

## New *Borboresthes* (Coleoptera: Tenebrionidae: Alleculinae: Alleculini) species from Southeast of China

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### Taxonomy, new species, descriptions, Alleculinae, Alleculini, *Borboresthes*, Palaearctic Region, China

**Abstract.** Fifteen new species of the genus *Borboresthes* Fairmaire, 1897 (all from China) are described as *Borboresthes aglia* sp. nov. (Guizhou), *B. arctia* sp. nov. (Zhejiang), *B. catocala* sp. nov. (Guizhou) and *B. doncunensis* sp. nov. (Hubei), belonging together with the species *B. fokiensis* Pic, 1922 (Fujian) to a newly established *fokiensis* species group; *B. hainanensis* sp. nov. (Island Hainan), *B. hemaris* sp. nov. (Guangdong) and *B. hyles* sp. nov. from Guangdong belonging to a newly established *hainanensis* species group and finally *B. laothoe* sp. nov. (Fujian), *B. mimas* sp. nov. (Island Hainan), *B. mufuensis* sp. nov. (Hebei), *B. saturnya* sp. nov. (Hebei), *B. sphinx* sp. nov. (Guizhou), *B. spilosoma* sp. nov. (Hubei), *B. tyria* sp. nov. (Guangdong) and *B. zeuzera* sp. nov. (Guangdong) belonging together with the species *B. klapperichi* Pic, 1955 to a newly established *klapperichi* species group. New distributional data for the species *B. klapperichi* - China (Shaanxi, Zhejiang) are added.

### INTRODUCTION

Fairmaire (1897) described the genus *Borboresthes* Fairmaire, 1897 with *Allecula cruralis* Marseul, 1876 as a type species from Japan, Taiwan and Far East. Species of this genus have oval or elongate oval, egg-shaped body, filiform antennae with antennomere 3 approximately as long as or slightly shorter than antennomere 4 and approximately semicircular pronotum near base as wide as or very slightly narrower than base of elytra. Protarsomeres and mesotarsomeres 3 and 4 and metatarsomere 3 are widened and lobed.

Species of the genus are distributed in the Eastern and South Eastern Palaearctic Region and in the Oriental Region. Borchmann (1910) knew only 2 species, Mader (1928) listed 7 and later Novák & Pettersson (2008) 43 species of this genus from Palaearctic Region. New species from the Palaearctic Region were described by Akita & Masumoto (2008, 2015) from Japan, by Masumoto et al. (2017, 2018) from Taiwan and by Novák (2012, 2015 and 2016) from China.

Pic (1922) described the species *Borboresthes fokiensis* Pic, 1922. Similar species live in southeastern China - *B. aglia* sp. nov. from Guizhou, *B. arctia* sp. nov. from Zhejiang, *B. catocala* sp. nov. from Guizhou and *B. doncunensis* sp. nov. from Henan, which together with *B. fokiensis* belonging to a newly established *fokiensis* species group. Species of this group have body pale, more flat and elongate (BL/EW 2.77-2.91), the antenna is long, slightly exceeding two thirds body length, antennomere 5-11 each almost longer than antennomere 3.

Pic (1955) described the species *Borboresthes klapperichi* Pic, 1955. Similar species from southeastern China are *B. laothoe* sp. nov. from Fujian, *B. mimas* sp. nov. from the Island Hainan, *B. mufuensis* sp. nov. from Hebei, *B. saturnya* sp. nov. from Hebei, *B. sphinx* sp. nov. from Guizhou, *B. spilosoma* sp. nov. from Hubei, *B. tyria* sp. nov. and *B. zeuzera* sp. nov. from Guangdong belonging together with the species *B. klapperichi* Pic, 1955 to a newly established *klapperichi* species group. Species of this group have their bodies dark, more convex, oval, egg-shaped (BL/EW 2.36-2.75), the antenna is relatively short, only slightly exceeding half body length, antennomeres 5-11 are almost shorter or as long as antennomere 3.

Species *B. hainanensis* sp. nov. from Island Hainan, *B. hemaris* sp. nov. from Guangdong and *B. hyles* sp. nov. from Guangdong belong to a newly established *hainanensis* species group.

The species of this group have dorsal surfaces of their bodies bicolour (pronotum distinctly darker than elytra).

All new species are described, illustrated and compared with other similar species.

New distributional data for the species *B. klapperichi* - China (Shaanxi, Zheijang) are added.

## 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  $(100 \times \text{length of pronotum along midline}) / (\text{width across basal angles of pronotum})$ .

In the list of types or material examined, a double slash (//) separates data on different labels and a slash (/) data in different rows.

The following codens are used:

HNHM collection of Hungarian Natural History Museum, Budapest, Hungary;

VNPC private collection of Vladimír Novák, Prague, Czech Republic.

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 used in text: hb= handwritten black; pb= printed black; wl= white label.

Measurements were made with the Olympus SZ 40 stereoscopic microscope with continuous magnification and the photos were taken with Soft Imaging System AnalySIS by using the Canon EOS 550 D camera, and Canon Macro Photo Lens MP-E and Helicon Focus 5.2 software.

## TAXONOMY

### ***fokienensis* species group**

#### ***Borboresthes aglia* sp. nov.**

(Figs. 1-4)

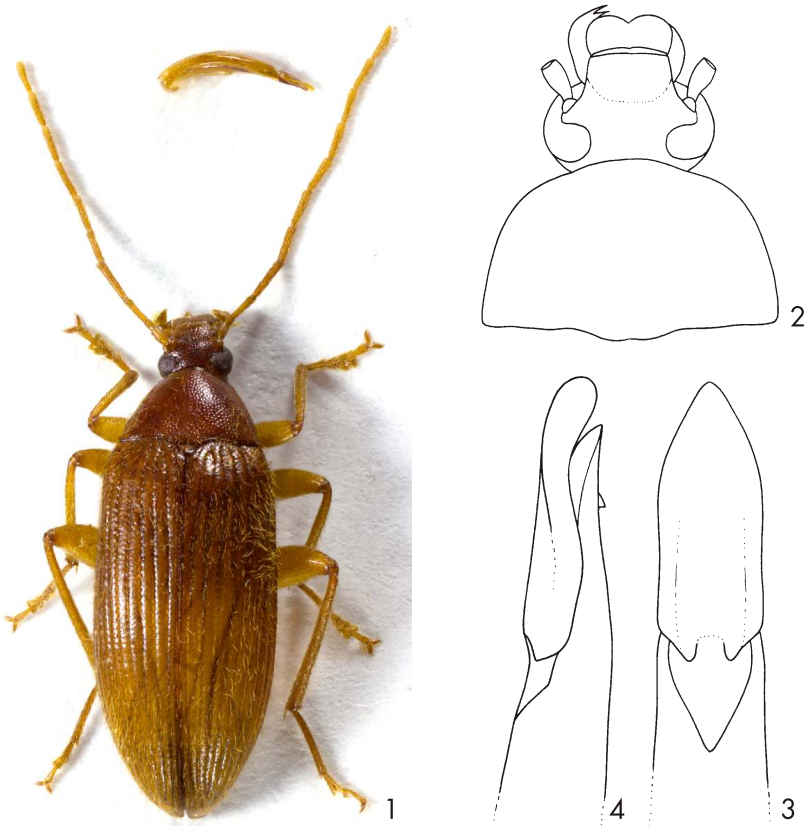
**Type locality.** China, south of Guizhou province, Yaogu env., 25°20'N, 107°56'E, 800-900 m.

**Type material.** Holotype (♂): wl [pb]: China, S Guizhou, 13.VI. / YAOGU env., 800-900m / 25°20'N 107°56'E / Jaroslav Turna leg., 2011, (VNPC). Paratypes: (1 ♀): same data as holotype, (VNPC). The types are provided with a printed red label: '*Borboresthes* / *aglia* sp. nov. / HOLOTYPE [or PARATYPE] / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 1, body relatively large, elongate oval, slightly convex, dorsal surface from ochre yellow to reddish brown, with punctuation, microgranulation and ochre yellow setation, BL 8.10 mm. Widest near half elytra length; BL/EW 2.91.

Head (Fig. 2) relatively small, slightly longer than wide, with microgranulation and punctuation. Posterior part reddish brown, with sparse, ochre yellow setae, coarse and dense, medium sized punctuation, shiny. Anterior part pale reddish brown with punctuation shallower and ochre

yellow setation denser and longer than those in posterior half. Clypeus pale reddish brown with dense ochre yellow setation, microgranulation, punctuation indistinct, apex straight. HW 1.14 mm; HW/PW 0.54. HL (visible part) 1.28 mm. Eyes large, transverse, distinctly excised, space between eyes wider than diameter of one eye and slightly wider than antennomere 3 long; OI equal to 42.34.



Figs. 1-4. *Borboressthes aglia* sp. nov. (male holotype): 1- Habitus; 2- head and pronotum; 3- aedeagus, dorsal view; 4- aedeagus, lateral view.

Antennae. Long (AL 5.61 mm, slightly exceeding two thirds body length AL/BL 0.69), filiform, unicolored ochre yellow, with fine microgranulation, shallow punctures and relatively long, dense ochre yellow setation. Antennomere 2 shortest, antennomere 4 longest, each of antennomeres 4-11 distinctly longer than antennomere 3.

RLA(1-11): 0.74 : 0.43 : 1.00 : 1.45 : 1.21 : 1.32 : 1.33 : 1.25 : 1.18 : 1.20 : 1.28.

RL/WA(1-11): 2.22 : 1.84 : 4.79 : 5.15 : 4.28 : 4.30 : 4.24 : 4.86 : 4.47 : 4.90 : 4.73.

Maxillary palpus. Ochre yellow with microgranulation and ochre yellow setation. Ultimate palpomere widely triangular. Palpomeres 2 and 3 distinctly narrowest in base, slightly dilated anteriorly.

Pronotum (Fig. 2). Reddish brown, almost semicircular, with long, semierect, ochre yellow

setation (denser near lateral margins than on disc), dense punctuation, punctures slightly larger than those in head, interspaces between punctures narrow with very fine microgranulation somewhere indistinct, shiny. Border lines distinct and complete, only in the middle of anterior margin not clearly conspicuous. Anterior margin distinctly and lateral margins slightly arcuate, posterior margin bisinuate, anterior angles indistinct, posterior angles almost rectangular. PL 1.24 mm; PW 2.13 mm; PI equal to 58.22.

Ventral side of body. Prothorax pale brown with a few long, pale setae. Meso- and metathorax reddish brown with punctures and sparse, short, pale setae. Abdomen reddish brown, with microgranulation, sparse, small and shallow punctures and transverse rugosities.

Elytron pale reddish brown, with suture narrowly darker. Dorsal surface with ochre yellow, long and dense, semierect setation, rather matte. Elytral striae with distinct rows of small punctures, elytral interspaces slightly convex, with microgranulation and very small, sparse and shallow punctures. EL 5.58 mm; widest near half elytra length, EW 2.78 mm. EL/EW 2.01.

Scutellum. Roundly triangular, pale brown, with sides darker, with microgranulation, small punctures and a few pale setae.

Elytral epipleura well-developed, reddish brown with pale setae and punctures, regularly narrowing to metasternum in basal half, then pale brown leading parallel in apical half.

Legs covered by dense and long, ochre yellow setation, with microgranulation and very small punctures. Tibiae and femora ochre yellow, apex of tibiae pale brown and slightly dilated anteriorly. Tarsi pale brown, pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.61 : 0.73 : 0.74 : 1.76 (protarsus); 1.00 : 0.28 : 0.26 : 0.21 : 0.57 (mesotarsus); 1.00 : 0.31 : 0.25 : 0.44 (metatarsus).

Both anterior tarsal claws with 17 visible teeth.

Aedeagus (Figs. 3, 4). Ochre yellow, robust, slightly shiny. Basal piece regularly arcuate laterally and slightly narrowing dorsally. Apical piece short, beak-shaped dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 4.12

**Female** without distinct differences, only both anterior tarsal claws with 10 and 11 visible teeth. BL 8.20 mm; HL 1.29 mm; HW 1.25 mm; OI 42.36; PL 1.31 mm; PW 2.20 mm; PI 58.89; EL 5.66 mm; EW 2.88 mm.

**Differential diagnosis.** Similar species are *Borboresthes arctia* sp. nov., *Borboresthes catocala* sp. nov., *Borboresthes doncunensis* sp. nov. and *Borboresthes fokienensis* Pic, 1922.

*Borboresthes aglia* sp. nov. distinctly differs from similar species *B. doncunensis* and *B. fokienensis* mainly by its space between eyes, which is broad (OI of male 42), distinctly wider than diameter of one eye, and by the shape of its aedeagus (Figs. 3 and 4); while *B. doncunensis* and *B. fokienensis* have shapes of aedeagi (as in Figs. 15 and 16, respectively 20 and 21) and the space between eyes narrow (OI 32-35 in males), approximately as wide as diameter of one eye.

*B. aglia* is clearly different from similar species *B. arctia* mainly by its setation of pronotum sparse, by microgranulation of pronotum not clearly distinct, by aedeagus shape (as in Figs. 3 and 4) and anterior tarsal claws of male having 17 teeth; while *B. arctia* has the setation of pronotum dense, dorsal surface of pronotum with distinct microgranulation, aedeagus as in Figs. 11 and 12 and anterior tarsal claws of male having 12 teeth.

*B. aglia* distinctly differs from similar species *B. catocala* mainly by punctures of pronotum, which are smaller and shallower than those on pronotum of *B. catocala* and by punctures in rows of elytral striae which are smaller than those in striae of *B. catocala*.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the Tau emperor *Aglia tau* (Linnaeus, 1758).

**Distribution.** China (Guizhou).

***Borboresthes arctia* sp. nov.**

(Figs. 5-8)

**Type locality.** China, south of Zhejiang province, Caoyutang forest park, 27°55'N, 119°39'E, 1100-1300 m.

**Type material.** Holotype (♂): wl [pb]: China, S Zhejiang, 31.V / CAOYUTANG, 1100-1300m / for.park, 27°55'N, 119°39'E / Jaroslav Turna leg., 2010, (VNPC). Paratypes: (7 ♂♂, 15 ♀♀): same data as holotype, (VNPC). The types are provided with a printed red label: 'Borboresthes / arctia sp. nov. / HOLOTYPUS [or PARATYPUS] / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 5, body relatively narrow, elongate, slightly oval, slightly convex, dorsal surface from ochre yellow to reddish brown, with punctuation, microgranulation and ochre yellow setation, BL 7.56 mm. Widest near half elytra length; BL/EW 2.86.

Head (Fig. 6) relatively small, approximately as wide as long, with microgranulation, sparse and long ochre yellow, semierect setae and punctuation, punctures medium sized. Posterior part reddish brown, shiny, dorsal surface in middle between eyes impunctate, microgranulation not clearly distinct. Anterior part slightly paler than posterior part, pale reddish brown, with distinct microgranulation. Clypeus pale brown with small and shallow punctures, long, ochre yellow setation slightly denser than in head and with distinct microgranulation, apex straight. HW 1.11 mm; HW/PW 0.56. HL (visible part) 1.15 mm. Eyes large, transverse, excised, space between eyes distinctly wider than diameter of one eye, slightly wider than length of antennomere 3; OI equal to 45.00.

Antennae. Long (AL 5.70 mm, reaching three quarters body length AL/BL 0.75), filiform, unicolored ochre yellow, with fine microgranulation, shallow punctures and relatively long, dense ochre yellow setation. Antennomeres 1-3 slightly shiny with a few punctures, antennomeres 4-11 rather matte, punctuation denser. Antennomere 2 shortest, antennomere 4 longest, each of antennomeres 4-11 distinctly longer than antennomere 3.

RLA(1-11): 0.78 : 0.31 : 1.00 : 1.47 : 1.16 : 1.27 : 1.20 : 1.21 : 1.22 : 1.20 : 1.28.

RL/WA(1-11): 2.22 : 1.27 : 4.14 : 6.52 : 5.53 : 5.58 : 5.89 : 5.25 : 4.79 : 4.38 : 4.50.

Maxillary palpus. Palpomeres 2 and 3 ochre yellow, slightly shiny, with long, ochre yellow setae distinctly dilated anteriorly. Ultimate palpomere pale brown, distinctly darker than penultimate palpomere, widely triangular, rather matte with long, pale setae.

Pronotum (Fig. 6). Reddish brown, transverse, with long and relatively sparse, semierect, ochre yellow setae, dense punctuation, punctures large, distinctly larger than those on head, interspaces between punctures narrow, shiny. Border lines distinct and complete. Lateral margins straight, anterior margin arcuate, posterior margin bisinuate, anterior angles indistinct, posterior angles obtuse. PL 1.13 mm; PW 1.97 mm; PI equal to 57.36.

Ventral side of body reddish brown with relatively sparse and short pale setation and punctuation. Abdomen pale reddish brown, with sparse and short pale setae, very small and sparse punctures, fine microgranulation, shiny.

Elytron pale reddish brown, with suture near scutellum narrowly darker - reddish brown. Dorsal surface with ochre yellow, long, semierect setation, slightly shiny. Elytral striae with distinct rows of small punctures, elytral interspaces slightly convex, with microgranulation and very small and

shallow punctures. EL 5.28 mm; EW 2.64 widest near half elytra length, EW 2.64 mm. EL/EW 2.00.

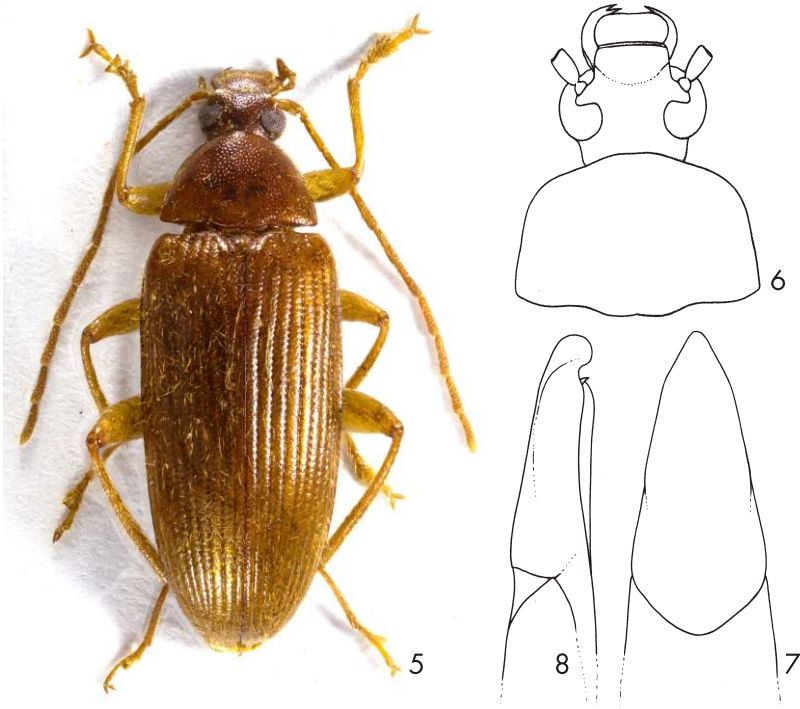
Scutellum. Pale reddish brown, with sides distinctly darker, roundly triangular with microgranulation, small and shallow punctures and a few pale setae.

