

Microsinocys, a new subgenus of *Bembidion* LATREILLE from western and southwestern China (Coleoptera: Carabidae)

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Abstract

Microsinocys, a new subgenus of *Bembidion* LATREILLE, 1802 (Coleoptera: Carabidae) is described for eleven new species from the high mountains of western and southwestern China. *Bembidion qinghaicum* sp.n. is selected as type species. Eleven new species are described: *Bembidion (Microsinocys) qinghaicum* sp.n. (Qinghai, Tibet), *B. (M.) barkamense* sp.n. (Sichuan), *B. (M.) facchini* sp.n. (Sichuan), *B. (M.) rebecca* sp.n. (Sichuan), *B. (M.) wraseanum* sp.n. (Sichuan), *B. (M.) luhuoense* sp.n. (Sichuan), *B. (M.) schillhammeri* sp.n. (Yunnan), *B. (M.) jani* sp.n. (Yunnan), *B. (M.) herbertfranzi* sp.n. (Tibet), *B. (M.) turnai* sp.n. (Sichuan) and *B. (M.) daxuense* sp.n. (Sichuan).

Key words: Coleoptera, Carabidae, Bembidiini, *Bembidion*, *Microsinocys*, China, taxonomy.

Introduction

While studying unidentified material from China, I discovered specimens of two very small and strange species of *Bembidiini* from Qinghai and Sichuan. No mention of such species is present in the relevant literature (ANDREWES 1935; NETOLITZKY 1942, 1943; JEDLICKA 1965). In examining collections of entomologists and museums, I found more unidentified specimens in the collections of Sciaky, Facchini, Farkac, Wrase, in the Naturhistorisches Museum Wien, and in the Naturhistorisches Museum Basel, belonging to species closely related to mine. All of these species are apparently undescribed, and since they are very similar to each other and they have very peculiar common characters, I have decided to group them together in a new subgenus of *Bembidion* LATREILLE, 1802, which is described below.

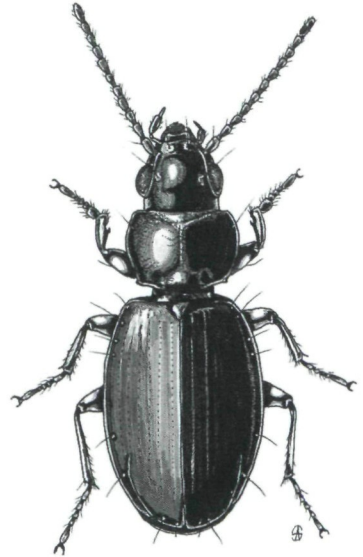


Fig. 1: Habitus of *Bembidion (Microsinocys) qinghaicum* sp.n.

Materials & Methods

This paper is based on study of 160 specimens belonging to the new subgenus described herein, and on comparison with specimens belonging to almost all the Palaearctic subgenera.

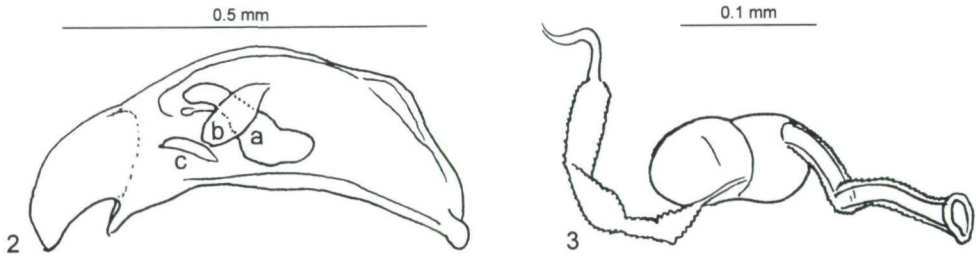


Fig. 2: General structure of the median lobe of the aedeagus of *Bembidion* (*Microsinocys*) showing sclerites "a", "b" and "c".

Fig. 3: Spermatheca of *B. (M.) qinghaicum*, paratype, E Tibet, road Toba - Jomda pass, 60 km E Toba.

Sources of material are the collections of the following institutions and specialists:

CF	Coll. Facchini	CT	Coll. Toledano
CFk	Coll. Farkac	CW	Coll. Wrase
CP	Coll. Pütz	NMB	Naturhistorisches Museum, Basel
CS	Coll. Sciaky	NMW	Naturhistorisches Museum, Wien

My studies on Chinese *Bembidiini* reveal many species not attributable with certainty to the known subgenera or genera. Until a better supraspecific classification is available, I prefer to regard here the taxon *Bembidion* sensu lato as a single genus, not split in distinct genera.

MADDISON (1993) has discussed in detail the history of the classification of the genus *Bembidion* and has explained why it is still better to keep the genus as a whole until a better knowledge of the group will be reached.

In my opinion it is possible to separate the species of this new subgenus in four different groups of taxa closely related to each other; therefore I describe as first, for each group, a species that shows better the typical habitus of the group, followed by the other components of the same group in decreasing order of affinity.

The measurements, made with a Leica MZ8 stereobinocular microscope at 30 x (body) and 75 x (median lobes of aedeagi), are expressed in the text by these abbreviations:

pw/pl	pronotal width / pronotal length ratio
pw/hw	pronotal width / head width ratio
el/ew	elytral length / elytral width ratio
ew/pw	elytral width / pronotal width ratio

The body length has been measured from front margin of clypeus to the apex of elytra, and the antennal length from base of the antennomere 1 to the apex of 11.

The dissections were made using standard techniques; genitalia and small parts were preserved in Euparal on acetate labels mounted on the same pins as the specimens.

Microsinocys subgen.n.

TYPE SPECIES. *Bembidion* (*Microsinocys*) *qinghaicum* sp.n. (figs. 1, 16).

DIAGNOSIS. This subgenus is characterized by very small size, moniliform antennae, pronotum not sinuate at sides, base of pronotum not rectilinear, median lobe gently protruding posteriorly, as in *Philochthus* STEPHENS, 1829, very faint elytral striae and very deep and laterally carinated apical stria.

DERIVATIO NOMINIS. The name of the subgenus derives from the small size of its species, the latin name of China and the similarity with *Ocys* STEPHENS, 1829, meaning "the little Chinese *Ocys*".

DESCRIPTION. Very small species (2.38 - 3.05 mm). Color piceous to black, non-metallic.

Head relatively wide, with shallow, lightly convergent frontal furrows not reaching behind the half of the eye and not extending on clypeus; antennae short (0.90 - 1.28 mm), moniliform. Antennomeres 2 and 3 narrower than articles 4 to 10, except for *B. barkamense* sp.n., where antennomere 3 has the same width. Eyes moderately convex. Mentum and submentum separated by a suture.

Pronotum transverse, with front angles very slightly prominent; sides rounded, not sinuated posteriorly, with narrow lateral sulcus. Basal margin of pronotum not rectilinear, as in *Philochthus*, with a median lobe more or less protruding posteriorly. Hind angle of pronotum with a pore, and with a more or less developed tooth projecting laterally. Basal foveae very small, but evident in *B. turnai* sp.n. and *B. daxuense* sp.n.; almost absent in all the other species, represented by a very small and weak concavity between the more or less convex disk and the basal margin.

Legs short; first article of protarsi of male well dilated; the second one slightly dilated.

Metasternal process unbordered.

Elytra rather convex, ovate, smooth, with basal margin reaching stria 4; striae very finely impressed, 1 and 2 complete, reaching the apex; stria 2 slightly diverging from stria 1 before apex; stria 3 joining stria 4 slightly before apex; stria 6 disappearing at the apex, absent in *B. facchinii* sp.n. and *B. jani* sp.n. Stria 7 normally absent, only indicated by some weak points. Apical stria extremely close to stria 5, but slightly more lateral, very deep and long, laterally bordered by a distinct carina. Stria 8 laterally contouring the apical carina at the apex.

Four humeral pore-punctures, almost equidistant. Two discal pore-punctures in interval 3, adjoining stria 3: the anterior one one-third of the distance from the base of the elytron, the posterior one two-thirds of the distance.

