

New species of Alleculini (Coleoptera: Tenebrionidae: Alleculinae) from the Palaearctic Region I - genus *Borbonalia* Novák, 2014

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Taxonomy, new species, descriptions, Coleoptera, Tenebrionidae, Alleculinae, Alleculini, *Borbonalia*, China, Taiwan, Palaearctic Region

Abstract. A new species of the genus *Borbonalia* Novák, 2014 are described as follows: *Borbonalia mazhanica* sp. nov., and *Borbonalia yulongshanica* sp. nov. from China (Yunnan Province) and *Borbonalia moraveci* sp. nov. from Taiwan. All new species are described, illustrated (including male genitalia) and compared with the most morphologically similar species. A list of so far known species of the genus *Borbonalia* Novák, 2014 is added.

INTRODUCTION

The genus *Borbonalia* was introduced by Novák (2014) for *Borbonalia brancuccii* Novák, 2014 as a type species. Species of this genus differ from species of *Borboresstes* Fairmaire, 1896 mainly by elytra widest in two thirds elytra length (species of *Borboresstes* have egg-shaped body widest near middle). Novák (2014 and 2019) described eleven species from China and Nepal, further eight species were described by Masumoto et al. (2017, 2019a, b) from Taiwan, so we presently know nineteen species in the Palaearctic Region (Novák 2020a). The first two species living in the Oriental Region were described by Novák (2020b) from Myanmar.

New species are described as *Borbonalia mazhanica* sp. nov. and *Borbonalia yulongshanica* sp. nov. from China (Yunnan Province), and *Borbonalia moraveci* sp. nov. from Taiwan. All new species are illustrated (including male genitalia) and compared with habitually similar species. List of all so far known *Borbonalia* species is 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 type material, a slash (/) separates data in separate rows, a double slash (//) separates different labels.

The following collection codes is used:

NMPC collection of National Museum, Praha, Czech Republic;

VNPC private collection of Vladimír Novák, Praha, 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).

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

TAXONOMY

Genus *Borbonalia* Novák, 2014

Type species: *Borbonalia brancuccii* Novák, 2014: 138.

Borbonalia mazhanica sp. nov.

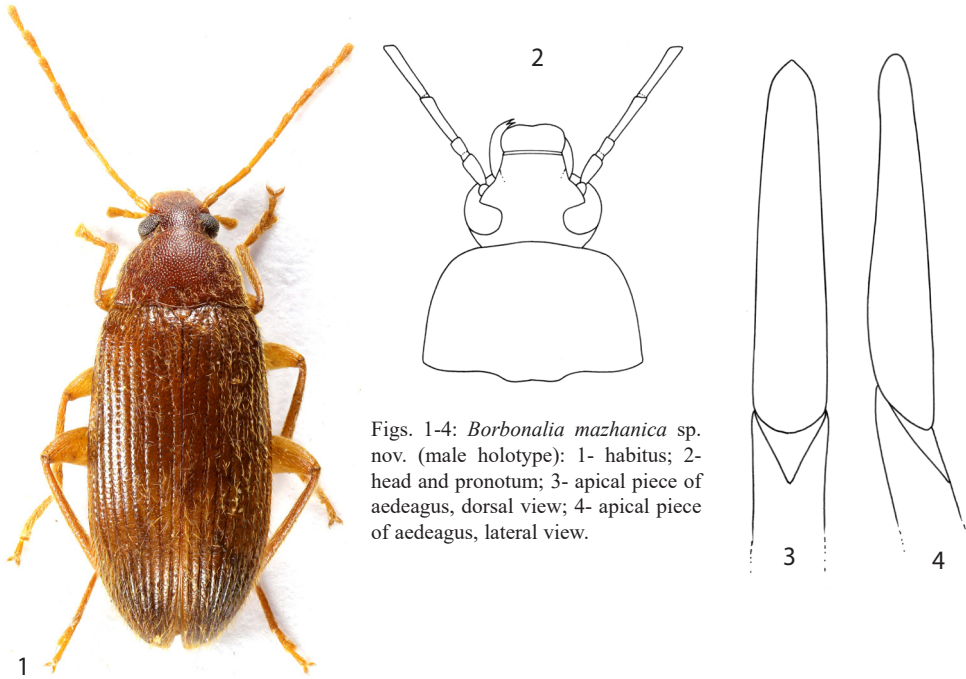
(Figs. 1-4)

Type locality. China, Yunnan Province, environ of Mazhan, Volcano Geological Park, 23°13.5'N 098°30.0'E, 1930 m.

