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Third Contribution to the Knowledge of the Chinese Species of the Genus *Trigonodemus* LeConte, 1863 (Coleoptera, Staphylinidae, Omaliinae)

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Abstract Three species of the genus *Trigonodemus* are described as new, based on specimens from the People's Republic of China: *T. pictus* (from Yunnan), *T. puncticollis* (from Sichuan), and *T. modestus* (from Sichuan). A key to all species of *Trigonodemus* known at present is given.

This is the third paper treating the species of the conspicuous genus *Trigonodemus* LeConte, 1863 of Omaliinae, and the second one dealing strictly with species from the People's Republic of China (see Smetana, 1996 a,b). The peculiar, relict distributional range of the genus *Trigonodemus* in eastern North America (one species), western North America (one species), and in eastern Asia was briefly discussed in one of the previous papers (Smetana, 1996 a). At that time only one species was known from Japan (*T. lebioides* Kraatz, 1877), but in the above paper one species from Fujian, originally assigned to a new monotypic genus *Klapperichianellia* Hlisnikovský, 1962 of the tribe Pterolomini of Silphidae (at that time), was transferred to *Trigonodemus* (*T. mirabilis* (Hlisnikovský, 1962)), and two additional species were described: *T. audax* Smetana, 1996 a (from Taiwan) and *T. fungicola* Smetana, 1996 a (from Sichuan). In a subsequent paper (Smetana, 1996 b), two additional species, *T. schuelkei* Smetana, 1996 b (from Shaanxi) and *T. monticola* Smetana, 1996 b (from Yunnan) were recorded, so that the number of the species of *Trigonodemus* rose from three to six. Three further species are described in this paper, bringing the total to nine species. However, additional species will undoubtedly be discovered in eastern Asia, which is obviously the evolutionary centre of this genus.

In the following the three new species are described and illustrated, and a key to all species of *Trigonodemus* known at present is given.

Trigonodemus pictus sp. nov.

(Figs. 1–4)

Description. Head and pronotum reddish testaceous to brunneorufous, prono-

tum usually with middle portion of disc variably, mostly extensively, darkened; elytra testaceous to rufotestaceous, with common, extensive, dark median spot starting at base and narrowed toward apex of elytra, and each with lateral dark spot starting below humerus and widened toward apex of elytron (see comments for color variation); mouthparts and legs testaceous to rufotestaceous, first four antennal segments testaceous, remaining antennal segments piceous; entire dorsal surface without microsculpture.

Head noticeably protracted anteriad; furrows on disc narrow and deeply engraved, no more than finely and inconspicuously punctate, base of head and dorsal surface of neck with numerous, more or less coarse punctures, remaining portions of head with only a few, scattered fine punctures, except elevated portion between furrows impunctate; anterior portion of head between furrows markedly elevated; ocelli situated moderately apart, distance separating them about equal to distance separating each ocellus from posteromedial margin of eye; eyes very convex, tempora as long as to vaguely longer than length of eyes from above. Antenna long and moderately strong, segment 3 distinctly longer than segment 2 (ratio 1.42), segment 4 slightly longer than wide, outer segments longer than wide.

Pronotum at base variably wider than length at midline and variable in shape (see comments), anterior margin markedly narrower than base (ratio 1.64), with posterolateral portions appreciably explanate, in most specimens with lateral margins in basal half vaguely sinuate to parallel-sided in front of posterior angles and then arcuately narrowed anteriad, posterior angles subacute and not appreciably protruding laterad; disc of pronotum with inconspicuous, rounded middle impression in front of base, connected to two indefinite longitudinal impressions diverging anteriad, another vague impression in front of each posterior angle; anteromedial portion of pronotum markedly convex; surface of pronotum with irregular and in general sparse punctation, except punctation denser near base and on posterolateral explanate portions.

Scutellum with a few punctures.

Elytra with striae in general moderately deeply engraved, gradually becoming slightly deeper toward lateral and lateroapical margins; strial punctation fine, gradually becoming even finer toward elytral apex, intervals vaguely convex, becoming almost flat toward elytral apex.

