

New and little known species of the genus *Trigonognatha* MOTSCHULSKY from China (Coleoptera: Carabidae, Pterostichinae)

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Abstract

Six new species of the genus *Trigonognatha* are described from China: *T. brancuccii* sp.n. (Sichuan), *T. saueri* sp.n. (Sichuan), *T. becvari* sp.n. (Sichuan and Yunnan), *T. fairmairei* sp.n. (Sichuan), *T. jaechi* sp.n. (Beijing) and *T. smetanai* sp.n. (Taiwan). Two new synonymies are established: *T. danieli* MARCILHAC, 1994 = *T. delavayi* FAIRMAIRE, 1888 and *T. viridis* ssp. *tewuensis* MARCILHAC, 1994 = *T. viridis viridis* TSCHITSCHERINE, 1898. New data on other species of the genus are provided and a revised key including all species of the genus is proposed.

Key words: Carabidae, *Trigonognatha*, new species, new synonymies, China, key

Introduction

The recent explorations of several mountain ranges in China have lead to the collection of many interesting species of Pterostichinae. Among these species I have identified six new species of the genus *Trigonognatha* MOTSCHULSKY, 1857 which are described in the present paper. The work also includes taxonomic observations on other species of the genus and a revised key to all known species.

Acronyms:

MNHN	Museum national d'Histoire naturelle, Paris	CD	Coll. Dacatra, San Donato Milanese
MSNM	Museo Civico di Storia Naturale, Milano	CK	Coll. Kučera, Praha
NHMB	Naturhistorisches Museum, Basel	CP	Coll. Pavesi, Milano
NHMW	Naturhistorisches Museum, Wien	CS	Coll. Sciaky, Milano
CNC	Canadian National Collection, Ottawa		

Trigonognatha MOTSCHULSKY, 1857

This genus was proposed for *T. cuprescens* MOTSCHULSKY, 1857, the only species known at that time. FAIRMAIRE (1888) described the genus *Aurisma* (type species: *A. delavayi* FAIRMAIRE by monotypy), which was eventually synonymized with *Trigonognatha* by TSCHITSCHERINE (1898).

The genus *Trigonognatha* is closely related to *Myas* DEJEAN, 1828 but there is no consensus as to whether these taxa should be treated as distinct genera or included into a single genus. For example, ALLEN (1980) recognized three genera, *Myas* (European), *Trigonognatha* (Asiatic) and *Neomyas* ALLEN, 1980 (American). Yet, LINDROTH (1966), HABU (1978) and BOUSQUET (1985) have preferred to list all these taxa into a single genus, *Myas*.

In my opinion the three genus group taxa should be considered as valid and belong to the tribe Molopini. Some authors have regarded the eastern Mediterranean genus *Xenion* TSCHITSCHERINE,

1902, as closely related to *Myas*, *Trigonognatha* and *Neomyas* and have combined them under the subtribal name *Trigonognathina*. I am not sure whether the tribe *Molopini* can be split into subtribes since the study of the female genitalia provides a strong evidence of a close relationship between *Molops* BONELLI, 1810, *Trigonognatha*, *Neomyas* and *Aristochroa* TSCHITSCHERINE, 1898. I have exposed elsewhere the reasons to exclude *Steropanus* FAIRMAIRE, 1888 from this group and transfer it to *Pterostichini* (SCIACY in press).

Trigonognatha brancuccii sp.n.

DIAGNOSIS - A *Trigonognatha* of large size (26 - 28 mm), dark coppery, with one anterior seta on each side of pronotum and the intervals 3, 5 and 7 slightly wider than the other ones.

TYPE LOCALITY: China, Sichuan, Emei Shan.

TYPE SERIES: **Holotype** ♂: 12 - 16.VI.1993, (CS). **Paratypes**: 6 ♂♂ ♀♀, 28.V.1989 (NHMB, CS).

Derivatio nominis - I am pleased to dedicate this species to Dr. Michel Brancucci (NHMB) for giving me the opportunity to study the rich collections under his care.

DESCRIPTION - Size 26 - 28 mm; color dark coppery. Habitus as in fig. 1.

Head large, impunctate, with deep frontal sulci, reaching middle of the diameter of eyes. Vertex microscopically punctate. Antennae short, hardly reaching pronotal base, pubescent from apical half of antennomere 4.

Pronotum transverse, evidently constricted towards base and sinuate before hind angles; sides not notched. One setigerous puncture in apical half, in pronotal gutter, and one in basal angle. Median sulcus well developed but superficial; lateral gutter narrow all along; fore angles not prominent; hind angles obtuse and rounded at tip. Basal impressions simple, ill-defined, separated from the lateral gutter by distinct carina; entire base with short longitudinal sulci. Legs rather short and stout; onychium with some setae underneath.

Elytra wide, with maximum width after middle. Striae deep, smooth; intervals strongly convex, 3rd, 5th and 7th slightly wider than others. No setigerous punctures on interval three. Shoulder well marked, basal and lateral margins producing a wide curve.

Genitalia. Aedeagus (figs. 7, 10) without particular characteristics, normal for the genus.