Type material. Holotype (♂): CHINA: Yunnan province, / Mazhan env., 6.VI. 2007 / VOLCANO GEOLOGICAL PARK, / 23°13.5'N 098°30.0'E, 1930 m, / J. Hájek & J. Růžička leg. // Individually collected on soil / surface, on plants and flowering / shrubs, ruderalized grasslands / on volcanic rocks / groove margins, (NMPC). The type is provided with a printed red label: '*Borbonalia / mazhanica* sp. nov. / HOLOTYPUS / V. Novák det. 2022'.

Description of holotype. Habitus as in Fig. 1, body small, elongate, slightly convex, slightly shiny, from ochre yellow to brown, dorsal surface with pale setation, punctuation and very fine microgranulation, BL 6.87 mm. Widest near two thirds elytra length; BL/EW 2.69.

Head (Fig. 2) reddish brown, distinctly wider than long, through the eyes distinctly narrower than anterior margin of pronotum or base of pronotum. Dorsal surface shiny with a few long, pale setae, dense and coarse punctures and microgranulation outside and inside of punctures, surface with microrugosities near insertion of antennae. Clypeus wide, transverse with sides arcuate, ochre yellow with apex slightly excised in middle. Dorsal surface with very small punctures, long, pale setae, matte. Mandibles pale brown with darker sides and apex, glabrous, shiny. HW 1.14 mm; HW/PW 0.60; HL (visible part) 0.97 mm. Eyes larger, transverse, excised, space between eyes distinctly wider than diameter of one eye; approximately as wide as length of antennomere 4; OI equal to 44.62.



Figs. 1-4: *Borbonalia mazhanica* sp. nov. (male holotype): 1- habitus; 2- head and pronotum; 3- apical piece of aedeagus, dorsal view; 4- apical piece of aedeagus, lateral view.

Antenna. Long and narrow, ochre yellow, rather matte. Surface with long, recumbent, pale setation, microgranulation and small punctures. Antennomere 2 shortest, antennomere 4 longest. Antennomeres 2-9 slightly widened apically.

RLA(1-9): 0.56 : 0.37 : 1.00 : 1.21 : 1.02 : 1.02 : 0.96 : 1.00 : 0.97.

RL/WA(1-9): 1.96 : 1.90 : 6.57 : 7.47 : 4.80 : 4.76 : 3.94 : 3.65 : 3.80.

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

Pronotum (Fig. 2) reddish brown, shiny, slightly convex, wide, transverse, widest in base, slightly narrower than elytra in humeri. Dorsal surface with dense and long, recumbent, pale setae, fine microgranulation and dense, coarse punctures, intervals between punctures narrower than diameter of punctures. PL 1.22 mm; PW 1.89 mm; PI equal to 64.55. Border lines very narrow, margins conspicuous from dorsal view. Lateral margins almost straight in basal half, finely arcuate in apical part. Base bisinuate, anterior margin slightly arcuate in middle, anterior angles indistinct, posterior angles obtuse.

Elytra. Brown, shiny, slightly convex, widest near two thirds elytra length. Dorsal surface with dense pale setation. EL 4.68 mm; EW 2.55 mm; EL/EW 1.84. Elytral striae with rows of coarse punctures, approximately as large as those in pronotum, intervals between punctures in rows narrower than diameter of punctures. Elytral intervals finely convex, with very fine microgranulation and sparse, small punctures.

Scutellum. Pale brown, roundly triangular, shiny, with a few shallow punctures, fine microgranulation and a few pale setae.

Elytral epipleura well-developed, brown, with large punctures, widest in base, distinctly narrowing to metaventrite in basal part, then relatively narrow and parallel in apical part.