Male genitalia. Median lobe of the aedeagus rather variable in external shape, but with the common characteristic of the presence in the internal sac of a large oblique sclerite (fig. 2 a), partially covered by another smaller one (fig. 2 b) in the left view of the median lobe. Base with a very large opening in the right side, and only a very little concavity in the left one. Left paramere normally with three setae (four in a paratype of *B. qinghaicum* and two in the holotype of *B. turnai*: I suppose that the first one could be an aberrant specimen and that the second one is a damaged specimen).

Female genitalia (fig. 3). Reservoir of spermatheca "bean-shaped"; duct externally gently corrugate, with a bend at the apical third; presence of a lightly sclerified "ear-shaped" ring at the vaginal end, visible only at 100 x or more; long gland, almost invisible at 75 x in incident light; at 400 x it appears very uneven.

DISTRIBUTION (fig. 4). The new subgenus is known from China: S Qinghai, W and N Sichuan, NW Yunnan and E Tibet, where its species inhabit the earthy banks of small creeks at about 4000 m a.s.l.

AFFINITIES. The new subgenus seems to be rather isolated: it shares few characters with the known genera and subgenera I could examine.

Following Perrault's keys to the genera of *Bembidiini* (PERRAULT 1981), it is impossible to find a known genus which can include species with the peculiar characters of *Microsinocys*: it keys to *Lymneops* CASEY, 1918, a North American intertidal genus of *Bembidiini* which certainly do not have systematic relationships with *Microsinocys*.

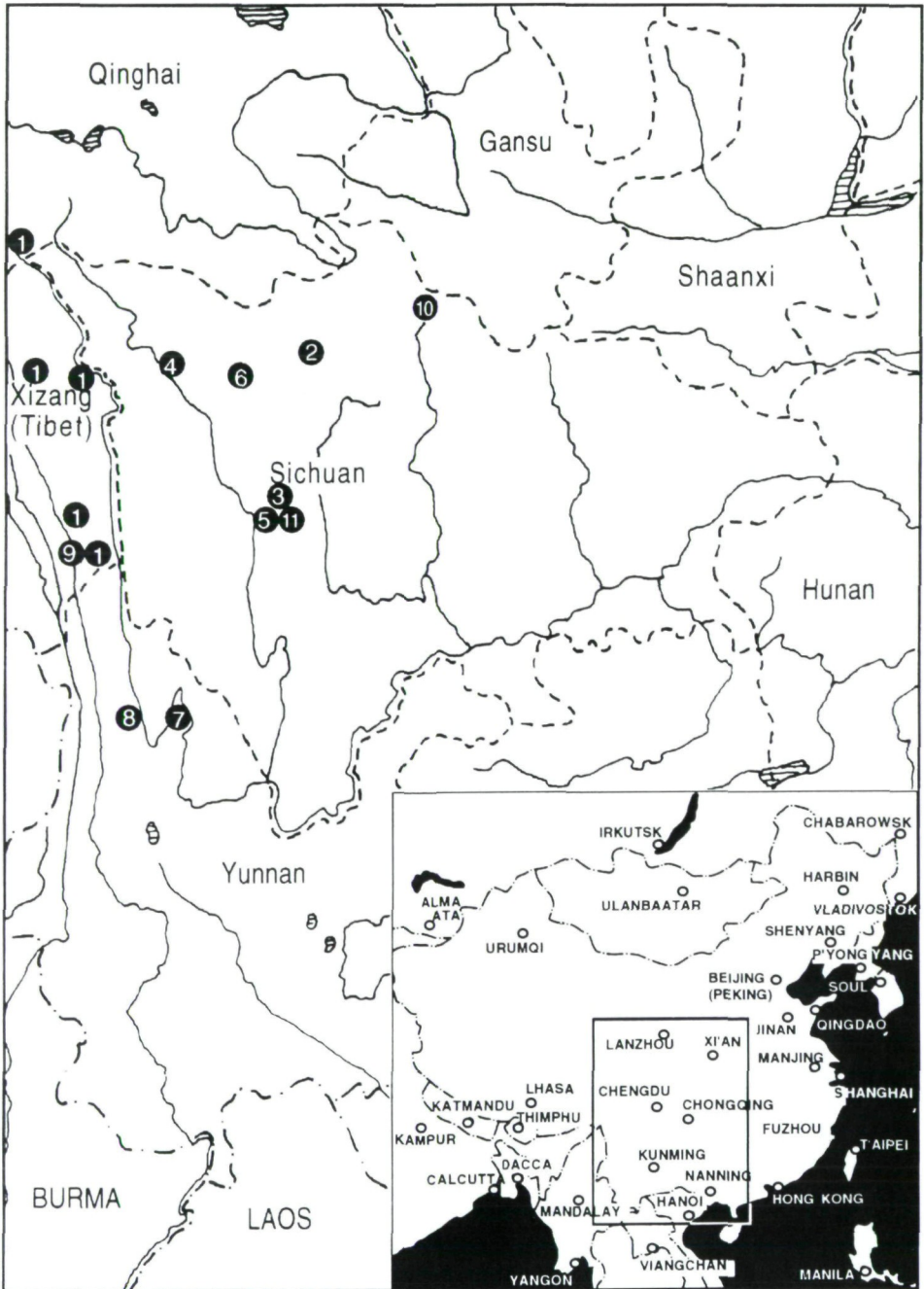


Fig. 4: Map of southwestern China showing the geographical distribution of the species of *Microsinocys*.
 1) *B. qinghaicum*; 2) *B. barkamense*; 3) *B. facchini*; 4) *B. rebecca*; 5) *B. wraseanum*; 6) *B. luhuoense*;
 7) *B. schillhammeri*; 8) *B. jani*; 9) *B. herbertfranzi*; 10) *B. turnai*; 11) *B. daxuense*.

For the position of the discal pores of elytra, it is possible to include it in the phyletic line of *Bembidion* sensu JEANNEL (1941). In this group just few species share some of the peculiar characters of *Microsinocys*. The very short and moniliform antennae are present also in *Bembidion* (*Bembidion*) *crassicornae* SOLSKI, 1874 from northern Spain.

In the shape of the pronotum, with rounded sides and base with a median lobe gently protruding posteriorly, the new subgenus is similar to *Philochthus* STEPHENS, 1829. Many species of *Philochthus* have a very little tooth laterally projecting from the pronotal hind angle. In some of these, e.g. *Bembidion guttula* FABRICIUS 1792, *B. luigionii* G. MÜLLER, 1931, *B. neresheimeri* J. MÜLLER, 1929, *B. mannerheimi* SAHLBERG, 1827, *B. ellipticocurtum* NETOLITZKY, 1935, the tooth is more or less developed, but visible, as in some of the new species described here.

Elytra so faintly punctate can be observed in few species of *Bembidiini*. This character is very impressive in *Bembidion liparum* ANDREWES, 1936 (= *B. lissonotum* ANDREWES, 1935, nec *B. lissonotum* BATES, 1873); in this species from Kashmir, probably closely related to *Bembidion* s. str., the elytra are almost completely smooth, except for the first two striae very faint and the striae 3 to 7 represented only by few punctures. But the similarities with the new species of *Microsinocys* end here.

Also outside the group of *Bembidion* sensu JEANNEL (1941) a few species sharing some of the characters of *Microsinocys* can be found.

Bembidion csikii JEDLIČKA, 1937, a species described in the subg. *Pekinium* CSIKI, 1902 but actually belonging to *Hoquedela* MÜLLER-MOTZFELD, 1988, (TOLEDANO & SCIÁKY in press), has the apical stria slightly carinated and elytral striae markedly reduced. However the reduced elytral striae, the carinated apical stria and the habitat on the high mountains of western and southwestern China are the only characteristics in common with *Microsinocys*.

Orzolina MACHADO, 1987, a monospecific genus of intertidal *Bembidiini* from Canary Islands shares some significant characters with *Microsinocys*: apical stria slightly carinated and elytral striae markedly reduced; certainly in this case too the similarities are not due to systematic relationships.

Microsinocys also shares some of its characters with *Ocys*: habitus similar to *Trechus* CLAIRVILLE, 1806, apical carina (more developed in *Microsinocys*) reduced elytral stria, base of pronotum with a median lobe gently protruding posteriorly, are characters present in some species of *Ocys* (e.g. *Ocys pseudopaphius* REITTER, 1902). Also the laterally projecting tooth at the hind angles of pronotum is present in some species of *Ocys*.