Elytral epipleura well-developed, pale reddish brown as elytron itself, with pale setae and punctures, regularly narrowing to metasternum in basal half, then relatively wide leads parallel.

Legs ochre yellow, long and narrow, with relatively dense and long, ochre yellow setation, very small punctures and microgranulation. Tibiae slightly dilated anteriorly, femora stronger. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.50 : 0.73 : 0.87 : 1.84 (protarsus); 1.00 : 0.28 : 0.30 : 0.33 : 0.76 (mesotarsus); 1.00 : 0.25 : 0.28 : 0.49 (metatarsus).

Both anterior tarsal claws with 17 visible teeth.

Aedeagus (Figs. 7, 8). Ochre yellow, partly pale brown, strong and robust, shiny. Basal piece in basal part slightly arcuate and straight in apical half laterally, parallel in basal half, then slightly narrowing in apical part dorsally. Apical piece elongate triangular dorsally and beak-shaped laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 2.82



Figs. 5-8. *Borboresthes arctia* sp. nov.: 5- Habitus of male holotype; 6- head and pronotum of male holotype; 7- aedeagus, dorsal view; 8- aedeagus, lateral view.

**Female** without distinct differences, only both anterior tarsal claws with 7 visible teeth.

**Variability.** The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Males (n=8). BL 8.22 mm (7.56-8.61 mm); HL 1.17 mm

(1.09-1.24 mm); HW 1.23 mm (1.11-1.30 mm); OI 40.27 (34.92-45.00); PL 1.27 mm (1.13-1.36 mm); PW 2.15 mm (1.97-2.32 mm); PI 58.48 (53.92-63.98); EL 5.78 mm (5.28-6.20 mm); EW 2.88 mm (2.64-3.10 mm). Females (n=15). BL 10.73 mm (10.35-10.93 mm); HL 1.13 mm (0.95-1.28 mm); HW 1.22 mm (1.13-1.35 mm); OI 42.09 (39.36-47.29); PL 1.22 mm (1.12-1.30 mm); PW 2.24 mm (1.98-2.38 mm); PI 53.61 (51.68-60.75); EL 6.02 mm (5.47-6.52 mm); EW 2.98 mm (2.64-3.22 mm).

**Differential diagnosis.** Similar species are *Borboresthes aglia* sp. nov., *Borboresthes catocala* sp. nov., *Borboresthes doncunensis* sp. nov. and *Borboresthes fokienensis* Pic, 1922. *Borboresthes arctia* sp. nov. distinctly differs from similar species *B. doncunensis* and *B. fokienensis* mainly by the space between eyes, which is relatively wide (OI in male approximately 40), distinctly wider than diameter of one eye and by the dorsal surface of head in the middle between eyes impunctate; while *B. doncunensis* and *B. fokienensis* have the space between eyes narrow (OI in male 32-35) and dorsal surface between eyes is regularly punctate. *B. arctia* is clearly different from similar species *B. aglia* and *B. catocala* mainly by its dorsal surface of head in the middle between eyes, which is impunctate, by larger punctures in rows of elytral striae than those in *B. aglia* and *B. catocala*, which have the dorsal surface between eyes regularly punctate.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the Garden tiger moth *Arctia caja* (Linnaeus, 1758).

**Distribution.** China (Zhejiang).

***Borboresthes catocala* sp. nov.**

(Figs. 9-12)

**Type locality.** China, south of Guizhou province, Yaogu env., 25°20'N 107°56' E, 800-900 m.

**Type material.** Holotype (♂): wl [pb]: China, S Guizhou, 13.VI. / YAOGU env., 800-900m / 25°20'N 107°56'E / Jaroslav Turna leg., 2011, (VNPC). The type is provided with a printed red label: 'Borboresthes / catocala sp. nov. / HOLOTYPE / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 9, body relatively large, elongate oval, slightly convex, dorsal surface from yellow to dark reddish brown, with punctuation, microgranulation and ochre yellow setation, BL 8.41 mm. Widest near half elytra length; BL/EW 2.77.

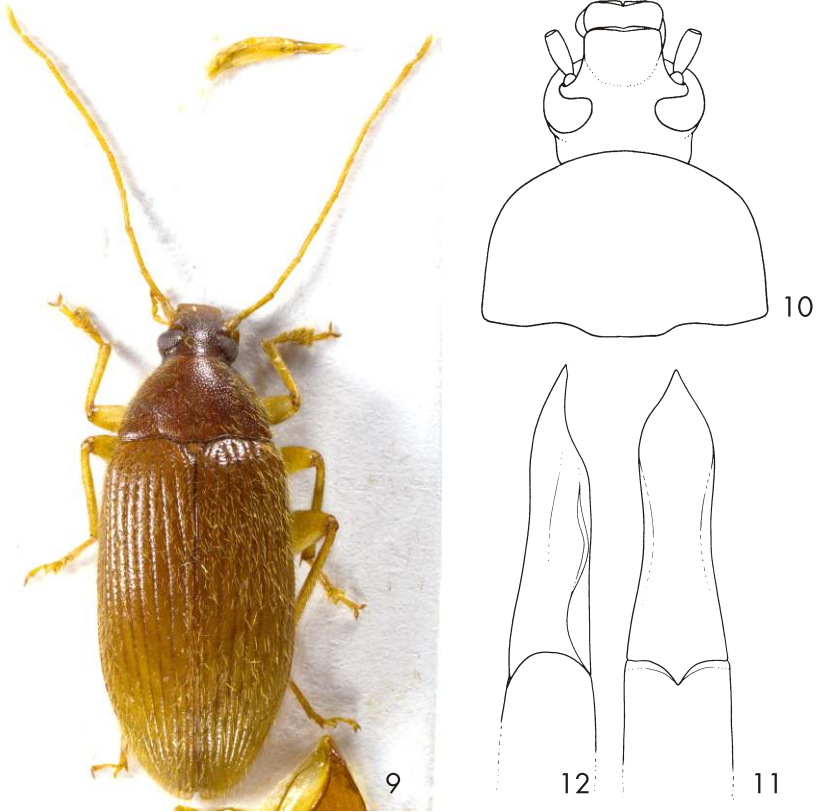
Head (Fig. 10) relatively small, slightly longer than wide, with microgranulation, medium sized punctuation and sparse, long, pale setation. Posterior part reddish brown, with coarse punctures, slightly shiny. Anterior part in basal half dark reddish brown, in apical half pale reddish brown, punctures distinctly shallower than those in posterior part. Clypeus pale brown with long, pale setation, microgranulation and very small and shallow punctures, apex straight. HW 1.28 mm; HW/PW 0.55. HL (visible part) 1.35 mm. Eyes large, transverse, excised, space between eyes distinctly wider than diameter of one eye, approximately as wide as antennomere 3 long; OI equal to 40.00.

Antennae. Long (AL 5.65 mm, reaching two thirds body length AL/BL 0.67), filiform, unicolored ochre yellow, with fine microgranulation, shallow punctures and relatively long, dense ochre yellow setation. Antennomere 2 shortest, antennomere 4 longest, each of antennomeres 4-11 distinctly longer than antennomere 3.

RLA(1-11): 0.66 : 0.26 : 1.00 : 1.40 : 1.19 : 1.22 : 1.23 : 1.19 : 1.25 : 1.06 : 1.11.

RL/WA(1-11): 2.07 : 1.10 : 4.89 : 6.83 : 7.00 : 6.29 : 5.70 : 6.18 : 7.86 : 5.81 : 5.44.

Maxillary palpus ochre yellow with microgranulation and ochre yellow setation. Palpomeres 2 and 3, distinctly narrowest in base, slightly dilated anteriorly. Ultimate palpomere widely triangular, slightly darker than penultimate.



Figs. 9-12. *Borboresthes catocala* sp. nov. (male holotype): 9- Habitus; 10- head and pronotum; 11- aedeagus, dorsal view; 12- aedeagus, lateral view.

Pronotum (Fig. 10). Reddish brown, almost semicircular, with long and relatively dense, semierect, ochre yellow setation, dense punctuation, punctures larger than those in head, interspaces between punctures very narrow with distinct microgranulation between punctures, shiny. Border lines distinct and complete. Anterior margin arcuate, lateral margins straight in basal part, rounded in apical part, posterior margin bisinuate, anterior angles indistinct, posterior angles finely obtuse. PL 1.43 mm; PW 2.34 mm; PI equal to 61.11.

Ventral side of body reddish brown. Meso- and metathorax with large punctures distinctly larger than punctures in prothorax. Abdomen pale brown, ultimate ventrite ochre yellow, distinctly paler than ventrites 1-4, with very fine microgranulation, very small, shallow punctures and a few pale setae.

Elytron pale reddish brown, elongate oval, convex, dorsal surface with ochre yellow, long and



dense, semierect setation, rather matte. Elytral striae with distinct rows of small punctures, elytral interspaces slightly convex, with microgranulation and very small and sparse punctures. EL 5.63 mm. Widest near half elytra length, EW 3.04 mm. EL/EW 1.85.

Scutellum. Pale reddish brown as elytron itself, with darker sides, slightly pentagonal, dorsal surface slightly convex with microgranulation, small punctures and a few setae.

Elytral epipleura well-developed, pale reddish brown with pale setae and punctures, regularly narrowing to ventrite 1 in basal half, then leads parallel.

Legs unicolored yellow, with dense and long, ochre yellow setation, microgranulation and very small punctures. Tibiae slightly dilated anteriorly, femora stronger. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.55 : 0.74 : 0.83 : 1.74 (protarsus); 1.00 : 0.30 : 0.37 : 0.38 : 0.68 (mesotarsus); 1.00 : 0.27 : 0.21 : 0.38 (metatarsus).

Both anterior tarsal claws with 12 visible teeth.

Aedeagus (Figs. 11, 12). Ochre yellow, robust, slightly shiny. Basal piece rounded laterally. Apical piece large, beak-shaped dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 2.13.

**Differential diagnosis.** Similar species are *Borboresthes aglia* sp. nov., *Borboresthes arctia* sp. nov., *Borboresthes doncunensis* sp. nov. and *Borboresthes fokienensis* Pic, 1922.

*Borboresthes catocala* sp. nov. distinctly differs from the similar species *B. doncunensis* and *B. fokienensis* mainly by the space between eyes, which is relatively wide (OI in male 40), distinctly wider than diameter of one eye and by the shape of aedeagus (as in Figs. 11 and 12); while *B. doncunensis* and *B. fokienensis* have the space between eyes narrow (OI in male 32-35) and aedeagi as in Figs. 15, 16 respectively 20, 21.

*B. catocala* is clearly different from the similar species *B. aglia* and *B. arctia* mainly by its pronotum without distinct microgranulation and by the setation of the dorsal surface of pronotum relatively dense; while *B. aglia* and *B. arctia* have the dorsal surface of pronotum with sparse setation and distinct microgranulation.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the Blue underwing *Catocala fraxini* (Linnaeus, 1758).

**Distribution.** China (Guizhou).

### ***Borboresthes doncunensis* sp. nov.**

(Figs. 13-16)

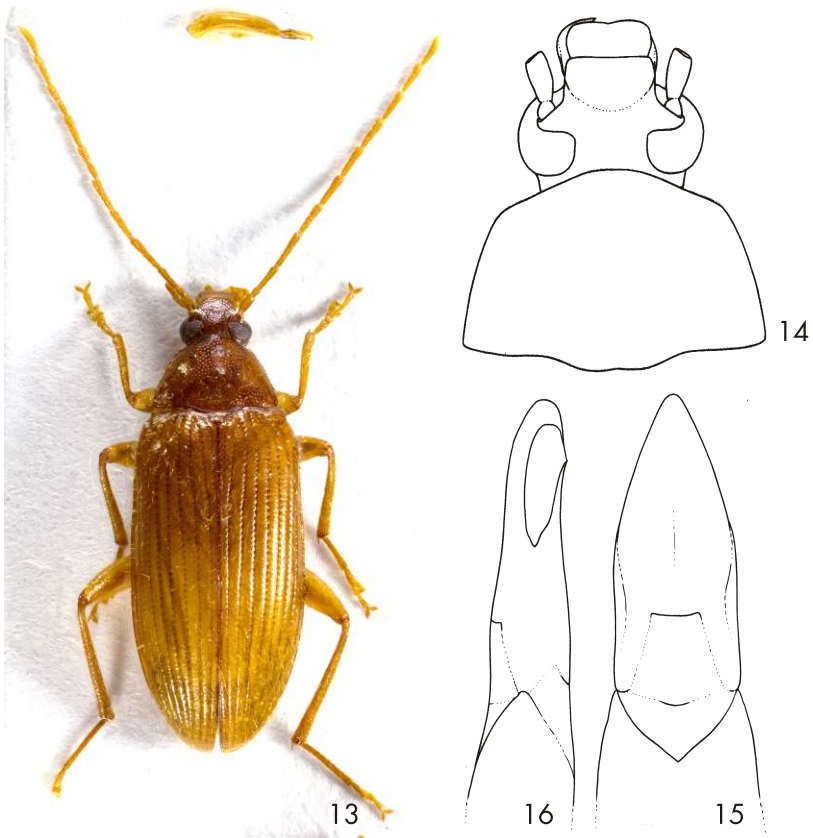
**Type locality.** China, west of Hubei province, Doncun, 31°0'N, 110°95'E.

**Type material.** Holotype (♂): wl [pb]: China, W Hubei, 5.+8.VI / ~ 3 km S DUNCUN / 31.0N 110.95E / Jaroslav Turna leg., 2005, (VNPC). Paratypes: (2 ♀♀): same data as holotype, (VNPC). The types are provided with a printed red label: 'Borboresthes / doncunensis sp. nov. / HOLOTYPUS [or PARATYPUS] / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 13, body relatively narrow, elongate, slightly oval, slightly convex, dorsal surface from ochre yellow to reddish brown, with punctuation, microgranulation and ochre yellow setation, BL 8.11 mm. Widest near half elytra length; BL/EW 2.84.

Head (Fig. 14) relatively small, approximately as wide as long, with microgranulation, very sparse and short ochre yellow setae and relatively dense punctuation, punctures medium sized.

Posterior part reddish brown, shiny, microgranulation very fine, but distinct. Anterior part slightly paler than posterior part, pale reddish brown, with distinct microgranulation. Clypeus pale brown with sparse, very small and shallow punctures, ochre yellow setae distinctly denser and longer than in head and distinct microgranulation and microrugosities, apex straight. HW 1.20 mm; HW/PW 0.58. HL (visible part) 1.15 mm. Eyes large, transverse, excised, space between eyes approximately as wide as diameter of one eye, slightly wider than length of antennomere 1 and slightly narrower than length of antennomere 3; OI equal to 32.49.



Figs. 13-16. *Borboresthes doncunensis* sp. nov. (male holotype): 13- Habitus; 14- head and pronotum; 15- aedeagus, dorsal view; 16- aedeagus, lateral view.

Antennae. Long (AL 5.73 mm, distinctly exceeding half body length AL/BL 0.71), filiform, unicolored ochre yellow, with fine microgranulation, shallow punctures and relatively long, dense ochre yellow setation. Antennomeres 1-3 slightly shiny with a few punctures, antennomeres 4-11 rather matte, punctuation denser. Antennomere 2 shortest, antennomere 4 longest, each of antennomeres 4-11 distinctly longer than antennomere 3.

RLA(1-11): 0.83 : 0.39 : 1.00 : 1.63 : 1.35 : 1.37 : 1.38 : 1.34 : 1.34 : 1.24 : 1.35.

RL/WA(1-11): 2.81 : 1.40 : 3.94 : 5.52 : 4.80 : 4.85 : 4.90 : 4.75 : 4.52 : 4.40 : 5.33.

Maxillary palpus ochre yellow, rather matte, with short, ochre yellow setae and fine

microgranulation. Ultimate palpomere widely triangular, palpomeres 2 and 3 distinctly dilated anteriorly.

Pronotum (Fig. 14). Reddish brown, transverse, with long and relatively sparse, semierect, ochre yellow setae, dense punctuation, punctures large, distinctly larger than those in head, interspaces between punctures narrow, shiny. Border lines distinct and complete. Lateral margins straight, anterior margin arcuate, posterior margin bisinuate, anterior angles distinctly obtuse, posterior angles rectangular. PL 1.26 mm; PW 2.07 mm; PI equal to 60.87.

Ventral side of body reddish brown with relatively sparse and short pale setation. Punctuation of meso- and metathorax distinctly larger than those in prothorax. Abdomen pale reddish brown, with very sparse and short pale setae, very small and shallow punctures, fine microgranulation, shiny.

Elytron pale reddish brown, with suture narrowly darker - reddish brown. Dorsal surface with ochre yellow, long, semierect setation, slightly shiny. Elytral striae with distinct rows of small sized punctures, elytral interspaces slightly convex, with microgranulation and very small and shallow punctures. EL 5.70 mm; widest near half elytra length, EW 2.86 mm. EL/EW 1.99.

Scutellum. Pale reddish brown, triangular with microgranulation.

Elytral epipleura well-developed, pale reddish brown as elytron itself, with pale setae and punctures, regularly narrowing to metasternum in basal half, then relatively wide, leading parallel.

Legs ochre yellow, long and narrow, with relatively dense and long, ochre yellow setation, very small punctures and microgranulation. Tibiae slightly dilated anteriorly, femora stronger. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.43 : 0.51 : 0.69 : 1.69 (protarsus); 1.00 : 0.30 : 0.23 : 0.30 : 0.70 (mesotarsus); 1.00 : 0.28 : 0.27 : 0.46 (metatarsus).

Both anterior tarsal claws with 12 or 13 visible teeth.