Geographical notes. This species is known only from Emei Shan, a mountain of 3099 m in western Sichuan, at the border of the plain. The fauna of this mountain seems faunistically little studied and is providing many undescribed carabid taxa. *Trigonognatha cavazzutii* CASALE & SCIACY, 1994, a small species allied to *T. eoa* (TSCHITSCHERINE, 1894) is also known from this mountain.

Affinities. This species is related to *T. yunnana* STRANEO (fig. 2) and *T. andrewesi* JEDLICKA. It can be distinguished from the former by its strongly microsculptured pronotum and irregular elytral striation; from the latter by its smaller size, different color and by the 3rd, 5th and 7th intervals of elytra only slightly wider than the other ones.

Trigonognatha saueri sp.n.

DIAGNOSIS - A *Trigonognatha* of medium size (15.9 - 16.2 mm), green, with one anterior seta on each side of pronotum, antennomere 4 glabrous and striae deep and impunctate.

TYPE LOCALITY: China, Sichuan, Gongga Shan, 4800 m.

TYPE SERIES: **Holotype** ♀: 20-26.VI.1992 (CS). **Paratype** ♀: collected with holotype (CP).

Derivatio nominis - This species is kindly dedicated to my friend Roman Sauer (Praha), in

recognition for the donation of many interesting carabids he collected during his entomological expeditions.

DESCRIPTION - Size 15.9 - 16.2 mm; color dark green. Habitus as in fig. 3.

Head large, impunctate, with deep frontal sulci, reaching middle of the diameter of eyes. Vertex microscopically punctate. Antennae short, not reaching pronotal base, pubescent from antennomere 5; antennomere 4 with only a few long additional setae at apex.

Pronotum transverse, constricted towards base and weakly sinuate before hind angles; sides notched all along. One setigerous puncture in apical half, in the pronotal gutter, and one in basal angle. Median sulcus well developed and deep, lateral gutter narrow all along; fore angles not prominent; hind angles right and sharp. Basal impressions simple and deep, impunctate, separated from lateral gutter by distinct carina; middle of base with short longitudinal sulci. Legs rather short and stout; onychium with some setae underneath.

Elytra wide, with maximum width after middle. Striae deep, smooth; intervals strongly convex. No setigerous punctures on interval three. Shoulder well marked, basal and lateral margins producing a wide curve.

Geographical notes. This species is known only from one locality in western Sichuan, Gongga Shan, a mountain of 7700 m with an incredible number of endemic species of all zoological groups. *Trigonognatha robusta* FAIRMAIRE, 1894 is another species of the genus found in the same area. The two species, however, are obviously distinct and are not, as far as known, sympatric.

Affinities. This species, although superficially similar to *T. robusta* (fig. 14), shares some important characters with *T. delavayi* of Yunnan (fig. 4). Both *T. saueri* and *T. delavayi* (FAIRMAIRE, 1888) are smaller than *T. robusta* and have the fourth antennomere pubescent only apically, while in *T. robusta* that antennomere is almost completely pubescent. On the other hand, the striae are very deep and smooth in *T. saueri*, even deeper than in *T. robusta*, while they are very superficial and punctate in *T. delavayi*.

Trigonognatha fairmairei sp.n.

DIAGNOSIS - A *Trigonognatha* of large size (19.2 - 21.3 mm), purplish, with one anterior seta on each side of pronotum, antennomere 4 glabrous, elytra widened after middle and striae deep and impunctate.

TYPE LOCALITY: China, SW Sichuan, Sumdo, 2000-2500 m.

TYPE SERIES: **Holotype** ♂: 8.VII.1994 (CS). **Paratypes:** 1 ♂ + 2 ♀♀ collected with holotype (CS); 1 ♀: W Sichuan, road Quianning - Dawu, pass 35 km NNW Quianning, 3950 m, 1.VIII.1994 (CS); 1 ♂ + 1 ♀: W Sichuan, Mts ca. 20 km NNW Sabdé, 2000-3500 m, 20.VI.1994 (CS); 1 ♀: Mou-pin (MNHN). Additional material examined: 1 ♀: W Yunnan, env. Baoshan, 6.-8.VI.1993 (NHMW).

Derivatio nominis - This species is dedicated to the famous entomologist Leon Fairmaire in whose collection I found an old specimen of this species.

DESCRIPTION - Size 18.2 - 21.3 mm; color purplish. Habitus as in fig. 5.

Head large, impunctate, with deep frontal sulci, reaching middle of the diameter of eyes. Vertex microscopically punctate. Antennae short, not reaching pronotal base, pubescent from antennomere 5; antennomere 4 with only a few long additional setae at apex.

Pronotum transverse, constricted towards base and weakly sinuate before hind angles; sides notched all along. One setigerous puncture in apical half, in the pronotal gutter, and one in basal angle. Median sulcus well developed and deep, lateral gutter narrow all along; fore angles not prominent; hind angles right and sharp. Basal impressions simple and deep, impunctate,

separated from lateral gutter by distinct carina; all surface transversally wrinkled, middle of base with short longitudinal sulci. Legs rather short and stout; onychium with some setae underneath.

Elytra wide, with maximum width after middle. Striae deep, smooth; intervals strongly convex. No setigerous punctures on interval three. Shoulder well marked, basal and lateral margins producing a wide curve.