Even though these similarities led me to call the subgenus *Microsinocys* I think it is better to include *Microsinocys* in the genus *Bembidion* sensu lato, and to attribute these similarities with *Ocys* to convergence.

Key to species of *Microsinocys*

- 1 - Pronotum with small, but evident basal foveae and laterally projecting tooth at hind angle of pronotum (figs. 14, 15) 10
- Pronotum without evident basal foveae, with or without laterally projecting tooth at hind angle of pronotum (figs. 5, 6, 7, 8, 9, 10, 11, 12, 13) 2
- 2 - Small species (2.4 - 2.6 mm) piceous-black, matt, pronotum rather depressed without laterally projecting tooth at hind angles 6
- If small species, then strongly convex and glossy pronotum and elytra; if species with depressed pronotum, then larger (> 2.77 mm) 3
- 3 - Pronotum rather depressed and slightly less transverse (pw/pl < 1.5) (figs. 5, 6, 7) 4
- Pronotum convex, more transverse (pw/pl ≥ 1.5) (figs. 11, 12, 13); elytra convex 8

- 4 - Black; laterally projecting tooth at the hind angle of pronotum (fig. 6); antennomere 3 as wide as articles 4 to 10 *barkamense* sp.n.
- Piceous or piceous-black; hind angle of pronotum without laterally projecting tooth (fig. 5, 7); antennomere 3 narrower than articles 4 to 10 5
- 5 - Piceous, glossy, with very superficial microsculpture on the elytra; elytral striae punctate, faintly impressed but evident *qinghaicum* sp.n.
- Piceous-black, matt, with rather evident microsculpture; elytral striae very superficial *facchinii* sp.n.
- 6 - Elytra strongly ovate, maximum elytral width slightly behind middle, humeral angles very rounded and narrow *luhuoense* sp.n.
- Elytra more parallel-sided, maximum elytral width at middle, humeral angles well marked 7
- 7 - Hind angle of pronotum rather rounded, with narrow margin behind posterior seta (fig. 8) *rebecca* sp.n.
- Hind angle of pronotum rather sharp, with wide margin behind posterior seta (fig. 9) *wraseanum* sp.n.
- 8 - Lateral margins of pronotum evidently convex toward hind angles of pronotum (figs. 11, 12); with or without laterally projecting tooth at hind angles of pronotum; elytral striae very superficial 9
- Lateral margins of pronotum almost rectilinear toward hind angles of pronotum (fig. 13); without laterally projecting tooth at hind angles of pronotum; elytral striae punctate, superficial, but clearly visible *herbertfranzi* sp.n.
- 9 - Smaller (2.6 - 2.8 mm) with laterally projecting tooth at hind angles of pronotum (fig. 11); basal margin of pronotum with median lobe evidently protruding posteriorly; median lobe of aedeagus small (0.53 mm), with small sclerites and without evident ventral gibbosity (fig. 34) *schillhammeri* sp.n.
- Larger (2.9 mm), without laterally projecting tooth at hind angles of pronotum (fig. 12); median lobe of aedeagus large (0.68 mm) with large sclerites and evident ventral gibbosity (fig. 35) *jani* sp.n.
- 10 - Larger size (> 2.76 mm) pronotum larger (ew/pw = 1.4), very superficial elytral striae *turnai* sp.n.
- Smaller size (2.63 mm), pronotum smaller (ew/pw = 1.5), more impressed striae, elytra strongly convex and oval *daxuense* sp.n.

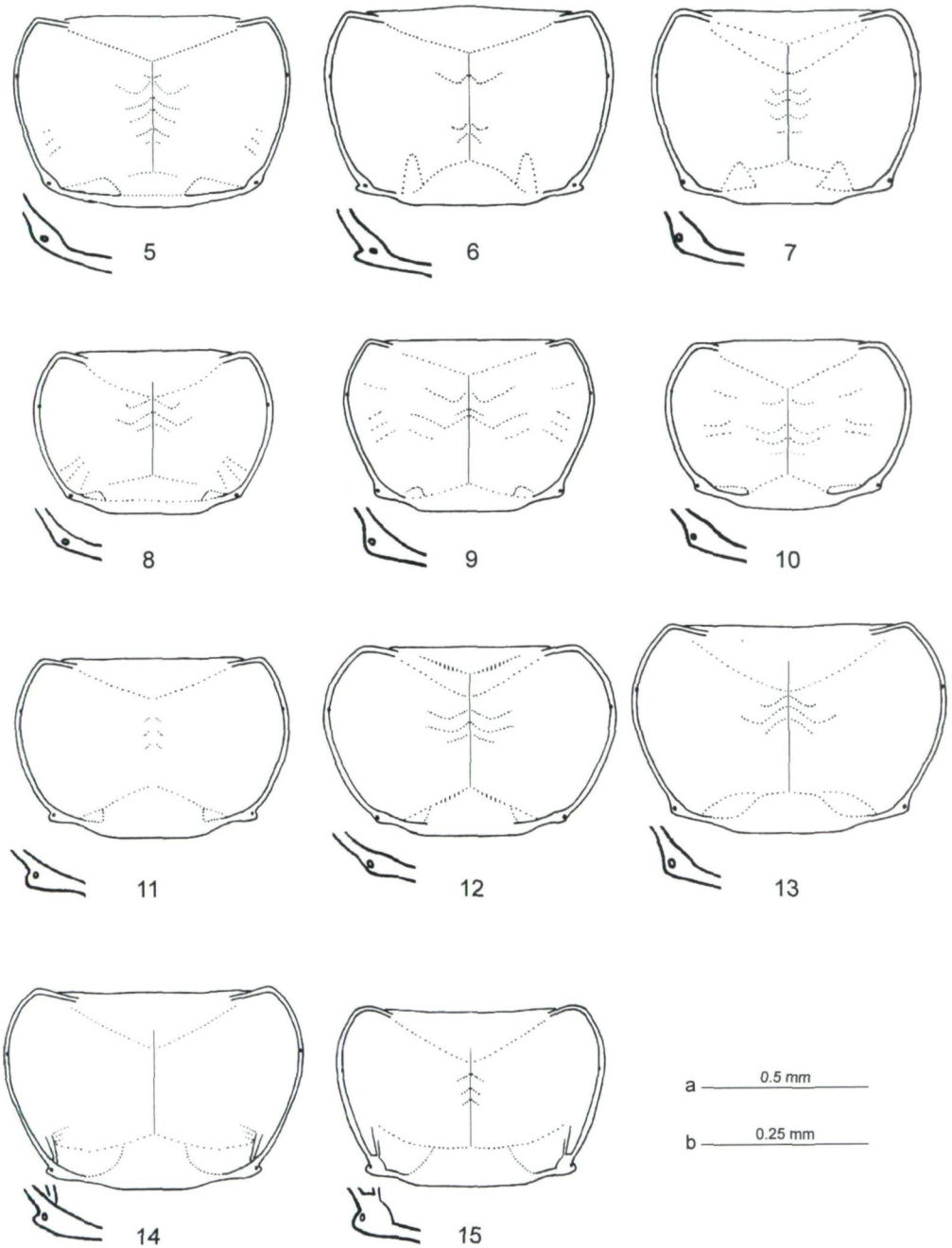
***Bembidion (Microsinocys) qinghaicum* sp.n. (figs. 1, 16)**

DIAGNOSIS. Piceous, large, without laterally projecting tooth at the hind angles of pronotum, with rather depressed pronotum, rounded elytral shoulders and faint microsculpture on the elytral apex.

