New species of Alleculini (Coleoptea: Tenebrionidae: Alleculinae) from the Palaearctic Region II - genus *Gerdacula* Novák, 2015

Vladimír NOVÁK

Nepasické náměstí 796, CZ-190 14 Prague 9 - Klánovice, Czech Republic e-mail: alleculinae.vn@centrum.cz

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Abstract. New species of the genus *Gerdacula* Novák, 2015 from China are described as follows: *Gerdacula guangdongica* sp. nov. (Guangdong Province), *Gerdacula hunanica* sp. nov. (Hunan Province) and *Gerdacula sichuanica* sp. nov. (Sichuan Province). All new species are described, illustrated (including male genitalia) and compared with the most morphologically similar species. A key and list of so far known species of the genus *Gerdacula* Novák, 2015 are added.

INTRODUCTION

The Alleculine genus *Gerdacula* was described by Novák (2015) with type species *Gerdacula fujianica* sp. nov. from China (Fujian) for two species from Nepal, two species from China (Fujian and Hubei) and one species inhabiting Myanmar was transferred from the genus *Allecula* Fabricius, 1801. Species of this genus are habitually similar to species of *Allecula* Fabricius, 1801 or *Borboresthes* Fairmaire, 1896 and differ by bell-shaped pronotum with sharp posterior angles, as wide as elytra at base, elongate oval body longer and narrower than body of *Borboresthes* with pronotum rather semicircular, males protarsal claws of *Gerdacula* have more teeth, while *Allecula* species have usually pronotum narrower than elytral base and protarsal claws have only few teeth.

Novák (2020a) listed 5 species from the Palaearctic Region, because Masumoto et al. (2017) described further species from Taiwan as *Gerdacula taiwana* Masumoto, Novák, Lee & Akita, 2017. One new species was described from Myanmar (Kachin State) by Novák (2020b) as *Gerdacula emawbumica* Novák, 2020.

New species of the genus *Gerdacula* Novák, 2015 from China are described as follows: *Gerdacula guangdongica* sp. nov. (Guangdong Province), *Gerdacula hunanica* sp. nov. (Hunan Province) and *Gerdacula sichuanica* sp. nov. (Sichuan Province). All new species are described, illustrated (including male genitalia) and compared with the most morphologically similar species. A key and list of so far known species of the genus *Gerdacula* Novák, 2015 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 minimum dorsal distance between eyes) / (maximum width of head across eyes). The pronotal index is calculated as (100 \times length of pronotum along midline) / (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 are 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 Gerdacula Novák, 2015

Type species: Gerdacula fujianica Novák, 2015.

Gerdacula guangdongica sp. nov.

(Figs. 1-4)

Type locality. China, Guangdong Province, West of Qixign, Heishiding nature reserve, 27°27.9′N 111°54.3′E, 190 m.

Type material. Holotype (3): CHINA: Guangdong prov. / W of Qixing, 1-3.v. 2011 / Heishiding nature reserve / forest stream valley, at light / 27°27.9′N 111°54.3′E, 190 m / M. Fikáček & J. Hájek leg., (NMPC). The type is provided with a printed red label: 'Gerdacula / guangdongica sp. nov. / HOLOTYPUS / V. Novák det. 2023'.

Description of holotype. Habitus as in Fig. 1, body medium sized, elongate, *leptura* shaped, semimatte, from pale reddish brown to brown, dorsal surface with dense, pale setation, very fine microgranulation and punctuation, BL 8.71 mm. Widest in basal third elytra length; BL/EW 3.35.

Head (Fig. 2) reddish brown, distinctly wider than long, through the eyes distinctly narrower than base of pronotum. Dorsal surface slightly shiny with long, pale setae, smaller punctures and very fine microgranulation. Clypeus wide, transverse with sides arcuate, pale reddish brown with apex straight. Dorsal surface with very small punctures, pale setae, and very fine microgranulation, shiny. Mandibles pale brown with darker sides and apex, glabrous, shiny. HW 1.29 mm; HW/PW 0.54; HL (visible part) 1.12 mm. Eyes large, transverse, excised, space between eyes as wide as diameter of one eye; slightly wider than length of antennomere 4; OI equal to 33.82

Antenna. Pale reddish brown, rather matte. Antennomeres long and narrow, surface with long, pale setation and microgranulation. Antennomere 2 shortest, antennomere 4 longest. Antennomeres 4-8 distinctly longer than antennomere 3.