Genitalia. Aedeagus without particular characteristics, normal for the genus.

Geographical notes. This species is known only from few localities in southwestern Sichuan and one in western Yunnan.

Affinities. It is probably allied to *T. robusta*, although easily distinguished through the different color, weaker elytral striation and wider elytra. The specimen from western Yunnan differs from the others by its deeper elytral striae and elytra less widened at middle, thus resembling more in body shape to *T. robusta*. For these differences I did not include it in the typical series, although I am persuaded that it belongs to this species.

Trigonognatha jaechi sp.n.

DIAGNOSIS - A *Trigonognatha* of large size (19.9 mm); black with weak purplish reflection on head and pronotum, purplish on elytra; with one anterior seta on each side of pronotum; sides of pronotum weakly sinuate and basal angles right; antennomere 4 glabrous and striae deep and impunctate.

TYPE LOCALITY: China, Beijing, Badaling.

TYPE SERIES: Holotype ♂: 1.VII.1992 (NHMW).

Derivatio nominis - This species is kindly dedicated to Dr. Manfred Jäch (Naturhistorisches Museum, Wien), for always allowing me to freely study the rich collections under his care and for always encouraging me in the study of Chinese carabids.

DESCRIPTION - Size 19.9 mm; color black with very weak purplish reflection on head and pronotum, purplish on elytra. Habitus as in fig. 6.

Head large, impunctate, with deep frontal sulci, reaching middle of the diameter of eyes. Vertex microscopically punctate. Antennae short, not reaching pronotal base, pubescent from antennomere 5; antennomere 4 with only a few long additional setae at apex.

Pronotum transverse, constricted towards base and weakly sinuate before hind angles; sides notched all along. One setigerous puncture in apical half, in the pronotal gutter, and one in basal angle. Median sulcus well developed and deep, lateral gutter narrow all along; fore angles not prominent; hind angles right and sharp. Basal impressions simple and deep, impunctate, separated from lateral gutter by distinct carina; middle of base with short longitudinal sulci. Legs rather short and stout; onychium with some setae underneath.

Elytra wide, with maximum width after middle. Striae deep, smooth; intervals strongly convex. No setigerous punctures on interval three. Shoulder well marked, basal and lateral margins producing a wide curve.

Genitalia. Aedeagus without particular characteristics, normal for the genus.

Geographical notes. This species is known only from Beijing. It is the first *Trigonognatha* known from northeastern China.

Affinities. The affinities of this species seem to be found in *T. cuprescens* MOTSCHULSKY, 1857, from Japan. These two species share the general shape of the body, even though *T. jaechi* is stouter and wider. It seems that the eastern species of *Trigonognatha* (namely *T. cuprescens* MOTSCHULSKY, 1857, *T. aurescens* (BATES, 1883), *T. coreana* TSHITSCHERINE, 1895 and *T.*

jaechi sp.n.) have a wide base of pronotum with basal angles right or rounded instead of obtuse as in most of the other species.

Trigonognatha becvari sp.n.

DIAGNOSIS - A *Trigonognatha* of medium size (17.1 - 19.2 mm); green; with one anterior seta on each side of pronotum; antennomere 4 pubescent in apical half and striae deep and impunctate.

TYPE LOCALITY: China, Yunnan, Dali.

TYPE SERIES: **Holotype** ♂: 6.VII.1993 (CS). **Paratypes** 2 ♂♂ + 2 ♀♀ collected with holotype (CS, CP, CD); 2 ♂♂: Yunnan, Zongdian, 16-21.VI.1994 (CS, CK); 1 ♂ + 1 ♀: NW Yunnan/SW Sichuan border area, road Xiangcheng-Zhongdian, pass 35 km S Xiangcheng (15 km N Wengshui), 3500 m, 10-13.VII.1994 (CS); 1 ♂: SW Sichuan, Xiang Chen, 3700 m, 26.VIII.1987 (MSNM, ex coll. Straneo); 1 ♂ + 1 ♀: Sichuan mer., Jin Fu Shan 1400 m, 28.VII.1994 (CS).

Derivatio nominis - Dedicated to my friend Stanislav Becvar (Ceske Budejovice), who has on several occasions offered carabids that he collected.

DESCRIPTION - Size 17.1 - 19.2 mm; color green. Habitus as in fig. 13.

Head large, impunctate, with deep frontal sulci, which reach the middle of diameter of the eyes. Vertex wrinkled. Antennae short, not reaching pronotal base, pubescent from apical half of antennomere 4.

Pronotum transverse, constricted towards base and weakly sinuate before hind angles; sides not notched. One setigerous puncture in the apical half, in the pronotal gutter, and one in basal angle. Median sulcus well developed and deep; lateral gutter narrow all along; fore angles not prominent; hind angles obtuse, rounded at tip. Basal impressions simple and deep, impunctate, separated from lateral gutter by distinct carina; middle of base with short longitudinal sulci. Legs rather short and stout; onychium with some setae underneath.

Elytra wide, with maximum width after middle. Striae not very deep, smooth; intervals convex. No setigerous puncture on interval three. Shoulder well marked, basal and lateral margins producing a wide curve.

Genitalia. Aedeagus (figs. 8, 11) without particular characteristics, normal for the genus.