Male. Abdominal sternite 8 subtruncate apically (Fig. 1); tergite 8 with distinct, obtuse medioapical emargination (Fig. 2). Aedoeagus (Figs. 3, 4) with median lobe distinctly, almost linearly, narrowed toward apex, with somewhat differentiated apical portion, with subacute apex; parameres moderately robust, somewhat curved toward median lobe anteriorly, somewhat exceeding apex of median lobe, each narrowed into subacute apex and with four fine apical setae; internal sac simple, as in Fig. 4.

Female. Abdominal sternite 8 distinctly prolonged medioapically, with narrowly arcuate apex.

Length 3.8–4.2 mm.

Type material. Holotype (male) and allotype (female): CHINA: "CHINA, NW

Yunnan Bai Ma Xue Shan 35 km S Dêqên 4300–4800 m 24.VI.98, S. Murzin". In the SMETANA collection, Ottawa, Canada.

Paratypes: Yunnan: same data as holotype, 105, in the SMETANA, PÜTHZ (Eisenhüttenstadt, Germany) and SCHÜLKE (Berlin, Germany) collections, and in the collections of the American Museum of Natural History, New York, USA; the Canadian National Collection of Insects, Ottawa, Canada; the Field Museum of Natural History, Chicago, USA; the Natural History Museum, London, England; the Muséum d'Histoire naturelle, Geneva, Switzerland; the Naturhistorisches Museum, Wien, Austria; and the Naturhistorisches Museum in Basel, Switzerland. "CHINA – YUNNAN DEQUEN – 3900 m/m 10.7 – 19.7. 1996 E. Kučera leg", 1 specimen, in the Kučera collection, Soběslav, Czech Republic. "CHINA NW Yunnan, Xue Shan nr. Zhongdian 4000, 24–26.VI. 1996 27°49N 99°34E"/"collected by J. Farkač, P. Kabátek and A. Smetana", in the SMETANA collection.

Geographical distribution. *Trigonodemus pictus* sp. nov. is at present known from high mountain elevations in northwestern Yunnan.

Bionomics. The specimens from Bai Ma Xue Shan were taken from pitfall traps baited with vinegar, but the habitat data are not known. *Trigonodemus pictus* is the only species of this genus that has been collected in such a long series. Obviously, the vinegar used as the pitfall trap bait was highly attractive for this species. This will very likely apply also to other species. Most species of the genus apparently have trophic dependency on mushrooms.

Comparisons and comments. *Trigonodemus pictus* has a color pattern very similar to that of the two North American species, *T. striatus* LECONTE, 1863 and *T. fasciatus* LEECH, 1939. However, the two North American species differ from *T. pictus*, in addition to the different shapes of the aedoeagi, by the less elongate head with larger eyes and shorter, more coarsely punctate discal furrows, and by the generally wider pronotum that is less distinctly narrowed anteriad. The difference in the shape of the pronotum is always noticeable, despite the fact that the pronotal base width : midline length ratio varies in *T. pictus* (ratio range 1.20–1.29). The elytral coloration is somewhat unstable, the dark spots may be variably reduced, exposing more pale color; however, in most specimens the pale color on each elytron appears as a pale strip starting at humerus and extending obliquely posteriad toward the apex of the suture. The configuration of the posterior pronotal angles in *T. pictus* is unstable as well, caused mainly by the variably pronounced sinuation of the lateral margins in front of the angles; in a few specimens the lateral margins are pronouncedly sinuate and the posterior angles conspicuously protrude laterad.

Etymology. The specific epithet is the Latin adjective *pictus*, *-a*, *-um*, meaning painted. It refers to the attractive coloration of the species.

Trigonodemus puncticollis sp. nov.

(Fig. 5)

Description. Piceous-black, exposed apex of abdomen slightly paler; mouthparts and first four antennal segments pale testaceous, remaining antennal segments piceous; legs rufotestaceous. Entire dorsal surface without microsculpture.