RLA(1-8): 0.57: 0.26: 1.00: 1.28: 1.14: 1.12: 1.02: 0.95.

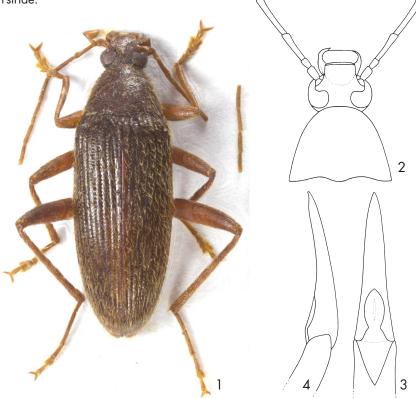
RL/WA(1-8): 2.06: 1.39: 4.58: 5.45: 6.13: 6.90: 5.73: 5.32.

Maxillary palpus pale brown, slightly shiny, with pale setae and fine microgranulation. Palpomeres 2 and 3 distinctly narrowest at base and widest in apex, ultimate palpomere rather matte widely triangular and slightly darker than penultimate.

Pronotum (Fig. 2) reddish brown, bell shaped, slightly convex, rather matte, widest in base, approximately as wide as elytra in humeri. Dorsal surface with dense and long, pale setae, fine microgranulation and shallow punctures. PL 1.74 mm; PW 2.38 mm; PI equal to 73.11. Border

lines very narrow, margins conspicuous, only in the middle of anterior margin not clearly distinct. Lateral margins almost straight and narrowing in basal half, finely arcuate in apical part. Base bisinuate, anterior margin arcuate, anterior angles indistinct, posterior angles sharp.

Elytra. Brown, shiny, slightly convex, widest near basal third elytra length. Dorsal surface with dense pale setation. EL 5.85 mm; EW 2.60 mm; EL/EW 2.25. Elytral striae with rows of coarse punctures, intervals between punctures in rows narrower than diameter of punctures. Elytral intervals finely convex, with very fine microgranulation, smaller and shallower punctures than those in striae.



Figs. 1-4. Gerdacula guangdongica sp. nov. (male holotype): 1- habitus; 2- head and pronotum with antennomeres 1-4; 3-apical piece of aedeagus, dorsal view; 4-apical piece of aedeaus, lateral view.

Scutellum. Reddish brown, widely triangular, slightly shiny, with fine microgranulation and a few setae.

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

Legs. Long and narrow, pale reddish brown. 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. Metatarsomere 1 very long. RLT: 1.00:0.49:0.65:0.74:1.51 (protarsus), 1.00:0.33:0.24:0.35:0.86 (mesotarsus), 1.00:0.32:0.18:0.39 (metatarsus).

Protarsal claws with more than 20 visible teeth.

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

Aedeagus (Figs. 3, 4) ochre yellow, slightly shiny. Basal piece rounded laterally and slightly narrowing in dorsal view. Apical piece elongate triangular dorsally, beak shaped from dorsal and lateral views. Ratio of length of apical piece to length of basal piece from dorsal view 1: 3.32.

Female. Unknown.

Differential diagnosis. (For details see the key below). Similar species with dorsal surface covered by dense setation from China are *Gerdacula fujianica* Novák, 2015 from Fujian Province and *Gerdacula sichuanica* sp. nov. from Sichuan Province.

Gerdacula guangdongica sp. nov. clearly differs from the similar species G. fujianica mainly by pronotum brown, rather matte with sparse, shallow punctures; while pronotum of G. fujianica is reddish brown, shiny with dense punctuation.

G. guangdongica is clearly different from similar species G. sichuanica mainly by pronotum brown, rather matte with sparse, shallow punctures; while pronotum of G. sichuanica is blackish brown, shiny with dense punctuation.

Etymology. Toponymic, named after the type locality Guangdong Province in China.

Distribution. China (Guangdong Province).

Gerdacula hunanica sp. nov.

(Figs. 5-8)

Type locality. China, Northwest of Hunan Province, Wulingshan, Tianzishan Nature Reserve, 800 m.

Type material. Holotype (3): CHINA, NW HUNAN prov. / Wulingshan 800 m / Tianzishan Nat. Res. / 16-18. Jun 1997, Bolm lgt., (VNPC). The type is provided with a printed red label: 'Gerdacula / hunanica sp. nov. / HOLOTYPUS / V. Novák det. 2023'.