Legs. Long and narrow, ochre yellow. Dorsal surface with pale setation, fine microgranulation and small punctures. Tibiae straight, normally shaped, widened apically, femora stronger. Pro- and mesotarsomeres 3 and 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.45 : 0.61 : 0.73 : 1.36 (protarsus), 1.00 : 0.72 : 0.71 : 0.91 : 1.93 (mesotarsus), 1.00 : 0.33 : 0.28 : 0.59 (metatarsus).

Protarsal claws with 13 and 15 visible teeth.

Ventral side of body pale reddish brown with punctures and short, pale setae. Abdomen pale brown with sparse, pale setae, very fine microgranulation and shallow punctures.

Aedeagus (Figs. 3, 4) ochre yellow, slightly shiny. Basal piece rounded laterally and slightly narrowing in dorsal view. Apical piece narrow, elongate, beak shaped from dorsal and lateral views. Ratio of length of apical piece to length of basal piece from dorsal view 1 : 3.57.

Female. Unknown.

Differential diagnosis. Similar species with unicolored dorsal surface from Yunnan Province in China is *Borbonalia yunfengica* Novák, 2019.

Borbonalia mazhanica sp. nov. clearly differs from the similar species *B. yunfengica* mainly by wider body (BL/EW 2.7), by wider space between eyes (OI 44.6), by distinct longitudinal furrow in the middle of ultimate ventrite and by shape of apical piece of aedeagus (as in Figs. 3 and 4); while *B. yunfengica* has narrower body (BL/EW 3.0), narrower space between eyes (OI 26.0), middle of ultimate ventrite has no longitudinal furrow, shape of apical piece of aedeagus is as in Novák (2019:173: figs. 15, 16).

Etymology. Toponymic, named after the type locality Mazhan in Yunnan Province (China).

Distribution. China (Yunnan Province).

***Borbonalia moraveci* sp. nov.**

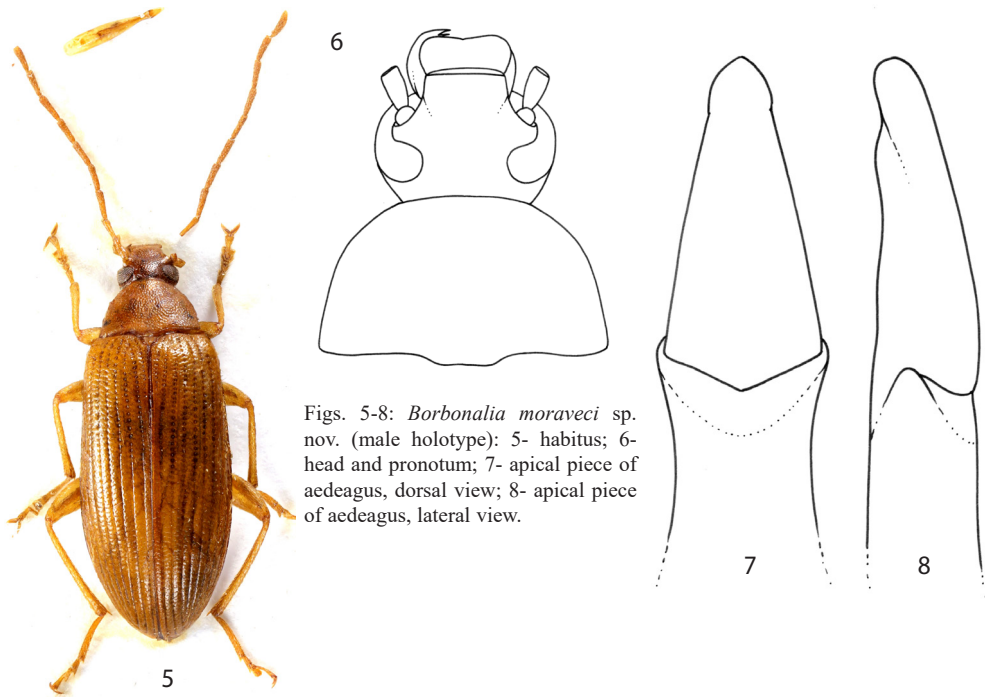
(Figs. 5-8)

Type locality. Taiwan, A Li Shan.