Geographical notes. This species is known from four localities in Yunnan and one in southwest Sichuan. Two other *Trigonognatha* occur in the same region, *T. yunnana* and *T. delavayi*, but neither was found in the same habitat as *T. becvari*.

Affinities. The species, although superficially similar to *T. delavayi* (fig. 4), possesses more character states in common with *T. robusta* from western Sichuan (fig. 14). For instance the fourth antennomere is almost completely pubescent and the striae are much deeper than in *T. delavayi*. Adults of *T. becvari* readily differ from those of *T. robusta* by their much smaller size and slenderer shape.

Trigonognatha smetanai sp.n.

DIAGNOSIS - A *Trigonognatha* of small size (11 - 13 mm), green, slender, with basal angles of pronotum rounded.

TYPE LOCALITY: Taiwan, Nantou Hsien, Nenkaoshan, Tenchi hut, 2900 m.

TYPE SERIES: **Holotype** ♂: 5.V.1992 leg. A. Smetana (CNC). **Paratypes**: 2 ♂♂ + 1 ♀ collected with holotype (CNC, CS); 1 ♂: Taiwan, Chia Hsien, Yushan N.P., Mun-Li cliff, 2700 m, 27.IV.1990 leg. A. Smetana (CNC); 1 ♂: Taiwan, Chia Hsien, Yushan N.P., Ta-Ta-Ghia, 2750 m, 27.IV.1990 leg. A. Smetana (CS); 1 ♂: Taiwan,

Hualien Hsien, Taroko N.P., Ridge SE Nanhushi Hut, 2700 m, 11.V.1990 leg. A. Smetana (CNC).

Derivatio nominis - Dedicated to Dr. A. Smetana (Ottawa), who collected this new species during his entomological expeditions to Taiwan.

DESCRIPTION - Size 11 - 13 mm; color dark green. Habitus as in fig. 16.

Head small, impunctate, with deep frontal sulci, reaching middle of the diametre of eyes. Vertex wrinkled. Antennae short, reaching pronotal base, pubescent from antennomere 4.

Pronotum transverse, constricted towards base and weakly sinuate before hind angles; sides not notched. One setigerous puncture in apical half, in pronotal gutter, and one in basal angle. Median sulcus well developed and deep; lateral gutter narrow all along; fore angles not prominent; hind angles more or less rounded at tip. Two basal impressions on each side, both impunctate; internal one longer, curved, almost reaching middle of pronotum, external one straight, two-thirds as long as other, separated from lateral gutter by distinct carina. Legs rather short and stout; onychium with some setae underneath.

Elytra slender, with maximum width after the middle. Striae not very deep, smooth; intervals convex. No setigerous puncture on interval three. Shoulders well marked, basal and lateral margins producing a wide curve.

Genitalia. Aedeagus (figs. 9, 12) without particular characteristics, normal for the genus.

Geographical notes. This is the fourth species of *Trigonognatha* to be described from Taiwan.

Affinities. This species differs from *T. formosana* JEDLIČKA, 1940, *T. asperipennis* (HABU, 1978) and *T. uenoi* (HABU, 1978), in having the basal angles of pronotum largely rounded, not right, and by its green color which is unique among Taiwanese *Trigonognatha*, but reminds some species of western China. Furthermore, *T. smetanai* is more slender than any other species of the genus, more so than *T. uenoi*, that is quite slender.

In spite of these differences *T. smetanai* is more closely related to the other Taiwanese species than to any other species. The four species from Taiwan can be differentiated from the others by their small size and slender body. Some other species have a slender body shape, like *T. eoa* and *T. cavazzutii*, but they differ by the presence of several setae in the anterior half of the pronotum. *T. vignai* CASALE & SIAKY, 1994, is quite small, but differs from the Taiwanese species by its stouter body and by its pronotum not or very slightly constricted in basal half.

HABU (1978), while describing *T. asperipennis* from Taiwan noted that he did not study any specimens of *T. formosana*. I have seen some specimens of *T. asperipennis* (fig. 18) and must add that their peculiar elytral sculpture noted originally by HABU (1978) is not always so evident. In all other character states the specimens I have seen agree perfectly with those attributed to *T. asperipennis* but also with those described for *T. formosana*, keeping in mind the scarce precision of many of Jedlička's descriptions. Therefore, I believe it is quite likely that *T. asperipennis* and *T. formosana* are conspecific, but until now I have been unable to study the type series of the latter, in spite of my requests to the Narodni Muzeum of Prag, where Jedlička's collection is presently preserved.

Trigonognatha viridis viridis TSCHITSCHERINE, 1898

(= *Trigonognatha viridis tewuensis* MARCILHAC, 1994 syn.n.)

This species, omitted by STRANEO (1991) in his key, has been described from one female specimen collected in Sun-pan (today Songpan, in northern Sichuan). I have been able to examine 18 specimens of both sexes collected in several localities of Sichuan, all in the area of Songpan: Quionglai Shan, 2500 m; Shuajingsi, 2700 m; Nanping, Jiuzhaigou, 3000 m, Sword Rock; Nanping, Jiuzhaigou, 3100 m, Long Lake; between Songpan and Huanglong, 3500 m.

