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Revision of *Pterostichus* subg. *Morphohaptoderus* TSCHITSCHERINE, 1898 with description of ten new species from China (Coleoptera: Carabidae)

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Abstract

The subgenus *Morphohaptoderus* of the genus *Pterostichus* BONELLI, 1810 is redefined and revised; the four species known to day are redescribed and ten new species are described: *P. (M.) dundai* and *P. (M.) huashanus* from Shaanxi, *P. (M.) irideus*, *P. (M.) saueri*, *P. (M.) kalabi*, *P. (M.) emei*, *P. (M.) pseudoplatyderus* and *P. (M.) giacomazzoi* from Sichuan, *P. (M.) cervenkai* and *P. (M.) megaloderus* from Yunnan. The subgenus is endemic to China (Gansu, Sichuan, Yunnan and Shaanxi).

Key words: Carabidae, *Pterostichus*, *Morphohaptoderus*, new species, China, taxonomic revision

Introduction

While studying several species of *Pterostichus* from China, I realized that the systematics of the tribe was confused and that many subgenera have been wrongly interpreted by several authors. Starting with this paper, I intend to work on the systematics of some subgenera of *Pterostichus* in order to clarify their complex taxonomic situation and describe new species which were recently collected.

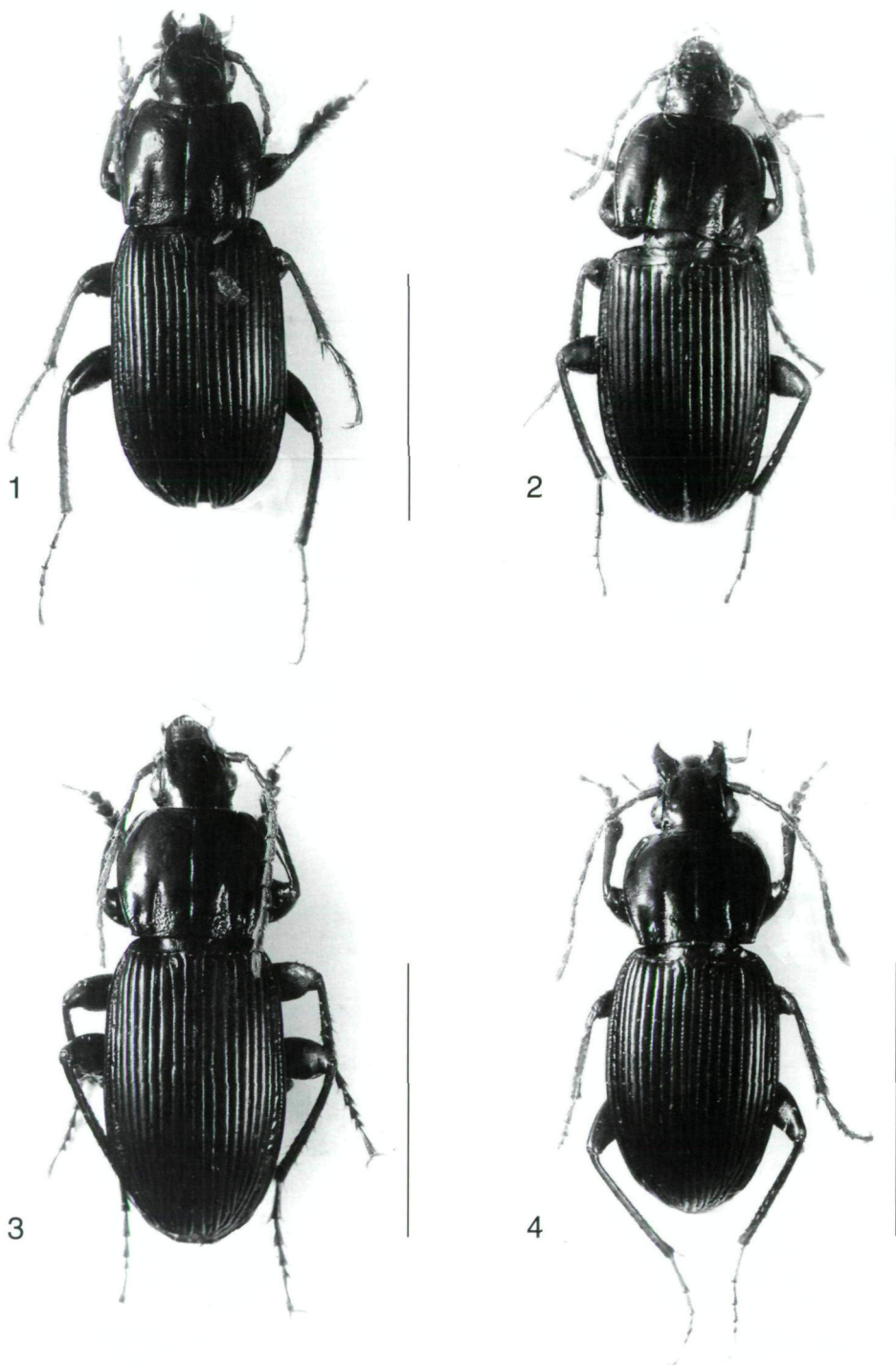
Acronyms used in this publication:

CB	Coll. Brežina	CP	Coll. Pavese	MSNM	Museo Civico di Storia Naturale, Milano
CBe	Coll. Beneš	CS	Coll. Sciaky	NHMB	Naturhistorisches Museum, Basel
CC	Coll. Casale	CV	Coll. Vigna Taglianti	NHMW	Naturhistorisches Museum, Wien
CCe	Coll. Červenka	CW	Coll. Wrase		
CL	Coll. Locca				

