorsal surface with pale setae, microgranulation and dense punctation, punctures small sized. PL 2.34 mm; PW 2.59 mm; PI equal to 90.16. Border lines very narrow, margins conspicuous from dorsal view. Lateral and anterior margins slightly arcuate, base finely bisinuate. Anterior and posterior angles obtuse.

Elytra. Reddish brown, narrow, elongate, slightly convex, matte, widest near middle. Dorsal surface with pale setation. EL 8.17 mm; EW 3.72 mm; EL/EW 2.20. Elytral striae with rows of medium sized, coarse punctures, intervals between punctures in rows narrower than diameter of punctures. Elytral intervals slightly convex, with very fine microgranulation and a few very small punctures.

Scutellum. Pale reddish brown, pentagonal, slightly shiny, with fine microgranulation and long, pale setae.

Elytral epipleura well-developed, reddish brown, with punctures, distinctly narrowing to ventrite 1 in basal part, with long, pale setae, relatively narrow and parallel in apical part.

Legs (Fig. 10). Long, narrow, reddish brown, femora strong, ochre yellow with dark reddish brown apex. Dorsal surface with pale setation, fine microgranulation and very small punctures. Protibiae with thorn near middle of inner side (as in Fig. 3), metatibiae with small tubercles on inner side. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.33 : 0.37 : 0.55 : 0.89 (protarsus), 1.00 : 0.47 : 0.49 : — (metatarsus).

Tarsal claws relatively large, both protarsal claws with 30 visible teeth.

Ventral side of body reddish brown with pale setae. Abdomen dark reddish brown, shiny, with very small punctures, dense, pale setation and microgranulation. Ultimate ventrite straight in apex.

Aedeagus (Figs. 11, 12) relatively large and strong. Basal piece ochre yellow, semimatte, rounded laterally and narrowing in dorsal view. Apical piece longer, elongate triangular or beak shaped dorsally, beak or hook shaped from lateral view. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 2.59.

Female unknown.

Differential diagnosis. The most similar species from Thailand is *Makicula imperator* Novák, 2021.

Makicula huahinica sp. nov. clearly differs from the similar species *M. imperator* mainly by narrower body and legs, by protibiae with tooth near middle of inner side, by apex of elytron rounded and by shape of apical piece of aedeagus as in Figs. 11 and 12; while *M. imperator* has wider body and stronger legs, protibiae have tooth in one third (see Novák 2021: 61: fig. 9) of inner side from base to apex, apex of elytron has small thorn and apical piece of aedeagus is as in Novák (2021: 61: figs. 10 and 11).

Etymology. Toponymic, named after the type locality Province Hua Hin in Thailand.

Distribution. Thailand (Hua Hin Province).

***Makicula lawaica* sp. nov.**

(Figs. 13-18)

Type locality. Malaysia, Kelantan State, Banjaram Titi Wangsa, environ of Kampong Lawa.

Type material. Holotype (♂): Malaysia - Kelantan / Banjaram Titi Wangsa / Kampong Lawa env. / 24.-26.2.1997 / Ivo Jeniš leg., (ZSMG). The type is provided with a printed red label: 'Makicula / lawaica sp. nov. / HOLOTYPUS / V. Novák det. 2022'.

Description of holotype. Habitus as in Fig. 13, body large, elongate, *leptura* shaped, matte, from pale reddish brown to blackish brown, dorsal surface with pale setation, punctuation and fine microgranulation, BL 15.25 mm. Widest near elytral humeri; BL/EW 3.34.

Head (Fig. 14) wider than long, through the eyes a little wider than anterior margin of pronotum and narrower than base of pronotum. Dorsal surface with fine microgranulation, long, pale setae and dense punctuation, punctures medium sized. Posterior part dark reddish brown with coarser punctures than those in reddish brown anterior part. Clypeus pale reddish brown with yellow apex, wide and transverse, half heart shaped, excised in middle of apex. Dorsal surface with small, shallow punctures, long, pale setae and fine microgranulation, rather matte. Mandibles reddish brown with darker sides and apex, glabrous, shiny, with pale setae in sides. HW 2.01 mm; HW/PW 0.68; HL (visible part) 1.77 mm. Eyes large, transverse, excised, space between eyes narrow, distinctly narrower than diameter of one eye; wider than length of antennomere 2; approximately as wide as length of antennomere 1; OI equal to 23.09.

Antenna. Long and narrow (AL 10.58 mm, exceeding two thirds body length - AL/BL 0.69). Antennomeres 1 and 2 pale reddish brown, antennomeres 3-11 reddish brown. Surface with short, pale setation, microgranulation and very small punctures. Antennomere 2 shortest, antennomeres 4-11 longer than antennomere 3, antennomeres 3-10 slightly widened apically.

RLA(1-11): 0.77 : 0.27 : 1.00 : 1.35 : 1.43 : 1.48 : 1.46 : 1.41 : 1.43 : 1.44 : 1.42.