Aedeagus (Figs. 15, 16). Ochre yellow, partly pale brown, strong and robust, shiny. Basal piece slightly arcuate laterally and slightly narrowing dorsally. Apical piece parallel in basal part then triangular in apical part dorsally and beak-shaped laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 2.72

**Female** without distinct differences, only space between eyes broader than in male and both anterior tarsal claws with 7 visible teeth.

**Variability.** The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Females (n=2). BL 8.25 mm (8.05-8.45 mm); HL 1.12 mm (1.11-1.12 mm); HW 1.25 mm (1.17-1.32 mm); OI 41.59 (39.47-43.70); PL 1.27 mm (1.17-1.37 mm); PW 2.25 mm (2.19-2.31 mm); PI 56.52 (53.43-59.31); EL 5.86 mm (5.77-5.95 mm); EW 3.05 mm (2.92-3.18 mm).

**Differential diagnosis.** Similar species are *Borboesthes aglia* sp. nov., *Borboesthes arctia* sp. nov., *Borboesthes catocala* sp. nov. and *Borboesthes fokienensis* Pic, 1922.

*Borboesthes doncunensis* sp. nov. distinctly differs from the similar species *B. aglia*, *B. arctia* and *B. catocala* mainly by its narrow space between eyes (OI in male 32.5), which is in male approximately as broad as diameter of one eye and by aedeagus shape (as in Figs. 15 and 16); while *B. aglia*, *B. arctia* and *B. catocala* have the space between eyes distinctly broader than diameter of one eye (OI in males 40-45).

*B. doncunensis* clearly differs from similar species *B. fokienensis* mainly by each of antennomeres

5-11 1.24-1.38 times longer than antennomere 3, by aedeagus shape (Fig. 15 and 16) and by anterior tarsal claws of male with 12 and 13 teeth; while *B. fokiensis* has each of antennomeres 5-11 only 1.05-1.15 times longer than antennomere 3, aedeagus as in Figs. 20 and 21 and anterior tarsal claws of male have 20 teeth.

**Etymology.** Named after the type locality - Doncun in Hubei province (China).

**Distribution.** China (Hubei).

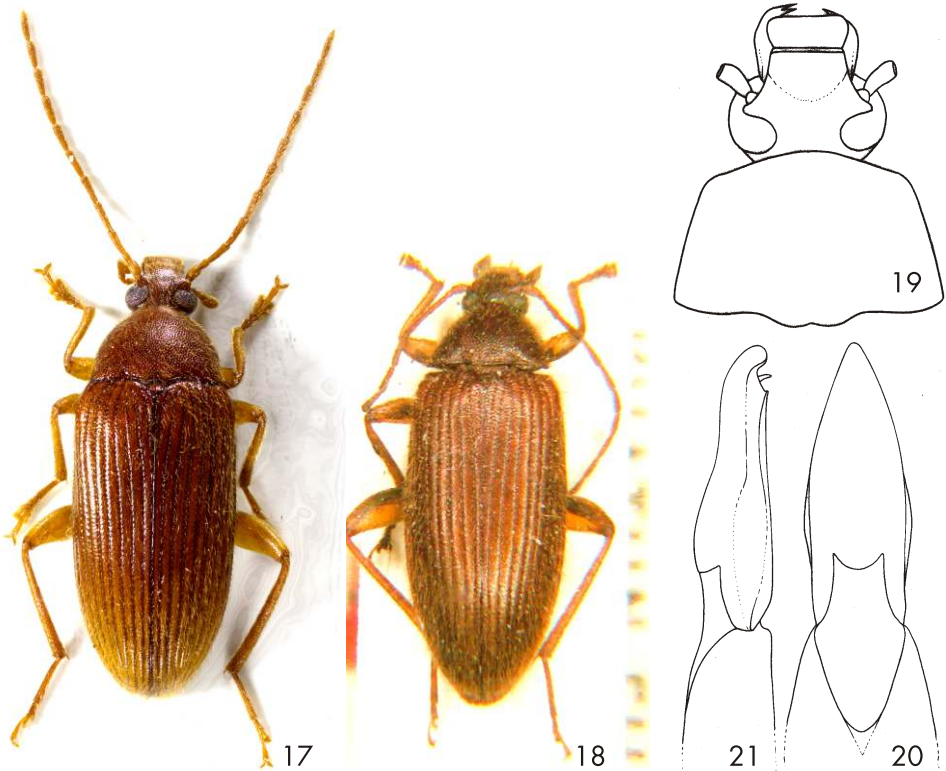
***Borboresthes fokiensis* Pic, 1922**  
(Figs. 17-21)

*Borboresthes fokiensis* Pic, 1922: 24.

**Type locality.** China (Fujian).

**Type material.** Syntype: wl: KUATUN, FUKIEN / China, 15. 7.46 / leg. Tschung - Sen [pb] // wl with rf: Paratypus [pb] / *Borboresthes / fokiensis / Pic* [hb] // rl: Paratype [pb] / *Borboresthes / fokiensis / det. Pic* [pb], (HNHM).

**Material examined.** (1 ♂): wl [pb]: China, E Fujian, 1.-2.V. / SHINIUSHAN, 1350m / 25°38'N, 118°30'E / Jaroslav Turna leg., 2010, (VNPC).



Figs. 17-21. *Borboresthes fokiensis* Pic, 1922: 17- Habitus of male; 18- habitus of syntype; 19- head and pronotum of male; 20- aedeagus, dorsal view; 21- aedeagus, lateral view.

**Measurement of male body.** BL 8.45 mm; HL 0.93 mm; HW 1.29 mm; OI 34.98; PL 1.20 mm; PW 2.24 mm; PI 53.57; EL 6.32 mm; EW 3.03 mm; AL(1-11) 5.96 mm; AL(1-11)/BL 0.71; HW/PW 0.58; BL/EW 2.79; EL/EW 2.09; AED 1: 3.24.  
 RLA(1-11): 0.69 : 0.27 : 1.00 : 1.43 : 1.15 : 1.08 : 1.11 : 1.13 : 1.05 : 1.07 : 1.15.  
 RL/WA(1-11): 2.06 : 1.29 : 4.86 : 7.44 : 5.65 : 4.67 : 4.96 : 4.15 : 4.27 : 4.00 : 4.83.  
 RLT: 1.00 : 0.50 : 0.63 : 0.76 : 1.60 (protarsus); 1.00 : 0.31 : 0.28 : 0.29 : 0.87 (mesotarsus); 1.00 : 0.25 : 0.28 : 0.49 (metatarsus).

**Remark.** Body relatively large, slightly convex, elongate oval, dorsal surface pale reddish brown with punctuation, ochre yellow setation and microgranulation, legs, antennae and maxillary palpus ochre yellow. Antennae long and narrow, slightly exceeding two thirds body length. Antennomeres 4-11 distinctly longer than antennomere 3. Habitus of male body as in Fig. 17, habitus of syntype (Fig. 18), head and pronotum as in Fig. 19, lateral margins straight, no arcuate, aedeagus as in Figs. 20 and 21. Anterior tarsal claws of male with 20 teeth, anterior tarsal claws of female with 9 teeth.

**Distribution.** China (Fujian).

### *hainanensis* species group

#### *Borboresthes hainanensis* sp. nov.

(Figs. 22-25)

**Type locality.** China, Hainan island, Minfeng Valley, Jianfeng Township, Ledong Li Autonomous County, 18°44'38.98"N, 108°50'39.29"E, 950 m.

**Type material.** Holotype (♂): wl [pb]: CHINA, Hainan Island / Minfeng Valley / Jianfeng Township / Ledong Li Autonomous County / 12. VI. 2018, 950m / 18°44'38.98"N, 108°50'39.29"E / P. Viktora lgt., (VNPC). Paratypes: (4 ♂♂, 1 ♀): same data as holotype, (VNPC); (1 ♂, 1 ♀): CHINA, Hainan isl. / Tian Chi Resort, 12. VI. 2018, 950 m / 18°44'38.98"N, 108°50'39.29"E / leg. P. Kabátek, (VNPC). The types are provided with a printed red label: 'Borboresthes / hainanensis sp. nov. / HOLOTYPUS [or PARATYPUS] / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 22, body large, elongate oval, slightly convex, dorsal surface from ochre yellow to reddish brown, with punctuation, microgranulation and ochre yellow setation, BL 9.63 mm. Widest near half elytra length; BL/EW 2.98.

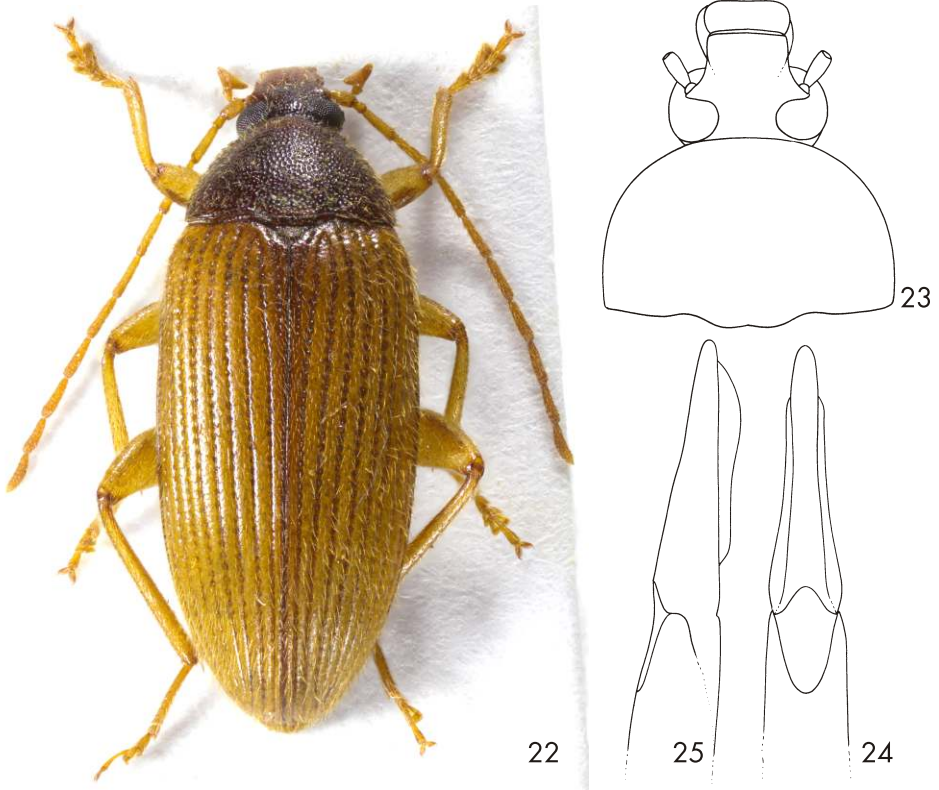
Head (Fig. 23) relatively small, approximately as wide as long, with microgranulation and punctuation, punctures small sized. Posterior part reddish brown, with sparse, ochre yellow setation, shiny. Anterior part pale brown with denser and longer ochre yellow setation than those in posterior half. Clypeus pale brown with dense pale setation, microgranulation and very small and shallow punctures, apex straight. HW 1.36 mm; HW/PW 0.52. HL (visible part) 1.34 mm. Eyes large, transverse, slightly excised, space between eyes slightly wider than diameter of one eye, as wide as antennomere 3 long; OI equal to 34.60.

Antennae. Long (AL 5.82 mm, slightly exceeding half body length AL/BL 0.60), filiform, unicolored ochre yellow, with fine microgranulation, shallow punctures and relatively long, dense ochre yellow setation. Antennomere 2 shortest, antennomere 4 longest, antennomeres 4-11 distinctly longer than antennomere 3.

RLA(1-11): 0.78 : 0.31 : 1.00 : 1.51 : 1.15 : 1.17 : 1.17 : 1.15 : 1.10 : 1.01 : 1.09.

RL/WA(1-11): 2.22 : 1.27 : 4.14 : 6.52 : 5.53 : 5.58 : 5.89 : 5.25 : 4.79 : 4.38 : 4.50.

Maxillary palpus. Ochre yellow with microgranulation and ochre yellow setation. Ultimate palpomere widely triangular. Palpomeres 2 and 3 distinctly narrowest at base, slightly dilated anteriorly.



Figs. 22-25. *Borboresthes hainanensis* sp. nov.: 22- Habitus of male holotype; 23- head and pronotum of male holotype; 24- aedeagus, dorsal view; 25- aedeagus, lateral view.

Pronotum (Fig. 23). Reddish brown, almost semicircular, with long and relatively dense, semierect, ochre yellow setation, dense punctuation, punctures larger than those on head, interspaces between punctures very narrow with distinct microgranulation between punctures, shiny. Border lines distinct and complete, only in the middle of anterior margin not clearly conspicuous. Anterior margin slightly and lateral margins distinctly arcuate, posterior margin bisinuate, anterior angles indistinct, posterior angles roundly rectangular. PL 1.60 mm; PW 2.91 mm; PI equal to 54.98.

Ventral side of body dark reddish brown with sparse and short pale setation and dense punctuation. Abdomen pale reddish brown, with pale setation.

Elytron pale brown, with suture narrowly darker - reddish brown. Dorsal surface with ochre yellow, long and dense, semierect setation, rather matte. Elytral striae with distinct rows of small sized punctures, elytral interspaces slightly convex, with microgranulation and very small and sparse punctures. EL 6.69 mm. Widest near half elytra length, EW 3.23 mm. EL/EW 2.06.

Scutellum. Reddish brown, darker than elytron, triangular with microgranulation, small

punctures and a few setae.

Elytral epipleura well-developed, pale brown with pale setae and punctures, regularly narrowing to ventrite 1 in basal half, then leads parallel.

Legs unicolored ochre yellow, with dense and long, ochre yellow setation, microgranulation and very small punctures. Tibiae slightly dilated anteriorly. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.61 : 0.73 : 0.74 : 1.76 (protarsus); 1.00 : 0.28 : 0.26 : 0.21 : 0.57 (mesotarsus); 1.00 : 0.31 : 0.25 : 0.44 (metatarsus).

Both anterior tarsal claws with 11 visible teeth.

Aedeagus (Figs. 24, 25). Slightly shiny. Ochre yellow basal piece arcuate laterally and distinctly narrowing dorsally. Apical piece narrow, elongate triangular, beak-shaped dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 2.87.

**Female** without distinct differences, only both anterior tarsal claws with 8 visible teeth.

**Variability.** The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Males (n=6). BL 9.10 mm (8.67-9.69 mm); HL 1.26 mm (1.20-1.34 mm); HW 1.29 mm (1.24-1.36 mm); OI 33.77 (29.53-37.60); PL 1.38 mm (1.28-1.60 mm); PW 2.56 mm (2.34-2.91 mm); PI 53.67 (50.38-54.98); EL 6.47 mm (6.15-6.69 mm); EW 3.13 mm (2.97-3.23 mm). Females (n=2). BL 9.20 mm (8.95-9.45 mm); HL 1.25 mm (1.25-1.25 mm); HW 1.32 mm (1.24-1.40 mm); OI 34.61 (34.03-35.19); PL 1.38 mm (1.34-1.41 mm); PW 2.57 mm (2.46-2.78 mm); PI 52.60 (50.72-54.47); EL 6.58 mm (6.36-6.79 mm); EW 3.18 mm (3.07-3.28 mm).

**Differential diagnosis.** Similar species are *Borboresthes hemaris* sp. nov. and *Borboresthes hyles* sp. nov.

*Borboresthes hainanensis* sp. nov. distinctly differs from the similar species *B. hemaris* and *B. hyles* mainly by its body more flat and elongate (BL/EW 2.98) and by the aedeagus shape (Figs. 24 and 25), while *B. hemaris* and *B. hyles* have the bodies more oval and convex, egg-shaped (BL/EW 2.67 resp. 2.51) and aedeagi as in Figs. 28, 29 respectively 32 and 33.

**Etymology.** Named after the type locality - Island Hainan (China).

**Distribution.** China (Island Hainan).

### ***Borboresthes hemaris* sp. nov.**

(Figs. 26-29)

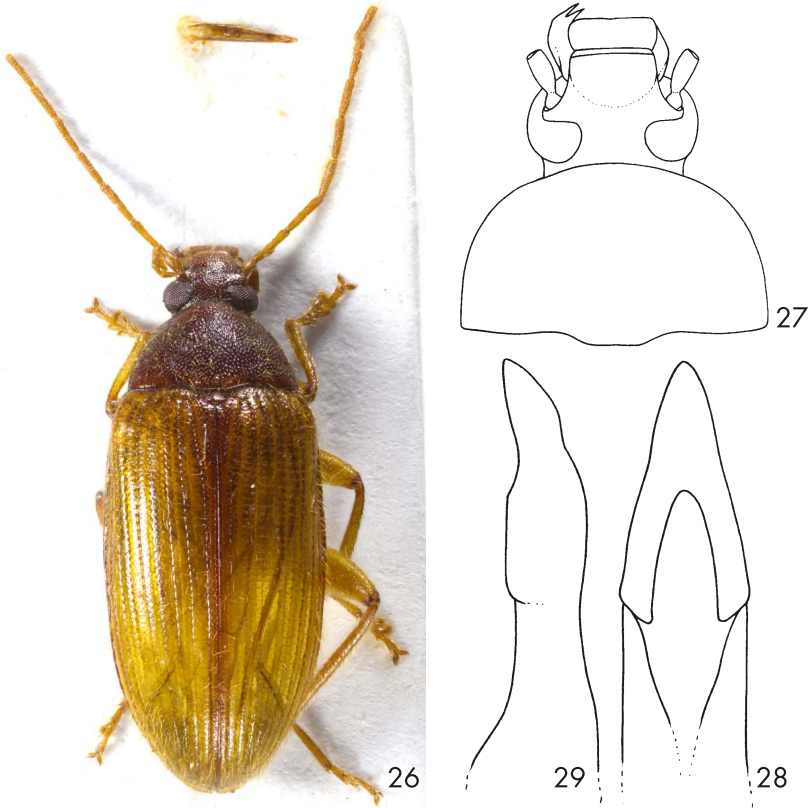
**Type locality.** China, north west of Guangdong province, Dachou Ding, 24°16-17'N, 112°24'E, 680-850 m.