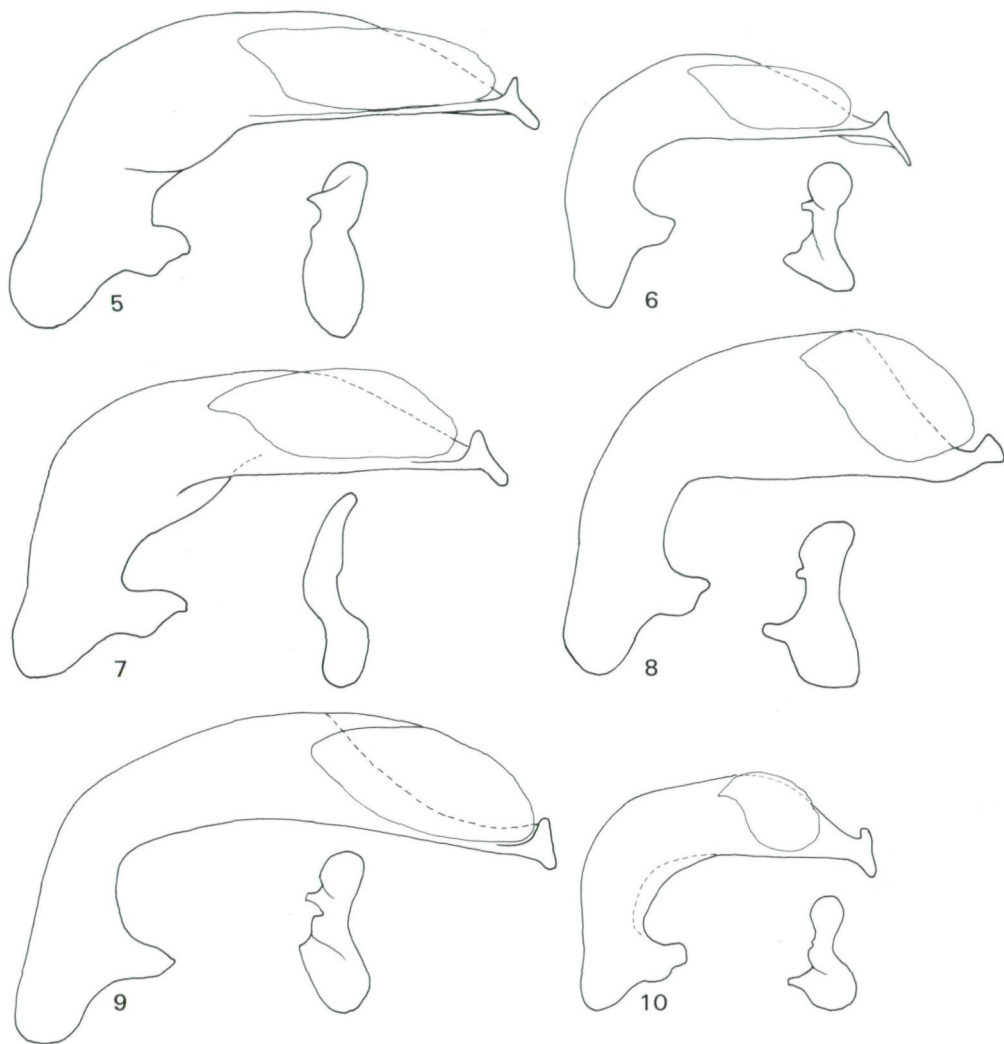
Subgenus *Morphohaptoderus* TSCHITSCHERINE, 1898

This subgenus was described by TSCHITSCHERINE (1898) for two species from China (Gansu), *Feronia maxima* TSCHITSCHERINE, 1888 [= type species of *Morphohaptoderus*, fixed by subsequent designation (JEANNEL 1937)], and *F. expedita* TSCHITSCHERINE, 1898. Later JEANNEL (1937) proposed to include in *Morphohaptoderus*, besides the Chinese species, several taxa from Caucasus and Turkey (*P. percontator*, *P. acrogonus*, etc.). This position, even though expressed with doubt, was followed by some authors (e.g. SCHATZMAYR 1942-43, SCHWEIGER 1967). JEDLIČKA (1962) included many more species and substantially changed in his table the characters distinguishing *Morphohaptoderus* from the other subgenera of *Pterostichus*.

The nearest subgenus to *Morphohaptoderus* is *Neohaptoderus*, described by TSCHITSCHERINE (1898) for three Chinese species; the main diagnostic character, and almost the only one, used by JEDLIČKA (1962) to separate the two subgenera is the presence of one (*Neohaptoderus*) or 2 - 3 (*Morphohaptoderus*) setigerous punctures on the elytral interval 3.



Figs. 1 - 4: Habitus of 1) *P. maximus*, 2) *P. huashanus*, 3) *P. dundai*, 4) *P. chungkingi*; the photographs are not to same scale, the vertical line to the right of every species represents 5 mm.



Figs. 5 - 10: Aedeagus and right paramere of 5) *P. maximus*, 6) *P. huashanus*, 7) *P. dundai*, 8) *P. chungkingi*, 9) *P. irideus*, 10) *P. emei*.

My study on the species of this group suggests that the interpretation given by JEDLIČKA (1962) is inaccurate and that subgenus *Morphohaptoderus* as meant by him is paraphyletic. The number of elytral punctures in *Neohaptoderus* is often variable and I have examined many specimens of several species of this subgenus with one setigerous puncture on one elytron and two on the other one. According to the key published by JEDLIČKA (1962) these specimens would be *Neohaptoderus* on one side and *Morphohaptoderus* on the other side.

Judging from the type species and other species certainly close to it and from the same geographic area, the name *Morphohaptoderus* should be restricted to a few species characterized by a group of characters that are constant and well defined: head small; elytra rather flat, with well engraved striae and 2 - 4 setigerous punctures on the third interval (if there are only 2 setigerous punctures they are in advanced position, with the anterior one in the anterior third and the posterior one near the middle), the surface iridescent, sometimes very strongly; onychium

almost constantly (except in one species) with few thin setae underneath; aedeagus with ostium placed to the left side, often with hooked apex; right paramere very short and stout, almost constantly (except in two species) with button-shaped apex.

This set of characters can be observed only in a few species described (*P. maximus*, *P. expeditus*, *P. chungkingi* JEDLIČKA, 1932, *P. straneellus* JEDLIČKA, 1938) and in ten species described in this paper. These species live in a limited area of China (western and northern Sichuan, northern Yunnan, southern Gansu and southern Shaanxi).

As to the other species from Turkey and the Caucasus which were included by some authors in *Morphohaptoderus*, they should be transferred to *Haptoderus* (see KIRSCHENHOFER 1987). Furthermore, many of the species from China included in *Morphohaptoderus* by JEDLIČKA (1962) should be transferred to *Neohaptoderus*, namely *Pterostichus diversus* (FAIRMAIRE, 1886), *P. stictopleurus* (FAIRMAIRE, 1888), *P. mundus* JEDLIČKA, 1938, *P. comorus* JEDLIČKA, 1932, *P. maderi* JEDLIČKA, 1938, *P. molopsoides* JEDLIČKA, 1934, *P. orestes* JEDLIČKA, 1936, *P. komalus* JEDLIČKA, 1936, *P. ignavus* (TSCHITSCHERINE, 1896), *P. haesitatus* (FAIRMAIRE, 1888), *P. sinicus* (TSCHITSCHERINE, 1896) and *P. yunnanensis* JEDLIČKA, 1934. *Pterostichus freyellus* JEDLIČKA, 1958, also included in *Morphohaptoderus* by JEDLIČKA (1962) has been synonymized with *Pterostichus polygenus* BATES, 1883, which belongs to the subgenus *Badistrinus* MOTSCHULSKY, 1865 (see HABU 1972).

Finally, *Pterostichus crebrepunctatus* STRaneo, 1937 should - in my opinion - be excluded from both *Morphohaptoderus* and *Neohaptoderus*. Its large size, punctate head, black color and shape of the aedeagus suggest that it pertains to another poorly known group of species from the Far East, e.g. that of *P. pratti* BATES, 1890.