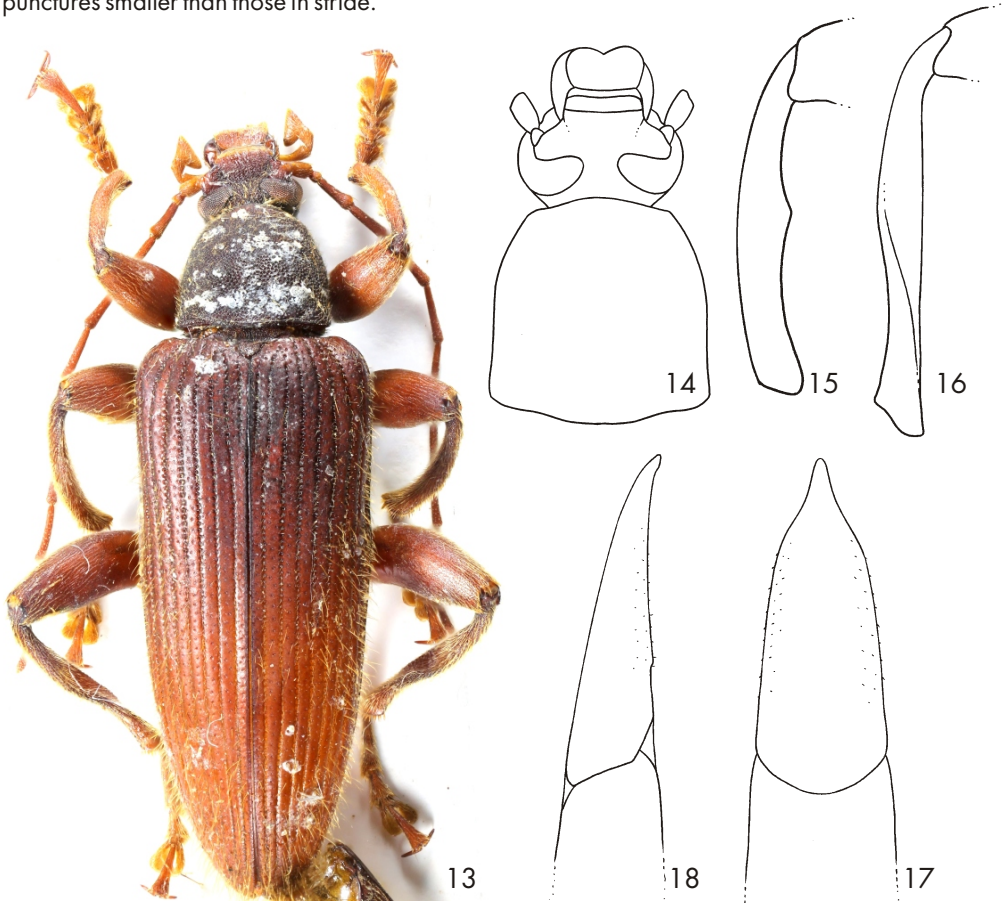
RL/WA(1-11): 1.98 : 1.07 : 3.33 : 5.29 : 5.61 : 5.62 : 5.71 : 6.20 : 6.83 : 7.18 : 9.18.

Maxillary palpus rather matte, pale reddish brown, with pale setae, microgranulation and very small punctures. Palpomeres 2 and 3 distinctly narrowest at base and widest at apex, ultimate palpomere widely triangular.

Pronotum (Fig. 14) dark reddish brown, matte, convex, almost as long as wide, widest in base, distinctly narrower than elytra in humeri. Disk with oblique impressions from both sides of base between middle and posterior angles. Dorsal surface with pale setae, microgranulation and dense punctuation, punctures medium sized. PL 2.76 mm; PW 2.95 mm; PI equal to 93.45. Border lines very narrow, margins conspicuous from dorsal view only in the middle of anterior margin not clearly conspicuous. Lateral margins almost straight, slightly arcuate near middle,

base finely bisinuate. Anterior margin arcuate, anterior and posterior angles obtuse.

Elytra. Reddish brown, narrow, elongate, slightly convex, matte, widest near humeri. Dorsal surface with erect pale setation. EL 10.82 mm; EW 4.56 mm; EL/EW 2.35. Surface with distinct longitudinal impression with row of punctures under scutellum near suture. Elytral striae with rows of medium sized, coarse punctures, intervals between punctures in rows almost narrower than diameter of punctures. Elytral intervals slightly convex, with very fine microgranulation and punctures smaller than those in striae.



Figs. 13-18. *Makicula lawaica* sp. nov. (holotype): 13- habitus; 14- head and pronotum; 15- protibia; 16- metatibia; 17- apical piece of aedeagus, dorsal view; 18- apical piece of aedeagus, lateral view.

Scutellum. Reddish brown, semielliptical, semimatte, with fine microgranulation, pale setae and small, shallow punctures.

Elytral epipleura well-developed, dark reddish brown, with punctures in basal part and denser, pale setae in apical half, distinctly narrowing to ventrite 1, then relatively narrow and parallel in apical part.

Legs (Figs. 15, 16). Long and strong, reddish brown, dorsal surface with pale setation, very

small punctures and fine microgranulation. Protibiae with thorn near middle, small dark thorn in apex and excision in apical part of inner side (as in Fig. 15), mesotibiae slightly rounded, metatibiae excised on inner side (as in Fig. 16). Protarsomeres 1-4, mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RL: 1.00 : 0.81 : 1.09 : 1.30 : 1.82 (protarsus), 1.00 : 0.69 : 0.82 : 0.82 : 1.43 (mesotarsus), 1.00 : 0.57 : 0.60 : 0.82 (metatarsus).