These specimens match the original description except in one point; the head and pronotum are not completely black as described by TSCHITSCHERINE (1898), but have violet reflections.

Recently MARCILHAC (1994) described a new subspecies, *Trigonognatha viridis tewuensis*, from two females collected in southern Gansu and noted that the new subspecies differs from the nomino-typical subspecies in having the pronotum less transverse and with violet reflections, its sides sinuate, the elytral intervals not transversely wrinkled in the apical half and the metepisterna clearly restricted posteriorly. I have found all these character states in the specimens I studied. Since both *viridis viridis* and *viridis tewuensis* were described from very few specimens and keeping in mind that the fauna of southern Gansu is similar to that of northern Sichuan, I believe that both taxa are synonyms.

Trigonognatha robusta (FAIRMAIRE, 1894)

As already noted by STRANEO (1991), JEDLIČKA (1962) was wrong in indicating Tschitscherine as the author of this species. In fact, it was described by FAIRMAIRE (1894). I have examined the single type specimen (MNHN), that therefore can be considered as holotype, a male bearing three labels, one, printed, "Ta tsien Loù - chasseurs indigènes 1893", the second, handwritten by FAIRMAIRE, "Aurisma robusta n. sp.", the third, printed, "L. Fairmaire vidit 1893 (with the last digit changed by hand into 4)". It is noteworthy to correct here a mistake in the original description; FAIRMAIRE (1894, p. 217) writes: "Ressemble à l'*A. delavayi* Fairm., du Yunnan, mais bien plus petite,...". As a matter of fact, instead of smaller this species is bigger than *T. delavayi*, as can be noticed also comparing the size of the two species mentioned in their respective original descriptions.

I can add here that it is usually believed that Ta Tsien Lu corresponds to the present town of Kangding (2912 m a.s.l.) situated at the foot of Gongga Shan, but Jan Farkač from Prag kindly informed me that an ancient Christian monastery, probably the one where the famous missionary and naturalist A. David used to live, still exists in Moxi, a village about 50 km SE of Kangding, while none have ever existed in Kangding City itself. Since the village of Moxi is much closer to the top of Gongga Shan than Kangding, I regard it as very likely that all species described from "Ta Tsien Lu" in fact come from the Moxi area.

Trigonognatha delavayi (FAIRMAIRE, 1888)

(= *Trigonognatha danieli* MARCILHAC, 1994 syn.n.)

This species was described from "Yunnan"; I have examined in MNHN three of the four specimens upon which Fairmaire described the species (the fourth one was probably presented to Tschitscherine). One of these, a male dissected by Y. Bousquet, bears four labels: one, printed, "Yunnan", the second, handwritten by FAIRMAIRE, "Aurisma delavayi Fairm.", the third, printed, "Ex Musaeo L. Fairmaire 1896", the fourth, printed, "Museum Paris, ex Coll. R. Oberthur". I here designate this specimen as lectotype.

Furthermore, I studied three specimens from northern Yunnan, Lijiang area, Yulongshue Shan.

This species is quite easily recognized by the very superficial elytral striation (fig. 4) which was noted by both FAIRMAIRE (1888) and TSCHITSCHERINE (1896).

MARCILHAC (1994) recently described *T. danieli*, which I believe is conspecific with *T. delavayi*. MARCILHAC noted that his new species differs from *T. delavayi* by two main character states: its size (20 mm instead of 14 mm) and the pubescence on the apical fourth of antennomere 4. FAIRMAIRE (1888) writes: "Long. 14 à 17 mill.". Furthermore, the three specimens from northern Yunnan, Lijiang area, Yulongshue Shan, the type locality of *T. danieli*, have a size ranging between 17.5 and 18.5 mm. These three specimens have the fourth antennomere