Key to the species of *Morphohaptoderus*

- 1 Anterior elytral setigerous punctures on interval 3 adjoining stria 2. Apex of aedeagus always hooked 2
- Anterior elytral setigerous punctures on interval 3 adjoining stria 3. Apex of aedeagus simple (five species) or with small hook (four species) 6
- 2 Striae deep, strongly or weakly punctate. Gansu and Sichuan 3
- Striae shallow, with indistinct punctuation. Shaanxi 5
- 3 Striae strongly punctate. Gansu and Sichuan 4
- Striae weakly punctate. Aedeagus as in fig. 9. Western Sichuan *irideus*
- 4 Elytra parallel-sided; pronotum almost not constricted at base. Apex of aedeagus strongly hooked (fig. 5). Gansu *maximus*
- Elytra dilated in the middle; pronotum strongly constricted at base. Apex of aedeagus weakly hooked (fig. 8). Southern Sichuan *chungkingi*
- 5 Size smaller than 8 mm; pronotum very weakly constricted in basal half. Aedeagus as in fig. 6 *huashanus*
- Size longer than 9 mm; pronotum strongly constricted in basal half. Aedeagus as in fig. 7 *dundai*
- 6 Size longer than 9 mm. Apex of aedeagus without hook 7
- Size smaller than 8 mm. Apex of aedeagus simple (three species) or hooked (four species) 8
- 7 Basal impressions of pronotum confluent and punctate. Base of pronotum distinctly narrower than base of elytra, pronotal gutter markedly dilated in basal half. Onychium with some setae underneath. Aedeagus as in fig. 27. Western Sichuan *giacomazzo*
- Basal impressions of pronotum well separate and impunctate. Base of pronotum wider than base of elytra, pronotal gutter narrow all along its length. Onychium glabrous underneath. Aedeagus

- as in fig. 28. Northern Yunnan *megaloderus*
- 8 Apex of aedeagus hooked 9
- Apex of aedeagus without hook 12
- 9 Sides of pronotum rectilinearly convergent towards base, not sinuate. Aedeagal hook very small. Colour constantly dark brown, size very seldom shorter than 6 mm 10
- Sides of pronotum sinuate in the basal half. Aedeagal hook big. Colour reddish or brown, size never longer than 6 mm. Aedeagus as in fig. 10. Western Sichuan *emei*
- 10 Smaller (6 - 7 mm); external basal impression of pronotum small but distinct; humeral tooth well developed; setigerous punctures on interval 3 large, almost foveate 11
- Larger (8 - 9 mm); external basal impression of pronotum almost indistinct; humeral tooth very small, hardly visible; setigerous punctures on interval 3 very small, difficult to distinguish. Aedeagus as in fig. 15. Western and northern Sichuan *kalabi*
- 11 Aedeagus as in fig. 16. Western Sichuan *saueri*
- Aedeagus as in fig. 17. Northern Yunnan *cervenkai*
- 12 Striae punctate; external basal impression of pronotum isolated from base. Gansu and Sichuan 13
- Striae impunctate; external basal impression of pronotum reaching base. Aedeagus as in fig. 19. Western and northern Sichuan *straneellus*
- 13 Body slenderer; elytra widest at middle. Aedeagus as in fig. 18. Gansu and northern Sichuan *expeditus*
- Body stouter; elytra widest at base. Aedeagus as in fig. 20. Northern Sichuan *pseudoplatyderus*

The sequence of the species described here follows the morphocline of the aedeagal apex.

Pterostichus (Morphohaptoderus) maximus TSCHITSCHERINE, 1888

Pterostichus (Haptoderus) maximus TSCHITSCHERINE, 1888: 190.

TYPE LOCALITY: China, Gansu, near the town Djioutchen and the villages Woutchy, Katapou and Tan-Chan.

This species was described from 16 specimens. According to JEDLIČKA (1962), the type series is deposited in the Zoological Institute of the Academy of Sciences in St. Petersburg. I have not seen any of these specimens and I do not know who many specimens there are. Instead, I have examined 2 syntypes (1 ♂, 1 ♀, deposited in the MSNM and CS), the male bearing one label ("Type") and the female bearing 2 labels ("Type", "Lectoparatypus, Vereschagina des."). Obviously, Vereschagina has fixed a lectotype, but I am not aware of any publication in which such a designation has been formally made.

The species is large, characterized by the long, almost parallel pronotum and elytra (fig. 1) and by the strongly hooked apex of the median lobe of the aedeagus (fig. 5). A similar aedeagal apex occurs in the two species from Shaanxi described in this paper: *P. dundai* and *P. huashanus*. Each elytron bears only two dorsal pores, one of which is located near the middle and the other one in preapical position.

Pterostichus maximus is one of the two species of *Morphohaptoderus* known from Gansu.

Pterostichus (Morphohaptoderus) huashanus sp.n.

DIAGNOSIS: A *Pterostichus (Morphohaptoderus)* of small size (6.5 - 7.1 mm), with the pronotum almost not constricted towards base, the elytra parallel-sided and the apex of aedeagus strongly hooked (fig. 6).



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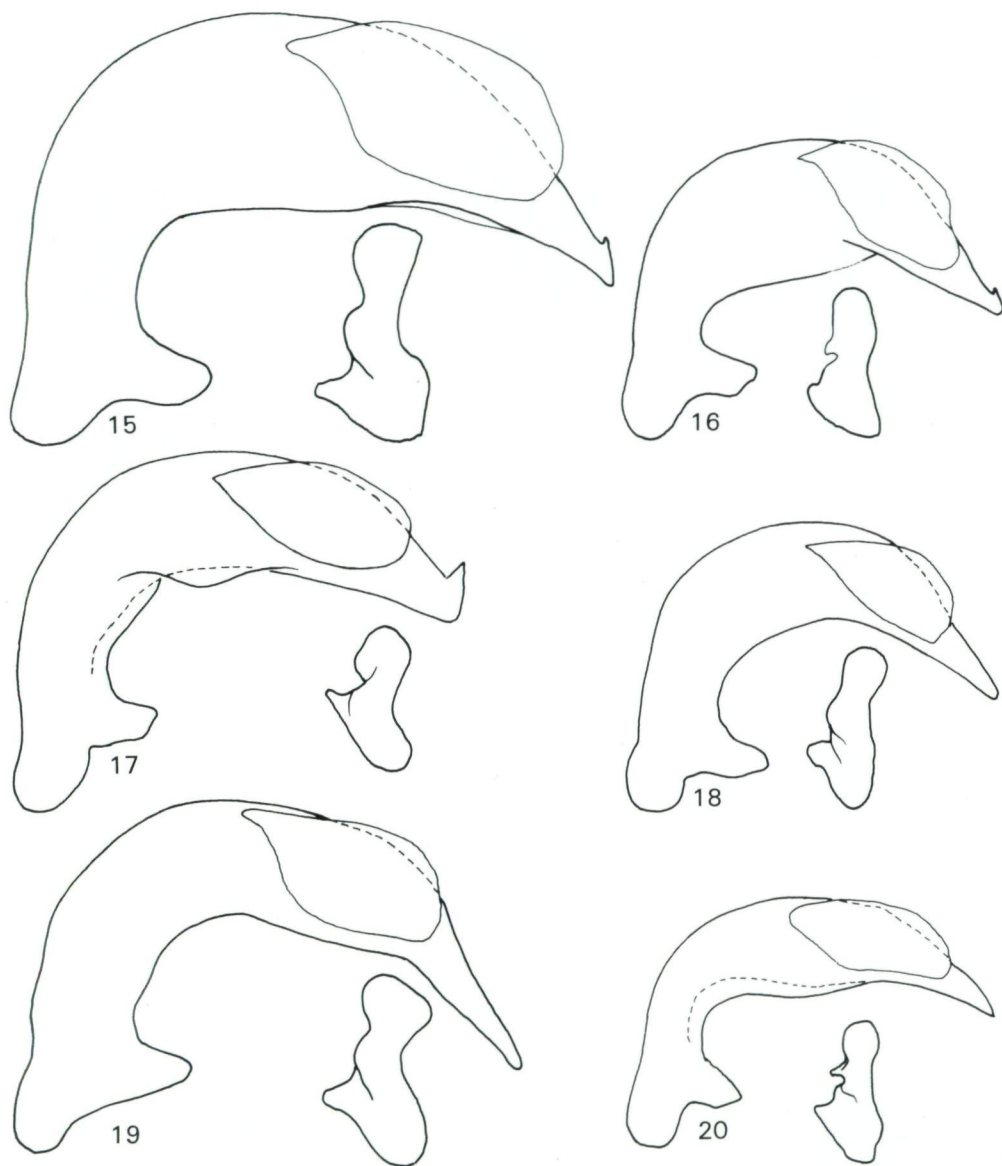


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Figs. 11 - 14: Habitus of 11) *P. irideus*, 12) *P. emei*, 13) *P. kalabi*, 14) *P. saueri*; the photographs are not to same scale, the vertical line to the right of each species represents 5 mm.