Tarsal claws relatively large, both protarsal claws with 35 visible teeth.

Ventral side of body dark reddish brown, with dense, small punctures and short, pale setae. Abdomen reddish brown, shiny, with microgranulation, recumbent, pale setation and dense punctuation, punctures very small.

Aedeagus (Figs. 17, 18) large and strong. Basal piece ochre yellow, shiny, strong, rounded laterally and narrowing in dorsal view. Apical piece short, brown, beak shaped from dorsal and lateral views. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 3.76.

Female unknown.

Differential diagnosis. The most similar species are *Makicula dorae* Novák, 2012 from Laos, *Makicula kadinka* Novák, 2021 and *Makicula wiangica* sp. nov. both from Thailand.

Makicula lawaica sp. nov. clearly differs from the similar species *M. dorae* mainly by protibiae with small dark thorn in inner part of apex, by metatibiae distinctly excised in the middle of inner side, elytron with distinct longitudinal impression under scutellum from both sides of elytral suture and by shape of apical piece of aedeagus as in Figs. 17 and 18; while *M. dorae* have no distinct dark thorn in inner side of apex, no distinct excision in the middle of inner side of metatibiae and no distinct impression under scutellum, apical piece of aedeagus is as in Novák (2012: 283: figs. 29 and 30).

M. lawaica is clearly different from similar species *M. kadinka* mainly by pronotum with coarse punctures, by protibiae with small dark thorn in inner part of apex, by metatibiae distinctly excised in the middle of inner side, by femora unicolored and by shape of apical piece of aedeagus as in Figs. 17 and 18; while *M. kadinka* have pronotum with shallow punctures no distinct dark thorn in inner side of apex, metatibia is narrowing in apical half before apex, apex of femora is distinctly darker and shape of apical piece of aedeagus is as in Novák (2021: 64: figs. 15 and 16).

M. lawaica clearly differs from the similar species *M. wiangica* mainly by protibiae with small dark thorn in inner part of apex, by metatibiae distinctly excised in the middle of inner side, by head between eyes regularly punctured and by shape of apical piece of aedeagus as in Figs. 17 and 18; while *M. wiangica* have no distinct dark thorn in inner side of apex, metatibia is narrowing in apical half before apex, head between eyes has shiny place without punctures and shape of apical piece of aedeagus as in Figs. 34 and 35.

Etymology. Toponymic, named after the type locality Kampong Lawa (Kelantan State in Malaysia).

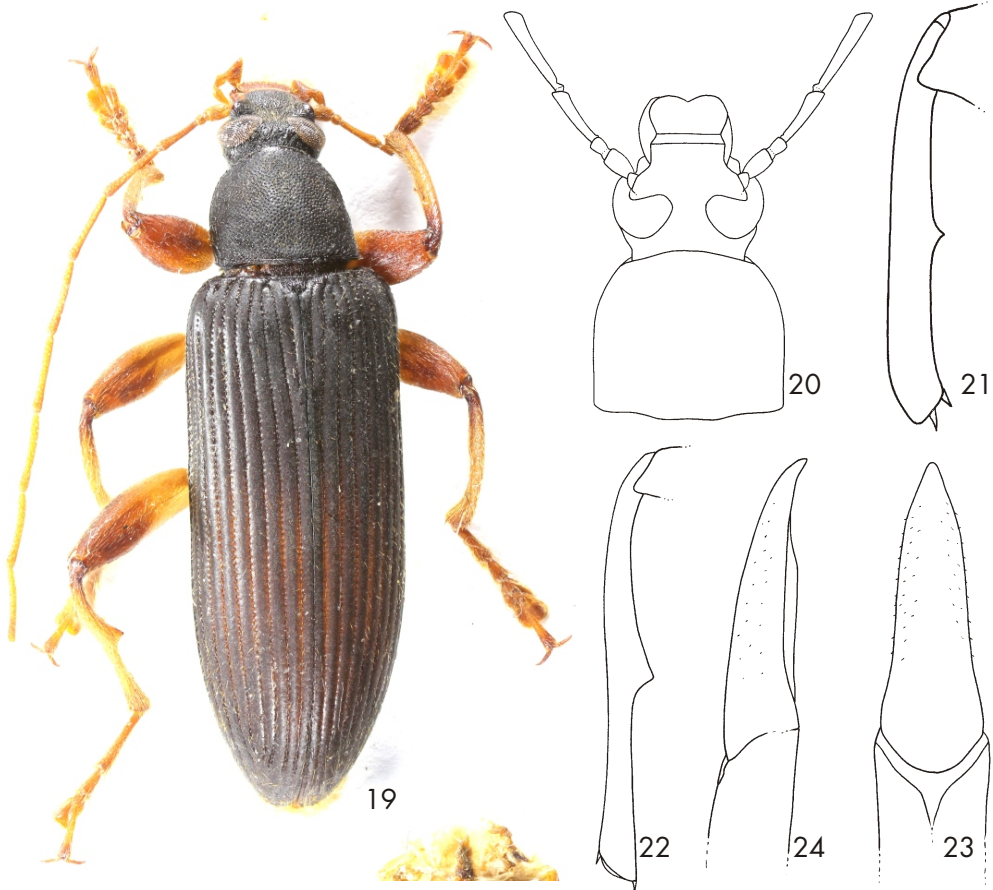
Distribution. Malaysia (Kelantan State).