**Type material.** Holotype (♂): wl [pb]: China, NW Guangdong prov. / DACHOU DING 680-850m / 24°16-17'N 112°24'E / Jatua leg., 30.VI.-1.VII.2015, (VNPC). Paratype: wl [pb]: (1 ♀): same data as holotype, (VNPC). The types are provided with a printed red label: "*Borboresthes* / *hemaris* sp. nov. / HOLOTYPE [or PARATYPE] / V. Novák det. 2018".

**Description of holotype.** Habitus as in Fig. 26, body large, elongate oval, convex, dorsal surface from ochre yellow to reddish brown, with punctuation, microgranulation and ochre yellow setation, BL 8.87 mm. Widest near half elytra length; BL/EW 2.67.

Head (Fig. 27) relatively small, approximately as wide as long, with microgranulation, sparse and long ochre yellow setation and punctuation, punctures small sized. Posterior part reddish

brown, with coarser punctures than those in pale reddish brown anterior part. Clypeus pale reddish brown with pale setation, very small and shallow punctures and microgranulation, apex straight. HW 1.45 mm; HW/PW 0.57. HL (visible part) 1.37 mm. Eyes large, transverse, excised, space between eyes as wide as diameter of one eye, approximately as wide as antennomere 3 long; OI equal to 33.36.



Figs. 26-29. *Borboresthes hemaris* sp. nov. (male holotype): 26-Habitus; 27-head and pronotum; 28-aedeagus, dorsal view; 29-aedeagus, lateral view.

Antennae. Long (AL(1-8) 3.61 mm, AL(1-8)/BL 0.41; complete antenna probably exceeding two thirds body length), filiform, unicolored ochre yellow, with fine microgranulation, shallow punctures and relatively long, dense ochre yellow setation. Antennomere 2 shortest, antennomere 4 longest, antennomeres 4-8 distinctly longer than antennomere 3.

RLA(1-8): 0.75 : 0.39 : 1.00 : 1.55 : 1.26 : 1.27 : 1.22 : 1.31.

RL/WA(1-8): 2.75 : 1.36 : 3.83 : 5.67 : 5.05 : 5.33 : 4.28 : 5.48.

Maxillary palpus. Ochre yellow with microgranulation and ochre yellow setation. Ultimate palpomere widely triangular. Palpomeres 2 and 3 distinctly narrowest in base, slightly dilated anteriorly.

Pronotum (Fig. 27). Reddish brown, semicircular, with long and relatively dense, semierect, ochre yellow setation, dense punctuation, punctures larger than those in head, interspaces



between punctures very narrow, microgranulation between punctures not clearly distinct. Border lines distinct and complete, only in the middle of anterior margin not clearly conspicuous. Anterior and lateral margins distinctly arcuate, posterior margin bisinuate, anterior angles indistinct, posterior angles rectangular. PL 1.40 mm; PW 2.53 mm; PI equal to 55.34.

Ventral side of body dark reddish brown with sparse and short pale setation and punctuation. Abdomen reddish brown, with very small and shallow punctures, fine microgranulation, fine microrugosities and sparse, pale setation. Apex of ultimate ventrite pale brown.

Elytron pale reddish brown, with suture narrowly darker - reddish brown. Dorsal surface with ochre yellow, long and dense, semierect setation, distinctly denser near lateral margins and in apex. Elytral striae with distinct rows of punctures distinctly smaller than those in pronotum, elytral interspaces very slightly convex, with microgranulation and very small and sparse punctures. EL 6.10 mm. Widest near half elytra length, EW 3.31 mm. EL/EW 1.84.

Scutellum. Pale reddish brown, slightly darker than elytron itself, rounded, almost semicircular, with small shallow punctures and fine microgranulation, shiny.

Elytral epipleura well-developed, pale brown with pale setae and punctures, regularly narrowing to ventrite 1 in basal half, then leads parallel.

Legs ochre yellow, with dense and long, ochre yellow setation, microgranulation and very small punctures. Tibiae slightly dilated anteriorly, femora strong. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.62 : 0.74 : 1.12 : 2.6 (protarsus); 1.00 : 0.36 : 0.39 : 0.48 : 0.73 (mesotarsus); 1.00 : 0.37 : 0.20 : 0.51 (metatarsus).

Both anterior tarsal claws with 10 visible teeth.

Aedeagus (Figs. 28, 29). Pale brown, slightly shiny. Basal piece slightly narrowing dorsally. Apical piece triangular dorsally and beak-shaped dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 4.33.

**Female** without distinct differences, only both anterior tarsal claws with 8 visible teeth. BL 8.96 mm; HL 1.35 mm; HW 1.43 mm; OI 34.55; PL 1.33 mm; PW 2.53 mm; PI 52.57; EL 6.28 mm; EW 3.39 mm.

**Differential diagnosis.** Similar species are *Borboresthes hainanensis* sp. nov. and *Borboresthes hyles* sp. nov.

*Borboresthes hemaris* sp. nov. distinctly differs from similar species *B. hainanensis* mainly by oval, convex, egg-shaped body (BL/EW 2.67), by shape of aedeagus (Figs. 28 and 29); while *B. hainanensis* has body more flat and elongate (BL/EW 2.98) and aedeagus is in Figs. 24 and 25.

*Borboresthes hemaris* sp. nov. is distinctly different from similar species *B. hyles* mainly by narrow space between eyes, approximately as wide as diameter of one eye (OI in male 33), by each of antennomeres 5-8 more than 1.2 times longer than antennomere 3 and by shape of aedeagus (Figs. 28 and 29); while *B. hyles* has space between eyes broad (OI in males 37-40), distinctly broader than diameter of one eye, antennomeres 5-8 0.94-1.08 times longer than antennomere 3 and shape of aedeagus is in Figs. 32 and 33.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the Broad-bordered bee hawk-moth *Hemaris fuciformis* (Linnaeus, 1758).

**Distribution.** China (Guangdong).

***Borboresthes hyles* sp. nov.**

(Figs. 30-33)

**Type locality.** China, north west of Guangdong province, Dachou Ding, 24°16-17'N, 112°24'E, 680-850 m.

**Type material.** Holotype (♂): wl [pb]: China, NW Guangdong prov. / DACHOU DING 680-850m / 24°16-17'N 112°24'E / Jatua leg., 30.VI.-1.VII.2015, (VNPC). Paratypes: (3 ♂♂, 3 ♀♀): same data as holotype, (VNPC). The types are provided with a printed red label: '*Borboresthes* / *hyles* sp. nov. / HOLOTYPE [or PARATYPE] / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 30, body large, elongate oval, convex, egg-shaped, dorsal surface from ochre yellow to dark reddish brown, with punctuation, microgranulation and ochre yellow setation, BL 10.05 mm. Widest near half elytra length; BL/EW 2.51.

Head (Fig. 31) relatively small, slightly longer than wide, with a few pale setae, microgranulation and punctuation, punctures small, slightly shiny. Posterior part dark reddish brown, with coarser punctures than those in anterior half. Anterior part reddish brown with dark blackish brown transverse, narrow rounded strip in base. Clypeus pale reddish brown with long pale setation, microgranulation and very small and shallow punctures, apex very finely excised in middle. HW 1.52 mm; HW/PW 0.49. HL (visible part) 1.59 mm. Eyes large, transverse, excised, space between eyes slightly wider than diameter of one eye, and slightly narrower than antennomere 3 long; OI equal to 37.16.

Antennae. Long (AL 6.39 mm, distinctly exceeding half body length AL/BL 0.64, reaching almost two thirds), narrow, filiform, unicolored ochre yellow, with fine microgranulation, shallow, very small and sparse punctures and long, ochre yellow setation. Antennomere 2 shortest, antennomere 4 longest.

RLA(1-11): 0.66 : 0.27 : 1.00 : 1.36 : 1.07 : 1.01 : 1.01 : 0.92 : 0.87 : 0.83 : 0.97.

RL/WA(1-11): 1.97 : 1.52 : 4.83 : 6.73 : 5.06 : 5.95 : 5.30 : 4.74 : 5.14 : 4.52 : 4.48.

Maxillary palpus pale brown with microgranulation and ochre yellow setation. Ultimate palpomere widely triangular. Palpomeres 2 and 3 distinctly narrowest in base, slightly dilated anteriorly.

Pronotum (Fig. 31). Dark reddish brown, almost semicircular, with sparse, long, pale setae, dense punctuation, punctures larger than those in head, interspaces between punctures very narrow, microgranulation between punctures indistinct. Border lines distinct and complete. Lateral margins in basal half straight. Lateral margins in apical part and anterior margin arcuate, posterior margin bisinuate, anterior angles indistinct, posterior angles rectangular. PL 1.68 mm; PW 3.08 mm; PI equal to 54.55.

Ventral side of body dark reddish brown with sparse and short pale setae and punctuation. Abdomen reddish brown with very fine microgranulation, very small and shallow punctuation, ultimate ventrite distinctly paler than ventrites 1-4. Ventrites 1-3 with dense, long, ochre yellow setation in middle.

Elytron oval, convex, slightly shiny, pale reddish brown or reddish brown, with suture narrowly darker - brown. Dorsal surface with ochre yellow, long and dense, semierect setation in middle of basal half distinctly sparser than near sides and in apical half. Elytral striae with distinct rows of small punctures, distinctly smaller than those in pronotum elytral interspaces slightly convex, with microgranulation and dense, small and shallow punctures. EL 6.78 mm. Widest near half elytra length; EW 4.00 mm. EL/EW 1.70.

Scutellum. Reddish brown, darker than elytron, roundly triangular, almost glabrous, shiny.

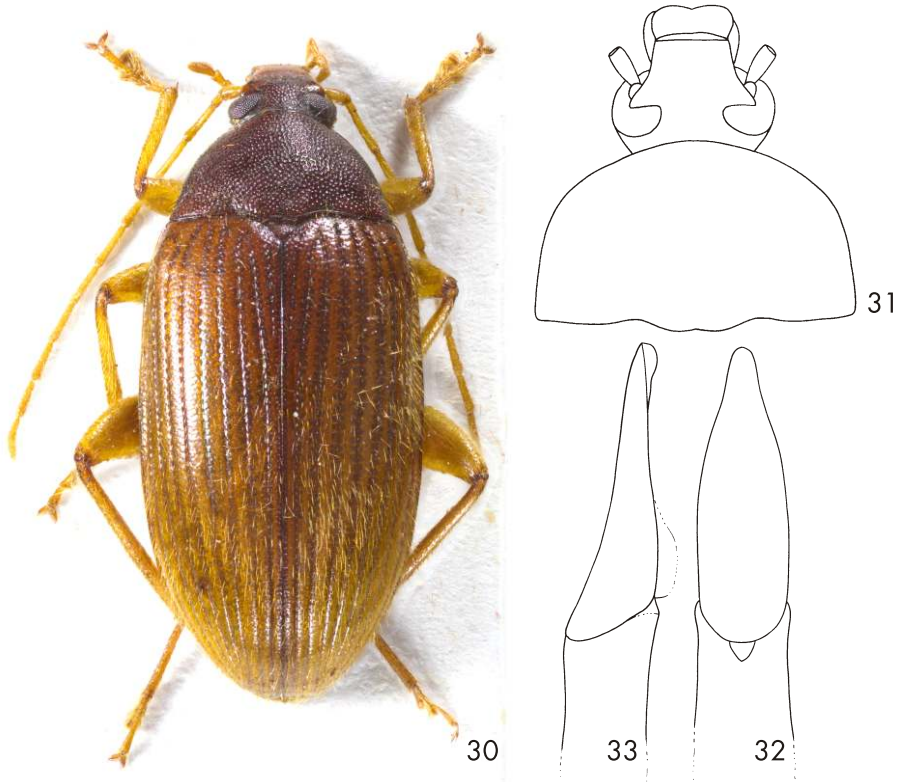
Elytral epipleura well-developed, wide, pale reddish brown with a few pale setae and punctures

in basal half, regularly narrowing to ventrite 1, then leads parallel pale brown, with denser and long, pale setation in apical part.

Legs ochre yellow, with dense and long, ochre yellow setation, microgranulation and very small punctures. Tibiae slightly dilated anteriorly. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.80 : 0.82 : 0.85 : 1.75 (protarsus); 1.00 : 0.36 : 0.31 : 0.42 : 0.81 (mesotarsus); 1.00 : 0.24 : 0.25 : 0.48 (metatarsus).

Both anterior tarsal claws with 11 visible teeth.

Aedeagus (Figs. 32, 33). Ochre yellow, slightly shiny. Basal piece almost straight laterally and slightly narrowing dorsally. Apical piece beak-shaped dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 3.62



Figs. 30-33. *Borboressthes hyles* sp. nov.: 30- Habitus of male holotype; 31- head and pronotum of male holotype; 32- aedeagus, dorsal view; 33- aedeagus, lateral view.

**Female** without distinct differences, only both anterior tarsal claws with 10 visible teeth.

**Variability.** The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Males (n=4). BL 9.92 mm (9.64-10.33 mm); HL 1.50 mm (1.45-1.59 mm); HW 1.49 mm (1.44-1.52 mm); OI 38.59 (37.14-40.95); PL 1.54 mm (1.47-1.68 mm); PW 3.04 mm (2.95-3.12 mm); PI 50.63 (47.76-54.55); EL 6.88 mm (6.66-7.34 mm); EW 3.94 mm (3.85-4.04 mm). Females (n=3). BL 10.00 mm (9.62-10.54 mm); HL 1.46 mm

(1.36-1.52 mm); HW 1.53 mm (1.44-1.57 mm); OI 39.97 (38.89-41.64); PL 1.61 mm (1.59-1.64 mm); PW 3.15 mm (3.05-3.20 mm); PI 51.18 (50.16-52.13); EL 6.94 mm (6.66-7.42 mm); EW 4.12 mm (3.93-4.33 mm).

**Differential diagnosis.** Similar species are *Borboresthes hainanensis* sp. nov. and *Borboresthes hemaris* sp. nov.

*Borboresthes hyles* sp. nov. distinctly differs from the similar species *B. hainanensis* mainly by its oval, convex, egg-shaped body (BL/EW 2.51) and by shape of the aedeagus (Figs. 32 and 33); while *B. hainanensis* has the body more flat and elongate (BL/EW 2.98) and the aedeagus as in Figs. 24 and 25.

*Borboresthes hyles* sp. nov. is distinctly different from similar species *B. hemaris* mainly by broad space between eyes, broader than diameter of one eye (OI in males 37-40), by each of antennomeres 5-8 0.94-1.08 times longer than antennomere 3 and by shape of aedeagus (Figs. 32 and 33); while *B. hyles* has space between eyes narrow (OI in male 33), approximately as broad as diameter of one eye, antennomeres 5-8 more than 1.2 times longer than antennomere 3 and shape of aedeagus is in Figs. 28 and 29.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the Spurge hawk moth *Hyles euphorbiae* (Linnaeus, 1758).

**Distribution.** China (Guangdong).

### *klapperichi* species group

### *Borboresthes klapperichi* Pic, 1955

(Figs. 34-38)

*Borboresthes klapperichi* Pic, 1955: 30.

**Type locality.** China, Fujian, Kuantun.

**Type material.** Syntype: wl: KUATUN, FUKIEN [pb] 27.7. [hb] 46 [pb] / (TSCHUNGSEN.) // wl with rf: Paratypus [pb] / *Borboresthes klapperichi* / Pic [hb] // rl: Paratype [pb] / *Borboresthes klapperichi* / det. Pic. [pb], (HNHM).

**Material examined.** (6 ♂♂, 6 ♀♀): wl [pb]: China, N Fujian, 1.-4.VI. / FENGSHUI GUAN / 27.9N, 117.85E, ~1700m / Jaroslav Turna leg., 2004, (VNPC); (1 ♂, 1 ♀): wl [pb]: China, S Shaanxi, 23.VI. / road Wanyuan – Zhenba, / 32.3N 108.0E, ~ / 1000m / Jaroslav Turna leg., 2000, (VNPC). (2 ♂♂, 1 ♀): wl [pb]: China, S Zhejiang, 31.V / CAOYUTANG, 1100-1300m / for.park, 27°55'N, 119°39'E / Jaroslav Turna leg., 2010, (VNPC).

**Measurements of male body.** BL 10.01 mm; HL 1.24 mm; HW 1.64 mm; OI 45.46; PL 1.87 mm; PW 3.41 mm; PI 54.84; EL 6.90 mm; EW 4.24 mm; AL(1-10) 4.95 mm; AL(1-10)/BL 0.50; HW/PW 0.48; BL/EW 2.36; EL/EW 1.63; AED 1: 6.93.

RLA(1-10): 0.63 : 0.29 : 1.00 : 1.24 : 0.97 : 1.00 : 0.90 : 0.89 : 0.84 : 0.90.

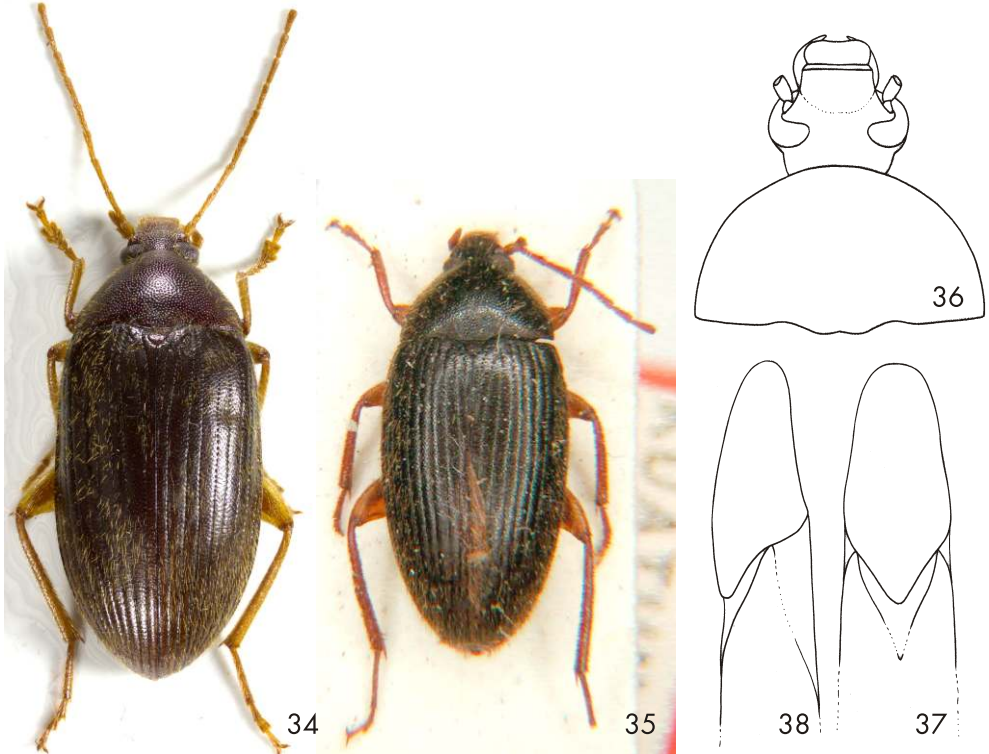
RL/WA(1-10): 2.00 : 1.23 : 4.18 : 4.96 : 3.42 : 4.18 : 3.32 : 3.73 : 3.35 : 3.95.