Figs. 15 - 20: Aedeagus and right paramere of 15) *P. kalabi*, 16) *P. saueri*, 17) *P. cervenkai*, 18) *P. expeditus*, 19) *P. straneellus*, 20) *P. pseudoplatyderus*.

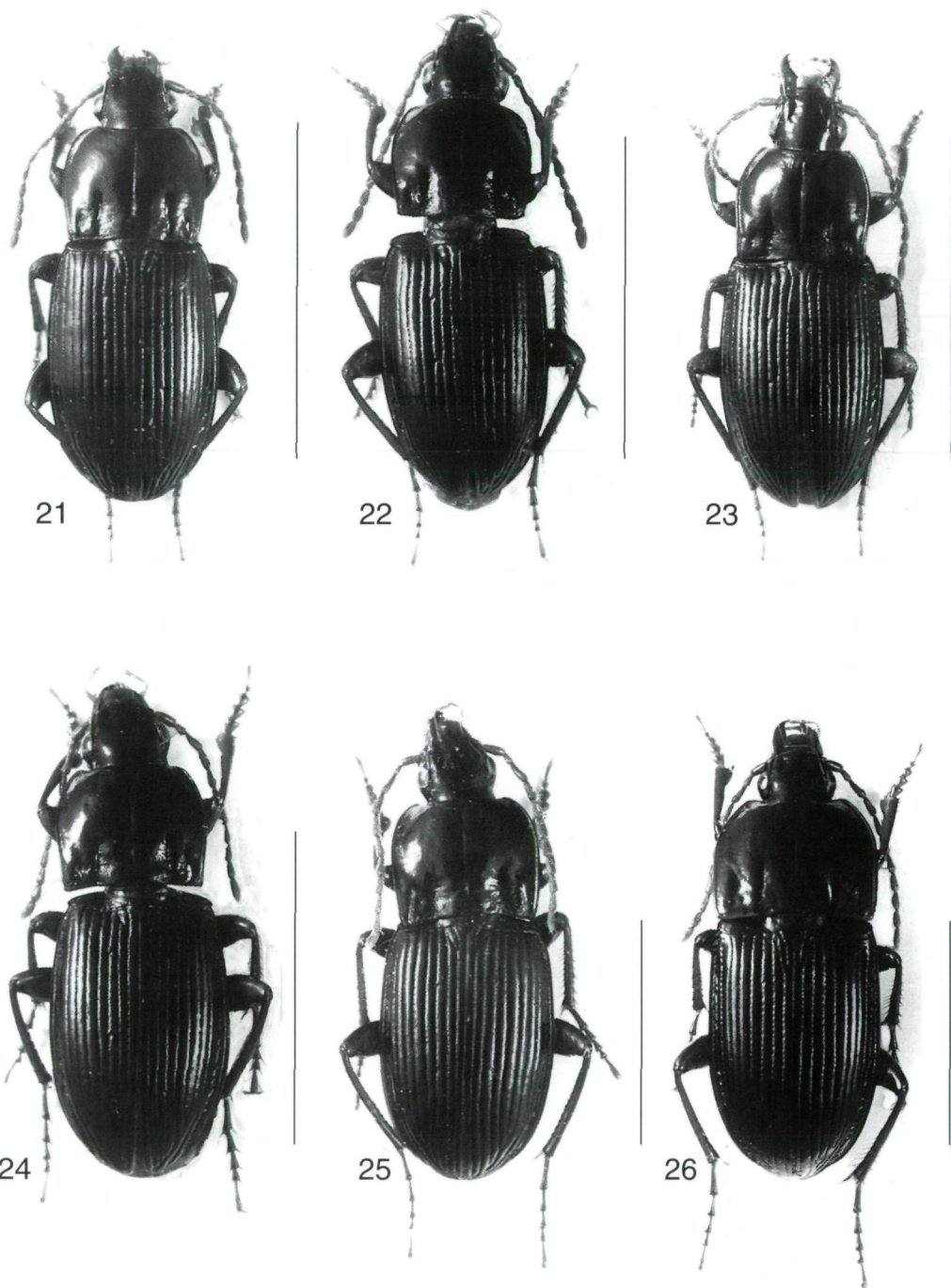
TYPE LOCALITY: China, Shaanxi, Hua Shan.

TYPE SERIES: Holotypus ♂: 28.VII.1990 (CS). 16 paratypes ♀♀ with the same data as holotypus (CS, CP).

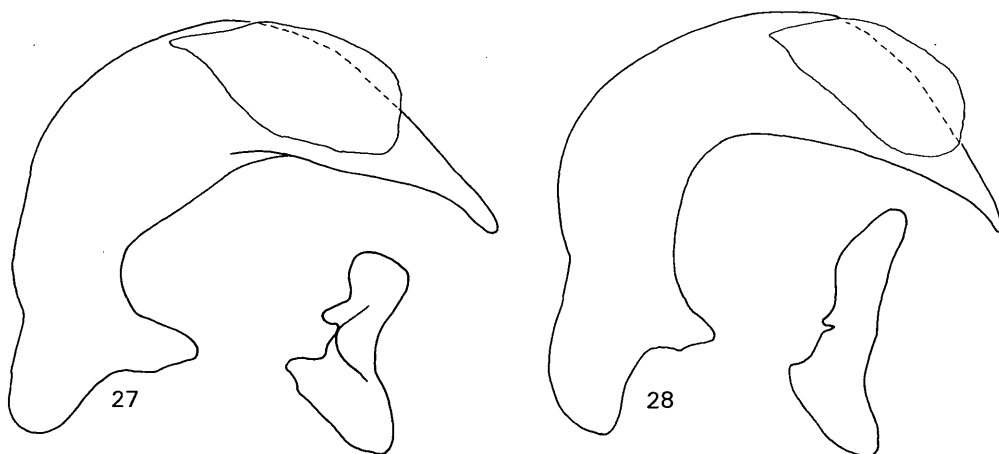
Derivatio nominis: This name derives from the type locality of the species.

DESCRIPTION: Size 6.5 - 7.1 mm; body dark brown, appendages dark reddish-brown. Habitus as in fig. 2.

Head large, not very convex, much narrower than pronotum; eyes feebly convex. Tempora long and oblique, collar constriction hardly distinct dorsally.



Figs. 21 - 26: Habitus of 21) *P. cervenkai*, 22) *P. expeditus*, 23) *P. pseudoplatyderus*, 24) *P. straneellus*, 25) *P. giacomazzo*, 26) *P. megaloderus*; the photographs are not to same scale, the vertical line to the right of each species represents 5 mm.