***Makicula miranda* sp. nov.**

(Figs. 19-24)

Type locality. Laos, Phongsaly Province, environ of Phongsaly, 21°41-2'N 102°06-8'E, 1500 m.

Type material. Holotype (♂): LAOS, Phongsaly prov., / 21°41-2'N 102°06-8'E, / PHONGSALY env., / 28.v.-20.vi.2003, - 1500m, / M.Brancucci leg., (MHBS). The type is provided with a printed red label: 'Makicula / miranda sp. nov. / HOLOTYPUS / V. Novák det. 2022'.



Figs. 19-24. *Makicula miranda* sp. nov. (holotype): 19- habitus; 20- head and pronotum; 21- protibia; 22- metatibia; 23- apical piece of aedeagus, dorsal view; 24- apical piece of aedeagus, lateral view.

Description of holotype. Habitus as in Fig. 19, body large, elongate, *leptura* shaped, matte, from ochre yellow to blackish brown, dorsal surface with pale setation, punctuation and fine microgranulation, BL 12.51 mm. Widest near middle elytra length; BL/EW 3.77.

Head (Fig. 20) blackish brown, approximately as long as wide, through the eyes a little wider than anterior margin of pronotum, distinctly narrower than base of pronotum. Dorsal surface with fine microgranulation, pale setae and dense punctuation, punctures medium sized. Apex of anterior part reddish brown. Clypeus pale reddish brown with yellow apex, wide and transverse, half heart shaped, excised in the middle of apex. Dorsal surface with shallow punctures, long, pale setae and fine microgranulation, matte. Mandibles reddish brown with darker sides and apex, glabrous, shiny, with pale setae in sides. HW 1.72 mm; HW/PW 0.72; HL (visible part) 1.68 mm. Eyes large, transverse, excised, space between eyes narrow, distinctly narrower than diameter of one eye; narrower than length of antennomere 1; OI equal to 19.90.

Antenna. Long and narrow, ochre yellow (AL(1-10) 9.81 mm, distinctly exceeding three quarters body length AL/BL(1-10) 0.78). Surface with short, recumbent, pale setation, microgranulation and small punctures. Antennomere 2 shortest, antennomeres 4-10 longer than antennomere 3.

RLA(1-10): 0.55 : 0.37 : 1.00 : 1.59 : 1.63 : 1.71 : 1.76 : 1.81 : 1.73 : 1.68.

RL/WA(1-10): 1.79 : 1.25 : 5.35 : 6.50 : 8.04 : 8.42 : 8.35 : 9.65 : 8.83 : 10.82.

Maxillary palpus rather matte, pale reddish brown, with pale setae, microgranulation and small punctures. Palpomeres 2 and 3 distinctly narrowest at base and widest at apex, ultimate palpomere widely triangular.

Pronotum (Fig. 20) blackish brown, matte, convex, slightly longer than wide, widest in base, distinctly narrower than elytra in humeri. Dorsal surface with short, sparse, pale setae, microgranulation and dense punctuation, punctures medium sized. PL 2.15 mm; PW 2.38 mm; PI equal to 90.34. Border lines very narrow, margins not clearly conspicuous in basal part of lateral margins and in the middle of anterior margin from dorsal view. Lateral margins straight in basal half, slightly arcuate in apical part, base finely bisinuate. Anterior margin arcuate, anterior and posterior angles obtuse.

Elytra. Blackish brown, narrow, elongate, slightly convex, matte, widest near middle. Dorsal surface with short pale setae. EL 8.68 mm; EW 3.32 mm; EL/EW 2.62. Elytral striae with rows of small, coarse punctures, intervals between punctures in rows almost narrower than diameter of punctures. Elytral intervals slightly convex, with very fine microgranulation and a few very small, shallow punctures.

Scutellum. Blackish brown, pentagonal, slightly shiny, with fine microgranulation and long setae.

Elytral epipleura well-developed, black, shiny, with small punctures in basal part, distinctly narrowing to ventrite 1, then relatively narrow and parallel with denser pale setae in apical part.

Legs (Figs. 21, 22). Long and narrow, ochre yellow, dorsal surface with pale setation, very small punctures and fine microgranulation. Femora stronger, protibiae with small thorn in the middle and excision in apical part of inner side (as in Fig. 21), mesotibiae finely rounded, metatibiae with larger thorn in the middle of inner side (as in Fig. 22). Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.67 : 0.90 : 1.07 : 1.83 (protarsus), 1.00 : 0.57 : 0.60 : 0.69 : 1.28 (mesotarsus), 1.00 : 0.40 : 0.47 : 0.81 (metatarsus).

Tarsal claws relatively large, both protarsal claws with 26 visible teeth.

Ventral side of body blackish brown, with short, recumbent, pale setae and small punctures. Abdomen black, shiny, with very small and dense punctures, microgranulation and long, recumbent, pale setation.

Aedeagus (Figs. 23, 24) large and strong, ochre yellow, shiny. Basal piece rounded laterally and narrowing in dorsal view. Apical piece elongate triangular dorsally, beak shaped from dorsal and lateral view. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 3.79.

Female unknown.