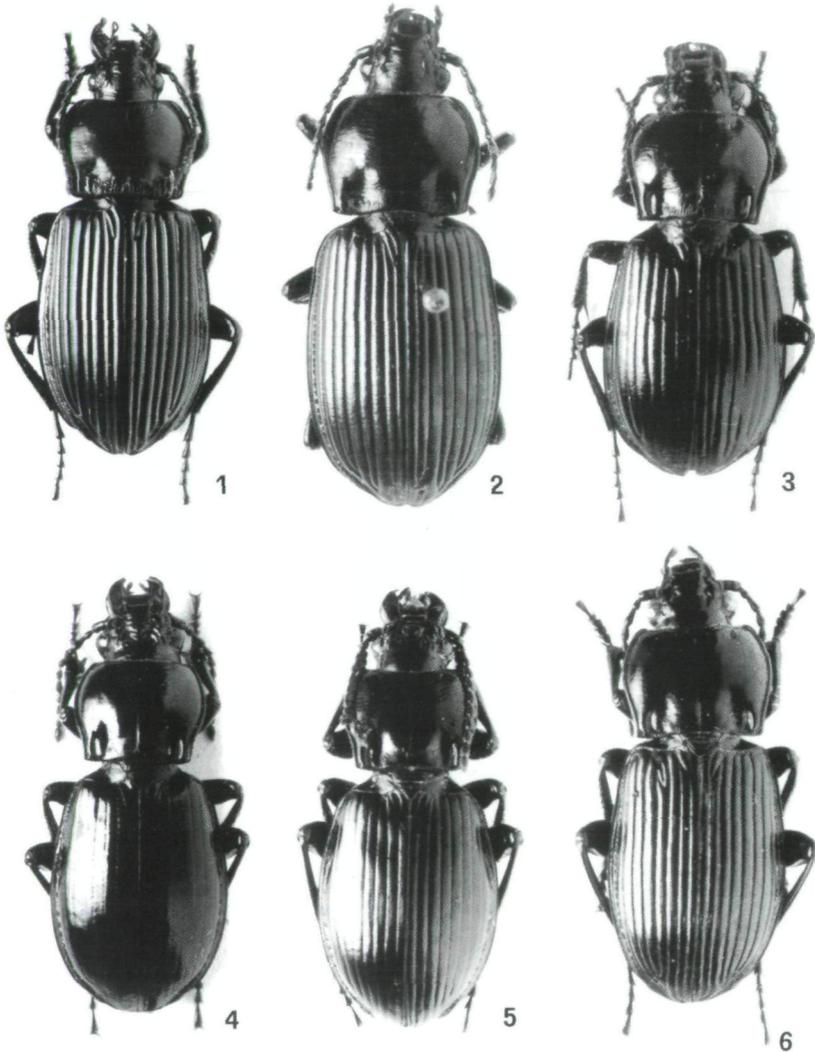
pubescent apically, but, in spite of Marcilhac's assertion, this character state is present also in *T. delavayi*, as already noted also by TSCHITSCHERINE (1896: 282): "Le 4-e [article des antennes] dépourvu de pubescence régulière mais présentant vers l'extrémité quelques poils épars". Probably Marcilhac's specimen is simply a particularly big specimen of the variable species *T. delavayi*.

Key to the species of the genus *Trigonognatha*

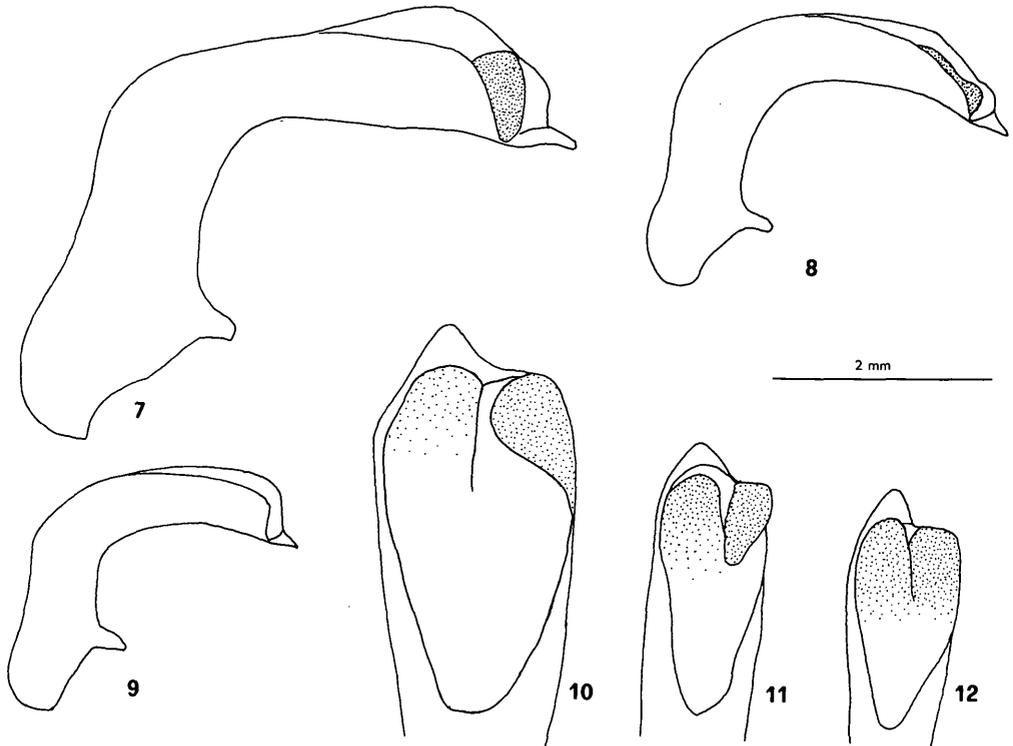
STRANEO (1991) published a key to the species of *Trigonognatha*. Besides the fact that the author omitted one species in his key, some additions have been already made by CASALE & SCIACY (1994). For that reason, I have preferred to publish a new key which in fact is a translation of the key of STRANEO (1991) with slight modifications to include all known species.