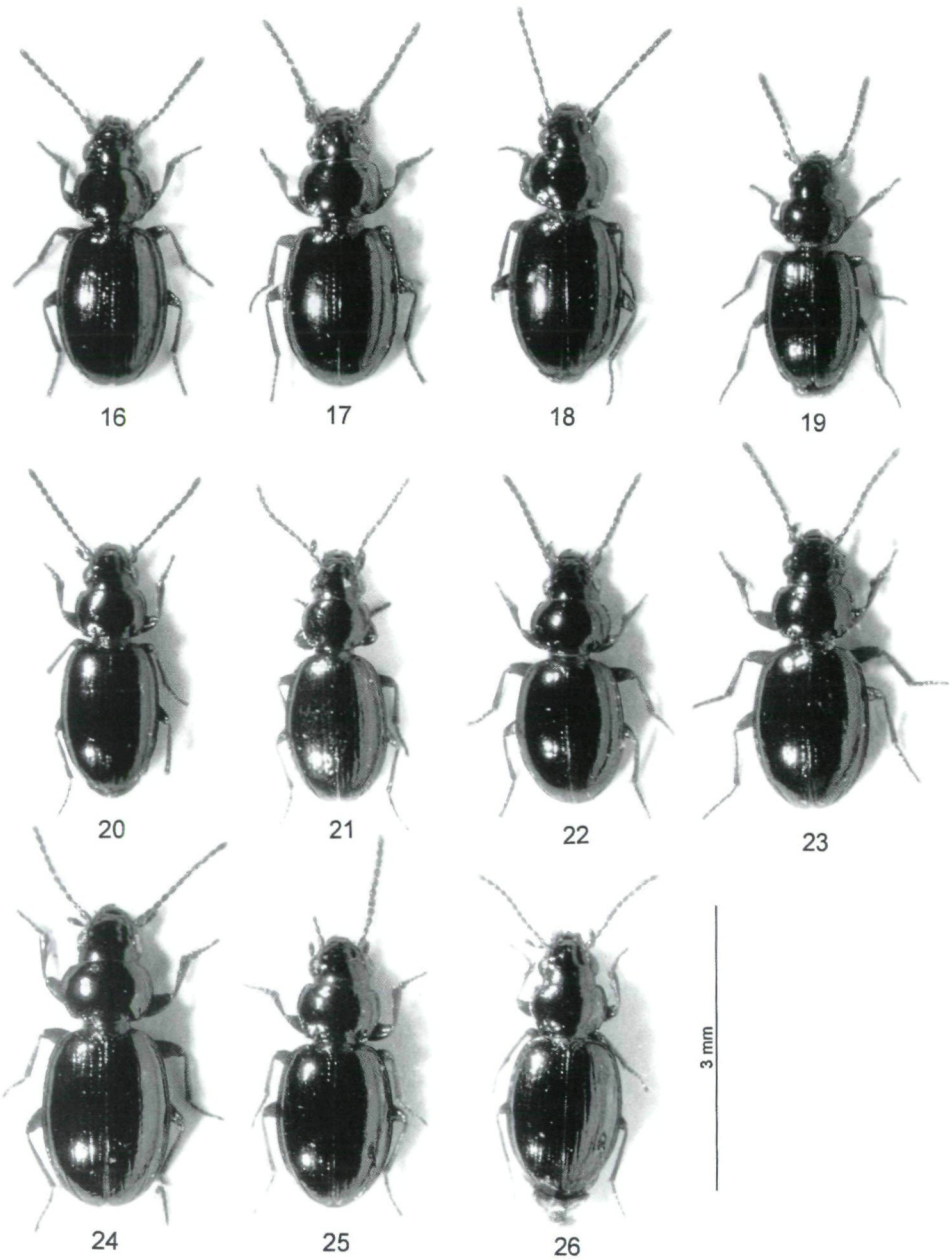
TYPE LOCALITY. China - S.Qinghai, 32°53' N 96°41' E, near Doramarkog, pass 4200 m.

TYPE SERIES. Holotype ♂: "China - S.Qinghai, 11.7.95, 32°53' N 96°41' E, 10 km Doramarkog, pass 4200 m, alpine meadow" (CT).

Paratypes: 17 ♂♂, 2 ♀♀, same locality and date as holotype (CT, CS, CF, NMW); 48 ♂♂, 36 ♀♀: E Tibet, road Toba-Jomda, pass 60 km E Toba, 31°19' N, 98°05' E, 4200 m, alpine meadow, 17.VII.1997 (CT, CS, CF, CW, NMW, NMB); 1 ♂, E Tibet, road Jomda-Dege, pass 40 km NE of Jomda, 31°38' N, 98°28' E, 4245 m, alpine meadow, 18.VII.1997 (CT); 3 ♂, 3 ♀: E Tibet, "Lao Shan" pass, road Markam-Zogang, 10 km W Markam, 4300 m, 29°42' N, 98°32' E, alpine meadow, 27-28.VI.1997 (CT); 1 ♀: E Tibet, "Tamala Shan" pass, road Qamdo-Toba, 20 km NE Qamdo, 31°16' N, 97°18' E, 4800 m, alpine meadow, 16.VII.1997, (CT); 2 ♂♂, 6 ♀♀: SE Tibet, "Chola Shan" pass, road Yanjing-Markam, 50 km S Markam, 4400 m, 29°16' N, 98°38' E, mixed forest, 24-27.VI.1997 (CT).



Figs. 5 - 15: Pronotum (at magnification a) and detail of the left hind angle of pronotum (at magnification b) of 5) *B. qinghaicum*; 6) *B. barkamense*; 7) *B. facchini*; 8) *B. rebecca*; 9) *B. wraseanum*; 10) *B. luhuoense*; 11) *B. schillhammeri*; 12) *B. jani*; 13) *B. herbertfranzi*; 14) *B. turnai*; 15) *B. daxuense*.



Figs. 16 - 26: Photographs of the habitus of 16) *B. qinghaicum*, holotype; 17) *B. barkamense*, holotype; 18) *B. facchini*, holotype, 19) *B. rebecca*, holotype; 20) *B. wraseanum*, holotype; 21) *B. luhuoense*; 22) *B. schillhammeri*, holotype; 23) *B. jani*, holotype; 24) *B. herbertfranzi*, holotype, 25) *B. turnai*, holotype; 26) *B. daxuense*, holotype.

DERIVATIO NOMINIS. The name is derived from the Chinese province of Qinghai, where part of the type series has been collected.

DESCRIPTION. Body length: 2.83 mm; colour piceous; antennomere 1, the base of 2 - 4 and the apex of the last one red brown (in some paratypes, the antennomeres 2 and 3 are entirely red brown); the rest of antennae is darker. palps red brown, often darker; only the penultimate article of maxillary palps always darker, and the last one of maxillary and labial palps light yellow. Coxae and legs red brown. Elytral margin and first elytral interval red brown; under side piceous, excepting the elytral epipleura, which are red brown.

Antennae relatively long (1.27 mm). Antennomere 2 and 3 longer than articles 4 to 10.

Pronotum (fig. 5) (pw/pl = 1.52) rather depressed, moderately larger than head (pw/hw = 1.27). Sides rounded, with a clear increase of the curvature at the level of the anterior pore. Basal margin with a median lobe gently protruding posteriorly; basal foveae almost absent. Basal margin completely rebordered. No laterally projecting tooth at the hind angle of pronotum. Anterior transverse impression very shallow; median line moderately deep, ending a little before the basal margin, at the basal transverse impression, very short. Disk gently corrugated.

Elytra ovate, relatively long (el/ew = 1.40), shiny, wider than pronotum (ew/pw = 1.38). Maximum width in the middle. Humeral angles rounded. Scutellar striole very short. Elytral striae gently punctate; stria 5 and 6 very faint; stria 7 absent. Apical pore adjoining the middle of apical stria.

Microsculpture faint, isodiametric on the neck, absent or extremely faint on the pronotum, and faint on the apex of elytra.

Male genitalia. Median lobe of aedeagus (fig. 27) short (0.61 mm), arcuate, apex more or less rounded, gently curved ventrally and to the right; sclerite "a" club-shaped; median lobe of paratypes from E Tibet slightly longer (0.64 mm); apex of median lobe of aedeagus of paratypes male from E Tibet, "Lao Shan" pass, wider and more rounded (fig. 28).

DISTRIBUTION. Known from China: SE Qinghai and E Tibet.

HABITAT. Found between 4200 - 4800 m a.s.l., in alpine meadows and mixed forest.

AFFINITIES. Closely related to *B. facchini* and *B. barkamense* sp.n., as suggested by the structure of the internal sac of the aedeagus and the depressed pronotum.

***Bembidion (Microsinocys) barkamense* sp.n. (fig. 17)**

DIAGNOSIS. Large, black, with antennomere 3 as wide as articles 4 to 10, pronotum rather depressed, with laterally projecting tooth in the hind angles of pronotum and without basal foveae.

TYPE LOCALITY. China, NW Sichuan, 3500 m, mountains 70 km NNW Barkam.

TYPE SERIES. Holotype ♂: "China, NW Sichuan, 3500 m, mts. 70 km NNW Barkam, (mixed forest), 21.7.1995" (CT).