Description of holotype. Habitus as in Fig. 5, body medium sized, elongate, *leptura* shaped, slightly convex, shiny, from pale reddish brown to blackish brown, dorsal surface almost glabrous, with punctuation and fine microgranulation, BL 9.31 mm. Widest in basal third elytra length; BL/EW 3.16.

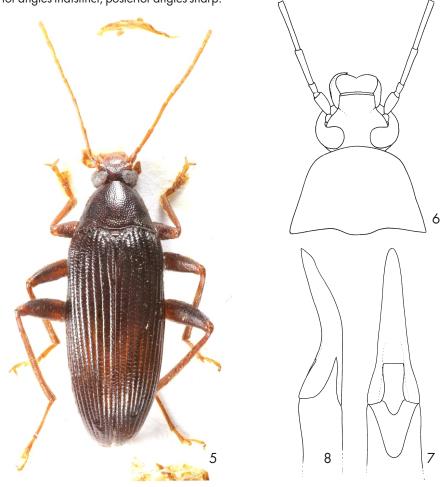
Head (Fig. 6) distinctly wider than long, through the eyes distinctly narrower than base of pronotum. Dorsal surface shiny, almost glabrous, with punctures and very fine microgranulation not clearly distinct everywhere. Anterior part reddish brown, posterior half blackish brown. Clypeus pale brown, wide, transverse, half heart shaped, with sides arcuate, apex slightly excised in middle. Dorsal surface with very small, shallow punctures, fine microgranulation, shiny. Mandibles pale brown with darker sides and apex, glabrous, shiny. HW 1.33 mm; HW/PW 0.60; HL (visible part) 1.09 mm. Eyes large, transverse, excised, space between eyes slightly narrower than diameter of one eye; slightly wider than length of antennomere 1; OI equal to 29.64.

Antenna. Pale brown, rather matte. Antennomeres long and narrow, surface with pale setae, small, shallow punctures and microgranulation. Antennomere 1 slightly shiny, antennomere 2 shortest, antennomere 4 longest. Antennomeres 5-8 shorter than or as long as antennomere 3.

RLA(1-8): 0.52: 0.29: 1.00: 1.36: 0.99: 1.00: 0.94: 0.88. RL/WA(1-8): 1.82: 1.52: 5.17: 9.53: 6.21: 5.67: 5.09: 5.25.

Maxillary palpus pale brown, slightly shiny, with pale setation and punctures. Palpomeres 2 and 3 distinctly narrowest at base and widest in apex, ultimate palpomere widely triangular.

Pronotum (Fig. 6) blackish brown, shiny, slightly convex, bell shaped, widest in base, approximately as wide as elytra in humeri. Dorsal surface almost glabrous, with a few pale setae near lateral margins, dense punctures and fine microgranulation. PL 1.43 mm; PW 2.21 mm; PI equal to 64.71. Border lines very narrow, margins conspicuous from dorsal view. Lateral margins almost straight and narrowing, finely arcuate near apex. Base bisinuate, anterior margin arcuate, anterior angles indistinct, posterior angles sharp.



Figs. 5-8. Gerdacula hunanica sp. nov. (male holotype): 5- habitus; 6- head and pronotum with antennomeres 1-4; 7- apical piece of aedeaus, dorsal view; 8- apical piece of aedeaus, lateral view.

Elytra. Blackish brown, shiny, glabrous, slightly convex, widest near humeri. EL 5.79 mm; EW 2.63 mm; EL/EW 2.20. Elytral striae with rows of coarse punctures, intervals between punctures

in rows as wide as or narrower than diameter of punctures. Elytral intervals finely convex, with fine microgranulation and shallow punctures distinctly smaller than those in striae.

Scutellum. Reddish brown, semielliptical, shiny, glabrous, with small punctures.

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

Legs. Long and narrow, reddish 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. Metatarsomere 1 very long. RLT: 1.00: 0.66: 0.71: 0.79: 1.64 (protarsus), 1.00: 0.39: 0.39: 0.39: 0.64 (mesotarsus), 1.00: 0.32: 0.21: 0.46 (metatarsus).

Protarsal claws with more than 20 visible teeth.

Ventral side of body reddish brown with punctures. Abdomen reddish brown, glabrous, shiny, with fine microgranulation and small, shallow punctures.

Aedeagus (Figs. 7, 8) ochre yellow, slightly shiny. Basal piece rounded laterally and slightly narrowing in dorsal view. Apical piece elongate triangular dorsally, beak shaped from dorsal and lateral views. Ratio of length of apical piece to length of basal piece in dorsal view 1: 4.59.