Differential diagnosis. The most similar species from Laos is a large species *Makicula speciosa* Novák, 2021.

Makicula miranda sp. nov. clearly differs from the similar species *M. speciosa* mainly by almost unicolored legs, by mesotibiae with only very small angle in inner side, by metatibiae relatively narrow and not excised, with one thorn in inner side and by shape of apical piece of aedeagus

(as in Figs. 23 and 24); while *M. speciosa* has apex of femora and base of tibiae distinctly darker (dark brown or blackish brown) than rest of legs (ochre yellow), mesotibiae have relatively large thorn near middle of inner side, stronger metatibiae have two larger thorns near middle, excised in basal half of inner side, shape of apical piece of aedeagus is as in Novák (2021: 72: figs. 34 and 35).

Etymology. From Latin *miranda* (it means 'surprising').

Distribution. Laos (Phongsaly Province).

***Makicula terrifica* sp. nov.**
(Figs. 25-30)

Type locality. Malaysia, Pahang State, Cameron Highlands, environ of Tanah Rata, N 04°28'25'', E 101°22'43''.

Type material. Holotype (♂): MALAYSIA, Pahang distr. / Cameron Highlands, 2012 / Tanah Rata env. 5.x.-24.x. / N 04°28'25'' E 101°22'43'' / R. Hergovits leg., (VNPC). The type is provided with a printed red label: '*Makicula / terrifica* sp. nov. / HOLOTYPUS / V. Novák det. 2022'.

Description of holotype. Habitus as in Fig. 25, body large, elongate, *leptura* shaped, matte, from reddish brown to blackish brown, dorsal surface with pale setation, punctuation and fine microgranulation, BL 13.20 mm. Widest near elytral humeri; BL/EW 3.47.

Head (Fig. 26) wider than long, through the eyes a little wider than anterior margin of pronotum, distinctly narrower than base of pronotum. Dorsal surface with fine microgranulation, long, pale setae and dense, large and coarse punctures. Posterior part dark brown with slightly larger punctures than those in reddish brown anterior part. Clypeus reddish brown with pale reddish brown apex, wide and transverse, half heart shaped, finely excised in middle of apex. Dorsal surface with punctures, long, pale setae and fine microgranulation, semimatte. Mandibles reddish brown with darker sides and apex, glabrous, shiny, with pale setae in sides. HW 1.69 mm; HW/PW 0.70; HL (visible part) 1.49 mm. Eyes large, transverse, excised, space between eyes narrow, distinctly narrower than diameter of one eye; approximately as wide as length of antennomere 1, wider than length of antennomere 2; slightly wider than length of antennomere 1; OI equal to 23.85.

Antenna. Long and narrow (AL 10.60 mm; distinctly exceeding tree quarters body length - AL/BL 0.80). Antennomeres brown, matte, ultimate antennomere widest before paler apex. Surface with recumbent, pale setation, microgranulation and small punctures. Antennomere 2 shortest, antennomeres 4-11 longer than antennomere 3.

RLA(1-11): 0.86 : 0.26 : 1.00 : 1.77 : 2.10 : 2.24 : 2.26 : 2.17 : 2.11 : 2.02 : 1.93.

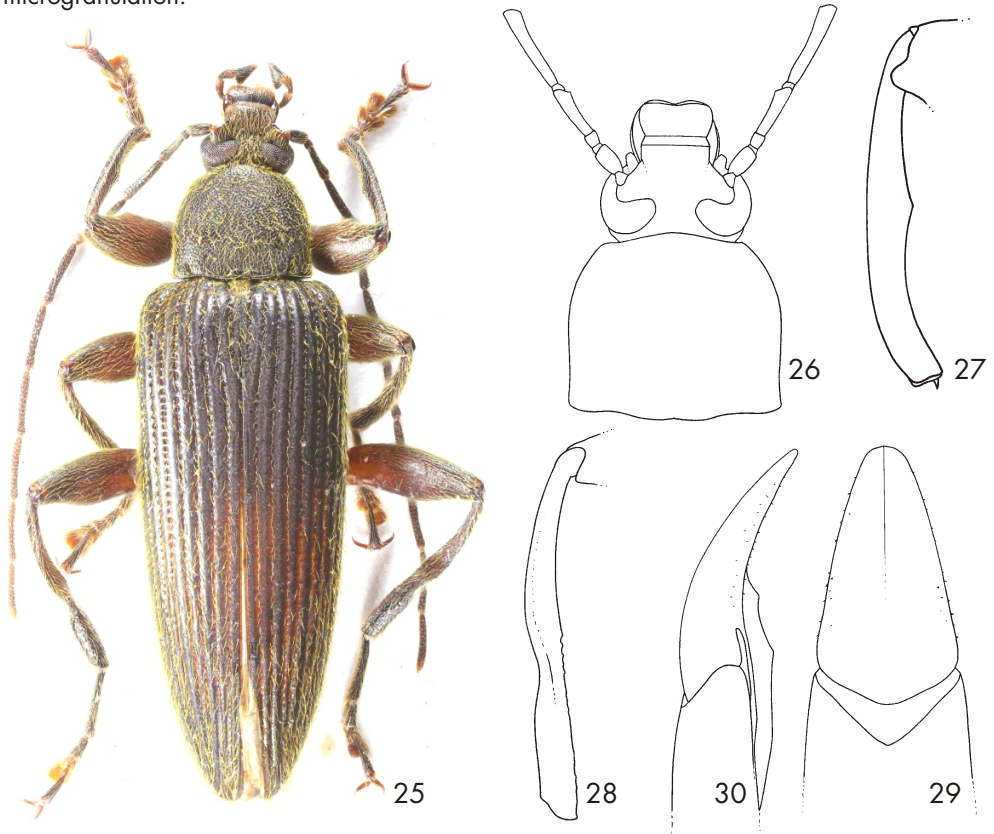
RL/WA(1-11): 2.29 : 1.04 : 3.37 : 5.37 : 7.35 : 7.29 : 7.89 : 8.21 : 8.73 : 8.76 : 9.78.