Type material. Holotype (♂): REP. OF CHINA / FORMOSA (TAIWAN) / A LI SHAN 17.-25.6.95 / P. MORAVEC, (VNPC). The type is provided with a printed red label: '*Borbonalia / moraveci* sp. nov. / HOLOTYPE / V. Novák det. 2022'.

Description of holotype. Habitus as in Fig. 5, body small, elongate, shiny, from ochre yellow to pale brown, dorsal surface with pale setation, punctuation and fine microgranulation, BL 6.73 mm. Widest near two thirds elytra length; BL/EW 2.80.

Head (Fig. 6) distinctly wider than long, through the eyes distinctly narrower than base of pronotum. Dorsal surface slightly shiny with pale setae, punctures and microgranulation.



Figs. 5-8: *Borbonalia moraveci* sp. nov. (male holotype): 5- habitus; 6- head and pronotum; 7- apical piece of aedeagus, dorsal view; 8- apical piece of aedeagus, lateral view.

Anterior part slightly paler than pale brown posterior half. Clypeus wide, transverse, ochre yellow with lateral margins arcuate and apex slightly excised in middle. Dorsal surface with microgranulation. Mandibles ochre yellow or pale brown with darker sides and apex, glabrous, shiny. HW 1.01 mm; HW/PW 0.63; HL (visible part) 0.88 mm. Eyes large, transverse, excised, space between eyes wider, distinctly wider than diameter of one eye; wider than length of antennomere 3; OI equal to 45.61.

Antenna. Long, narrow, ochre yellow or pale brown, rather matte (AL 4.47 mm, AL/BL 0.66 - reaching two thirds body length). Surface with recumbent, pale setation, microgranulation and small punctures. Antennomere 2 shortest, antennomeres 5-11 longer than antennomere 3. Antennomeres 3-10 slightly widened apically, ultimate antennomere widest in two thirds of its length.

RLA(1-11): 0.51 : 0.39 : 1.00 : 1.28 : 1.19 : 1.25 : 1.15 : 1.24 : 1.15 : 1.10: 1.33.

RL/WA(1-11): 1.51 : 1.63 : 4.39 : 4.81 : 4.48 : 4.95 : 5.06 : 5.44 : 4.79 : 5.12 : 4.57.

Maxillary palpus ochre yellow, rather matte, with pale setae and very fine microgranulation. Palpomeres 2 and 3 distinctly narrowest at base and widest in apex, ultimate palpomere widely triangular.

Pronotum (Fig. 6) pale reddish brown, wide, transverse, shiny, slightly convex, widest in base, slightly narrower than elytra in humeri. Dorsal surface with sparse, pale setae, fine microgranulation and dense, large punctures, intervals between punctures narrower than diameter of punctures. PL 0.95 mm; PW 1.60 mm; PI equal to 59.37. Border lines very narrow, margins conspicuous from dorsal view. Lateral margins straight and narrowing in

basal part, arcuate in apical half. Base finely bisinuate, anterior margin arcuate, anterior angles indistinct, posterior angles a little obtuse.

Elytra. Ochre yellow, suture narrowly darker, elongate, slightly convex, slightly oval, shiny, widest near two thirds elytra length. Dorsal surface with sparse pale setae. EL 4.90 mm; EW 2.40 mm; EL/EW 2.04. Elytral striae with rows of coarse punctures, smaller than those in pronotum, intervals between punctures in rows narrower or as wide as diameter of punctures. Elytral intervals finely convex, with fine microgranulation and very small punctures.

Scutellum. Ochre yellow with margins darker, pentagonal shaped, rather matte, with fine microgranulation.

Elytral epipleura well-developed, ochre yellow, with punctures in basal part, distinctly narrowing to metaventricle, then relatively wide and parallel in apical part.

Legs. Long and narrow, ochre yellow. Dorsal surface with pale setation and fine microgranulation. Tibiae straight, normally shaped, widened apically. Pro- and mesotarsomeres 3 and 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.51 : 0.57 : 0.80 : 1.69 (protarsus), 1.00 : 0.30 : 0.39 : 0.48 : 0.95 (mesotarsus), 1.00 : 0.29 : 0.27 : 0.43 (metatarsus).

Protarsal claws with more than 20 visible teeth.