DERIVATIO NOMINIS. The name derives from the type locality.

DESCRIPTION. Body length: 2.83 mm; colour black; antennomere 1 brown; the rest of antennae dark brown. Palps brown; only the penultimate article of maxillary palps darker, and the last article of maxillary and labial palps light yellow. Coxae red brown and legs brown. Elytral margin dark brown; under side piceous, excepting the elytral epipleura, dark brown.

Antennae very short (1.25 mm). Antennomere 3 wide as articles 4 to 10; antennomere 2 narrower.

Eyes rather flat.

Pronotum (fig. 6) (pw/pl = 1.47) slightly convex, moderately larger than head (pw/hw = 1.23). Basal margin with a median lobe gently protruding posteriorly; basal foveae almost absent. Basal margin bordered only at sides, ending at sides with a little angle, with a laterally projecting tooth. Anterior transverse impression very shallow; median line moderately deep, ending a little before the basal margin, at the basal transverse impression, which is very shallow. Disk smooth.

Elytra ovate, convex, rather wide (el/ew = 1.33), shiny, wider than pronotum (ew/pw = 1.43). Maximum width at middle. Humeral angles slightly rounded. Scutellar striae very short. Elytral striae gently punctate; 1 and 2 more impressed than the other; 5 and 6 very faint, joining at the apical stria; 7 almost absent. Apical pore adjoining the middle of apical stria.

Microsculpture faint, isodiametric on the neck, absent or extremely faint on the pronotum, and faint on the apex of elytra.

Male genitalia. Median lobe of aedeagus (fig. 30) long (0.65 mm), less arcuate and with ventral margin more rectilinear in the apical half than in *B. qinghaicum*; sclerite "a" club-shaped as in *B. qinghaicum*, sclerite "c" Y-shaped.

DISTRIBUTION. Known from China: Sichuan.

HABITAT. Found at an altitude of 3500 m, in mixed forest.

AFFINITIES. Closely related to *B. qinghaicum* and *B. facchini*, as suggested by the structure of the internal sac of the aedeagus and the depressed pronotum; among these species, *B. barkamense* is the only one showing a well developed tooth at the hind angles of pronotum.

Bembidion (Microsinocys) facchini sp.n. (fig. 18)

DIAGNOSIS. A comparatively large species, piceous black, with pronotum rather depressed, without laterally projecting tooth at the hind angles of pronotum, with very faintly impressed elytral striae and with evident microsculpture.

TYPE LOCALITY. China - W Sichuan, E Kangding-Xinduqiao pass 16 km W Kangding, 4290 m.

TYPE SERIES. Holotype ♂, "China - W Sichuan, E Kangding-Xinduqiao pass 16 km W Kangding, 4290 m alp. reg. 3.8.94" (CF).

DERIVATIO NOMINIS. I dedicate this new species to my friend Sergio Facchini from Piacenza, in whose collection I found the holotype.

DESCRIPTION. Body length: 2.77 mm; colour piceous black, as in *B. rebecca* sp.n.; antennae dark brown except antennomere 1 and 2, a little lighter. Palps dark brown, excepting the penultimate, piceous-black, and the last article of maxillary and labial palps, light yellow.

Coxae and legs dark brown. Elytral margin a little lighter than disk; under side piceous, except the elytral epipleura, dark brown.

Antennae relatively long (1.28 mm). Antennomere 3 slightly longer than articles 4 to 10.

Head with faint frontal furrows, strongly microsculptured.

Pronotum (fig. 7) (pw/pl = 1.43) rather depressed, slightly larger than head (pw/hw = 1.25). Sides gently constricted posteriorly. Basal margin with a median lobe slightly protruding posteriorly, a little more than in *B. qinghaicum*; basal foveae almost absent. Basal margin rebordered only at sides, without laterally projecting tooth at the hind angles. Anterior transverse impression deeper than in the other species and very wide; median line faintly impressed, ending a little before the basal margin, at the almost invisible basal transverse impression.

Elytra ovate, very slightly narrower than in *B. qinghaicum* (el/ew = 1.39), wider than pronotum (ew/pw = 1.44). Maximum width in the middle. Humeral angles rounded. Scutellar striae very short. Elytral striae very gently punctate, less than in *B. qinghaicum* and *B. rebecca* in the basal

half; weakly sulcate in the posterior half; stria 1 very faint, almost invisible in the basal half, indicated by few punctures only; stria 5 very, very faint, almost invisible; striae 6-7 absent. Apical pore positioned adjoining the apical stria, 2/5 of the way from anterior end of stria.

Microsculpture more distinct than in *B. rebecca*, isodiametric on the neck, in small polygonal meshes on the pronotum, and well evident in large transverse polygonal meshes on the elytra.

Male genitalia. Median lobe of aedeagus (fig. 31) long (0.64 mm), narrower and with apical half of the ventral margin more rectilinear than in *B. qinghaicum*, with a dorsal concavity; internal sac very similar to *B. qinghaicum*. Apex more pointed and curved at left than in the other *Microsinocys*.

DISTRIBUTION. Known from China: Sichuan.

HABITAT. Found at an altitude of 4290 m.

AFFINITIES. Closely related to *B. qinghaicum* and *B. barkamense*, as suggested by the structure of the internal sac of the aedeagus and the depressed pronotum.

Bembidion (Microsinocys) rebecca sp.n. (fig. 19)

DIAGNOSIS. Comparatively small, piceous-black, without laterally projecting tooth at the hind angles of pronotum, with well marked shoulders and elytra rather parallel-sided.

TYPE LOCALITY. China - NW Sichuan, 31°46'N 99°32'E pass 20 km NW Rongbaca, 4091 m.

TYPE SERIES. Holotype ♂: "China - NW Sichuan, 20.7.1995, 31.46 N 99.32 E pass 20 km NW Rongbaca, *Picea* forest 4090 m" (CT). Paratypes: 1 ♂, 5 ♀♀, same locality and date as holotype (CT, CS, NMW).

DERIVATIO NOMINIS. I dedicate this species to Rebecca Olivieri, the girl I live for, who gently and with love helps me in my studies, following me everywhere, in museums and into the field.

DESCRIPTION. Body length: 2.38 - 2.57 mm; colour piceous black, darker than *B. qinghaicum*; antennomere 1, and the base of 2 - 4 red brown (in the holotype, the antennomere 2 is almost entirely red brown), the apex of the last article a little lighter; the rest of antennae darker. Palps dark brown, excepting the last article of maxillary and labial palps, light yellow.