RLT: 1.00 : 0.60 : 0.68 : 0.77 : 1.42 (protarsus); 1.00 : 0.50 : 0.29 : 0.40 : 1.14 (mesotarsus); 1.00 : 0.32 : 0.31 : 0.69 (metatarsus).

**Remark.** Body relatively large, convex, egg-shaped, dorsal surface dark blackish brown with punctuation, ochre yellow setation and mirogranulation, legs, antennae and maxillary palpus ochre yellow. Habitus of male body as in Fig. 34, habitus of syntype (Fig. 35), head and pronotum

almost semicircular (Fig. 36), aedeagus with very short apical piece (as in Figs. 37 and 38). Anterior tarsal claws of male with 14 and 15 teeth, anterior tarsal claws of female with 9 teeth.

**Distribution.** China (Fujian, Taiwan). **New for Shaanxi and Zheijang.**



Figs. 34-38. *Borboresthes klapperichi* Pic, 1955: 34- Habitus of male; 35- habitus of syntype; 36- head and pronotum; 37- aedeagus, dorsal view; 38- aedeagus, lateral view.

***Borboresthes laothoe* sp. nov.**

(Figs. 39-42)

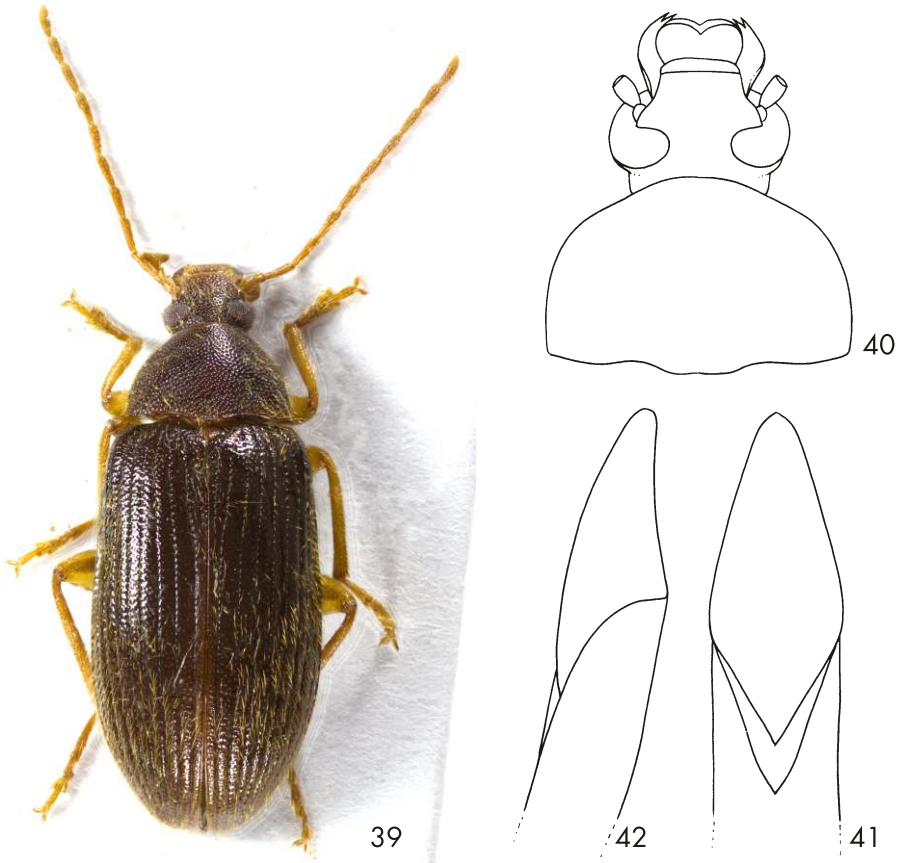
**Type locality.** China, east of Fujian province, Shiniushan, 25°38'N 118°30'E, 1350 m.

**Type material.** Holotype: (♂): wl [pb]: China, E Fujian, 1.-2.V. / SHINIUSHAN, 1350m / 25°38'N 118°30'E / Jaroslav Turna leg., 2008, [VNPC]. Paratypes: (5 ♂♂, 7 ♀♀): same data as holotype, (VNPC). The types are provided with a printed red label: '*Borboresthes* / *laothoe* sp. nov. / HOLOTYPUS [or PARATYPUS] / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 39, body large, oval, convex, dorsal surface from ochre yellow to dark brown, with punctuation and ochre yellow setation, BL 8.49 mm. Widest near half elytra length; BL/EW 2.72.

Head (Fig. 40) relatively small, approximately as wide as long, with punctuation, ochre yellow setation, punctures medium sized, shiny. Posterior part dark brown, with sparser setation and coarser punctuation than those in reddish brown anterior part with distinct microgranulation.

Clypeus pale reddish brown with dense and long, ochre yellow setation, microgranulation and very small, sparse and shallow punctures. HW 1.32 mm; HW/PW 0.55. HL (visible part) 1.31 mm. Eyes relatively large, transverse, distinctly excised, space between eyes distinctly wider than diameter of one eye, approximately as wide as antennomere 4 long; OI equal to 41.77.



Figs. 39-42. *Borboresthes laothoe* sp. nov.: 39- Habitus of male holotype; 40- head and pronotum of male holotype; 41- aedeagus, dorsal view; 42- aedeagus, lateral view.

Antennae. Long, filiform, slightly exceeding half body length (AL 4.75 mm, AL/BL 0.56), pale brown, with microgranulation and relatively long and dense, ochre yellow setation. Antennomere 2 shortest, antennomere 4 longest, antennomeres 5-11 slightly shorter than antennomere 3.

RLA(1-11): 0.63 : 0.38 : 1.00 : 1.05 : 0.98 : 0.97 : 0.90 : 0.91 : 0.90 : 0.94 : 0.98.

RL/WA(1-11): 2.04 : 1.74 : 4.40 : 5.26 : 4.78 : 5.00 : 3.44 : 3.81 : 3.59 : 3.65 : 3.22.

Maxillary palpus. Pale brown with ochre yellow setation, very fine microgranulation and very small, sparse punctures. Ultimate palpomere broadly triangular. Palpomer 2 and 3 distinctly narrowest in base, slightly dilated anteriorly.

Pronotum (Fig. 40). Dark reddish brown, almost semicircular, convex, with long, dense, semierect, ochre yellow setation near sides, setation on disc sparse, with dense punctuation,

punctures distinctly larger than those in head, interspaces between punctures very narrow, microgranulation indistinct, shiny. Border lines distinct and complete, only in the middle of anterior margin not clearly conspicuous. Anterior and lateral margins arcuate, posterior margin bisinuate, anterior angles indistinct, posterior angles obtuse angled. PL 1.40 mm; PW 2.39 mm; PI equal to 58.58.

Ventral side of body blackish brown with recumbent pale setation and relatively dense punctuation, punctures relatively large. Abdomen dark reddish brown, shiny, with pale setation, dense punctuation, punctures very small. Sides of ultimate and penultimate ventrites with microgranulation.

Elytron dark blackish brown, convex, shiny, with long, semierect, ochre yellow setation, dense near lateral margins, sparse on disc. Elytral striae with distinct rows of punctures slightly smaller than those in pronotum, elytral interspaces slightly convex, with very small punctures, shiny. EL 5.78 mm. Broadest near half elytra length, EW 3.05 mm; EL/EW 1.90.

Scutellum. Pale brown, widely, roundly triangularly shaped with small punctures and a few pale setae, shiny.

Elytral epipleura well-developed, blackish brown with pale setae and dense, relatively large punctuation, regularly narrowing to ventrite 1 in basal half, then distinctly paler, leading parallel.

Legs covered by dense and long, ochre yellow setation, with microgranulation and small punctures. Femora strong and yellow, shiny, tibia narrow, ochre yellow, slightly dilated anteriorly. Tarsi pale brown, pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.44 : 0.67 : 0.74 : 2.07 (protarsus); 1.00 : 0.40 : 0.43 : 0.53 : 0.84 (mesotarsus); 1.00 : 0.35 : 0.41 : 0.78 (metatarsus).

Both anterior tarsal claws with 11 and 12 visible teeth.

Aedeagus (Figs. 41, 42). Ochre yellow, slightly shiny. Basal piece slightly arcuate laterally and slightly narrowing dorsally. Apical piece very short, triangular dorsally and beak-shaped laterally and dorsally. Ratio of length of apical piece to length of basal piece 1 : 11.96.

**Female** without distinct differences, only space between eyes slightly broader and both anterior tarsal claws with 7 visible teeth.

**Variability.** The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Males (n=6). BL 8.60 mm (8.10-9.21 mm); HL 1.34 mm (1.28-1.42 mm); HW 1.37 mm (1.30-1.47 mm); OI 41.34 (37.42-44.11); PL 1.41 mm (1.26-1.58 mm); PW 2.35 mm (2.16-2.55 mm); PI 59.93 (58.08-63.43); EL 5.85 mm (5.45-6.27 mm); EW 3.25 mm (2.98-3.49 mm). Females (n=7). BL 8.66 mm (8.21-8.92 mm); HL 1.39 mm (1.30-1.44 mm); HW 1.41 mm (1.33-1.47 mm); OI 46.22 (42.25-51.63); PL 1.45 mm (1.33-1.49 mm); PW 2.65 mm (2.53-2.76 mm); PI 53.61 (52.57-55.02); EL 5.82 mm (5.58-5.99 mm); EW 3.29 mm (3.05-3.40 mm).

**Differential diagnosis.** Similar species with more elongate body (BL/EW 2.6-2.8) are *Borboresthes mufuensis* sp. nov., *Borboresthes saturnia* sp. nov., *Borboresthes spilosoma* sp. nov. and *Borboresthes zeuzera* sp. nov.

*Borboresthes laothoe* sp. nov. distinctly differs from the similar species *B. saturnia* mainly by its dorsal surface of pronotum and elytra setaceous; while *B. saturnia* has the dorsal surface of pronotum and elytra almost glabrous.

*B. laothoe* is clearly different from similar species *B. mufuensis*, *B. spilosoma* and *B. zeuzera*

mainly by its larger and coarser punctures in elytral striae than those in elytral striae of *B. mufuensis*, *B. spilosoma* and *B. zeuzera*.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the Poplar hawk moth *Laothoe populi* (Linnaeus, 1758).

**Distribution.** China (Fujian).

***Borboresthes mimas* sp. nov.**

(Figs. 43-46)

**Type locality.** China, Hainan Island, Minfeng Valley, Jianfeng Township, Ledong Li Autonomous County, 18°44'38.98"N, 108°50'39.29"E, 950 m.

**Type material.** Holotype (♂): wl [pb]: China, Hainan Island / Minfeng Valley / Jianfeng Township / Ledong Li Autonomous County / 12.VI.2018, 950m / 18°44'38.98"N, 108°50'39.29"E / P. Viktora lgt., (VNPC). Paratype: (1 ♂): same data as holotype, (VNPC). The types are provided with a printed red label: 'Borboresthes / mimas sp. nov. / HOLOTYPUS [or PARATYPUS] / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 43, body relatively large, oval, strongly convex, egg-shaped, dorsal surface from ochre yellow to blackish brown, with punctuation, fine microgranulation and ochre yellow setation, BL 8.59 mm. Widest near half elytra length; BL/EW 2.54.

Head (Fig. 44) relatively small, transverse, slightly wider than long, with long, ochre yellow setation, dense punctuation and microgranulation, punctures relatively small. Posterior part dark blackish brown, distinctly darker than reddish brown anterior part, punctures slightly coarser than those in anterior part. Clypeus pale reddish brown with setation slightly denser than in anterior part, with microgranulation and very small and shallow punctures, apex straight. HW 1.43 mm; HW/PW 0.50. HL (visible part) 1.34 mm. Eyes large, transverse, excised, space between eyes distinctly wider than diameter of one eye, slightly narrower than antennomere 3 long; OI equal to 41.84.

Antennae. Long (AL 5.15 mm, distinctly exceeding half body length AL/BL 0.60), filiform, pale reddish brown, with sparse, small and shallow punctures, fine microgranulation, and long, dense ochre yellow setation. Antennomere 2 shortest, antennomere 4 longest, each of antennomeres 4-11 distinctly longer than antennomere 3.

RLA(1-11): 0.46 : 0.33 : 1.00 : 1.37 : 1.16 : 1.26 : 1.05 : 1.08 : 1.05 : 1.00 : 1.26.

RL/WA(1-11): 1.52 : 1.32 : 3.46 : 4.33 : 3.17 : 4.36 : 3.33 : 3.28 : 3.64 : 3.80 : 5.05.

Maxillary palpus with microgranulation, very small and sparse punctures, ochre yellow setation. Ultimate palpomere widely triangular, palpomeres 2 and 3 narrowest in base and widest in apex.

Pronotum (Fig. 44). Dark brown, shiny, slightly longer than semicircular, convex, with long, dense, semierect, ochre yellow setation, with dense punctuation, punctures approximately as large as in head, interspaces between punctures narrow, microgranulation indistinct, shiny. Border lines narrow and complete, only in the middle of anterior and posterior margins not clearly conspicuous. Lateral and anterior margins arcuate, posterior margin bisinuate, anterior angles indistinct, posterior angles rectangular. PL 1.76 mm; PW 2.88 mm; PI equal to 61.11.

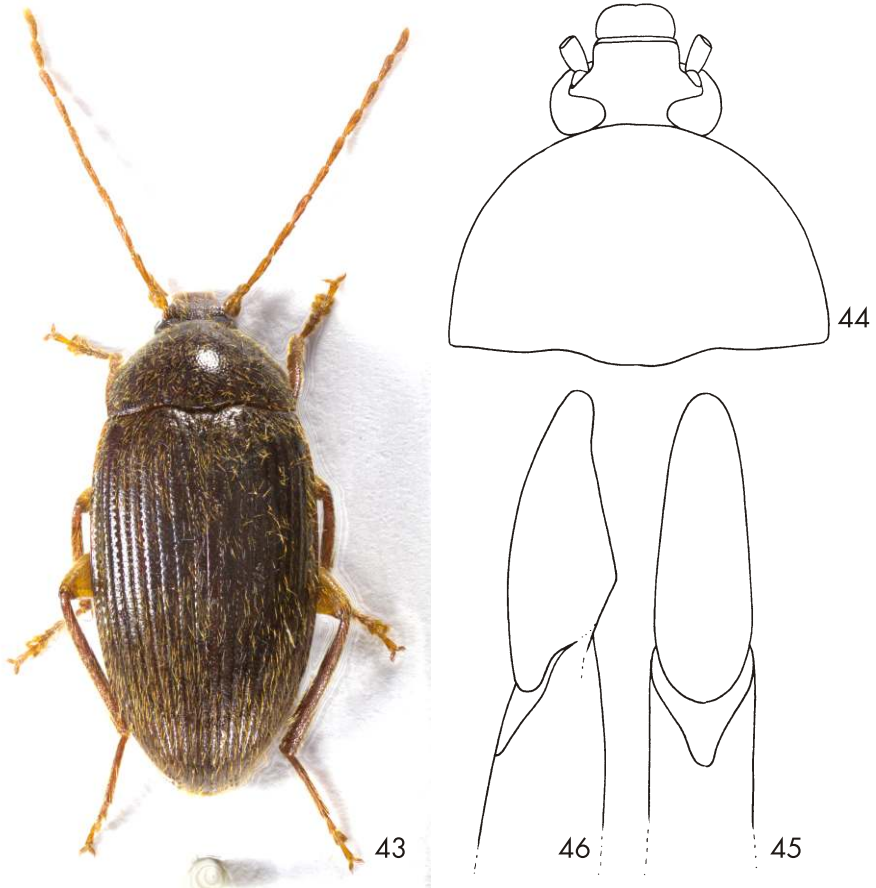
Ventral side of body blackish brown, with short and sparse ochre yellow setation and relatively dense punctuation. Setation of prothorax denser and longer than those in meso- and metathorax.



Abdomen reddish brown, with pale setation, microgranulation and dense punctuation, punctures small. Ultimate ventrite paler than ventrites 1-4.

Elytron blackish brown, oval, convex, with dense, ochre yellow, semierect setation, shiny. Elytral striae with distinct rows of coarse punctures distinctly larger than those in pronotum. Elytral interspaces convex, with dense, shallow punctuation and microgranulation. EL 5.89 mm; widest near half elytra length, EW 3.38. EL/EW 1.74.

Scutellum. Dark brown, roundly triangular with microgranulation, small punctures and a few pale setae.



Figs. 43-46. *Borboresthes mimas* sp. nov.: 43- Habitus of male holotype; 44- head and pronotum of male holotype; 45- aedeagus, dorsal view; 46- aedeagus, lateral view.

Elytral epipleura well-developed, brown with relatively large and coarse punctures in basal part, regularly narrowing to ventrite 1, then leads parallel with pale setae in apical part.

Legs with small punctures and microgranulation. Strong femora ochre yellow with ochre yellow setation, reddish brown tibiae and tarsi with longer and denser than those in femora, tibiae slightly dilated anteriorly. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.59 : 1.04 : 0.97 : 1.62 (protarsus); 1.00 : 0.39 : 0.49 : 0.41 : 0.75

(mesotarsus); 1.00 : 0.30 : 0.28 : 0.52 (metatarsus).

Anterior tarsal claws with 13 and 14 visible teeth.

Aedeagus (Figs. 45, 46). Ochre yellow, shiny. Basal piece very long, arcuate laterally and narrowing dorsally. Apical piece very short, beak-shaped dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 8.49.

**Female** unknown.

**Variability.** The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Males (n=2). BL 8.14 mm (7.69-8.59 mm); HL 1.24 mm (1.14-1.34 mm); HW 1.33 mm (1.22-1.43 mm); OI 41.24 (40.64-41.84); PL 1.66 mm (1.56-1.76 mm); PW 2.78 mm (2.67-2.88 mm); PI 59.77 (58.43-61.11); EL 5.64 mm (5.39-5.89 mm); EW 3.24 mm (3.10-3.38 mm).