Figs. 27 - 28: Aedeagus and right paramere of 27) *P. giacomazzoi*, 28) *P. megaloderus*.

Pronotum large, strongly transverse, weakly constricted in basal half. Anterior angles evidently projecting forward; sides weakly curved towards base, then abruptly projecting in small acute tooth. Lateral gutter narrow, not explanate towards base. Two basal impressions sparsely punctate, external one very short, less than one half length of internal one.

Elytra rather short but almost parallel-sided; striae deep but not punctate; intervals convex. Third interval with two setigerous punctures, one on anterior third and one on posterior third, both adjoining stria 2. Shoulders well marked but not dentate, basal margin forming a distinct angle with lateral one. Elytral microsculpture similar in both sexes.

Genitalia: Aedeagus short, with apex strongly hooked (fig. 6).

Affinities: This species is smaller than *P. maximus* and *P. dundai* but all three species share a peculiar hook at the apex of the aedeagus.

Geographical notes: The type locality of this and the following species, Hua Shan, is a mountain of about 2000 m in southern Shaanxi. Therefore it is likely that these species live at lower elevations than many other species of this subgenus. Some of them, in fact, have been collected at elevations of over 4000 m.

Pterostichus (Morphohaptoderus) dundai sp.n.

DIAGNOSIS: A *Pterostichus (Morphohaptoderus)* of large size (9.1 - 9.9 mm), elongate and slender, with the pronotum strongly constricted at base, the elytra narrow and parallel-sided and the apex of aedeagus strongly hooked (fig. 7).

TYPE LOCALITY: China, Shaanxi, Hua Shan.

TYPE SERIES: Holotypus ♂: 28.VII.1990 (CS). 24 paratypes ♀♀ with the same data as holotypus (CS, CP, CW)

Derivatio nominis: This species is dedicated to my friend Radek Dunda, from Prague, for kindly giving me interesting material of Carabidae collected during his entomological trips.

DESCRIPTION: Size 9.1 - 9.9 mm; body dark brown, appendages dark reddish-brown. Habitus as in fig. 3.

Head large, not very convex, much narrower than pronotum; eyes feebly convex. Tempora long and oblique, collar constriction hardly distinct dorsally.

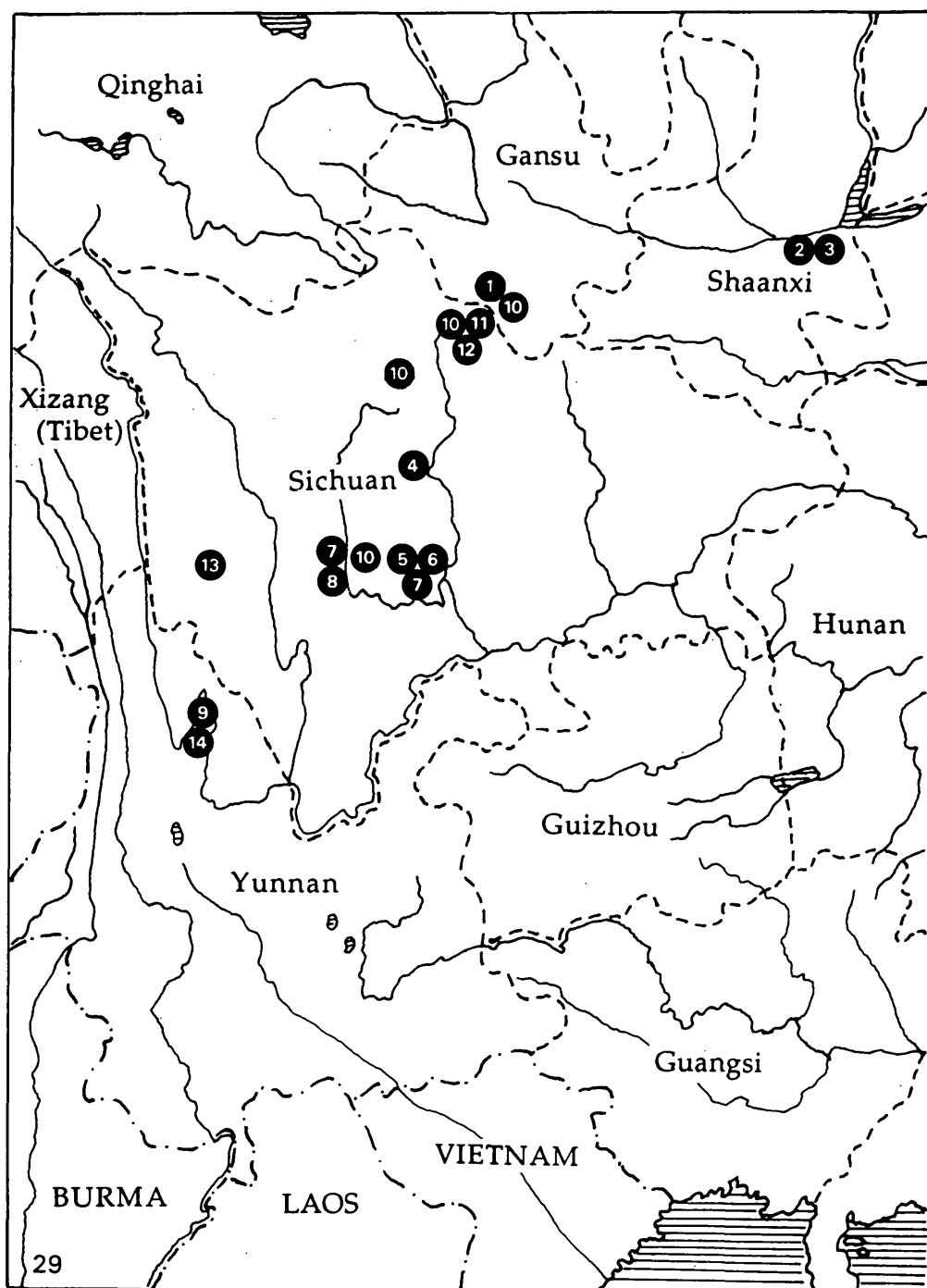


Fig. 29: Map of southwestern China showing the geographical distribution of the species of *Morphohaptoderus*. 1) *P. maximus*, 2) *P. huashanus*, 3) *P. dundai*, 4) *P. chungkingi*, 5) *P. irideus*, 6) *P. emei*, 7) *P. kalabi*, 8) *P. saueri*, 9) *P. cervenkai*, 10) *P. expeditus*, 11) *P. pseudoplatyderus*, 12) *P. straneellus*, 13) *P. giacomazzoi*, 14) *P. megaloderus*.

Pronotum large, strongly transverse, markedly constricted towards base. Anterior angles weakly projecting forward; sides strongly curved towards base, then abruptly projecting into small acute tooth. Lateral gutter narrow, not explanate towards base. Two basal impressions sparsely punctate, external one very short, less than one half length of internal one.

Elytra very long and parallel-sided; striae deep but not punctate; intervals convex. Third interval with two setigerous punctures, one on anterior third and one on posterior third, both adjoining stria 2. Shoulders well marked and with small tooth, basal margin forming a distinct angle with lateral one. Elytra of females with much stronger microsculpture and therefore much more opaque than males.