Head narrow, moderately protracted anteriad; furrows on disc markedly diverging anteriad, deeply engraved, densely and rather coarsely punctate, remaining portions of head with numerous, moderately coarse punctures, except elevated portion between furrows impunctate; anterior portion between furrows markedly elevated, convex, with posterior portion narrow; ocelli situated moderately apart, distance separating them about equal to distance separating each ocellus from posteromedial margin of eye; eyes convex and large, tempora as long as length of eyes seen from above. Antenna long and moderately strong, segment 3 distinctly longer than segment 2 (ratio 1.48); segment 4 longer than wide (ratio 1.6), outer segments longer than wide.

Pronotum almost parallel-sided in basal half, in apical half markedly and slightly arcuately, narrowed anteriad, at base markedly wider than length along midline (ratio 1.35), anterior margin markedly narrower than base (ratio 1.66), posterolateral portions slightly flattened and explanate, posterior angles not protruding, obtuse; disc of pronotum with impressions similar to those described for *T. pictus*, diverging longitudinal impressions densely and more finely punctate (than rest of disc); rest of disc, including elevated, convex anteromedial portion, moderately densely, unevenly punctate.

Scutellum with a few punctures on basal portion.

Elytra with striae very superficial and hardly engraved, mostly represented by fine, unevenly situated serial punctures on mediobasal portion, gradually becoming slightly more engraved toward apex and lateral margin of each elytron; intervals flat on mediobasal portion, gradually becoming slightly convex toward apex and lateral margin of each elytron.

Female. Abdominal sternite 8 markedly extended medioapically, with apex obtusely rounded (Fig. 5); tergite 8 damaged, but apparently rounded apically.

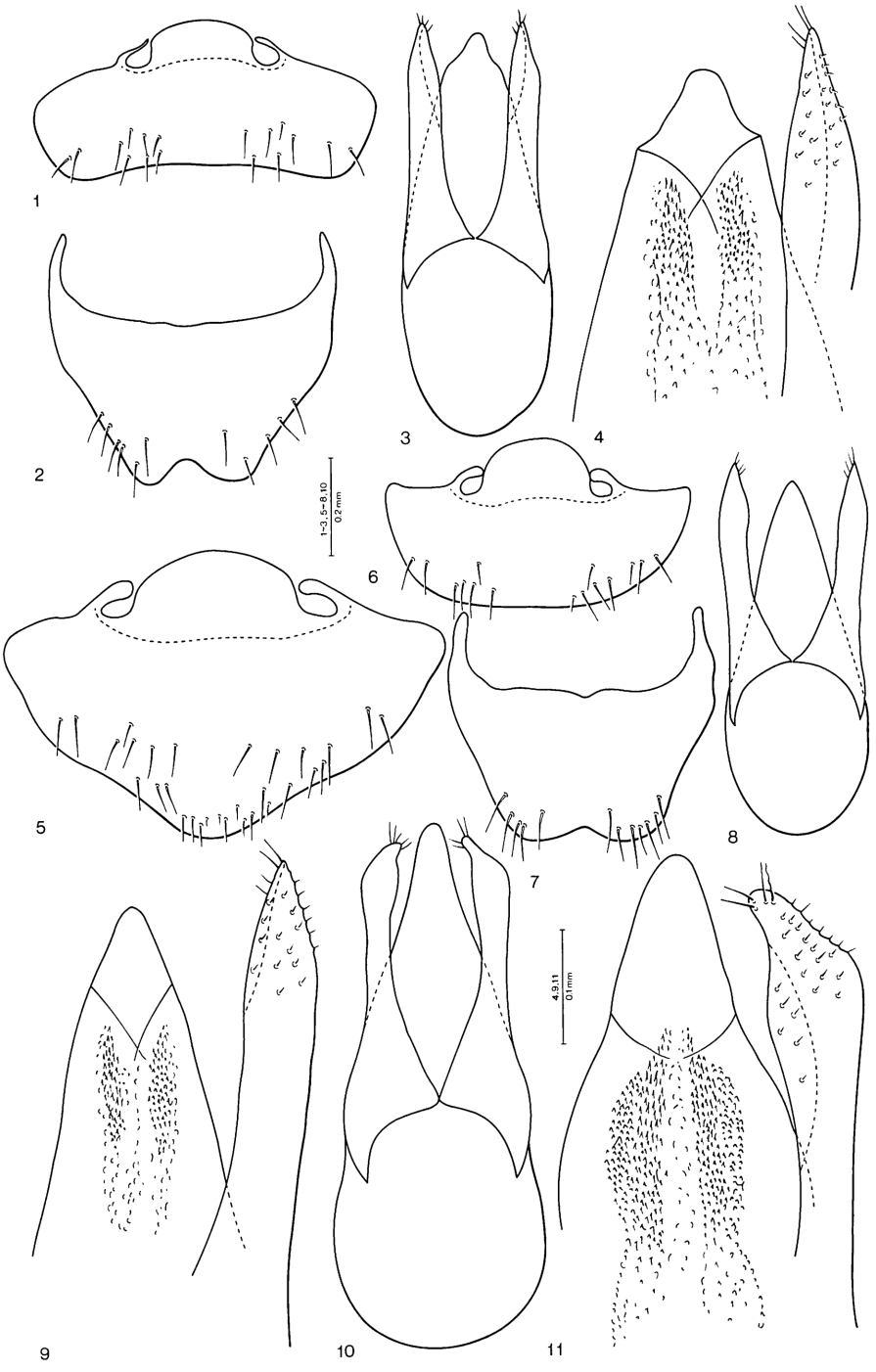
Male unknown.