**Differential diagnosis.** Similar species with more oval body (BL/EW 2.3-2.55) are *Borboresthes klapperichi* Pic, 1955, *Borboresthes sphinx* sp. nov. and *Borboresthes tyria* sp. nov. *Borboresthes mimas* sp. nov. distinctly differs from the similar species *B. klapperichi* mainly by its small body (about 8 mm), antennomeres 5-11 each distinctly longer than antennomere 3, by the aedeagus shape (Figs. 45 and 46) and by shallower punctuation of pronotum than in *B. klapperichi*, which has large body (10 mm), antennomeres 5-11 each distinctly shorter than antennomere 3, shape of aedeagus as in Figs. 37 and 38.

*B. mimas* is clearly different from the similar species *B. sphinx* mainly by its narrow space between eyes (OI in male 42), by the aedeagus shape, by the pronotum and elytral striae with larger and coarser punctures than has *B. sphinx*, which has the space between eyes broad (OI in male 48) and the aedeagus as in Figs. 57 and 58.

*B. mimas* distinctly differs from the similar species *B. tyria* mainly by its sparse and shallow punctuation of pronotum, punctures are small, interspaces between punctures broad, anterior tarsal claws of male have 13 and 14 teeth and the shape of the aedeagus is as in Figs. 45 and 46; while *B. tyria* has dense and coarse punctuation of pronotum, punctures large and interspaces between punctures very narrow, shape of aedeagus is as in Figs. 65 and 66 and by anterior tarsal claws of male with 11 teeth.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the Lime hawk moth *Mimas tiliae* (Linnaeus, 1758).

**Distribution.** China (Island Hainan).

### ***Borboresthes mufuensis* sp. nov.**

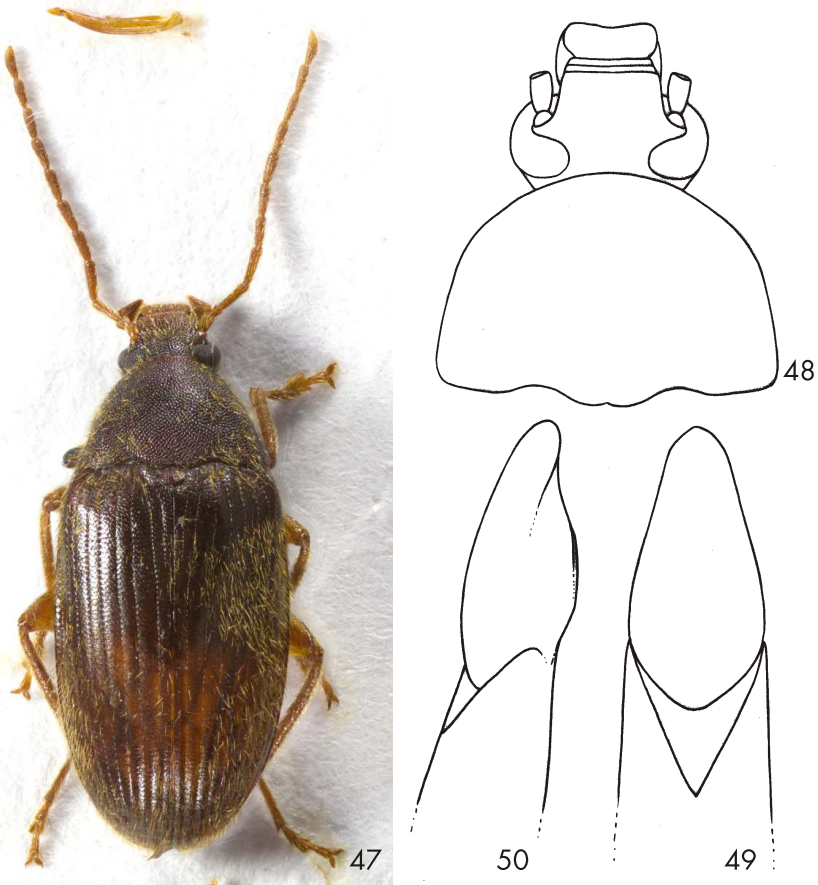
(Figs. 47-50)

**Type locality.** China, southeast of Hebei province, Mufu Shan, Jugongshan forest park, 29°4' N 114°6' E, ~1000 m.

**Type material.** Holotype (♂): wl [pb]: China, SE Hubei, 2002 / Mufu Shan, 29.4 N 114.6 E / JIUGONGSHAN forest / park, ~1000m, 3.-5. + 18.VI. / Jaroslav Turna leg., (VNPC). Paratypes: (5 ♀♀): same data as holotype, (VNPC). The types are provided with a printed red label: 'Borboresthes / mufuensis sp. nov. / HOLOTYPUS [or PARATYPUS] / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 47, body relatively large, elongate oval, strongly convex, dorsal surface from reddish brown to blackish brown, with punctuation, fine microgranulation and ochre yellow setation, BL 8.94 mm. Widest near half elytra length; BL/EW 2.62.

Head (Fig. 48) relatively small, slightly transverse, with long, ochre yellow setation. Posterior part blackish brown, with dense punctuation, punctures medium sized, interspaces between punctures very narrow. Anterior part reddish brown with microgranulation and microrugosities, shallower punctuation than those in posterior half. Clypeus pale reddish brown with long pale setation, microgranulation and microrugosities, very small and shallow punctures, apex straight. HW 1.48 mm; HW/PW 0.55. HL (visible part) 1.32 mm. Eyes large, transverse, excised, space between eyes distinctly wider than diameter of one eye, slightly wider than antennomere 3 long; OI equal to 44.30.



Figs. 47-50. *Borboesthes mufuensis* sp. nov. (male holotype): 47- Habitus; 48- head and pronotum; 49- aedeagus, dorsal view; 50- aedeagus, lateral view.

Antennae. Long (AL 4.21 mm, not reaching half body length AL/BL 0.47), filiform, with shallow punctures, fine microgranulation, and relatively long, dense ochre yellow setation. Antennomere

2 shortest, antennomere 4 longest, antennomeres 5-11 distinctly shorter than antennomere 3. Antennomeres 6-11 brown, slightly darker than reddish brown antennomeres 1-5.

RLA(1-11): 0.60 : 0.30 : 1.00 : 1.04 : 0.93 : 0.94 : 0.94 : 0.93 : 0.92 : 0.90 : 1.00.

RL/WA(1-11): 1.67 : 1.18 : 4.06 : 4.24 : 3.37 : 3.60 : 3.61 : 3.74 : 3.72 : 3.53 : 4.44.

Maxillary palpus with microgranulation and ochre yellow setation. Ultimate palpomere slightly darker than penultimate, widely triangular. Palpomeres 2 and 3 pale reddish brown, distinctly narrowest in base, slightly dilated anteriorly.

Pronotum (Fig. 48). Blackish brown, almost semicircular, with long and relatively dense, semierect, ochre yellow setation, dense punctuation, punctures as large as in head, interspaces between punctures very narrow, microgranulation indistinct, slightly shiny. Border lines distinct and complete, only in the middle of anterior and posterior margins not clearly conspicuous. Lateral margins straight in basal part, in apical part and anterior margin arcuate, posterior margin bisinuate, anterior angles indistinct, posterior angles roundly rectangular. PL 1.72 mm; PW 2.67 mm; PI equal to 64.42.

Ventral side of body blackish brown, prothorax with dense, long setation, small punctures, meso- and metathorax with sparse, pale setation and larger punctures than those in prothorax. Abdomen blackish brown, with dense pale setation and dense punctuation, punctures very small.

Elytron blackish brown, with ochre yellow setation denser near sides than on middle of dorsal surface, shiny. Elytral striae with distinct rows of punctures, slightly smaller than those in pronotum. Elytral interspaces slightly convex, with microgranulation and dense punctuation, punctures distinctly smaller than those in striae. EL 5.90 mm; widest near half elytra length, EW 3.41 mm. EL/EW 1.73.

Scutellum. Blackish brown, roundly triangular with microrugosities, shallow punctures and a few pale setae.

Elytral epipleura well-developed, dark brown with long and dense, pale setae and small sized dense punctuation, regularly narrowing to ventrite 1 in basal half, then leads parallel.

Legs reddish brown, with dense and long, ochre yellow setation and coarse, dense punctuation, punctures relatively large. Tibiae narrow, slightly dilated anteriorly, femora stronger. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RL: 1.00 : 0.51 : 0.59 : 1.04 : 2.08 (protarsus); 1.00 : 0.35 : 0.39 : 0.53 : 0.98 (mesotarsus); 1.00 : 0.30 : 0.27 : 0.56 (metatarsus).

Both anterior tarsal claws with 11 visible teeth.

Aedeagus (Figs. 49, 50). Ochre yellow, slightly shiny. Basal piece long, finely arcuate laterally and finely narrowing dorsally. Apical piece very short, triangular dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 7.78

**Female** without distinct differences, only both anterior tarsal claws with 7 visible teeth.

**Variability.** The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Females (n=5). BL 8.38 mm (8.04-9.05 mm); HL 1.30 mm (1.25-1.40 mm); HW 1.32 mm (1.26-1.42 mm); Ol 41.99 (40.60-43.58); PL 1.38 mm (1.27-1.49 mm); PW 2.35 mm (2.25-2.52 mm); PI 58.75 (56.44-62.13); EL 5.70 mm (5.51-6.16 mm); EW 3.14 mm (2.97-3.41 mm).

**Differential diagnosis.** Similar species with more elongate body (BL/EW 2.6-2.8) are *Borboresthes laothoe* sp. nov., *Borboresthes saturnia* sp. nov., *Borboresthes spilosoma* sp. nov. and *Borboresthes zeuzera* sp. nov.

*Borboresthes mufuensis* sp. nov. distinctly differs from the similar species *B. saturnia* mainly by its dorsal surface of pronotum and elytra setaceous; while *B. saturnia* has the dorsal surface of pronotum and elytra almost glabrous.

*B. mufuensis* is clearly different from similar species *B. spilosoma* and *B. zeuzera* mainly by its denser punctuation of elytral intervals than have elytral intervals of *B. spilosoma* and *B. zeuzera*.

*B. mufuensis* distinctly differs from the similar species *B. laothoe* mainly by its small punctures in elytral striae and dense punctuation in elytral intervals; while *B. laothoe* has distinctly larger punctures in elytral striae and sparser punctuation in elytral intervals than *B. mufuensis*.

**Etymology.** Named after the type locality - Mufu Shan in Hebei province (China).

**Distribution.** China (Hebei).

***Borboresthes saturnia* sp. nov.**

(Figs. 51-54)

**Type locality.** China, South eastern Hubei province, Mufu Shan, Jiugongshan forest park, 29°4'N, 114°6'E, ca 1000 m.

**Type material.** Holotype (♂): wl [pb]: China, SE Hubei, 2002 / Mufu Shan, 29.4 N 114.6 E / JIUGONGSHAN forest / park, ~1000m, 3.-5. + 18.VI. / Jaroslav Turna leg., (VNPC). Paratypes: (1 ♂, 3 ♀♀): same data as holotype, (VNPC). The types are provided with a printed red label: '\*Borboresthes / saturnia sp. nov. / HOLOTYPUS [or PARATYPUS] / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 51, body large, elongate oval, strongly convex, dorsal surface from ochre yellow to black, with punctuation, fine microgranulation and very sparse, ochre yellow setae, BL 8.87 mm. Widest near half elytra length; BL/EW 2.62.

Head (Fig. 52) relatively small, approximately as wide as long, with a few ochre yellow setae, shiny. Posterior part black, with dense and coarse punctuation, punctures medium sized, interspaces between punctures narrow. Anterior part pale reddish brown with distinct microgranulation and shallower punctuation than those in posterior part. Clypeus pale brown with dense ochre yellow setation, microgranulation and sparse, very small and shallow punctures, rather matte, apex straight. HW 1.38 mm; HW/PW 0.52. HL (visible part) 1.33 mm. Eyes large, transverse, slightly excised, space between eyes wide, distinctly wider than diameter of one eye, as wide as antennomere 4 long; OI equal to 47.06.

Antennae. Long (AL 5.08 mm, slightly exceeding half body length AL/BL 0.57), filiform, unicolored ochre yellow, with fine microgranulation, shallow punctures and relatively long, dense, ochre yellow setation. Antennomere 2 shortest, antennomere 4 and 6 longest, antennomeres 4-10 as long or slightly longer than antennomere 3.

RLA(1-11): 0.54 : 0.33 : 1.00 : 1.11 : 0.99 : 1.11 : 1.03 : 1.05 : 1.00 : 0.86.

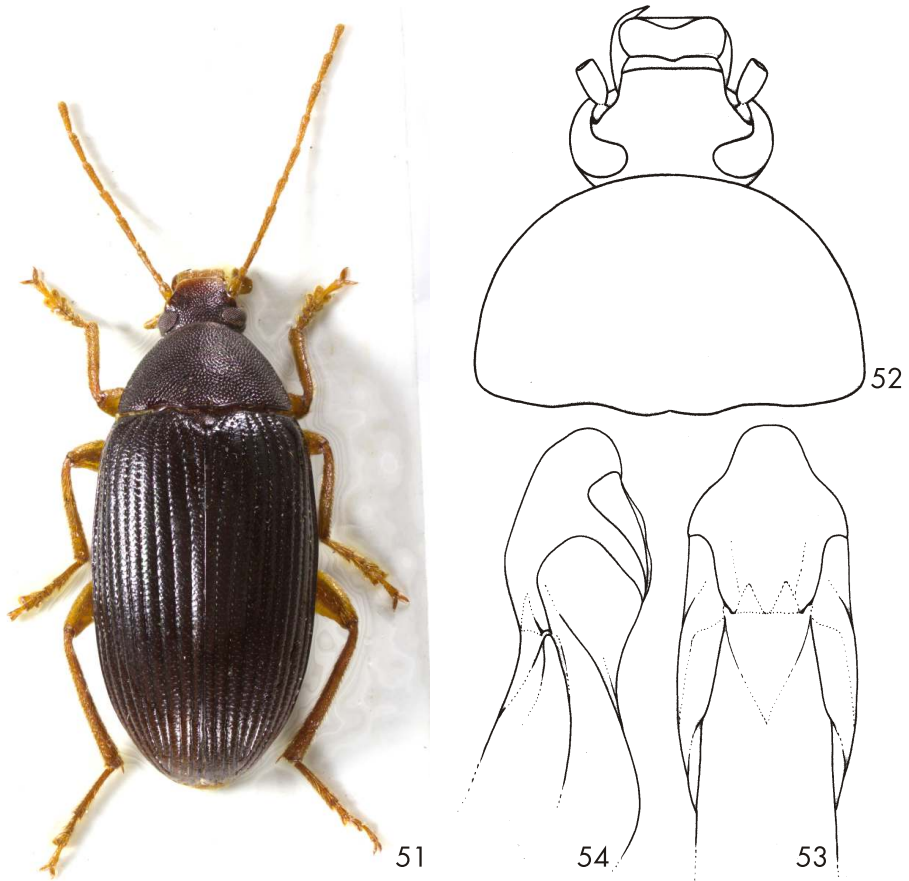
RL/WA(1-11): 1.69 : 1.59 : 4.50 : 5.00 : 4.44 : 4.09 : 3.95 : 4.72 : 4.26 : 3.86 : 4.12.

Maxillary palpus with ochre yellow setation and fine microgranulation. Palpomeres 2 and 3 distinctly narrowest in base, slightly dilated anteriorly. Ultimate palpomere pale brown, widely triangular, distinctly darker than penultimate.

Pronotum (Fig. 52). Black, almost semicircular, almost glabrous, only near lateral margins with a few short, pale setae. Dorsal surface convex, with dense punctuation, punctures medium sized, as large as in posterior part of head. Interspaces between punctures very narrow, shiny. Border lines distinct and complete, only in the middle of anterior margin not clearly conspicuous. Anterior and lateral margins arcuate, posterior margin bisinuate, anterior angles indistinct, posterior

angles roundly obtuse. PL 1.62 mm; PW 2.67 mm; PI equal to 60.67.

Ventral side of body black with punctuation and a few, short pale setae. Abdomen black, slightly shiny, with fine microgranulation, dense and shallow punctuation, punctures small. Ultimate ventrite distinctly paler than penultimate, reddish brown with large shallow impression in middle.



Figs. 51-54. *Borboresthes saturnia* sp. nov.: 51- Habitus of male holotype; 52- head and pronotum of male holotype; 53- aedeagus, dorsal view; 54- aedeagus, lateral view.

Elytron black, shiny, elongate oval, convex. Dorsal surface almost glabrous, with a few short, pale setae, only near apex more long, ochre yellow setae present. Elytral striae with distinct rows of medium sized punctures, elytral interspaces distinctly convex, with fine microgranulation and very small punctures. EL 5.92 mm. Widest near half elytra length, EW 3.38 mm. EL/EW 1.75.

Scutellum. Black, roundly triangular with shallow punctures, glabrous, shiny.

Elytral epipleura well-developed, black, with a few pale setae and punctures, widest in base, regularly narrowing to metasternum in basal half, then relatively wide leads parallel.

Legs unicolorous ochre yellow, with dense and long, ochre yellow setation, microgranulation and small punctures, shiny. Tibiae narrow, slightly dilated anteriorly, femora stronger. Pro- and

mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.68 : 0.76 : 1.22 : 2.46 (protarsus); 1.00 : 0.39 : 0.42 : 0.58 : — (mesotarsus); 1.00 : 0.37 : 0.35 : 0.53 (metatarsus).

Both anterior tarsal claws with 12 and 13 visible teeth.

Aedeagus (Figs. 53, 54). Ochre yellow, strong, robust, slightly shiny. Basal piece long, regularly arcuate laterally and slightly narrowing dorsally. Apical piece very short, triangular dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1: 8.49

**Female** without distinct differences, only both anterior tarsal claws with 7 visible teeth.

**Variability.** The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Males (n=2). BL 8.76 mm (8.64-8.87 mm); HL 1.32 mm (1.30-1.33 mm); HW 1.38 mm (1.37-1.38 mm); OI 47.74 (47.06-48.42); PL 1.52 mm (1.42-1.62 mm); PW 2.62 mm (2.56-2.67 mm); PI 58.07 (55.47-60.67); EL 5.92 mm (5.92-5.92 mm); EW 3.36 mm (3.33-3.38 mm). Females (n=3). BL 8.69 mm (8.36-8.99 mm); HL 1.32 mm (1.30-1.33 mm); HW 1.36 mm (1.35-1.37 mm); OI 50.36 (47.92-51.74); PL 1.36 mm (1.24-1.45 mm); PW 2.60 mm (2.38-2.77 mm); PI 52.30 (52.10-52.45); EL 6.01 mm (5.64-6.42 mm); EW 3.44 mm (3.41-3.47 mm).