- 1 (4) Lateral margin of pronotum with two-four setigerous punctures in anterior half on each side. Upper part of body green, coppery or golden; pronotum cordiform. Species of small size (11 mm).
- 2 (3) Elytra without discal pores. All intervals subequal in width. Qinghai ... *eo*a (TSCHITSCHERINE, 1894)
- 3 (2) Elytra with one discal pore behind middle. Intervals 3, 5 and 7 evidently wider than the others. Western Sichuan (Emei Shan)..... *cavazzutii* CASALE & SCIACY, 1994
- 4 (1) Lateral margin of pronotum with a single setigerous puncture in anterior half on each side
- 5 (6) Size very small (11 mm). Pronotum very weakly constricted at base. Upper part of body brilliant copper. Northern Sichuan..... *vignai* CASALE & SCIACY, 1994
- 6 (5) Not with all preceding characters. Size larger than 11 mm.
- 7 (8) Head, pronotum and elytra black, without metallic reflections. Size large (27 mm). Thailand..... *ferreroi* STRANEO, 1991
- 8 (7) At least elytra, but more frequently also head and pronotum, distinctly metallic.
- 9 (16) Head, pronotum and elytra uniformly green or greenish-blue.
- 10 (13) Antennomere 4 glabrous (except for normal tactile apical setae)
- 11 (12) Striae very superficial, punctate. Head with frontal impressions very superficial. Size medium (14 - 20 mm). Northern Yunnan..... *delavayi* (FAIRMAIRE, 1888)
- 12 (11) Striae very deep, impunctate. Head with frontal impressions deep. Size medium (14 mm). Western Sichuan..... *saueri* sp.n.
- 13 (10) Antennomere 4 pubescent immediately after base.
- 14 (15) Size larger (19 mm). Western Sichuan *robusta* (FAIRMAIRE, 1894)
- 15 (14) Size smaller (14 mm). Northern Yunnan, southern Sichuan *becvari* sp.n.
- 16 (9) Head, pronotum and elytra with different coloration.
- 17 (28) Size larger (22 - 33 mm).
- 18 (19) Size very large (33 mm). Head black, pronotum black with red margins, elytra brilliant red, with green margins. Pronotum transverse, weakly restricted and sinuate in basal half. Guangdong *princeps* (BATES, 1883)
- 19 (18) Size smaller (less than 30 mm). Color different.
- 20 (23) Intervals 3, 5 and 7 wider than adjacent ones.
- 21 (22) Difference in width between odd and even intervals very strong. Size larger (28 mm). Guangdong..... *hauseri* JEDLICKA, 1933
- 22 (21) Difference in width between odd and even intervals weaker. Size smaller (26 mm). Western Sichuan *brancuccii* sp.n.
- 23 (20) All intervals almost of same width.

- 24 (25) Body evidently two-colored: head and pronotum black with purplish reflections, elytra brilliant green. Size large (25 mm). Northern Sichuan, southern Gansu.....
..... *viridis* TSCHITSCHERINE, 1898
- 25 (24) Head, pronotum and elytra of same color
- 26 (27) Size between 26 and 28 mm. Pronotum more strongly sinuate before hind angles and more restricted towards base. Basal impressions irregular, not regularly concave. Fujian.....
..... *andrewesi* JEDLIČKA, 1932
- 27 (26) Size between 22 and 23 mm. Pronotum very weakly sinuate before hind angles and less restricted towards base. Basal impressions regularly concave. Yunnan
..... *yunnana* STRANEO, 1943
- 28 (17) Size smaller (12-20 mm).
- 29 (40) Species from China, Burma, Korea or Japan.
- 30 (31) Pronotum subquadrate, not sinuate towards base; basal angles of pronotum rounded. Color violet, size medium (18-20 mm). Korea, Japan..... *coreana* TSCHITSCHERINE, 1895
- 31 (30) Pronotum cordate or subcordate, more or less sinuate towards the base; basal angles always sharp.
- 32 (37) Species from the Asian mainland.
- 33 (34) Head and pronotum always more or less metallic, of same color as elytra. Pronotum rather dull, strongly microsculptured and strongly constricted before basal angles, which are right. Sichuan, Yunnan..... *fairmairei* sp.n.
- 34 (33) Head and pronotum black, smooth, elytra violet.
- 35 (36) Size smaller (14 mm). Burma (Tenasserim) *feana* (BATES, 1892)
- 36 (35) Size larger (19 mm). Beijing *jaechi* sp.n.
- 37 (32) Species from Japan.
- 38 (39) Size larger (18-20 mm). Color dark bronze. Pronotum weakly sinuate before hind angles; basal impressions double *cuprescens* MOTSCHULSKY, 1857
- 39 (38) Size smaller (16 - 17 mm). Color from golden-coppery to green-bronzed, sometimes two-colored. Pronotum strongly sinuate before hind angles; basal impressions simple.....
..... *aurescens* (BATES, 1883)
- 40 (29) Species from Formosa.
- 41 (42) Pronotum and elytra completely covered with transversal wrinkles, giving them a markedly opaque aspect. Color purplish-coppery. Pronotum strongly cordate, with basal angles right or weakly obtuse. Size medium (16 - 17 mm) *asperipennis* (HABU, 1978)
- 42 (41) Pronotum and elytra not completely covered with transversal wrinkles, if some wrinkles are present, they are limited in extension and superficial. If there is an opaque aspect it is due to the strong microsculpture.
- 43 (44) Color dark green. Base of pronotum distinctly advanced at sides, hind angles largely rounded. Size very small (12 mm) *smetanai* sp.n.
- 44 (43) Color coppery or purplish. Base of pronotum straight, hind angles right or obtuse, not rounded.
- 45 (46) Color coppery on head, pronotum and elytra, rather opaque because of strong microsculpture. Head and pronotum impunctate. Hind angles of pronotum right. Size larger (15 mm).....
..... *formosana* JEDLIČKA, 1940
- 46 (45) Head black with weak purplish reflections, elytra distinctly purplish, shining, sometimes bronzed in female. Head and pronotum with very subtle but dense punctuation. Hind angles of pronotum obtuse. Size smaller (12 mm)..... *uenoi* (HABU, 1978)



Figs. 1 - 6: *Trigonognatha* spp., habitus. *T. brancuccii* (1), *T. yunnana* (2), *T. saueri* (3), *T. delavayi* (4), *T. fairmairei* (5), *T. jaechi* (6). The photographs are not to same scale; the vertical line at the right of every species represents 10 mm.