Length 4.9 mm.

Type material. Holotype (female): CHINA: "China. Sichuan sud Barkam 7. 96 Moretto". In the SMETANA collection, Ottawa, Canada.

Geographical distribution. *Trigonodemus puncticollis* is at present known only from the type locality in northwestern Sichuan.

Figs. 1–11. —— 1–4. *Trigonodemus pictus*: 1, male sternite 8; 2, male tergite 8; 3, aedoeagus, ventral view; 4, apex of median lobe and right paramere, detail. —— 5. *Trigonodemus puncticollis*, female sternite 8. —— 6–9. *Trigonodemus modestus*: 6, male sternite 8; 7, male tergite 8; 8, aedoeagus, ventral view; 9, apex of median lobe and right paramere, detail. —— 10–11. *Trigonodemus lebioides*: 10, aedoeagus, ventral view; 11, apex of median lobe and right paramere, detail.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Bionomics. Nothing is known about the collection circumstances of the holotype.

Comparisons and comments. *Trigonodemus puncticollis* may be easily recognized by its rather large and robust form, by the relatively densely punctate pronotum (including the elevated anteromedial portion), and by the superficial elytral striae. In general habitus, it resembles *T. montanus*, but it differs from it by the characters mentioned above.

Etymology. The specific epithet is a combination of the Latin adjective *punctatus*, *-a*, *-um* (punctate) and the noun *collum*, *-i*, n (used for pronotum). It refers to the relatively dense punctation of the pronotum of this species.

Trigonodemus modestus sp. nov.

(Figs. 6–9)

Description. Testaceo-castaneous to castaneous; mouthparts, first four segments of antennae and legs testaceous, remaining antennal segments dark brown. Entire dorsal surface without microsculpture.

Head moderately protracted anteriad; furrows on disc narrow and deeply engraved, moderately finely punctate, base of head and dorsal surface of neck with numerous, rather coarse punctures, remaining portions of head virtually impunctate except for some rather coarse punctures anterolaterally on clypeus; anterior portion of head between furrows markedly elevated; ocelli situated moderately apart, distance separating them about equal to distance separating each ocellus from posteromedial margin of eye; eyes very convex, tempora behind eyes markedly, slightly arcuately narrowed toward neck, about as long as length of eyes from above. Antenna long and moderately strong, segment 3 distinctly longer than segment 2 (ratio 1.36), segment 4 distinctly longer than wide, outer segments longer than wide.