Genitalia: Apex of aedeagus strongly hooked (fig. 7). Light paramere longer than in other species of the subgenus, with apex not button-shaped.

Affinities: The peculiar shape of the pronotum of this species separates it from all the other species of the subgenus, but the shape of the aedeagus, with a very pronounced hook, shows that it is related to *P. huashanus* and *P. maximus*.

Pterostichus (Morphohaptoderus) chungkingi JEDLIČKA, 1932

Pterostichus chungkingi JEDLIČKA, 1932: 71.

TYPE LOCALITY: China, Sichuan, Chung-king [= today: Chongqing].

I have studied two paratypes of this species in MSNM. The holotype and the remaining paratypes should be deposited in the Jedlička collection (housed in the Národní Museum, Praha).

Pterostichus chungkingi is similar to *P. maximus*, but is flatter and wider (fig. 4), particularly the pronotum which is much wider than in *P. maximus*. Elytra with two dorsal pores, one of which in the middle, the other in preapical position. The apex of the aedeagus has a small hook which is less developed than in *P. maximus* (fig. 8), but very similar to that of *P. irideus*. Such shape of the aedeagus apex is clearly intermediate between the unarmed apices (e.g. *P. straneellus*) and those with a well developed hook (e.g. *P. maximus*).

The identification of the type locality of this species is not obvious, as in Sichuan there are two towns with the same name Chongqing. The largest one is in southern Sichuan, near the border of Guizhou, at very low elevation, while a smaller one is in western Sichuan, north-west of Kangding. As some species described from "Chung-king" show clear relationships with species from Kangding area or from Emei Shan, I consider it very likely that the type locality of these species is Chongqing in western Sichuan.

Pterostichus (Morphohaptoderus) irideus sp.n.

DIAGNOSIS: A *Pterostichus (Morphohaptoderus)* of large size (10.1 - 11.2 mm), elongate and slender, with the pronotum strongly constricted at base, the elytra narrow and parallel-sided and the apex of aedeagus weakly hooked (fig. 9).

TYPE LOCALITY: China, Sichuan, Emei Shan.

TYPE SERIES: Holotypus ♂: 28.V.1989 (NHMB). 10 paratypes ♂♂♀♀ with the same data as holotypus (NHMB, CS); 3 paratypes ♂♀♀ topotypical, 12.VIII.1993 (CL).

Derivatio nominis: This specific name refers to the strong elytral iridescence of this species.

DESCRIPTION: Size 10.1 - 11.2 mm; body dark brown, appendages dark reddish-brown. Habitus as in fig. 11.

Head large, not very convex, much narrower than pronotum; eyes feebly convex. Tempora long and oblique, collar constriction hardly distinct dorsally.

Pronotum large, strongly transverse, weakly constricted towards base. Anterior angles weakly projecting forward, sides weakly curved towards base, then projecting in a small acute tooth. Lateral gutter narrow, not explanate towards base. Two basal impressions with few scattered points, external one longer than one half length of internal one.

Elytra very long and parallel-sided; striae deep and weakly punctate; intervals convex. Third interval with two setigerous punctures, one little after anterior third and one on posterior third, both adjoining stria 2. Shoulders well marked but without tooth, basal margin forming a distinct obtuse angle with lateral one. Elytra of females with stronger microsculpture and therefore much more opaque than males, even though not so markedly as in *P. dundai*.

Genitalia: Aedeagus long, with apex weakly hooked (fig. 9), similar to that of *P. chungkingi* but longer and slenderer.

Affinities: This species is very similar in external appearance to *P. dundai*, but its aedeagus looks much more like that of *P. chungkingi*. It therefore occupies a systematic position somehow intermediate between the two. From *P. chungkingi* it is distinct in the different shape of pronotum and the longer and slenderer aedeagus.

Geographical notes: The type locality of this and the next species is a mountain of 3099 m in western Sichuan, at the margin of the plain. This mountain, called Emei Shan, is showing a rich endemic fauna; among the endemic species of Carabidae are *Epaphiopsis budhaica* (DEUVE, 1988), *Epaphiopsis perreaui* (DEUVE, 1988), *Nebria (Eunebria) rougemonti* LEDOUX & ROUX, 1988 and several other species.

Pterostichus (Morphohaptoderus) emei sp.n.

DIAGNOSIS: A *Pterostichus (Morphohaptoderus)* of very small size (5.9 - 6.3 mm), short and stout, with the pronotum weakly constricted at base, the elytra short and wide and the apex of aedeagus with a distinct hook (fig. 10).

TYPE LOCALITY: China, Sichuan, Emei Shan.

TYPE SERIES: Holotypus ♂: 28.V.1989 (NHMB). 4 paratypes ♂♂♀♀ with the same data as holotypus (NHMB, CS).

Derivatio nominis: The name of this species derives from that of the type locality, a mountain whose fauna, rich in endemic elements, seems very poorly studied and keeps providing a lot of undescribed species.

DESCRIPTION: Size 5.9 - 6.3 mm; body dark brown, appendages reddish-brown. Habitus as in fig. 12.

Head large, not very convex, much narrower than pronotum; eyes feebly convex. Tempora long and oblique, collar constriction hardly distinct dorsally.

Pronotum large, strongly transverse, weakly constricted in basal half. Anterior angles weakly projecting forward, sides curved towards base, then weakly sinuate before right basal angles. Lateral gutter narrow, not explanate towards base. Two basal impressions impunctate, external one less than one half length of internal one.

Elytra rather short but almost parallel-sided; striae deep but not punctate; intervals convex. Third interval with two setigerous punctures, at the anterior fifth and one almost in the middle, both adjoining stria 3. Shoulders well marked but without tooth, basal margin forming a distinct angle with lateral one. Elytral microsculpture similar in both sexes.

Genitalia: Aedeagus short, with apex strongly hooked (fig. 10).

Affinities: This species of very small size apex with a big tooth on the aedeagal apex is probably

related to *P. maximus*, *P. huashanus* and *P. dundai*.

Geographical notes: This species is known only from the type locality, where it is sympatric, and probably syntopic, with *P. irideus*.

***Pterostichus (Morphohaptoderus) kalabi* sp.n.**

DIAGNOSIS: A *Pterostichus (Morphohaptoderus)* of medium size (8.3 - 8.9 mm), rather short and stout, with the pronotum weakly constricted, the elytra wide but parallel-sided and the apex of aedeagus weakly hooked (fig. 15).

TYPE LOCALITY: China, Western Sichuan, Gongga Shan, 4500 m.

TYPE SERIES: Holotypus ♂: 20-26.VI.1992 (CS). 8 paratypes ♂♂♀♀ with the same data as holotypus (CS, CP); 1 paratype ♂ from Gongga Shan massive, 3100 m, upp. Hailuoguo vall. (camp 3), 29°35' N/101°59'E, 26.V/6.VI.1993 (CB); 4 paratypes ♂♂♀♀ from Western Sichuan, Emei Shan, m 2800, 25-31.VI.1992 (CS, CP); 2 paratypes ♂♀ from Western Sichuan, Liziping, 28.VI-3.VII.1991 (CS); 3 paratypes ♂♀♀ from Luding co., Moxi env., 3000 m, 25.V.-10.VI.1993 (CS, CBe).

Derivatio nominis: This species is dedicated to Jaroslav Kaláb, from Jinacovice, for kindly offering me interesting Carabid beetles collected during his entomological expeditions.