Female. Unknown.

Differential diagnosis. (For details see the key below). Similar species with almost glabrous dorsal surface from China is *Gerdacula hubeica* Novák, 2015 from Hubei Province.

Gerdacula hunanica sp. nov. clearly differs from the similar species G. hubeica mainly by lateral margins of pronotum straight and narrowing apically in basal two thirds; while G. hubeica has lateral margins of pronotum finely arcuate.

Etymology. Toponymic, named after the type locality Hunan Province in China.

Distribution. China (Hunan Province).

Gerdacula sichuanica sp. nov.

(Figs. 9-12)

Type locality. China, Sichuan Province, Jiulonggou near Dayi, Chongquing Jiulong Valley, cca 60 km West of Chengdu, 31°00′N 103°30′E.

Type material. Holotype (3): CHINA, Sichuan 27.VI.-2.VII. / Jiulonggou near Dayi 1995 / (=Chongquing Jiulong Valley) / cca 60 km W of Chengdu / 31°00′N 103°30′E / M. Trýzna et O. Šafránek lgt., (VNPC). The type is provided with a printed red label: 'Gerdacula / sichuanica sp. nov. / HOLOTYPUS / V. Novák det. 2023'.

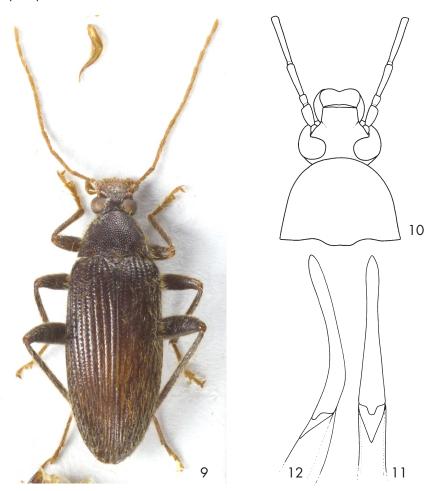
Description of holotype. Habitus as in Fig. 9, body medium sized, elongate, *leptura* shaped, slightly convex, shiny, from pale brown to blackish brown, dorsal surface with pale setation, fine microgranulation and punctuation, BL 8.34 mm. Widest in basal third elytra length; BL/EW 3.14.

Head (Fig. 10) distinctly wider than long, through the eyes distinctly narrower than base of pronotum. Dorsal surface shiny with a few long, pale setae, dense, large and coarse punctures and microgranulation. Basal part blackish brown, apical part pale reddish brown. Clypeus wide, transverse with sides arcuate, pale reddish brown with apex slightly excised in middle. Dorsal surface with shallow punctures, microgranulation and long, pale setae, shiny. Mandibles pale reddish brown with darker sides and apex, glabrous, shiny. HW 1.34 mm; HW/PW 0.64; HL

(visible part) 1.07 mm. Eyes larger, transverse, excised, space between eyes approximately as wide as diameter of one eye; wider than length of antennomere 1; OI equal to 32.86.

Antenna. Pale brown, rather matte (AL(1-11) 5.46 mm, reaching two thirds body length - AL/BL(1-11) 0.66). Antennomeres long and narrow, surface with long, dense, pale setation, microgranulation and small punctures. Antennomere 2 shortest, antennomere 4 longest. Antennomeres 4-9 and 11 distinctly longer than antennomere 3.

RLA(1-11): 0.51 : 0.19 : 1.00 : 1.65 : 1.38 : 1.21 : 1.21 : 1.12 : 1.08 : 0.98 : 1.12. RL/WA(1-11): 1.79 : 0.89 : 4.72 : 7.85 : 6.16 : 6.44 : 5.72 : 4.75 : 4.60 : 4.61 : 4.75.



Figs. 9-12. Gerdacula sichuanica sp. nov. (male holotype): 9- habitus; 10- head and pronotum with antennomeres 1-4; 11-apical piece of aedeaus, dorsal view; 12-apical piece of aedeaus, lateral view.

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

Pronotum (Fig. 10) blackish brown, shiny, slightly convex, bell shaped, widest in base, approximately as wide as elytra in humeri. Dorsal surface with long, pale setae denser near lateral margins than in disc, fine microgranulation, dense, large and coarse punctures, intervals between punctures narrower than diameter of punctures. PL 1.52 mm; PW 2.09 mm; Pl equal to 72.73. Border lines very narrow, margins conspicuous from dorsal view. Lateral margins almost straight in basal half, arcuate in apical part. Base bisinuate, anterior margin arcuate, anterior angles indistinct, posterior angles sharp.