Pronotum at base wider than length at midline (ratio 1.33), anterior margin markedly narrower than base (ratio 0.65), with posterolateral portions appreciably explanate, with lateral margins in basal half vaguely sinuate or parallel-sided in front of posterior angles and then arcuately narrowed anteriad, posterior angles subacute, not appreciably protruding laterad; disc of pronotum with impressions similar to those described for *T. pictus*; anteromedial portion of pronotum slightly convex; surface of pronotum with irregular and in general sparse punctation, punctures present also on convex anterolateral portion.

Scutellum with a few punctures.

Elytra with striae in general moderately deeply engraved, gradually becoming somewhat deeper toward lateral and lateroapical margins; strial punctation fine, intervals vaguely convex, becoming almost flat medioapically near elytral apex.

Male. Abdominal sternite 8 evenly subtruncate apically (Fig. 6); tergite 8 slightly, widely emarginate apically (Fig. 7). Aedoeagus (Figs. 8, 9) with median lobe rather narrow, gradually narrowed into subacute apex; paramere relatively robust, with

apex of each branch slightly exceeding apex of median lobe, each branch with medioapical margin obliquely subtruncate subapically, with rather acute apex and with four fine apical setae; internal sac simple, as in Fig. 9.

Female. Abdominal sternite 8 distinctly prolonged medioapically, with narrowly arcuate apex.

Length 3.8–4.0 mm.

Type material. Holotype (male) and allotype (female): CHINA: "CHINA: W-Sichuan 1999 Ganzi Tibet. Aut. Pref., Kangding Co. Daxue Shan, Mu Ge Cuo, ob. See, 15 km NW Kangding, 3700 m Grünerle, Pilze, 30°09N 101°52E 27.VI., leg. M. Schülke"/"Sammlung M. Schülke Berlin". Holotype in the SCHÜLKE collection, Berlin; allotype in the SMETANA collection, Ottawa.

Geographical distribution. *Trigonodemus modestus* is at present known only from the type locality in western Sichuan.

Bionomics. The two specimens of the original series were apparently found in association with mushrooms in an alder forest.

Comparisons and comments. In general habitus *Trigonodemus modestus* resembles smaller specimens of *T. montanus* SMETANA, 1996 b from northern Yunnan, but it differs, in addition to the differences in the shape of the aedoeagus, by the smaller and slightly less convex eyes that are about as long as tempora seen from above (in *T. montanus* the tempora are shorter than length of eyes seen from above), by the generally narrower pronotum with anterior margin less pronouncedly narrower than base (ratio 0.64, compared to ratio 0.58 in *T. montanus*), and by the generally coarser and more numerous punctures on the pronotum.

The holotype is missing the last segment of the left antenna, and the female sternite 8 is damaged (left one-third is missing).

Etymology. The specific epithet is the Latin adjective *modestus*, *-a*, *-um* (modest, moderate), referring to the inconspicuous appearance and coloration of the species.

To aid in the identification of the species of *Trigonodemus* known at present, a new key to the species, replacing the two recently published keys (SMETANA, 1996 a,b), is presented below.

1. Specimen originating in North America. 2
— Specimen originating in Asia. 3
2. Apex of median lobe truncate, with apical margin of characteristic shape; apices of parameres hardly exceeding apex of median lobe (fig. 3 in SMETANA, 1996 a). Length 3.9–4.8 mm. Eastern North America: CANADA (Nova Scotia, Ontario, Quebec), USA. ..... *T. striatus* LECONTE, 1863
— Apex of median lobe acute; apices of parameres distinctly exceeding apex of median lobe (fig. 9 in SMETANA, 1996 a). Length 3.8–4.0 mm. Western North America: CANADA (British Columbia). ..... *T. fasciatus* LEECH, 1939
3. Elytra unicolored, either pale yellow, or testaceo-castaneous to piceous or piceous-black, without distinct color markings. 4

— Elytra bicolored, with distinct color markings. 7

4. Elytra uniformly pale yellow, contrasting in color with black head and pronotum (pronotum narrowly paler along hind margin). Aedoeagus as in figs. 25 and 26 in SMETANA, 1996 a. CHINA: Fujian. ..... *T. mirabilis* (HLISNIKOVSKÝ, 1962)

— Elytra testaceo-castaneous to piceous or piceous-black, not contrasting in color with head and pronotum. 5

5. Punctation of pronotum relatively dense, including elevated convex anteromedial portion. Elytral striae in general very superficial and hardly engraved, mostly represented by fine, unevenly situated strial punctures, particularly on mediobasal portion of each elytron. Larger species, length 4.9 mm. CHINA: Sichuan. ..... *T. puncticollis* sp. nov.