DESCRIPTION: Size 8.3 - 8.9 mm; body dark brown, appendages dark reddish-brown. Habitus as in fig. 13.

Head large, not very convex, much narrower than pronotum; eyes feebly convex. Tempora long and oblique, collar constriction hardly distinct dorsally.

Pronotum large, strongly transverse, weakly constricted in basal half. Anterior angles evidently projecting forward, sides weakly curved towards base, then abruptly projecting in a small acute tooth. Lateral gutter narrow, not explanate towards base. Two basal impressions impunctate, external one very small, almost obsolete.

Elytra rather short but almost parallel-sided; striae deep but not punctate; intervals convex. Third interval with two or three setigerous punctures very small and difficult to see, anterior one or two adjoining stria 3, posterior one adjoining stria 2. Shoulders well marked but not dentate, basal margin forming a distinct angle with lateral one. Elytral microsculpture similar in both sexes.

Genitalia: Aedeagus short, with apex weakly hooked (fig. 15).

Affinities: Even though *P. kalabi* is similar in external characters to *P. straneellus*, the presence of a small hook on the aedeagus apex suggest that *P. kalabi* and *P. saueri* are closely related.

Geographical notes: This species is known only from various places in western Sichuan. In one locality, Gongga Shan, it has been collected together with *P. saueri*.

***Pterostichus (Morphohaptoderus) saueri* sp.n.**

DIAGNOSIS: A *Pterostichus (Morphohaptoderus)* of small size (6.2 - 6.9 mm), rather short and stout, with the pronotum weakly constricted, the elytra wide but parallel-sided and the apex of aedeagus with a small hook (fig. 16).

TYPE LOCALITY: China, western Sichuan, Gongga Shan, 4500 m.

TYPE SERIES: Holotypus ♂: 20-26.VI.1992 (CS) 10 paratypes ♂♂♀♀ with the same data as holotypus (CS, CP). 7 paratypes ♂♂♀♀ from Gongga Shan massive, 3100 m, upp. Hailuoguo vall. (camp 3), 29°35' N/101°59'E, 26.V/6.VI.1993 (CB, CS); 8 paratypes ♂♂♀♀ from Gongga Shan, Yantsoko, 3800-3900 m, 25.V.1990 (CS, CV); 18 paratypes ♂♂♀♀ from Luding co., Moxi env., 3000 m, 25.V.-10.VI.1993 (CS, CBe).

Derivatio nominis: This species is dedicated to my friend Roman Sauer, from Prague, who has often presented me interesting Carabid beetles collected during his entomological expeditions.

DESCRIPTION: Size 6.2 - 6.9 mm; body dark brown, appendages reddish-brown. Habitus as in fig. 14.

Head large, not very convex, much narrower than pronotum; eyes feebly convex. Tempora long and oblique, collar constriction hardly distinct dorsally.

Pronotum large, strongly transverse, weakly constricted in basal half. Anterior angles evidently projecting forward; sides weakly curved towards base, then abruptly projecting in small acute tooth. Lateral gutter narrow, not explanate towards base. Two basal impressions impunctate, external one about one half length of internal one.

Elytra rather short but almost parallel-sided; striae deep but not punctate; intervals convex. Third interval with two or three setigerous punctures, anterior one or two adjoining stria 3, posterior one adjoining stria 2. Shoulders well marked and with a small tooth, basal margin forming a distinct angle with lateral one. Elytral microsculpture similar in both sexes.

Genitalia: Aedeagus short, with apex weakly hooked (fig. 16).

Affinities: The species is closely related to *P. kalabi*, as both share a peculiar shape of the aedeagal apex. Although the shape of the aedeagus is very similar, their sympatry proves their specific independence.

Geographical notes: Known from few stations in a limited area of western Sichuan. At the type locality, Gongga Shan, it has been collected together with *P. kalabi*.

***Pterostichus (Morphohaptoderus) cervenkai* sp.n.**

DIAGNOSIS: A *Pterostichus (Morphohaptoderus)* of small size (6.2 - 6.9 mm), rather short and stout, with the pronotum weakly constricted, the elytra wide but parallel-sided and the apex of aedeagus with a large hook (fig. 17).

TYPE LOCALITY: China, northern Yunnan, Heishui env.

TYPE SERIES: Holotypus ♂: 24-28.V.1993 (CS). 7 paratypes ♂♂♀♀ with the same data as holotypus (CS, CCE, CP), 2 paratypes ♂♀ from Lijiang area, Yulongshan mts., E slopes, 27° 02'-06'/100° 13', 3000-4000 m. 7-11.VIII.1990 (NHMB).

Derivatio nominis: This species is dedicated to my friend Radek Červenka, from Prague, who has often offered me interesting Carabid beetles collected during his entomological expeditions.

DESCRIPTION: Size 6.2 - 6.9 mm; body dark brown, appendages reddish-brown. Habitus as in fig. 21.

Head large, not very convex, much narrower than pronotum; eyes feebly convex. Tempora long and oblique, collar constriction hardly distinct dorsally.

Pronotum large, strongly transverse, weakly constricted in basal half. Anterior angles weakly projecting forward, sides almost parallel-sided in basal half, hind angles almost right, forming a small rounded tooth. Lateral gutter narrow, not explanate towards base. Two basal impressions impunctate, external one about one half length of internal one.

Elytra rather short but almost parallel-sided; striae deep but not punctate; intervals convex. Third interval with three or four setigerous punctures, anterior two or three large, foveate, adjoining stria 3, posterior one smaller and adjoining stria 2. Shoulders well marked and with small tooth, basal margin forming a distinct angle with lateral one. Elytral microsculpture similar in both sexes.

Genitalia: Aedeagus short, with ventral margin bisinuate and apex strongly hooked (fig. 17).

Affinities: This species is probably related to *P. saueri*, as both share a similar body shape. the shape of the aedeagus, with a hook, is similar to that of *P. saueri* and *P. kalabi*, even though the tooth is much larger in *P. cervenkai*.

Geographical notes: This species is known only from the type locality, where it is sympatric, and probably syntopic, with *P. megaloderus*. Until now, these two species are the only known from the province of Yunnan.

***Pterostichus (Morphohaptoderus) expeditus* (TSCHITSCHERINE, 1898)**

Feronia (Morphohaptoderus) expedita TSCHITSCHERINE, 1898: 192.

TYPE LOCALITY: China, southern Gansu, Hei-ho river, near the border to Sichuan.

This species was known from a single female specimen found in Gansu; JEDLIČKA (1932) mentions the species from Sichuan as well, even though it is not clear whether he had personally examined new material. Although I have not been able to study the holotype, I ascribe to this species 20 specimens from northern Sichuan, collected in several stations very close to the border of Gansu, that fit the original description very well. I have examined material from: Nanping, Jiuzhaigou, m 3100, Long Lake; Nanping, Jiuzhaigou, 3000 m, Sword Rock; 30 km S of Nanping, Jiuzhaigou, 3000 m; Hongyuan.

The species is small, slender and parallel-sided (fig. 22), related to some species from Sichuan here described. The apex of the aedeagus is simple, pointed downward, without hook (fig. 18).

***Pterostichus (Morphohaptoderus) pseudoplatyderus* sp.n.**

DIAGNOSIS: A *Pterostichus (Morphohaptoderus)* of small size (6.2 - 6.9 mm), rather short and stout, with the pronotum weakly constricted, the elytra wide but parallel-sided and the apex of aedeagus simple, weakly pointed downward (fig. 20).