**Differential diagnosis.** Similar species with more elongate body (BL/EW 2.6-2.8) are *Borboresthes laothoe* sp. nov., *Borboresthes mufuensis* sp. nov., *Borboresthes spilosoma* sp. nov. and *Borboresthes zeuzera* sp. nov.

*Borboresthes saturnia* sp. nov. distinctly differs from the similar species *B. laothoe*, *B. mufuensis*, *B. spilosoma* and *B. zeuzera* by its dorsal surface of the pronotum and elytra almost glabrous; while *B. laothoe*, *B. mufuensis*, *B. spilosoma* and *B. zeuzera* have dorsal surfaces with pale setation.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the Giant peacock moth *Saturnia pyri* (Denis & Schiffermüller, 1775).

**Distribution.** China (Hebei).

### *Borboresthes sphinx* sp. nov.

(Figs. 55-58)

**Type locality.** China, south Guizhou province, Yaogu env., 25°20'N 107°56'E, 800-900 m.

**Type material.** Holotype (♂): wl [pb]: China, S Guizhou, 13.VI. / YAOGU env., 800-900m / 25°20'N 107°56'E / Jaroslav Turna leg., 2011, (VNPC). The type is provided with a printed red label: 'Borboresthes / sphinx sp. nov. / HOLOTYPUS / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 55, body large, oval, convex, dorsal surface from ochre yellow to black, with punctuation, microgranulation and ochre yellow setation, BL 8.51 mm. Widest near half elytra length; BL/EW 2.54.

Head (Fig. 56) relatively small, approximately as wide as long, with long, ochre yellow setation and punctuation, punctures large and coarse, interspaces between punctures narrow. Posterior part black, anterior part reddish brown, clypeus pale brown with denser ochre yellow setation than in head, microgranulation and very small and shallow punctures, apex straight. HW 1.38

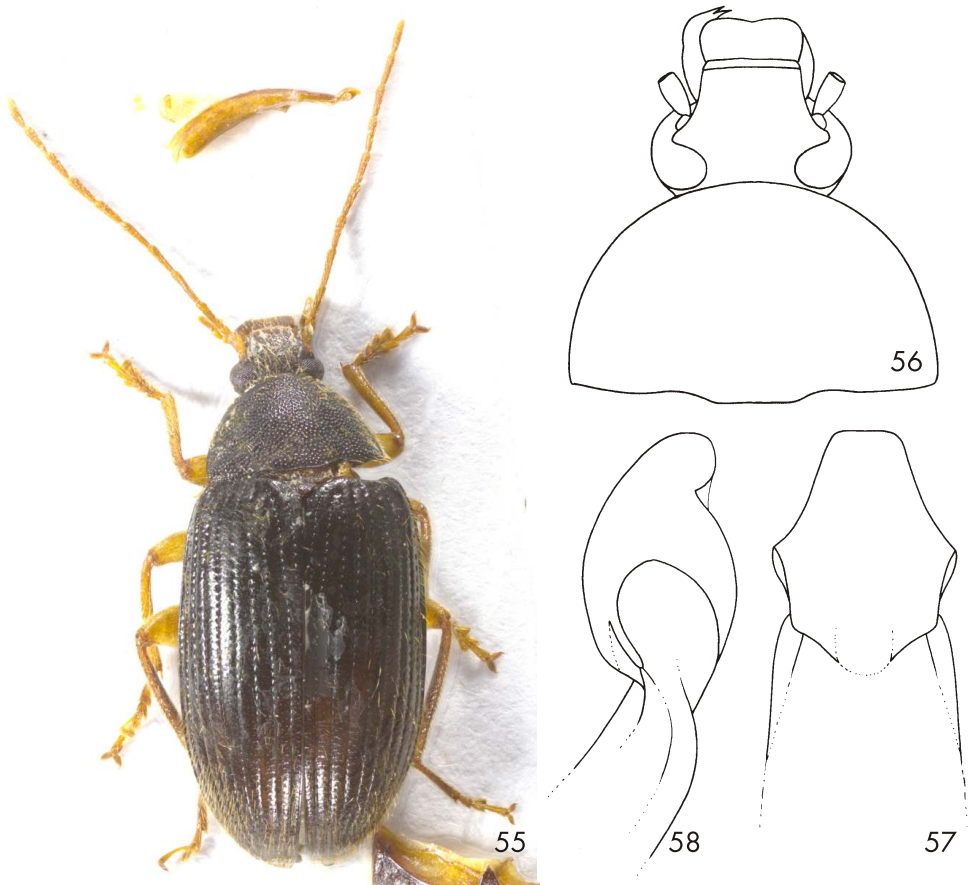
mm; HW/PW 0.53. HL (visible part) 1.41 mm. Eyes large, transverse, slightly excised, space between eyes wide, distinctly wider than diameter of one eye, and wider than length of antennomere 4; OI equal to 47.77.

Antennae. Long (AL 5.06 mm, distinctly exceeding half body length AL/BL 0.60), filiform, unicolored pale brown, with fine microgranulation, shallow punctures and long, dense ochre yellow setation. Antennomere 2 shortest, antennomere 4 longest, antennomeres 5-8 slightly longer than antennomere 3.

RLA(1-11): 0.65 : 0.30 : 1.00 : 1.17 : 1.02 : 1.09 : 1.09 : 1.09 : 0.99 : 0.97 : 1.12.

RL/WA(1-11): 2.55 : 1.30 : 4.53 : 4.81 : 4.00 : 4.27 : 3.92 : 3.76 : 3.70 : 3.52 : 4.57.

Maxillary palpus. Pale brown with microgranulation and ochre yellow setation. Ultimate palpomere widely triangular. Palpomeres 2 and 3 distinctly narrowest in base, slightly dilated anteriorly.



Figs. 55-58. *Borboresthes sphinx* sp. nov.: 55- Habitus of male holotype; 56- head and pronotum of male holotype; 57- aedeagus, dorsal view; 58- aedeagus, lateral view.

Pronotum (Fig. 56). Black, semicircular, with long and relatively dense, semierect, ochre yellow setation, dense punctuation, punctures very large, larger than those in head, interspaces between



punctures very narrow, shiny. Border lines distinct and complete. Anterior and lateral margins arcuate, posterior margin bisinuate, anterior angles indistinct, posterior angles slightly obtuse. PL 1.56 mm; PW 2.59 mm; PI equal to 60.23.

Ventral side of body black. Prothorax with dense pale setation and dense, small punctuation, meso- and metathorax with sparse pale setation and large punctuation. Abdomen with small and dense punctuation and relatively sparse, pale setation. Ventriles 1-3 dark brown, ultimate and penultimate ventrites black, ultimate ventrite impunctate with microgranulation.

Elytron black, oval, convex, shiny, with long, ochre yellow, semierect setation, distinctly denser near lateral margins and in apex than in middle, shiny. Elytral striae with distinct rows of large punctures, elytral interspaces convex, with fine microgranulation and very small, shallow and sparse punctures. EL 5.54 mm. Widest near half elytra length, EW 3.35 mm. EL/EW 1.56.

Scutellum. Black, roundly, widely triangular with small and shallow punctures, shiny.

Elytral epipleura well-developed, black with pale setae and punctures, regularly narrowing to ventrite 1 in basal half, then leads parallel.

Legs with dense and long, ochre yellow setation, microgranulation and very small punctures. Femora strong, ochre yellow, tibiae and tarsi pale brown, tibiae slightly dilated anteriorly. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.75 : 1.00 : 1.27 : 2.61 (protarsus); 1.00 : 0.44 : 0.46 : 0.65 : 1.12 (mesotarsus); 1.00 : 0.41 : 0.30 : 0.63 (metatarsus).

Both anterior tarsal claws with 14 visible teeth.

Aedeagus (Figs. 57, 58). Large, robust, pale brown, slightly shiny. Basal piece large, regularly arcuate laterally and very finely narrowing dorsally. Apical piece very short, beak-shaped dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1:7.39.

**Female** unknown.

**Differential diagnosis.** Similar species with more oval body (BL/EW 2.3-2.55) are *Borboresthes klapperichi* Pic, 1955, *Borboresthes mimas* sp. nov. and *Borboresthes tyria* sp. nov. *Borboresthes sphinx* sp. nov. distinctly differs from the similar species *B. klapperichi* mainly by its small body (8.5 mm), antennomeres 5-11 each distinctly longer than antennomere 3, by the shape of aedeagus (Figs. 57 and 58) and by larger and coarser punctures on pronotum and in elytral striae than in *B. klapperichi*, which has large body (10 mm), antennomeres 5-11 each distinctly shorter than antennomere 3, the shape of aedeagus as in Figs. 37 and 38.

*B. sphinx* is clearly different from similar species *B. tyria* mainly by a wider space between eyes (OI in male 48), by the shape of aedeagus, by anterior tarsal claws in male with 14 teeth and by the longer pronotum (PI 60) than in *B. tyria* (PI 56), which has narrow space between eyes (OI in male 41), anterior tarsal claws in male with 11 teeth and aedeagus as in Figs. 65 and 66.

*B. sphinx* distinctly differs from similar species *B. mimas* mainly by broader space between eyes (OI in male 48), by shape of aedeagus and by larger and coarser punctures on pronotum and elytral striae than has *B. mimas*, which has space between eyes narrow (OI in males 42) and aedeagus is as in Figs. 45 and 46.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the Privet hawk moth *Sphinx ligustri* Linnaeus, 1758.

**Distribution.** China (Guizhou).

***Borboresthes spilosoma* sp. nov.**

(Figs. 59-62)

**Type locality.** China, west Hubei province, Muyuping env., 31°45'N, 110°4'E, ca 1000 m.

**Type material.** Holotype (♂): wl [pb]: China, W Hubei, 20.-21.VI. / MUYUPING S.env. / 31.45N 110.4E ~1300m / Jaroslav Turna leg., 2003, (VNPC). Paratypes: wl [pb]: (2 ♂♂, 2 ♀♀): same data as holotype, (VNPC). The types are provided with a printed red label: 'Borboresthes / spilosoma sp. nov. / HOLOTYPUS [or PARATYPUS] / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 59, body large, elongate oval, convex, dorsal surface from ochre yellow to dark reddish brown, with punctuation, microgranulation and ochre yellow setation, BL 8.82 mm. Widest near half elytra length; BL/EW 2.75.

Head (Fig. 60) relatively small, approximately as wide as long, with microgranulation, relatively dense and long, ochre yellow setation and dense punctuation, punctures small. Posterior part dark reddish brown, anterior part reddish brown. Clypeus pale brown with long, ochre yellow setation, denser than in head, microgranulation and very small and shallow punctures, apex straight. HW 1.42 mm; HW/PW 0.56. HL (visible part) 1.42 mm. Eyes large, transverse, distinctly excised, space between eyes wider than diameter of one eye, wider than length of antennomere 4; OI equal to 46.46.

Antennae. Long (AL 4.86 mm, slightly exceeding half body length AL/BL 0.55), filiform, with fine microgranulation, small, shallow punctures and relatively long and dense ochre yellow setation. Antennomeres 1-3 pale brown, distinctly paler than brown antennomeres 4-11. Antennomere 2 shortest, antennomere 4 longest, antennomeres 5-10 distinctly shorter than antennomere 3.

RLA(1-11): 0.59 : 0.29 : 1.00 : 1.12 : 0.96 : 0.97 : 0.97 : 0.99 : 0.90 : 0.92 : 1.02.

RL/WA(1-11): 1.89 : 1.09 : 3.48 : 4.64 : 3.54 : 3.32 : 3.88 : 3.19 : 2.79 : 2.76 : 3.87.

Maxillary palpus. Pale reddish brown, with microgranulation and ochre yellow setation. Ultimate palpomere widely triangular. Palpomeres 2 and 3 distinctly narrowest in base, slightly dilated anteriorly.

Pronotum (Fig. 60). Reddish brown, almost semicircular, convex, with long and relatively dense, ochre yellow setation, dense punctuation, punctures as large as in head, interspaces between punctures very narrow with fine microgranulation, matte. Border lines distinct and complete. Anterior and lateral margins regularly arcuate, posterior margin bisinuate, anterior angles indistinct, posterior angles rectangular. PL 1.57 mm; PW 2.53 mm; PI equal to 62.06.

Ventral side of body reddish brown with ochre yellow setation and punctuation. Middle of ventrites with denser punctuation than in sides. Sides of ventrites with distinct microgranulation. Abdomen pale reddish brown, with pale setation.

Elytron reddish brown, with suture narrowly darker - blackish brown. Dorsal surface with ochre yellow, long and dense, semierect setation, denser in apex and near lateral margins than in middle. Elytral striae with distinct rows of small punctures as large as in pronotum, elytral interspaces slightly convex, with very small and sparse punctures and microgranulation, slightly shiny. EL 5.83 mm. Widest near half elytra length, EW 3.21 mm. EL/EW 1.82.

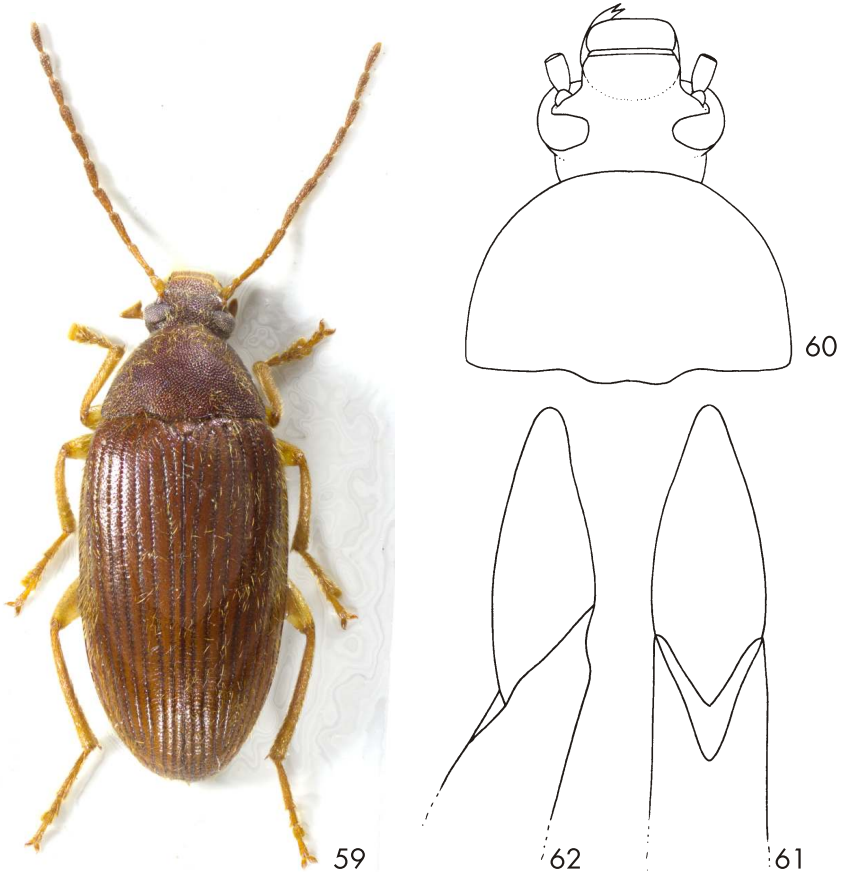
Scutellum. Reddish brown, as elytron itself with sides dark brown, pentagonal, with small punctures, microgranulation and a few setae.

Elytral epipleura well-developed, reddish brown with long, ochre yellow setation and dense punctuation, regularly narrowing to ventrite 1 in basal half, then pale reddish brown leads parallel.

Legs ochre yellow, with dense and long, ochre yellow setation, setation of femora somewhere darker, microgranulation and very small punctures. Tibiae slightly dilated anteriorly. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RL: 1.00 : 0.78 : 0.68 : 0.92 : 1.97 (protarsus); 1.00 : 0.44 : 0.39 : 0.46 : 1.03 (mesotarsus); 1.00 : 0.30 : 0.23 : 0.53 (metatarsus).

Both anterior tarsal claws with 12 visible teeth.

Aedeagus (Figs. 61, 62). Ochre yellow, slightly shiny. Basal piece long, arcuate laterally and narrowing dorsally. Apical piece very short, roundly triangular dorsally and beak-shaped dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 7.56.



Figs. 59-62. *Borboresthes spilosoma* sp. nov.: 59- Habitus of male holotype; 60- head and pronotum of male holotype; 61- aedeagus, dorsal view; 62- aedeagus, lateral view.

**Female** without distinct differences, only space between eyes slightly broader than in male and both anterior tarsal claws with 7 visible teeth.

**Variability.** The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Males (n=3). BL 8.91 mm (8.82-8.98 mm); HL 1.40 mm

(1.38-1.42 mm); HW 1.41 mm (1.36-1.44 mm); OI 43.68 (41.29-46.46); PL 1.48 mm (1.43-1.57 mm); PW 2.64 mm (2.53-2.71 mm); PI 56.00 (52.77-62.06); EL 6.03 mm (5.83-6.15 mm); EW 3.29 mm (3.21-3.39 mm). Females (n=2). BL 9.21 mm (9.11-9.30 mm); HL 1.47 mm (1.44-1.50 mm); HW 1.50 mm (1.46-1.54 mm); OI 47.92 (46.11-49.72); PL 1.53 mm (1.48-1.57 mm); PW 2.74 mm (2.72-2.76 mm); PI 55.64 (53.62-57.72); EL 6.21 mm (6.10-6.32 mm); EW 3.53 mm (3.47-3.58 mm).

**Differential diagnosis.** Similar species with more elongate body (BL/EW 2.6-2.8) are *Borboresthes laothoe* sp. nov., *Borboresthes mufuensis* sp. nov., *Borboresthes saturnia* sp. nov. and *Borboresthes zeuzera* sp. nov.

*Borboresthes spilosoma* sp. nov. distinctly differs from the similar species *B. saturnia* by its dorsal surface of pronotum and elytra setaceous; while *B. saturnia* has the dorsal surface almost glabrous.