— Punctation of pronotum in general sparse, represented by unevenly dispersed punctures, including convex anteromedial portion (but never dense there). Elytral striae in general more or less more deeply engraved, including mediobasal portion of each elytron. On average smaller species, length 3.8–4.7 mm. 6

6. Pronotum wide, with apical margin conspicuously narrower than basal margin (ratio 0.58). Eyes larger and more convex, tempora shorter than length of eyes from above (ratio 0.75). Color of body in general darker, piceous-brown to piceous-black. Aedoeagus larger, apices of paramere markedly exceeding apex of median lobe (figs. 3, 4 in SMETANA, 1996 b). Larger species, length 3.9–4.7 mm. CHINA: Yunnan. ..... *T. montanus* SMETANA, 1996 b

— Pronotum narrower, with apical margin markedly but not conspicuously, narrower than basal margin (ratio 0. 65). Eyes smaller and less convex, tempora about as long as length of eyes from above. Color of body in general paler, testaceo-castaneous to castaneous. Aedoeagus smaller, apices of paramere slightly exceeding apex of median lobe (Fig. 8). Smaller species, length 3.8–4.0 mm. CHINA: Sichuan. ..... *T. modestus* sp. nov.

7. Antennal segment 4 slightly longer than wide. Larger species, 4.0–4.5 mm long. 8

— Antennal segment 4 short, globular. Smaller species, length under 4.0 mm. ... 10

8. Elytra with common, mediobasal dark spot starting at elytral base, and each with lateral elongate dark spot starting below humerus. Aedoeagus small, as in Fig. 3. Length 3.8–4.2 mm. CHINA: Yunnan. ..... *T. pictus* sp. nov.

— Elytra with common, medial dark spot starting far below elytral base, and each with lateral dark spot starting around middle of elytron. Aedoeagi larger, differently shaped (Fig. 10 and fig. 7 in SMETANA, 1996 b). 9

9. Branches of paramere each slender, with lateral margin distinctly concave in middle portion, and with apex not quite reaching apex of median lobe (Figs. 10, 11). Length 3.9–4.4 mm. JAPAN. ..... *T. lebioides* KRAATZ, 1877

— Branches of paramere each robust, with lateral margin straight in middle portion, and with apex distinctly exceeding apex of median lobe (fig. 7 in SMETANA, 1996 b). Length 4.1 mm. CHINA: Shaanxi. ..... *T. schuelkei* SMETANA, 1996 b

10. Middle portion of pronotum behind front margin with numerous, more or less coarse punctures. Apex of median lobe of aedoeagus acute (fig. 15 in SMETANA, 1996 a). Length 3.3–3.8 mm. CHINA: Sichuan. . . *T. fungicola* SMETANA, 1996 a
— Middle portion of pronotum behind front margin almost impunctate (two punctures present). Apex of median lobe wide, truncate (fig. 21 in SMETANA, 1996 a). Length 3.4 mm. TAIWAN. . . . . *T. audax* SMETANA, 1996 a

Acknowledgments

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要　　約

A. SMETANA：中国産シデムシモドキ属の知見第3報．——中国の云南省と四川省からシデムシモドキ属ハネカクシ類の3新種を記載し，それぞれ*Trigonodemus pictus*，*T. puncticollis*および*T. modestus*と命名した．この特異な属の既知種は計11種になったが，そのうちの9種までが東アジアに固有であることからみて，分化の中心がこの地域にあったことは明らかである．論文末に既知種すべての検索表を掲げたが，今後なお中国から新しい種の発見されることが期待される．

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