Maxillary palpus matte, with long, pale setae, microgranulation and small punctures. Basal half of palpomere 2 and 3 reddish, apical part pale reddish brown. Palpomer 2 and 3 distinctly narrowest at base and widest at apex, ultimate palpomere blackish brown, widely triangular.

Pronotum (Fig. 26) dark brown, matte, convex, slightly wider than long, widest in base, distinctly narrower than elytra in humeri. Disk with indistinct oblique impressions from both sides of base between middle and posterior angles. Dorsal surface with dense and long, pale setae, microgranulation and dense medium sized tubercles. PL 2.10 mm; PW 2.40 mm; PI equal to 87.50. Border lines very narrow, lateral margins and anterior margin in middle not clearly conspicuous from dorsal view. Lateral margins almost straight in basal half, slightly excised before

posterior angles, arcuate in apical part, base finely bisinuate. Anterior margin arcuate, anterior and posterior angles obtuse.

Elytra. Dark reddish brown, narrow, elongate, slightly convex, semimatte, widest near humeri. Dorsal surface with dense, pale setation. EL 9.61 mm; EW 3.81 mm; EL/EW 2.52. Elytral striae with rows of medium sized, coarse punctures, intervals between punctures in rows almost narrower than diameter of punctures. Elytral intervals slightly convex, with very fine microgranulation.



Figs. 25-30. *Makicula terrifica* sp. nov. (holotype): 25- habitus; 26- head and pronotum; 27- protibia; 28- metatibia; 29- apical piece of aedeagus, dorsal view; 30- apical piece of aedeagus, lateral view.

Scutellum. Blackish brown almost completely covered by pale setation, surface with fine microgranulation.

Elytral epipleura well-developed, blackish brown, shiny, with larger punctures in basal part, distinctly narrowing to ventrite 1, then relatively narrow with long and dense, pale setae and parallel in apical part.

Legs (Figs. 27, 28). Long and narrow, blackish brown, dorsal surface with long, pale setation, very small punctures and fine microgranulation. Femora strong, reddish brown, profemora with angle before apex in inner side. Protibiae with angle near middle of inner side and slightly excised apical half in inner side (as in Fig. 27), metatibiae excised in basal half of inner side and unusually strangled behind middle (as in Fig. 28). Protarsomeres 2-4, mesotarsomeres 3, 4 and

metatarsomere 3 widened and lobed. RLT: 1.00 : 0.89 : 0.65 : 1.00 : 1.97 (protarsus), 1.00 : 0.57 : 0.64 : 0.93 : 1.46 (mesotarsus), 1.00 : 0.41 : 0.43 : 0.75 (metatarsus).

Tarsal claws relatively large, both protarsal claws with almost 40 visible teeth.

Ventral side of body blackish brown, with pale setae and punctures. Abdomen blackish brown, shiny, with very small punctures, microgranulation and long pale setation denser near lateral margins than in middle. Penultimate ventrite with shallow impression in middle and ultimate ventrite with large impression in middle.

Aedeagus (Figs. 29, 30) large and strong. Basal piece pale brown, shiny, rounded laterally and narrowing in dorsal view. Apical piece darker, short, widely triangular dorsally, hook shaped from lateral view. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 4.03.

Female unknown.

Differential diagnosis. *Makicula terrifica* sp. nov. is a unique species by its shape of pronotum, by distinct small angle in inner side of profemora before apex and mainly by metatibiae unique shaped (strangled as in Fig. 28). No similar species in the genus *Makicula* is known yet.

Etymology. From Latin *terrifica* (it means 'terrible').

Distribution. Malaysia (Pahang State).

***Makicula wiangica* sp. nov.**

(Figs. 31-35)

Type locality. Thailand, Chiang Rai, Wiang Pa Pao.

Type material. Holotype (♂): Thailand, Chiang Rai, / Wiang Pa Pao, / 13.XI.2012 / K. Takahashi leg., (NMTJ). Paratype: (1 ♀): same data as holotype, (VNPC). The types are provided with a printed red label: "Makicula / wiangica sp. nov. / HOLOTYPUS [or PARATYPUS] / V. Novák det. 2022".