Ventral side of body ochre yellow with small punctures. Abdomen ochre yellow or pale brown with sparse, pale setae, fine microgranulation and small, shallow punctures.

Aedeagus (Figs. 7, 8) ochre yellow, slightly shiny. Basal piece distinctly narrowing in dorsal view. Apical piece widely triangular from dorsal view, beak shaped dorsally and laterally. Ratio of length of apical piece to length of basal piece from dorsal view 1: 5.13.

Female. Unknown.

Differential diagnosis. Similar species with pale dorsal surface from Taiwan are *Borbonalia barclayi* Masumoto, Novák, Akita & Lee, 2019 and *Borbonalia chanmeilingae* Masumoto, Novák, Akita & Lee, 2019.

Borbonalia moraveci sp. nov. clearly differs from similar species *B. barclayi* mainly by dorsal surface ochre yellow or pale brown, by body longer and narrower (BL/EW 2.8), by antennomeres 4-11 longer than antennomere 3 and by shape of apical piece of aedeagus as in Figs. 7 and 8; while *B. barclayi* has dorsal surface more reddish, body is wider and shorter (BL/BW 2.5), antennomeres 4-11 are shorter than antennomere 3 and shape of aedeagus is as in Masumoto et al. (2019b: 40: figs. 19 and 20).

B. moraveci is distinctly different from similar species *B. chanmeilingae* mainly by dorsal surface approximately same colour (pale brown or ochre yellow), by antennomeres 5-11 distinctly longer than antennomere 3 and by shape of apical piece of aedeagus as in Figs. 7 and 8; while *B. chanmeilingae* has head and pronotum distinctly darker than elytra, antennomeres 5-11 are approximately as long or shorter than antennomere 3 and shape of aedeagus is as in Masumoto et al. (2019a: plate 2: figs. 17 and 18).

Etymology. Patronymic, named after the collector of the type specimen, my friend and specialist in family Carabidae (Coleoptera) - Pavel Moravec (Litoměřice, Czech Republic), after his surname.

Distribution. China (Yunnan Province).

***Borbonalia yulongshanica* sp. nov.**

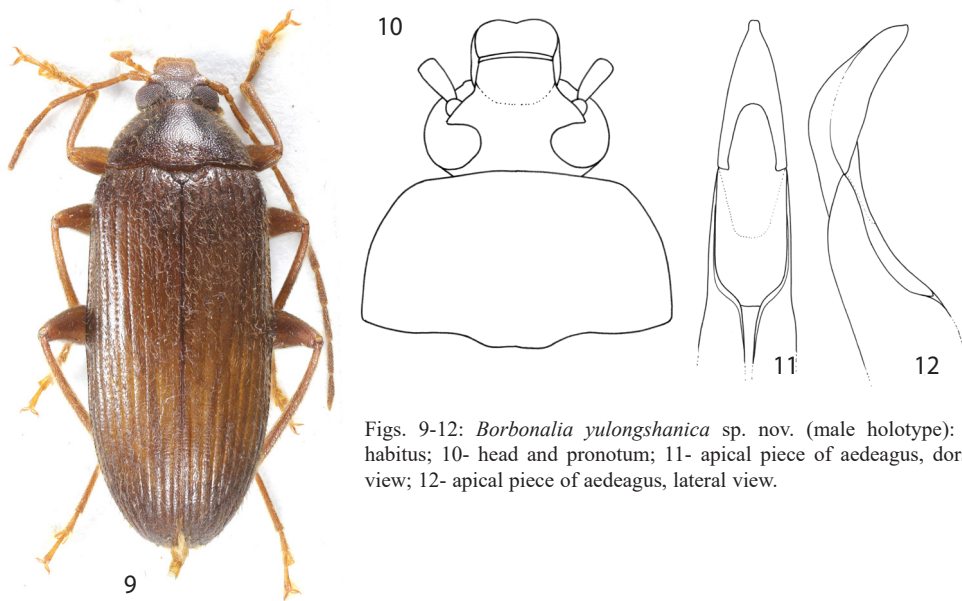
(Figs. 9-12)

Type locality. China, Yunnan Province, Yulongshan mountains, Baishui, 27°08'N 100°14'E, 2900-3500 m.