Elytra. Dark reddish brown, shiny, slightly convex, widest in one third elytra length. Dorsal surface with dense pale setation. EL 5.75 mm; EW 2.66 mm; EL/EW 2.16. Elytral striae with rows of large and coarse punctures, approximately as large as those in pronotum, intervals between punctures in rows narrower than diameter of punctures. Elytral intervals finely convex, with fine microgranulation and small, shallow punctures.

Scutellum. Blackish brown, semielliptical, shiny, with a few small, shallow punctures and a few pale setae.

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

Legs. Long and narrow, blackish brown. Dorsal surface with long, pale setation, fine microgranulation and small punctures. Tibiae straight, normally shaped, widened apically. Proand mesotarsomeres 3 and 4 and metatarsomere 3 widened and lobed. Metatarsomere 1 very long. RLT: 1.00: 0.42: 0.43: 0.57: 1.15 (protarsus), 1.00: 0.31: 0.33: 0.31: 0.57 (mesotarsus), 1.00: 0.31: 0.22: 0.43 (metatarsus).

Protarsal claws with 18 visible teeth.

Ventral side of body blackish brown with punctures, metaventrite with short, pale setae. Abdomen reddish brown, with sparse, pale setae, fine microgranulation and shallow punctures, ultimate ventrite pale brown.

Aedeagus (Figs. 11, 12) ochre yellow, rather matte. Basal piece rounded laterally and 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: 2.97.

Female, Unknown.

Differential diagnosis. (For details see the key below). Similar species with dorsal surface covered by dense setation from China are *Gerdacula fujianica* Novák, 2015 from Fujian Province and *Gerdacula guangdongica* sp. nov. from Guangdong Province.

Gerdacula sichuanica sp. nov. clearly differs from the similar species G. fujianica mainly by dorsal surface of pronotum blackish brown; while pronotum of G. fujianica has dorsal surface reddish brown.

G. sichuanica is clearly different from similar species G. guangdongica mainly by pronotum blackish brown, shiny with dense punctuation; while pronotum of G. guangdongica is brown, rather matte with sparse, shallow punctures.

Etymology. Toponymic, named after the type locality Sichuan Province in China.

Distribution. China (Sichuan Province).

KEY TO THE SPECIES OF GERDACULA NOVÁK, 2015

1	(2)	Species from China
		Species from Nepal and Myanmar
		Species from Nepal.
		Species from Myanmar
5	(6)	Dorsal surface of elytra unicolored
6	(5)	Dorsal surface of elytra bicolour
7	(8)	Antennomere 4 of male approximately as long as antennomere 3.
8	(7)	Antennomere 4 of male distinctly longer than antennomere 3.
9	(10)	Setation of dorsal surface sparse.
		Setation of dorsal surface dense.
		Lateral margins of pronotum straight and narrowing apically in basal two thirds. Habitus as in Fig. 5 head and pronotum (Fig. 6), apical piece of aedeagus as in Figs. 7 and 8. Hunan Province
		Gerdacula hunanica sp. nov
12	(1.1)	Lateral margins of pronotum finely arcuate. Shape of apical piece of aedeagus as in Novák (2015
		153: figs 13 and 14)
13	(14)	Pronotum reddish brown, shiny Gerdacula fujianica Novák, 2015
		Pronotum blackish brown or rather matte.
14	(16)	Pronotum blackish brown, shiny with dense and coarse punctures. Habitus as in Fig. 9, head and
	` '	pronotum (Fig. 10), apical piece of aedeagus as in Figs. 11 and 12. Sichuan Province.
16	(1.5)	Pronotum brown, rather matte with sparser and shallow punctures. Habitus as in Fig. 1, head and
. •	()	pronotum (Fig. 2), apical piece of aedeagus as in Figs. 3 and 4. Guangdong Province.
		Coracola goangica sp. nov

LIST OF GERDACULA NOVÁK SPECIES

genus Gerdacula Novák, 2015

brancuccii Novák, 2015
communis (Borchmann, 1942)
emawbumica Novák, 2020
fujianica Novák, 2015
guangdongica sp. nov.
hubeica Novák, 2015
hunanica sp. nov.

Mepal
Myanmar
China (Fujian Province)
China (Guangdong Province)
China (Hubei Province)
China (Hunan Province)

nepalica Novák, 2015 Nepal

sichuanica sp. nov. China (Sichuan Province)

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