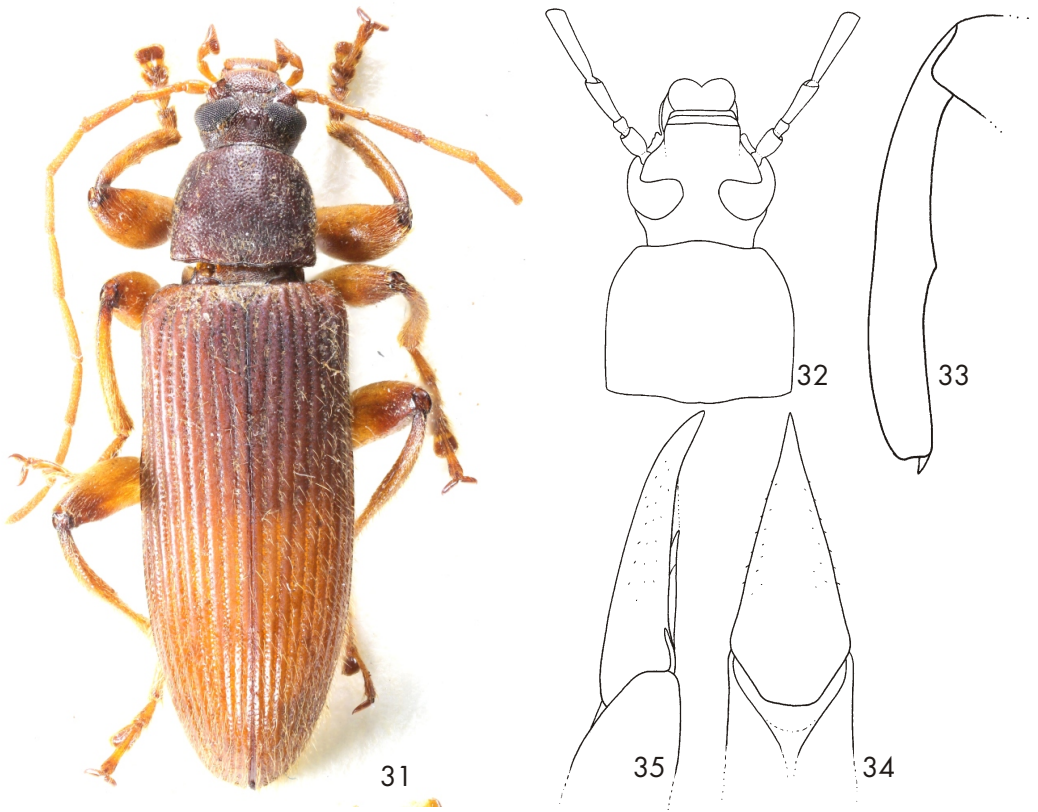
Description of holotype. Habitus as in Fig. 31, body large, elongate, *leptura* shaped, matte, from ochre yellow to reddish brown, dorsal surface with pale setation, punctuation and fine microgranulation, BL 11.97 mm. Widest near middle elytra length; BL/EW 3.59.

Head (Fig. 32) slightly longer than wide, through the eyes a little wider than anterior margin of pronotum, distinctly narrower than base of pronotum. Dorsal surface reddish brown, shiny with pale setae and dense punctuation, punctures medium sized, coarse. Posterior part with shiny place without punctures between eyes. Clypeus pale reddish brown, wide and transverse, half heart shaped, excised in middle of apex. Dorsal surface with dense, small punctures, long, pale setation and fine microgranulation, shiny. Mandibles reddish brown, glabrous, shiny, with pale setae in sides. HW 1.82 mm; HW/PW 0.80; HL (visible part) 1.89 mm. Eyes large, transverse, excised, space between eyes narrow, distinctly narrower than diameter of one eye; slightly wider than length of antennomere 1; OI equal to 23.49.

Antenna. Long and narrow, ochre yellow (AL 9.14 mm; reaching three quarters body length - AL/BL 0.76). Surface with short, recumbent, pale setation, microgranulation and small punctures. Antennomere 2 shortest, antennomeres 4-11 longer than antennomere 3.

RLA(1-11): 0.63 : 0.29 : 1.00 : 1.55 : 1.50 : 1.59 : 1.68 : 1.74 : 1.77 : 1.66 : 1.53.

RL/WA(1-11): 1.88 : 1.32 : 3.81 : 4.78 : 5.92 : 6.78 : 6.92 : 7.17 : 7.29 : 6.83 : 6.57.



Figs. 31-35. *Makicula wiangica* sp. nov. (holotype): 31- habitus; 32- head and pronotum; 33- protibia; 34- apical piece of aedeagus, dorsal view; 35- apical piece of aedeagus, lateral view.

Maxillary palpus shiny, ochre yellow, with pale setae, fine microgranulation and very small punctures. Palpomeres 2 and 3 distinctly narrowest at base and widest at apex, ultimate palpomere slightly darker, widely triangular.

Pronotum (Fig. 32) reddish brown, matte, convex, slightly longer than wide, widest near middle, distinctly narrower than elytra in humeri. Disk with almost indistinct, shallow, oblique impressions from both sides of base between middle and posterior angles. Dorsal surface with pale setae, microgranulation and dense punctuation, punctures smaller than those in head. PL 1.97 mm; PW 2.18 mm; PI equal to 86.33. Border lines very narrow, margins conspicuous from dorsal view only in the middle of anterior margin not clearly conspicuous. Lateral margins straight in basal half, slightly arcuate in apical part, base finely bisinuate. Anterior margin finely arcuate near middle, anterior and posterior angles obtuse.