Type material. Holotype (♂): CHINA, Yunnan prov., / 27°08'N 100°14'E, 2900- / Yulongshan mts. 3500m / BAISHUI 7.-12.VII. 1990 / Vít Kubáň leg., (VNPC). Paratype (1 ♂): China N-YUNNAN / 27°08'N 100°14'E / Yulongshan mts. 2900- / -3500m BAISHUI vill. / lgt. D. Král 7-12.7.90, (VNPC). The types are provided with a printed red label: '*Borbonalia / yulongshanica* sp. nov. / HOLOTYPUS or PARATYPUS / V. Novák det. 2022'.

Description of holotype. Habitus as in Fig. 9, body larger, elongate, slightly shiny, from pale brown to dark brown, dorsal surface with pale setation, punctuation and fine microgranulation, BL 9.98 mm. Widest near two thirds elytra length; BL/EW 2.93.

Head (Fig. 10) distinctly wider than long, through the eyes distinctly narrower than anterior margin of pronotum. Dorsal surface shiny with a few pale setae, microgranulation and punctures. Posterior part dark brown with coarser punctures than those in reddish brown anterior half. Clypeus wide, transverse, pale reddish brown with apex excised in middle. Dorsal surface with small, shallow punctures, microgranulation and long, pale setae, rather matte. HW 1.57 mm; HW/PW 0.57; HL (visible part) 1.27 mm. Eyes large, transverse,



Figs. 9-12: *Borbonalia yulongshanica* sp. nov. (male holotype): 9- habitus; 10- head and pronotum; 11- apical piece of aedeagus, dorsal view; 12- apical piece of aedeagus, lateral view.

excised, space between eyes narrow, approximately as wide as diameter of one eye; wider than length of antennomere 1; OI equal to 33.74.

Antenna. Long, narrow, rather matte (AL 6.85 mm, AL/BL 0.69 - distinctly exceeding two thirds body length). Surface with short and dense, recumbent, pale setation, microgranulation and small punctures. Antennomeres 1-4 pale reddish brown, antennomeres 5-11 from pale brown to brown. Antennomere 2 shortest, antennomeres 5-9 and 11 longer than antennomere 3.

RLA(1-11): 0.64 : 0.27 : 1.00 : 1.41 : 1.17 : 1.09 : 1.12 : 1.08 : 1.12 : 0.96: 1.15.

RL/WA(1-11): 2.21 : 1.64 : 5.08 : 6.20 : 6.42 : 5.54 : 4.93 : 6.17 : 7.05 : 6.00 : 6.91.

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

Pronotum (Fig. 10) brown, wide, transverse, shiny, slightly convex, widest in base, slightly narrower than elytra in humeri. Dorsal surface with sparse, pale setae, relatively small punctures and fine microgranulation inside of punctures. PL 1.57 mm; PW 2.75 mm; PI equal to 57.09. Border lines narrow, margins conspicuous from dorsal view. Lateral margins finely arcuate. Base finely bisinuate, anterior margin slightly arcuate in middle, anterior angles distinct - roundly obtuse, posterior angles obtuse.

Elytra. Brown, elongate, slightly convex, slightly shiny, widest near two thirds elytra length. Dorsal surface with pale setae. EL 7.14 mm; EW 3.41 mm; EL/EW 2.09. Elytral striae with rows of small punctures, almost smaller than those in pronotum, intervals between punctures in rows approximately as wide as diameter of punctures. Elytral intervals finely convex, with fine microgranulation and small punctures.

Scutellum. Brown, roundly triangular with darker margins, shiny, with a few shallow punctures, fine microgranulation and a few pale setae.

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

Legs. Long and narrow, brown. Dorsal surface with pale setation, fine microgranulation and small punctures. Tibiae straight, normally shaped, widened apically. Pro- and mesotarsomeres 3 and 4 and metatarsomere 3 widened and lobed. RLT: 1.00 : 0.35 : 0.48 : 0.58 : 1.23 (protarsus), 1.00 : 0.32 : 0.26 : 0.20 : 0.69 (mesotarsus), 1.00 : 0.67 : 1.83 : 2.01 (metatarsus).