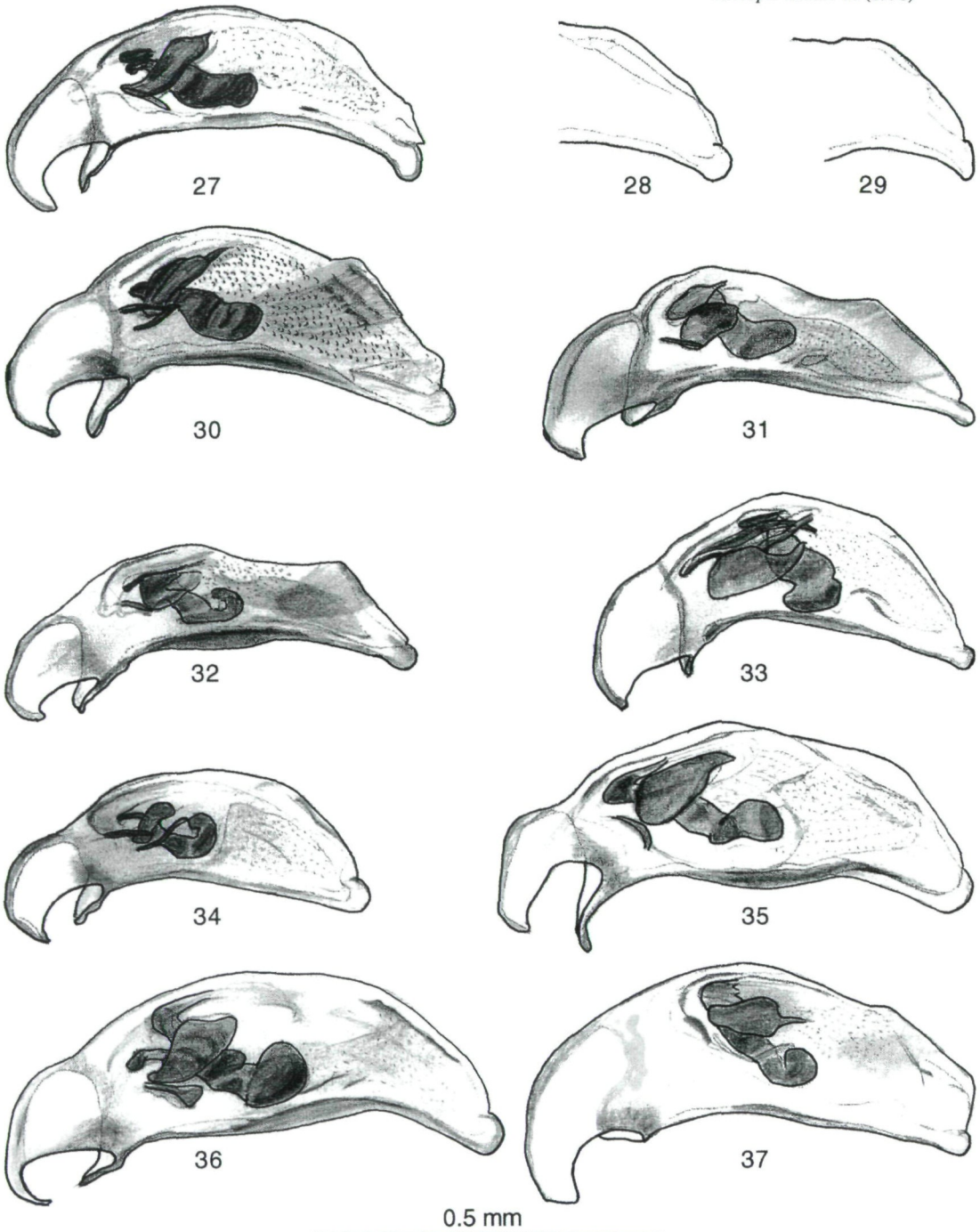
Coxae red brown and legs brown. Basal margin of pronotum brownish. Elytral margin a little lighter than disk; under side piceous, except the elytral epipleura, brown.

Antennae shorter than in *B. qinghaicum* (0.9 - 1.1 mm). Antennomere 2 and 3 slightly longer than articles 4 to 10.

Head with extremely faint frontal furrows, almost absent, reaching behind the anterior third of the eye. In the holotype and in the paratype male, just some transverse rugosities; in a paratype female, the front is almost completely smooth.

Pronotum (fig. 8) (pw/pl = 1.45) slightly convex, a little larger than head (pw/hw = 1.26). Sides rounded, gently constricted posteriorly. Basal margin with a median lobe very slightly protruding posteriorly, less than in *B. qinghaicum*; basal foveae almost absent. Basal margin completely rebordered, without laterally projecting tooth. Anterior transverse impression very shallow; median line faintly impressed, ending a little before the basal margin, at the basal transverse impression, which is very short. Disk smooth.

Elytra ovate, narrower and more parallel-sided than in *B. qinghaicum* (el/ew = 1.40), wider than pronotum (ew/pw = 1.33 - 1.40). Maximum width in the middle. Humeral angles well marked. Scutellar striole very short. Elytral striae gently punctate, a little less than in *B. qinghaicum*; stria 5 very faint; 6 - 7 absent, sometimes stria 5 too. Apical pore positioned adjoining the apical stria, 2/5 of the way from anterior end of stria.



Figs. 27 - 37: Left view of the median lobe of the aedeagus of 27) *B. qinghaicum*, holotype; 28) *B. qinghaicum* paratype E Tibet, Markam; 29) *B. qinghaicum* paratype E Tibet, road Toba - Jomda pass, seen from a lower point of view; 30) *B. barkamense*, holotype; 31) *B. facchini*, holotype; 32) *B. rebecca*, holotype; 33) *B. wraseanum*, holotype; 34) *B. schillhammeri*, holotype; 35) *B. jani*, holotype; 36) *B. herbertfranzi*, holotype; 37) *B. turnai*, holotype.

Microsculpture faint, isodiametric on the neck; very faint, in large polygonal meshes on the pronotum and rather evident, in large polygonal meshes on the elytra.

Male genitalia. Median lobe of aedeagus (fig. 32) short (0.60 mm), narrower than in *B. qinghaicum*, with a dorsal concavity and a light ventral gibbosity; sclerite "a" strongly curved at apical end; sclerite "b" small and bifid; sclerite "c" very reduced.

DISTRIBUTION. Known from China: Sichuan.

HABITAT. Found at an altitude of 4090 m in *Picea* forest.

AFFINITIES. Very similar to *B. wraseanum* sp.n., sharing with this species the parallel-sided elytra with evident shoulders and the small size. However, the shape of the sclerites in the internal sac of the aedeagus is quite different; the more evident external diagnostic character to distinguish it from *B. wraseanum* is the more rounded hind angle of the pronotum.

Bembidion (Microsinocys) wraseanum sp.n. (fig. 20)

DIAGNOSIS. Comparatively small species, piceous-black, with rather parallel-sided elytra, without laterally projecting tooth at the hind angle of pronotum, where the basal sulcus is rather large.

TYPE LOCALITY. China, W Sichuan, Daxue Shan, 5 km W Tsheto - La pass, W Kangding, 3800 - 4000 m, 30°04' N, 101°47' E.

TYPE SERIES. Holotype ♂, "China, W Sichuan, Daxue Shan, 5 km W Tsheto-La pass, (W Kangding) 3800-4000 m, 30°04' N, 101°47' E, 26.V.1997" (CW). Paratypes: 1 ♂, 1 ♀, same locality and date as holotype (CT, CW); 1 ♀, China: Sichuan, Ganzi pref., Daxue Shan, 101°47' E, 30°04' N, ca 21 km W Kangding, 3970 m, 26.V.1997 (CP).

DERIVATIO NOMINIS. I dedicate this species to my friend Dr. David Wrase, who kindly gave me the type material to study.

DESCRIPTION. Body length: 2.46 - 2.53 mm; colour piceous-black; antennomere 1, the base of 2 - 4 red brown; the rest of antennae dark brown. Palps red brown; only the penultimate article of maxillary palps dark brown, and the last article of maxillary and labial palps light yellow. Coxae red brown and legs brown. Elytral margin and first elytral interval red brown; under side piceous, excepting the elytral epipleura, red brown.

Antennae, very short (1.11 - 1.18 mm). Antennomeres 2 and 3 longer than articles 4 to 10.

Pronotum (fig. 9) (pw/pl = 1.48) slightly convex and slightly larger than head (pw/hw = 1.28). Sides rounded, but almost rectilinear towards hind angles; in the paratype ♂ the whole lateral margin is convex. Basal margin with a median lobe gently protruding posteriorly; basal foveae almost absent. Basal margin rebordered only at sides, ending at sides with a rather large angle, obtuse. Anterior transverse impression very shallow; median line moderately deep, ending at basal margin; basal transverse impression very shallow. Disk gently corrugated.

Elytra rather parallel-sided, elongate (el/ew = 1.45), matt, slightly wider than pronotum (ew/pw = 1.35). Maximum width in the middle. Humeral angles well marked. Scutellar striole absent. Elytral striae almost impunctate, faintly sulcate; stria 6 very faint, 7 absent. Apical pore positioned adjoining the apical stria, 2/5 of the way from anterior end of stria.

Microsculpture evident, isodiametric on the neck, faint, in large meshes on the pronotum, and evident in large meshes on the elytra.

Male genitalia. Median lobe of aedeagus (fig. 33) very short (0.57 mm), strongly arcuate; sclerite "a" wide and short; sclerite "b" very large, pointed at the apical end; sclerite "c" absent; presence of an additional sharp and long sclerite, parallel to the sclerite "b", between sclerite "a" and "b".

DISTRIBUTION. Known from China: Sichuan.

HABITAT. Found at an altitude of 3800 - 4000 m.

AFFINITIES. This species shares many characters with *B. rebecca*; it is easily distinguishable by the clearly larger hind angle of pronotum, and by the male genitalia.

***Bembidion (Microsinocys) luhuoense* sp.n. (fig. 21)**

DIAGNOSIS. A comparatively small species with elytra strongly ovate, very rounded and narrow shoulders and maximum elytral width slightly behind the middle.