Elytra. Reddish brown, paler than pronotum, narrow, elongate, slightly convex, matte, widest near middle. Dorsal surface with long, pale setation. EL 8.11 mm; EW 3.36 mm; EL/EW 2.41. Elytral striae with rows of coarse punctures, intervals between punctures in rows almost narrower than diameter of punctures. Elytral intervals slightly convex, with very fine microgranulation and very sparse, small and shallow punctures.

Scutellum. Reddish brown with sides darker, semielliptical, matte, with fine microgranulation and long, pale setae and punctures.

Elytral epipleura well-developed, reddish brown, with punctures in basal part distinctly narrowing to ventrite 1, then relatively narrow and parallel with long, pale setae in apical part.

Legs (Fig. 33). Long and narrow, ochre yellow, apex of strong femora darker. Dorsal surface with pale setation, fine microgranulation and very small punctures. Profemora with small thorn in middle and excision in apical part of inner side (as in Fig. 33), metatibiae slightly excised on inner side. Protarsomeres 2-4, mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RL: 1.00 : 0.76 : 1.06 : 1.42 : 1.86 (protarsus), 1.00 : 0.55 : 0.64 : 0.75 : 1.16 (mesotarsus), 1.00 : 0.47 : 0.57 : 0.90 (metatarsus).

Tarsal claws relatively large, both protarsal claws with 30 visible teeth.

Ventral side of body reddish brown, with pale setae. Abdomen reddish brown, shiny, with very small, shallow punctures, recumbent, pale setation and microgranulation. Ultimate ventrite with shallow impression in middle of apex.

Aedeagus (Figs. 34, 35) large and strong. Basal piece ochre yellow, shiny, rounded laterally and narrowing in dorsal view. Apical piece slightly darker, triangular dorsally, beak shaped from lateral view. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 2.68.

Female. Body more robust, larger and wider, antenna distinctly shorter than in male, tibiae normally shaped, protarsal claws shorter with only 12 visible teeth.

Measurements of female body. BL 15.60 mm; HL 2.24 mm; HW 2.26 mm; OI 38.94; PL 2.64 mm; PW 3.14 mm; PI 84.08; EL 10.72 mm; EW 4.60 mm; AL 10.03 mm; AL/BL 0.64; HW/PW 0.72; BL/EW 3.39; EL/EW 2.33.

RLA(1-11): 0.67 : 0.22 : 1.00 : 1.25 : 1.46 : 1.45 : 1.35 : 1.48 : 1.54 : 1.45 : 1.49.

RL/WA(1-11): 1.95 : 0.96 : 4.28 : 5.36 : 7.09 : 6.20 : 6.00 : 6.58 : 8.68 : 9.12 : 9.35.

RL: 1.00 : 0.59 : 0.80 : 1.48 : 2.30 (protarsus), 1.00 : 0.65 : 0.60 : 0.86 : 1.28 (mesotarsus), 1.00 : 0.47 : 0.65 : 1.03 (metatarsus).

Differential diagnosis. The most similar species from Thailand is *Makicula kadinka* Novák, 2021.

Makicula wiangica sp. nov. clearly differs from the similar species *M. kadinka* mainly by shape of pronotum (shorter and wider), by punctuation of pronotum (denser and coarser), by place between eyes without punctures and by shape of apical piece of aedeagus (Figs. 34 and 35); while *M. kadinka* has pronotum longer and narrower, punctuation of pronotum is sparser and shallower, place between eyes is regularly punctured and shape of apical piece of aedeagus is as in Novák (2021: 64: figs. 15 and 16).

Etymology. Toponymic, named after the first word of type locality Wiang Pa Pao in Thailand.

Distribution. Thailand (Chiang Rai Province).

LIST OF MAKICULA SPECIES

<i>Makicula andreasi</i> Novák, 2012	China (Yunnan Province)
<i>Makicula bobikae</i> Novák, 2012	Laos (Bolikhamsai Province)
<i>Makicula danangica</i> Novák, 2021	Vietnam (Da Nang Province)
<i>Makicula dorae</i> Novák, 2012	Laos (Bolikhamsai Province)
<i>Makicula gialaiica</i> sp. nov.	Vietnam (Gia Lai Province)
<i>Makicula huahinica</i> sp. nov.	Thailand (Hua Hin Province)
<i>Makicula imperator</i> Novák, 2021	Cambodia (Siem Reap Province), Thailand (Chonburi Province)

<i>Makicula lawaica</i> sp. nov.	Malaysia (Kelantan State)
<i>Makicula kadinka</i> Novák, 2021	Thailand (Chiang Mai Province)
<i>Makicula mengi</i> Novák, 2012	China (Yunnan Province)
<i>Makicula miranda</i> sp. nov.	Laos (Phongsaly Province)
<i>Makicula monica</i> Novák, 2021	Myanmar (Mon State)
<i>Makicula phoupaneica</i> Novák, 2012	Laos (Houa Phan Province)
<i>Makicula phuwiangica</i> Novák, 2021	Thailand (Khon Kaen Province)
<i>Makicula speciosa</i> Novák, 2021	Laos (Vientiane)
<i>Makicula terrifica</i> sp. nov.	Malaysia (Pahang State)
<i>Makicula wiangica</i> sp. nov.	Thailand (Chiang Rai Province)

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