Protarsal claws with 17 or 18 visible teeth.

Ventral side of body dark brown with small punctures and pale setae.

Aedeagus (Figs. 11, 12) ochre yellow, rather matte. Basal piece rounded laterally and narrowing in dorsal view. Apical piece beak shaped from dorsal and lateral views. Ratio of length of apical piece to length of basal piece from dorsal view 1: 2.74.

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 9.63 mm (9.28-9.98 mm); HL 1.23 mm (1.18-1.27 mm); HW 1.51 mm (1.44-1.57 mm); OI 35.18 (33.74-36.62); PL 1.48 mm

(1.38-1.57 mm); PW 2.57 mm (2.39-2.75 mm); PI 57.42 (57.09-57.74); EL 6.93 mm (6.72-7.13 mm); EW 3.22 mm (3.03-3.41 mm).

Differential diagnosis. Similar large species with unicolored brown dorsal surface are *Borbonalia nepalica* Novák, 2014 and *Borbonalia wrasei* Novák, 2014.

Borbonalia yulongshanica sp. nov. clearly differs from similar species *B. nepalica* and *B. wrasei* mainly by narrower and more parallel body (BL/EW 2.9), by pronotum rounded in lateral margins before posterior angles, by space between eyes approximately as wide as diameter of one eye (OI approximately 34) and by shape of apical piece of aedeagus as in Figs. 11 and 12; while *B. nepalica* and *B. wrasei* have body wider (BL/EW 2.7 in *B. nepalica* and 2.6 in *B. wrasei*), lateral margins before posterior angles are distinctly excised, space between eyes is distinctly wider than diameter of one eye (OI approximately 55 in *B. nepalica* and 51 in *B. wrasei*) and shape of apical piece of aedeagus is as in Novák (2014: 149: figs. 15 and 16 for *B. nepalica* and 157: figs. 27 and 28 for *B. wrasei*).

Etymology. Toponymic, named after the type locality Yulongshan mountains in Yunnan Province (China).

Distribution. China (Yunnan Province).

LIST OF *BORBONALIA* SPECIES

genus *Borbonalia* Novák, 2014: 136 type species *Borbonalia brancuccii* Novák, 2014

<i>akiyamai</i> Masumoto, Novák, Lee & Akita, 2017	Taiwan
<i>barclayi</i> Masumoto, Novák, Akita & Lee, 2019	Taiwan
<i>becvari</i> Novák, 2019	China (Yunnan Province)
<i>brancuccii</i> Novák, 2014	China (Yunnan Province)
<i>beinamica</i> Masumoto, Novák, Lee & Akita, 2017	Taiwan
<i>chanmeilingae</i> Masumoto, Novák, Akita & Lee, 2019	Taiwan
<i>diaolinica</i> Novák, 2019	China (Yunnan Province)
<i>ewersi</i> Masumoto, Novák, Akita & Lee, 2019	Taiwan
<i>gongashanica</i> Novák, 2019	China (Sichuan Province)
<i>jizuica</i> Novák, 2014	China (Yunnan Province)
<i>kachinica</i> Novák, 2020	Myanmar (Kachin State)
<i>langeri</i> Novák, 2020	Myanmar (Chin State)
<i>mazhanica</i> sp. nov.	China (Yunnan Province)
<i>moraveci</i> sp. nov.	Taiwan
<i>murzini</i> Novák, 2014	China (Sichuan, Xizang, Yunnan Provinces)
<i>nepalica</i> Novák, 2014	Nepal
<i>schneideri</i> Novák, 2014	China (Sichuan Province)
<i>tibetica</i> Novák, 2014	China (Xizang Provinces)

<i>tienchihica</i> Masumoto, Novák, Akita & Lee, 2019	Taiwan
<i>wangtaichuani</i> Masumoto, Novák, Akita & Lee, 2019	Taiwan
<i>wrasei</i> Novák, 2014	China (Yunnan Province)
<i>xueshana</i> Masumoto, Novák, Lee & Akita, 2017	Taiwan
<i>yulongshanica</i> sp. nov.	China (Yunnan Province)
<i>yunfengica</i> Novák, 2019	China (Yunnan Province)

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