TYPE LOCALITY. China, W Sichuan, 4200 m, road Luhuo-Sertar pass 40 km N Luhuo, 31°42' N, 100°47' E.

TYPE SERIES. Holotype ♀, "China, W Sichuan, 4200 m, road Luhuo-Sertar pass 40 km N Luhuo, 31°42' N, 100°47' E, alpine meadow, 22.VII.1997" (CT).

DERIVATIO NOMINIS. The name derives from the type locality.

DESCRIPTION. Body length: 2.57 mm; colour piceous-black, as in *B. rebecca*; antennae dark brown except antennomere 1, red, and 2, brown. Palps dark brown, excepting the penultimate, piceous-black, and the last article of maxillary and labial palps, light yellow.

Coxae and legs brown. Pronotum completely piceous-black. Elytral margin a little lighter than disk; under side piceous, except the elytral epipleura, dark brown.

Antennae very slightly longer than in *B. rebecca* (1.11 mm). Antennomeres 2 and 3 slightly longer than articles 4 to 10.

Head with very faint frontal furrows, almost absent, with some transverse rugosities.

Pronotum (fig. 10) (pw/pl = 1.42) weakly convex, slightly larger than head (pw/hw = 1.22). Sides rounded, gently constricted posteriorly, less than in *B. rebecca*. Basal margin with a median lobe faintly protruding posteriorly, more than in *B. rebecca*; basal foveae almost absent. Basal margin rebordered only at sides, laterally ending without a laterally projecting tooth. Anterior transverse impression very shallow; median line faintly impressed, ending a little before the basal margin, at the very short basal transverse impression. Disk smooth, a little more convex than in *B. rebecca*.

Elytra strongly ovate, larger and longer than in *B. rebecca* (el/ew = 1.41), wider than pronotum (ew/pw = 1.50). Maximum width very slightly behind middle. Humeral angles extremely rounded, basal margin of elytra narrower than in the other *Microsinocys*. Scutellar striole short. Elytral striae very faint, almost impunctate; 5 and 6 very faint, 7 almost absent. Apical pore adjoining middle of apical stria.

Microsculpture rather evident, isodiametric on the neck; faint in large meshes on the pronotum and clearly evident, in large polygonal meshes on the elytra.

Male genitalia. Unknown.

DISTRIBUTION. Known from China: Sichuan.

HABITAT. Found at an altitude of 4200 m, in alpine meadow.

AFFINITIES. Related to *B. rebecca* and *B. wraseanum*, similar in size and shape of the pronotum, but quite different in the shape of the elytra.

***Bembidion (Microsinocys) schillhameri* sp.n. (fig. 22)**

DIAGNOSIS. Piceous, small (2.58 - 2.80 mm) with a rather well developed laterally projecting tooth at the hind angles of pronotum, very convex sides of pronotum, very oval elytra, well

rounded shoulders and apex of elytra, very faint elytral striae and without microsculpture.

TYPE LOCALITY. China - NW Yunnan, Yulongxueshan NP near Baishui, ca 30 km N Lijiang, 2900-3200 m.

TYPE SERIES. Holotype ♂: "China - NW Yunnan, Yulongxueshan NP near Baishui, ca 30 km N Lijiang, 2900-3200 m, 7-11.7.1994" (NMW). Paratypes: 1 ♂, YÜNNAN, YULONG Mts., 27.10 N, 100.13 E, 3900 m, 16-19 Jun 1993 (NMB); 2 ♀♀, YÜNNAN, YULONG Mts., 27.01 N, 100.12 E, 3200 m, 24-26 May 1993 (NMB, CT).

DERIVATIO NOMINIS. This species is dedicated to my friend Harald Schillhammer (NMW) who kindly lent me the holotype.

DESCRIPTION. Body length 2.58 mm; colour piceous; antennomere 1, the basal 4/5 of the 2, the basal half of 3 - 4 and the apex of the last article red; the rest of antennae darker. Palps dark brown; the last article of maxillary and labial palps red. Coxae and legs red brown. Elytral margin and first elytral interval red; under side piceous, excepting the elytral epipleura, red.

Antennae, very short (1.13 mm). Only antennomere 3 slightly longer than articles 4 to 10.

Head with very shallow and lightly convergent frontal furrows. Eyes clearly smaller than in the other species described here.

Pronotum (fig. 11) (pw/pl = 1.54) convex, larger than head (pw/hw = 1.30). Basal margin with a median lobe clearly protruding posteriorly, more than in the other species; basal foveae almost absent. Basal margin rebordered only at sides, laterally ending with a little tooth, clearly visible. Anterior transverse impression very shallow; median line moderately deep, ending very slightly beyond the basal transverse impression, very short and faint. Disk smooth, very glossy.

Elytra ovate, more rounded than in the other *Microsinocys* (el/ew = 1.29), very glossy, rather wider than pronotum (ew/pw = 1.37). Maximum width in the middle. Humeral angles rounded. Apex very wide and rounded. Scutellar striole very short. Elytral striae gently punctate; stria 5 very faint, and almost invisible in posterior half of elytra; striae 6 and 7 absent. Apical pore adjoining middle of apical stria.

Microsculpture absent on pronotum and elytra; very faint, isodiametric on the neck.

Male genitalia. Median lobe of aedeagus (fig. 34) very short (0.53 mm); ventral margin rectilinear in the apical half; apex rounded; sclerite "a" strongly curved at apical end; sclerite "b" small and club-shaped; sclerite "c" very sharp.

DISTRIBUTION. Known from China: Yunnan.

HABITAT. Found at an altitude of 2800 - 3900 m.

AFFINITIES. Closely related to *B. jani*, with which it shares the very wide and convex shape of pronotum and elytra.

Bembidion (Microsinocys) jani sp.n. (fig. 23)

DIAGNOSIS. Piceous, large (2.87 mm), without laterally projecting tooth at the hind angles of pronotum; pronotum convex with very rounded sides, elytra distinctly oval, with well-rounded shoulders and apex, very faint elytral striae, and without microsculpture.

TYPE LOCALITY. China, N Yunnan, 27°49' N, 99°34' E, 4200-4700 m, mts. 15 km W of Zhongdian

TYPE SERIES. Holotype ♂: "China, N Yunnan, 27°49' N, 99°34' E, 4200-4700 m, mts. 15 km W of Zhongdian, 23.VI.1994"(CFk).

DERIVATIO NOMINIS. I dedicate this species to my friend Dr. Jan Farkac, who kindly lent me the holotype.

DESCRIPTION. Body length: 2.87 mm; colour piceous-black; antennomere 1 and 2, the base of 3-4 and the apex of the last article red brown; the rest of antennae is darker. Palps brown; only

the last article of maxillary and labial palps light yellow. Coxae and legs red brown. Elytral margin and first elytral interval red brown; under side piceous, excepting the elytral epipleura, red brown.

Antennae, very short (1.25 mm). Antennomere 3 longer than articles 4 to 10.

Pronotum (fig. 12) (pw/pl = 1.52) strongly convex, larger than head (pw/hw = 1.27). Sides strongly rounded; lateral margin evidently convex also towards the hind angle of pronotum. Basal margin rebordered only at sides, with a median lobe evidently protruding posteriorly and without laterally projecting tooth. Basal foveae almost absent. Anterior transverse impression very shallow; median line moderately deep, ending a little before the basal margin, at the basal transverse impression, very shallow. Disk gently corrugated.

Elytra strongly ovate, rather short (el/ew = 1.37), shiny, wider than pronotum (ew/pw = 1.44). Maximum width in the middle. Humeral angles rounded. Scutellar striae almost absent. Elytral striae very faintly punctate; striae 3 - 5 very faint, ending a little before apex; 6 and 7 absent. Apical pore positioned adjoining the apical stria, 1/3 of the way from anterior end of stria.

Microsculpture faint, isodiametric on the neck, extremely faint on the pronotum and on the elytra.

Male genitalia. Median lobe of aedeagus (fig. 35) very large (0.68 mm) with a evident ventral gibbosity, apex rounded, sclerites "a" and "b" large.

DISTRIBUTION. Known from China: Yunnan.

HABITAT. Found at an altitude of 4200 - 4700 m.