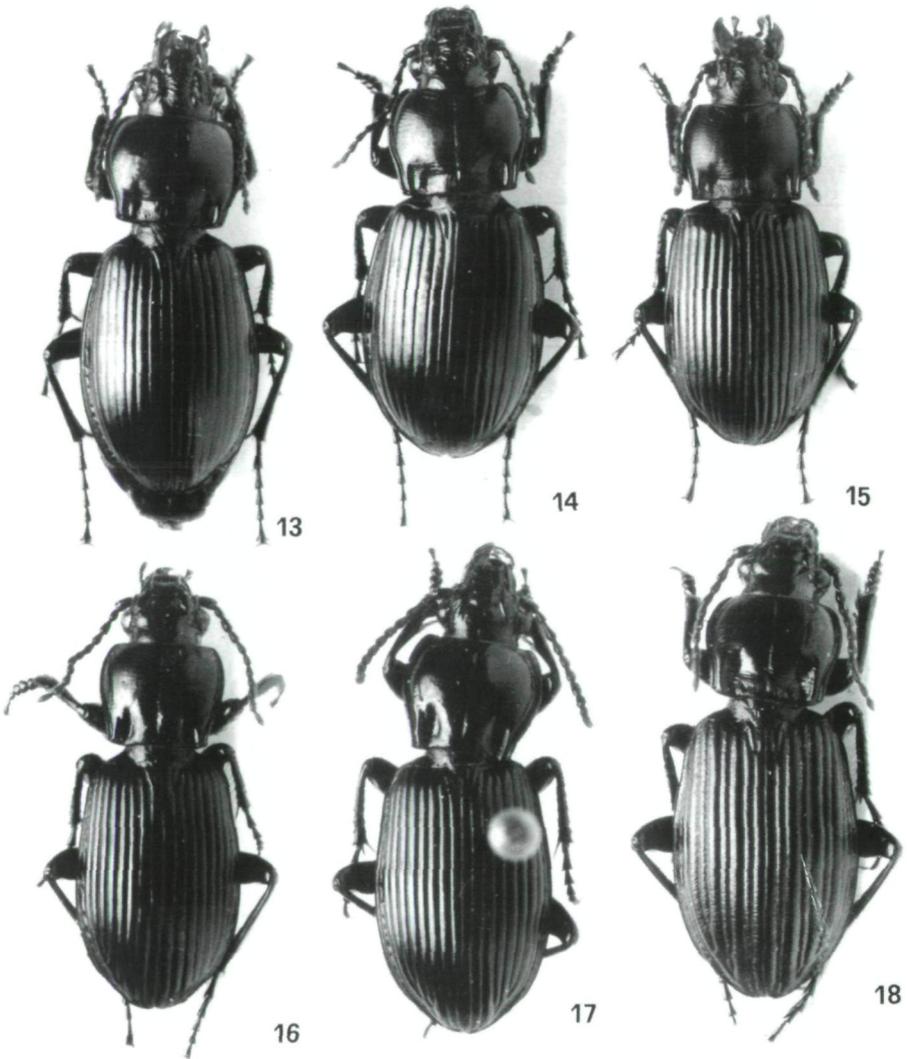
Figs. 7 - 12: *Trigonognatha* spp., male genitalia; aedeagus in lateral and dorsal view of *T. brancuccii* (7, 10), *T. becvari* (8, 11), *T. smetanai* (9, 12).

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Zusammenfassung

Sechs neue Arten der Gattung *Trigonognatha* werden aus China beschrieben: *T. brancuccii* sp.n. (Sichuan), *T. saueri* sp.n. (Sichuan), *T. becvari* sp.n. (Sichuan und Yunnan), *T. fairmairei* sp.n. (Sichuan und Yunnan), *T. jaechi* sp.n. (Beijing) und *T. smetanai* sp.n. (Taiwan). Zwei neue Synonyme werden etabliert: *T. danieli* MARCILHAC, 1994 = *T. delavayi* FAIRMAIRE, 1888 und *T. viridis* ssp. *tewuensis* MARCILHAC, 1994 = *T. viridis* ssp. *viridis* TSCHITSCHERINE, 1898. Neue Daten über andere Arten der Gattung und ein neuer Bestimmungsschlüssel sind inkludiert.



Figs. 13 - 18: *Trigonognatha* spp., habitus. *T. becvari* (13), *T. robusta* (14), *T. viridis* (15), *T. smetanai* (16), *T. uenoi* (17), *T. asperipennis* (18). The photographs are not to same scale; the vertical line at the right of every species represents 10 mm.

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