*B. spilosoma* is clearly different from similar species *B. laothoe* and *B. zeuzera* by the punctures of the pronotum and elytral striae distinctly smaller than those in the pronotum and elytral striae of *B. laothoe* and *B. zeuzera*.

*B. spilosoma* distinctly differs from similar *B. mufuensis* mainly by the elytral intervals more flat and with smaller, sparser and shallower punctuation than those in more convex elytral intervals of *B. mufuensis*.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the moth Buff ermine *Spilosoma luteum* (Hufnagel, 1766)

**Distribution.** China (Hubei).

***Borboresthes tyria* sp. nov.**  
(Figs. 63-66)

**Type locality.** China, north west of Guangdong province, Dachou Ding, 24°16-17'N, 112°24'E, 680-850 m.

**Type material.** Holotype (♂): wl [pb]: China, NW Guangdong prov. / DACHOU DING 680-850m / 24°16-17'N 112°24'E / Jatua leg., 30.VI.-1.VII.2015, (VNPC). Paratypes: wl [pb]: (1 ♂ 1 ♀): same data as holotype, (VNPC). The types are provided with a printed red label: '*Borboresthes / tyria* sp. nov. / HOLOTYPE [or PARATYPE] / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 63, body relatively large, elongate oval, convex, egg-shaped, dorsal surface from ochre yellow to brown, with punctuation, microgranulation and ochre yellow setation, BL 7.78 mm. Widest near half elytra length; BL/EW 2.56.

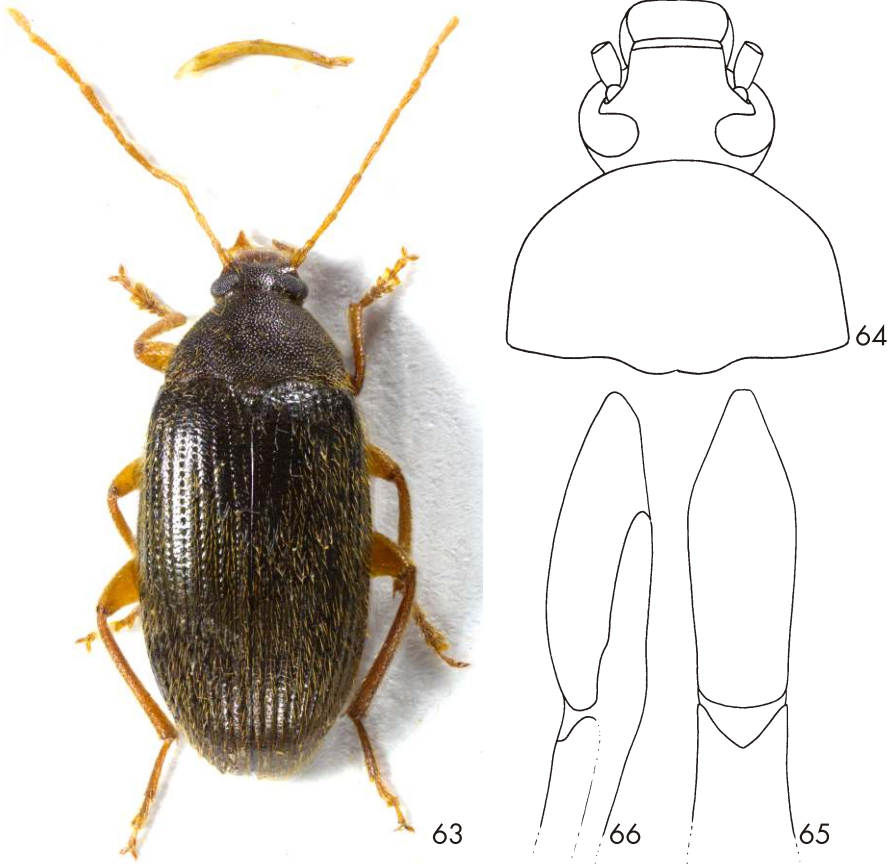
Head (Fig. 64) relatively small, shiny, slightly longer than wide, with microgranulation, punctuation and sparse, long ochre yellow setation, punctures small. Posterior part brown, distinctly darker than reddish brown anterior part, with punctures coarser than those in anterior half. Clypeus pale reddish brown with dense and long, ochre yellow setation, microrugosities and very small and shallow punctures, apex straight. HW 1.29 mm; HW/PW 0.55. HL (visible part) 1.41 mm. Eyes large, transverse, slightly excised, space between eyes slightly wider than diameter of one eye, as wide as antennomere 3 long; OI equal to 40.77.

Antennae. Long, pale reddish brown (AL 4.90 mm, slightly exceeding half body length AL/BL 0.63), filiform, with fine microgranulation, shallow punctures and relatively long and dense, ochre yellow setation. Antennomere 2 shortest, antennomere 4 longest, antennomeres 5-11 slightly longer than antennomere 3.

RLA(1-11): 0.60 : 0.35 : 1.00 : 1.29 : 1.01 : 1.04 : 1.04 : 1.10 : 1.02 : 1.01 : 1.13.

RL/WA(1-11): 1.85 : 1.53 : 4.20 : 5.40 : 4.72 : 4.58 : 4.35 : 4.00 : 4.53 : 4.47 : 4.75.

Maxillary palpus. Ochre yellow with microgranulation and ochre yellow setation. Ultimate palpomere pale reddish brown, slightly darker than penultimate, widely triangular. Palpomeres 2 and 3 distinctly narrowest in base, slightly dilated anteriorly.



Figs. 63-66. *Borboresthes tyria* sp. nov.: 63- Habitus of male holotype; 64- head and pronotum of male holotype; 65- aedeagus, dorsal view; 66- aedeagus, lateral view.

Pronotum (Fig. 64). Dark brown, almost semicircular, convex, with long and relatively dense, semierect, ochre yellow setation, dense punctuation, punctures distinctly larger than those in head, interspaces between punctures very narrow, shiny. Border lines distinct and complete, only in the middle of anterior margin not clearly conspicuous. Lateral margins in basal half straight, anterior margin and lateral margins in apical half arcuate, posterior margin bisinuate, anterior angles indistinct, posterior angles obtuse. PL 1.32 mm; PW 2.36 mm; PI equal to 55.93.

Ventral side of body dark reddish brown with dense pale setation and dense punctuation. Abdomen pale brown, with long, ochre yellow setation, very fine microgranulation and dense punctuation, punctures small and shallow.

Elytron black, dorsal surface with ochre yellow, long and dense, semierect setation, near sides and in apex distinctly denser than in middle of basal half. Elytral striae with distinct rows of punctures, approximately as large as those in pronotum, elytral interspaces slightly convex, with fine microgranulation and very small and shallow punctures. EL 5.05 mm. Widest near half elytra length, EW 3.04 mm. EL/EW 1.66.

Scutellum. Brown, with sides darker, roundly triangular with punctures and a few setae.

Elytral epipleura well-developed, dark reddish brown with a few pale setae and punctures, regularly narrowing to ventrite 1 in basal half, then leads parallel.

Legs with dense and long, ochre yellow setation, microgranulation and very small punctures. Femora ochre yellow, tibiae and tarsi pale reddish brown. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.59 : 0.74 : 0.96 : 1.81 (protarsus); 1.00 : 0.39 : 0.29 : 0.39 : 0.85 (mesotarsus); 1.00 : 0.29 : 0.31 : 0.57 (metatarsus).

Both anterior tarsal claws with 11 visible teeth.

Aedeagus (Figs. 65, 66). Ochre yellow, shiny. Basal piece long, regularly arcuate laterally and slightly narrowing dorsally. Apical piece short, beak-shaped dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 5.97

**Female** without distinct differences, only space between eyes slightly broader than in male and both anterior tarsal claws with 8 visible teeth. BL 8.22 mm; HL 1.40 mm; HW 1.32 mm; OI 46.00; PL 1.34 mm; PW 2.44 mm; PI 54.92; EL 5.48; EW 3.20.

**Variability.** The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Males (n=2). BL 7.93 mm (7.78-8.07 mm); HL 1.39 mm (1.37-1.41 mm); HW 1.30 mm (1.29-1.30 mm); OI 40.86 (40.77-40.94); PL 1.36 mm (1.32-1.40 mm); PW 2.42 mm (2.36-2.48 mm); PI 56.19 (55.93-56.45); EL 5.18 mm (5.05-5.30 mm); EW 3.09 mm (3.04-3.13 mm).

**Differential diagnosis.** Similar species with more oval body (BL/EW 2.3-2.55) are *Borboresthes klapperichi* Pic, 1955, *Borboresthes mimas* sp. nov. and *Borboresthes sphinx* sp. nov.

*Borboresthes tyria* sp. nov. distinctly differs from similar species *B. klapperichi* mainly by its small body (8 mm), antennomeres 5-11 each distinctly longer than antennomere 3, by the shape of the aedeagus (Figs. 65 and 66) and by anterior tarsal claws of male with 11 teeth; while *B. klapperichi* has larger body (10 mm), antennomeres 5-11 each distinctly shorter than antennomere 3, the shape of the aedeagus as in Figs. 37 and 38 and anterior tarsal claws of male have 14 and 15 teeth.

*B. tyria* is clearly different from the similar species *B. sphinx* mainly by its narrow space between eyes (OI in male 41), by the shape of aedeagus, by anterior tarsal claws in male with 11 teeth and by shorter pronotum (PI 56) than in *B. sphinx* (PI 60), which has broad space between eyes (OI in male 48), anterior tarsal claws in male with 14 teeth and the aedeagus as in Figs. 61 and 62.

*B. tyria* distinctly differs from similar species *B. mimas* mainly by its dense and coarse punctuation of pronotum, punctures large and interspaces between punctures very narrow, by the shape of aedeagus and by anterior tarsal claws of male with 11 teeth; while *B. mimas* has sparse and shallow punctuation of pronotum, punctures are small, interspaces between punctures broad, anterior tarsal claws of male have 13 and 14 teeth and the shape of aedeagus as in Figs. 45 and 46.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the Cinnabar moth *Tyria jacobaeae* (Linnaeus, 1758).

**Distribution.** China (Guangdong).

***Borboresthes zeuzera* sp. nov.**

(Figs. 67-70)

**Type locality.** China, north west of Guangdong province, Dachou Ding, 24°16-17'N, 112°24'E, 680-850 m.

**Type material.** Holotype (♂): wl [pb]: China, NW Guangdong prov. / DACHOU DING 680-850m / 24°16-17'N 112°24'E / *Jatua* leg., 30.VI.-1.VII.2015, (VNPC). The type is provided with a printed red label: '*Borboresthes / zeuzera* sp. nov. / HOLOTYPUS / V. Novák det. 2018'.

**Description of holotype.** Habitus as in Fig. 67, body large, elongate oval, slightly convex, dorsal surface from ochre yellow to dark reddish brown, with punctuation, microgranulation and ochre yellow setation, BL 7.95 mm. Widest near half elytra length; BL/EW 2.65.

Head (Fig. 68) relatively small, approximately as wide as long, with microgranulation, sparse, ochre yellow setation and punctuation, shiny. Posterior part dark reddish brown with larger and coarser punctures than those in pale reddish brown anterior part. Clypeus pale brown with dense pale setation and microgranulation, apex straight. HW 1.25 mm; HW/PW 0.53. HL (visible part) 1.21 mm. Eyes large, transverse, excised, space between eyes slightly wider than diameter of one eye, approximately as wide as antennomere 3 long; OI equal to 39.65.

Antennae. Long (AL 4.24 mm, slightly exceeding half body length AL/BL 0.53), filiform, unicolored ochre yellow, with fine microgranulation, shallow punctures and relatively long, dense ochre yellow setation. Antennomere 2 shortest, antennomere 4 longest, antennomeres 5-11 slightly shorter than antennomere 3.

RLA(1-11): 0.48 : 0.29 : 1.00 : 1.32 : 0.98 : 0.96 : 0.92 : 0.93 : 0.95 : 0.99 : 0.82.

RL/WA(1-11): 1.25 : 1.05 : 3.68 : 4.41 : 3.29 : 3.70 : 3.57 : 3.46 : 3.21 : 3.04 : 3.13.

Maxillary palpus. Pale brown with microgranulation and ochre yellow setation. Ultimate palpomere widely triangular. Palpomeres 2 and 3 distinctly narrowest in base, slightly dilated anteriorly.

Pronotum (Fig. 68). Dark reddish brown, transverse, with long, semierect, ochre yellow setation, dense punctuation, punctures larger than those in head, interspaces between punctures very narrow, microgranulation between punctures indistinct, shiny. Border lines distinct, narrow and complete. Anterior margin arcuate, lateral margins straight in basal half with distinct angle in middle, posterior margin bisinuate, anterior angles indistinct, posterior angles rectangular. PL 1.49 mm; PW 2.51 mm; PI equal to 59.36.

Ventral side of body dark reddish brown with short pale setation, punctuation of prothorax denser than punctuation of meso- and metathorax. Abdomen reddish brown, with pale setation and shallow, small punctures. Ultimate ventrite in middle ochre yellow.

Elytron reddish brown, elongate oval, convex. Dorsal surface with ochre yellow, long and dense, setation, shiny. Elytral striae with distinct rows of small punctures, elytral interspaces slightly convex, with microgranulation and very small and sparse punctures. EL 5.25 mm. Widest near half elytra length, EW 3.00 mm. EL/EW 1.75.

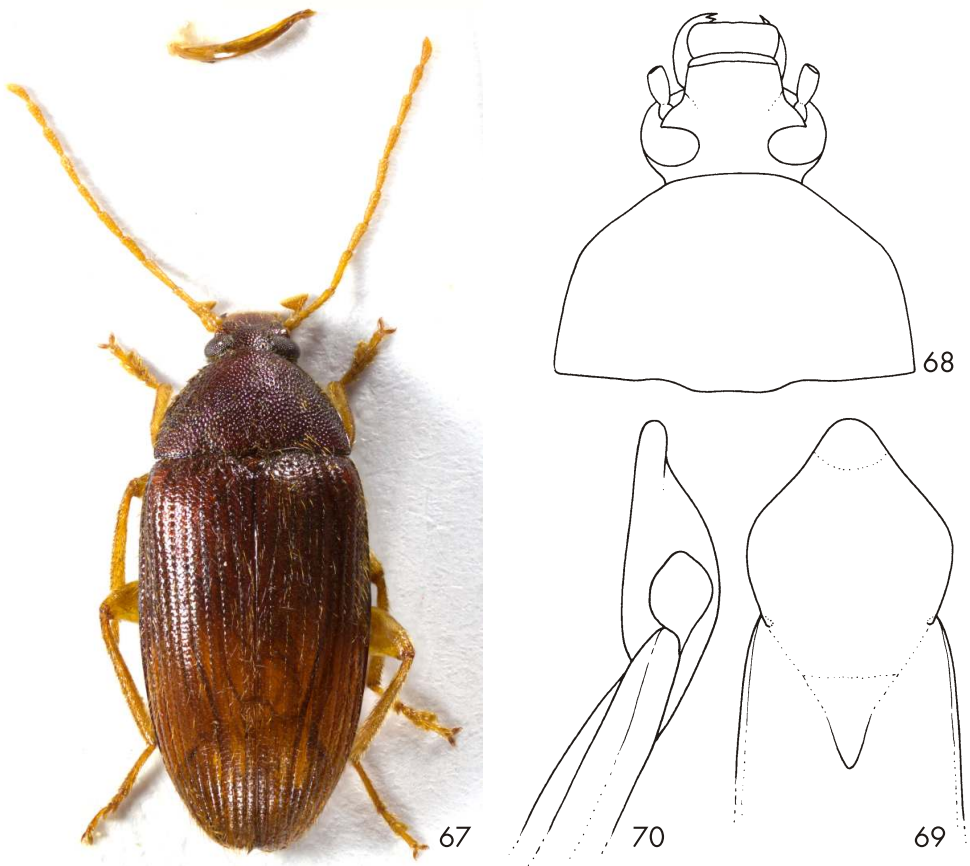
Scutellum. Reddish brown, roundly triangular, partly with microrugosities, a few punctures and setae, shiny.

Elytral epipleura well-developed, with long, pale setae, reddish brown with large punctures in basal part, regularly narrowing to ventrite 1, then pale reddish brown leads parallel.

Legs unicolored ochre yellow, with dense and long, ochre yellow setation, microgranulation and very small punctures. Tibiae slightly dilated anteriorly with strong, short setae in inner margin. Pro- and mesotarsomeres 3, 4 and metatarsomere 3 widened and lobed. RLt: 1.00 : 0.78 : 0.90 : 1.25 : 2.04 (protarsus); 1.00 : 0.37 : 0.40 : 0.40 : 0.74 (mesotarsus); 1.00 : 0.26 : 0.28 : 0.54 (metatarsus).

Both anterior tarsal claws with 10 and 11 visible teeth.

Aedeagus (Figs. 69, 70). Robust, pale brown, shiny. Basal piece regularly arcuate laterally and slightly narrowing dorsally. Apical piece very short, beak-shaped dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 9.88.



Figs. 67-70. *Borboresthes zeuzera* sp. nov. (male holotype): 67- Habitus; 68- head and pronotum; 69- aedeagus, dorsal view; 70- aedeagus, lateral view.

**Female.** Unknown.

**Differential diagnosis.** Similar species with more elongate body (BL/EW 2.6-2.8) are



*Borboresthes laothoe* sp. nov., *Borboresthes mufuensis* sp. nov., *Borboresthes saturnia* sp. nov. and *Borboresthes spilosoma* sp. nov.

*Borboresthes zeuzera* sp. nov. distinctly differs from the similar species *B. saturnia* mainly by its dorsal surface of pronotum and elytra with pale setation; while *B. saturnia* has dorsal surface of pronotum and elytra almost glabrous.

*B. zeuzera* is clearly different from the similar species *B. mufuensis* and *B. spilosoma* mainly by its larger punctures in elytral striae than those in elytral striae of *B. mufuensis* and *B. spilosoma*.

*B. zeuzera* distinctly differs from the similar species *B. laothoe* mainly by punctures of pronotum and elytral striae distinctly smaller than those in pronotum and elytral striae of *B. laothoe*.

**Etymology.** The name of this species, a noun in apposition, is the Latin generic name of the Leopard moth *Zeuzera pyrina* (Linnaeus, 1761).

**Distribution.** China (Guangdong).

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