AFFINITIES. Closely related to *B. schillhammeri*, with which it shares the very wide and convex shape of pronotum and elytra; the structure of the internal sac of the median lobe of the aedeagus is very similar to *B. herbertfranzi* sp.n.

Bembidion (Microsinocys) herbertfranzi sp.n. (fig. 24)

DIAGNOSIS. Piceous, very large, with convex pronotum and very large elytra.

TYPE LOCALITY. SE Tibet, "Chola Shan" pass, road Yanjing-Markam, 50 km S Markam, 4400 m, 29°16' N, 98°38' E.

TYPE SERIES. Holotype ♂, "SE Tibet, "Chola Shan" pass, road Yanjing-Markam, 50 km S Markam, 4400 m, 29°16' N, 98°38' E, mixed forest, 24-27.VI.1997" (CT). Paratypes: 9 ♂♂, 7 ♀♀, same locality and date as holotype (CT, CS, NMW, NMB).

DERIVATIO NOMINIS. Named for Prof. DI DDr. H.c. H. Franz in commemoration of his 90th birthday.

DESCRIPTION. Body length: 3.00 mm; colour piceous; antennomere 1 and the base of antennomeres 2 - 3 red brown; rest of antennae dark brown, except for the apex of the last article, slightly darker. Palps red brown; only the penultimate article of maxillary palps darker, and the last article of maxillary and labial palps light yellow. Coxae and legs red brown. Elytral margin and first elytral interval red brown, the latter clearly lighter than the rest of elytra; under side piceous, excepting the elytral epipleura, red brown. Antennae very short (1.27 - 1.30 mm). Antennomeres 2 and 3 slightly longer than articles 4 - 10. Head with very shallow and lightly convergent frontal furrows.

Pronotum (fig. 13) (pw/pl = 1.53 - 1.55) convex, clearly larger than head (pw/hw = 1.37 - 1.40). Basal margin oblique at sides, and with a median lobe gently protruding posteriorly; basal foveae almost absent. Basal margin bordered only at sides. No laterally projecting tooth at hind angles of pronotum. Anterior transverse impression very shallow; median line moderately deep, ending a little before the basal margin, at the basal transverse impression, represented only by a

shallow depression. Disk smooth.

Elytra ovate, larger than in the other *Microsinocys* (el/ew = 1.40 - 1.45), shiny, wider than pronotum (ew/pw = 1.36 - 1.38). Maximum width in the middle. Humeral angles rounded. Scutellar striole very short. Elytral striae gently punctate; stria 5 and 6 very faint; 7 almost absent, represented by few punctures only. Apical pore positioned adjoining the apical stria, 3/5 of the way from anterior end of stria.

Microsculpture faint, isodiametric on the neck, absent on pronotum and elytra.

Male genitalia. Median lobe of aedeagus (fig. 36) very large (0.75 - 0.76 mm) with apex more ventrally deflected than in the other *Microsinocys*, very wide and rounded; sclerites "a", "b" and "c" very large.

DISTRIBUTION. Known from China: E Tibet.

HABITAT. Found at an altitude of 4400 m, in mixed forest.

AFFINITIES. Belonging to the group of wider and more convex species including *B. schillhammeri* and *B. jani*. The structure of the internal sac of the aedeagus is rather similar to *B. jani* and quite different from *B. schillhammeri*.

Bembidion (Microsinocys) turnai sp.n. (fig. 25)

DIAGNOSIS. Large, piceous-black, with pronotum with evident basal foveae and well developed tooth at hind angles and ew/pw = 1.4.

TYPE LOCALITY. China Sichuan, 30 Km NEE Songpan, ca 3500 m.

TYPE SERIES. Holotype ♂: "China Sichuan, 30 Km NEE Songpan, ca 3500 m, 19.6.1992" (CS). Paratypes: 2 ♀♀, same locality and date as holotype (CS, CT).

DERIVATIO NOMINIS. I dedicate this species to Mr. Jaroslav Turna.

DESCRIPTION. Body length: 2.77 - 2.95 mm; colour piceous-black; antennomere 1 and the base of antennomere 2 red brown; rest of antennae darker. Palps dark brown; last article of maxillary and labial palps red brown. Coxae red and legs red brown. Elytral margin and first interval dark brown; under side piceous, except for elytral epipleura, slightly lighter.

Antennae short (1.27 mm). Antennomeres 2 and 3 slightly longer than articles 4 - 10.

Head wider than in the other species.

Pronotum (fig. 14) (pw/pl = 1.43 - 1.47) slightly convex, larger than head (pw/hw = 1.20 - 1.26). Basal margin with a median lobe gently protruding posteriorly; basal foveae small, but present. Basal margin rebordered only at sides, laterally ending with a tooth, very well developed. Anterior transverse impression very shallow; median line moderately deep, ending a little beyond the basal transverse impression, very short and faint. Disk smooth, glossy.

Elytra ovate (el/ew = 1.34 - 1.39), glossy, wider than pronotum (ew/pw = 1.40 - 1.45). Maximum width at the middle. Humeral angles well marked. Apex very slightly pointed. Scutellar striole very short. Elytral striae gently punctate, striae 1 and 2 more impressed than the others; 5 - 7 very faint, disappearing slightly before the apex. Apical pore positioned adjoining the apical stria, 2/5 of the way from anterior end of stria.

Microsculpture absent on pronotum and elytra; very faint, isodiametric on the neck.

Male genitalia. Median lobe of aedeagus (fig. 37) large (0.65 mm) with small, rounded apex; long sclerite "a" curved apically. In the holotype the sclerites are in a more apical position than in the other species: this is due to preparation of the median lobe with the internal sac slightly extracted.

DISTRIBUTION. Known from China: Sichuan.

HABITAT. Found at an altitude of 3500 m.

AFFINITIES. *B. turnai* is related to *B. daxuense* as suggested by the similar pronotum with basal foveae and tooth projecting laterally at hind angles.

***Bembidion (Microsinocys) daxuense* sp.n. (fig. 26)**

DIAGNOSIS. Pronotum small with evident basal foveae and well developed tooth at hind angles, very convex elytra and $ew/pw = 1.5$.

TYPE LOCALITY. China, W Sichuan, Daxue Shan, 5 km W Tsheto-La pass, W Kangding, 3800-4000 m, 30°04' N, 101°47' E.

TYPE SERIES. Holotype ♀, "China, W Sichuan, Daxue Shan, 5 km W Tsheto-La pass, (W Kangding) 3800-4000 m, 30°04' N, 101°47' E, 26.V.1997" (CW).

DERIVATIO NOMINIS. The name derives from the locality where the holotype has been collected.

DESCRIPTION. Body length: 2.63 mm; colour piceous-black; antennomere 1, 2 and the base of 3 - 4 red brown; rest of antennae darker. Palps brown; only the penultimate article of maxillary palps dark brown. Coxae and legs red brown. Elytral margin and first interval dark brown; under side piceous, except for elytral epipleura, slightly lighter.

Antennae short (1.12 mm). Antennomeres 2 and 3 slightly longer than articles 4 to 10.

Pronotum (fig. 15) ($pw/pl = 1.48$) slightly convex, larger than head ($pw/hw = 1.26$). Basal margin with a median lobe gently protruding posteriorly; basal foveae small, but present. Basal margin rebordered only at sides, laterally ending with a tooth, very well developed. Anterior transverse impression very shallow; median line moderately deep, ending at the basal transverse impression, which is very short and faint. Disk smooth, glossy.

Elytra strongly ovate ($el/ew = 1.27$), glossy, wider than pronotum ($ew/pw = 1.51$). Maximum width at the middle. Humeral angles well marked. Apex very slightly pointed. Scutellar striae very short. Elytral striae gently punctate-striate, more impressed than in *B. turnai*; striae 1 - 5 rather well impressed, 6 and 7 very weakly punctate. Apical pore positioned adjoining the apical stria, 1/3 of the way from anterior end of stria.

Microsculpture absent on pronotum and superficial on the apex of the elytra; very faint, isodiametric on the neck.

Male genitalia. Unknown.

DISTRIBUTION. Known from China: Sichuan.

HABITAT. Found at an altitude of 3900 - 4000 m.

AFFINITIES. *B. daxuense* is related to *B. turnai*, as indicated by the similar pronotum with basal foveae and tooth projecting laterally at hind angles.

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