TYPE LOCALITY: China, northern Sichuan, Nanping, Jiuzhaigou, 3000 m, Sword Rock.

TYPE SERIES: Holotypus ♂: 10-15.VII.1992 (CV). 11 paratypes ♂♂♀♀ with the same data as holotypus (CS, CV); 6 paratypes ♂♂♀♀ from Nanping, Jiuzhaigou, m 3100, Long Lake, 10-15.VII.1992 (CS, CV); 1 paratype ♀ from between Jiuzhaigou and Songpan, 11-14.VII.1992 (CV); 1 paratype ♂ from Jiuzhaigou, virgin forest, m 3100, 15.VII.1992 (CC).

Derivatio nominis: The name of this species alludes to its resemblance to some species of the genus *Platyderus*.

DESCRIPTION: Size 6.2 - 6.9 mm; body dark brown, appendages reddish-brown. Habitus as in fig. 23.

Head large, not very convex, much narrower than pronotum; eyes feebly convex. Tempora long and oblique, collar constriction hardly distinct dorsally.

Pronotum large, strongly transverse, weakly constricted in basal half. Anterior angles weakly projecting forward; sides almost parallel-sided in basal half, hind angles almost right. Lateral gutter narrow, not explanate towards base. Two basal impressions impunctate, external one about one half length of internal one.

Elytra rather short but almost parallel-sided; striae deep but not punctate; intervals convex. Third interval with three setigerous punctures, anterior two foveate and adjoining stria 3, posterior one adjoining stria 2. Shoulders well marked and with small tooth, basal margin forming a distinct angle with lateral one. Elytral microsculpture similar in both sexes.

Genitalia: Aedeagus short, with apex simple, not hooked (fig. 20).

Affinities: This species is related to *P. expeditus*, but is easily distinguished by the elytra not constricted at base and without humeral tooth. The aedeagus is without apical hook and resembles those of *P. expeditus*, *P. straneellus*, *P. giacomazzoi* and *P. megaloderus*.

Geographical notes: Known from a few stations in a restricted area of Northern Sichuan, near the border of Gansu. It is sympatric and syntopic with *P. expeditus* and *P. straneellus*.

***Pterostichus (Morphohaptoderus) straneellus* JEDLIČKA, 1938**

Pterostichus straneellus JEDLIČKA, 1938: 11.

TYPE LOCALITY: China, Sichuan, Tatsienlu [= today: Kangding].

Considered as "incertae sedis" by JEDLIČKA (1962), this species possesses all characters of the subgenus *Morphohaptoderus*. The only unusual character, the one that probably misled Jedlička, is the occurrence of four large setigerous punctures on the third elytral interval. The species was described from Tatsienlu, but has a wide distribution in Sichuan. I have examined material from northern Sichuan (Zhangla; Sanggarpar; Juzhagou, 30 km W of Nanping; Nanping, Jiuzhaigou, m 3100, Long Lake; Nanping, Jiuzhaigou, m 3000, Sword Rock; between Jiuzhaigou and Songpan; Songpan, Huanglong, m 3200) and western Sichuan (Zhi-Long, Shou-Ji).

This species seems closely related to some species described herein; externally (fig. 24) the species is similar to *P. kalabi*, but the shape of the aedeagus is different. In *P. straneellus* the apex is very long and simple, not hooked (fig. 19), like in *P. giacomazzoi* (fig. 27).

The distribution of this species extends across northern and western Sichuan. In northern Sichuan it is sympatric and syntopic with *P. expeditus* and *P. pseudoplatyderus*, in western Sichuan it is sympatric, but up to now has not been found in syntopy, with *P. kalabi* and *P. saueri*.

***Pterostichus (Morphohaptoderus) giacomazzoi* sp.n.**

DIAGNOSIS: Large (10.1 mm), wide and flat, with the pronotum almost not constricted, the elytra wide but parallel-sided and the apex of aedeagus long and simple, not hooked (fig. 27).

TYPE LOCALITY: China, western Sichuan, 10 km S Litang, 4000 m.

TYPE SERIES: Holotypus ♂: 9.VII.1992 (CS).

Derivatio nominis: This species is dedicated to Mr. Enzo Giacomazzo (Venice) for presenting me with interesting Carabid beetles collected by him.

DESCRIPTION: Size 10.1 mm; body dark brown, elytra with faint bluish reflections, appendages dark reddish-brown. Habitus as in fig. 25.

Head small, not very convex, much narrower than pronotum; eyes feebly convex. Tempora long and oblique, collar constriction hardly distinct dorsally.

Pronotum large, strongly transverse, almost not constricted in basal half. Anterior angles evidently projecting forward but obtuse; sides almost rectilinearly constricted towards base, hind angles obtuse. Lateral gutter very wide and explanate in basal half; base strongly concave. Two basal impressions subequal in length, both punctate.

Elytra wide and flat, weakly enlarged in middle; striae deep and strongly punctate; intervals convex. Third interval with three setigerous punctures, anterior two adjoining stria 3, posterior one adjoining stria 2. Shoulders well marked and dentate, basal margin forming a distinct angle with lateral one.

Genitalia: Aedeagus long, with apex simple, not hooked (fig. 27).

Affinities: This is one of the largest species of the subgenus; in external aspect it looks quite isolated, but the apex of the aedeagus, which is long and without hook, is very similar to that of *P. expeditus* and *P. straneellus*.

Geographical notes: This species is known only from the type locality, where it has been found together with two undescribed species related to *P. sinensis* JEDLIČKA, 1962.

***Pterostichus (Morphohaptoderus) megaloderus* sp.n.**

DIAGNOSIS: A *Pterostichus (Morphohaptoderus)* of large size (9.8 - 10 mm), wide and convex, with the pronotum not constricted at base, the elytra wide but parallel-sided and the apex of aedeagus long and simple, not hooked (fig. 28).

TYPE LOCALITY: China, Northern Yunnan, Heishui env.

TYPE SERIES: Holotypus ♂: 9.VII.1992 (NHMW). 1 paratype ♀ with the same data as holotypus (CS)

Derivatio nominis: The name of this species derives from the Greek words megas [μεγας] (= big, large) and dere [δερε] (= neck, thorax), and alludes to the width of its pronotum.

DESCRIPTION: Size 9.8 - 10 mm; body dark brown, appendages dark reddish-brown. Habitus as in fig. 26.

Head small, not very convex, much narrower than pronotum; eyes feebly convex. Tempora long and oblique, collar constriction hardly distinct dorsally.

Pronotum large, strongly transverse, not constricted in basal half. Anterior angles evidently projecting forward but obtuse, sides almost parallel-sided in basal half, hind angles obtuse. Lateral gutter narrow, not explanate towards base. Two basal impressions very deep and impunctate, external one longer than one half length of internal one.

Elytra wide and flat, weakly enlarged in middle; striae deep and strongly punctate; intervals convex. Third interval with three setigerous punctures, anterior one adjoining stria 3, two posterior adjoining stria 2. Shoulders well marked but with very small tooth, hardly visible, basal margin forming a distinct angle with lateral one.

Genitalia: Aedeagus long with apex simple, not hooked; right paramere longer than in other species of the subgenus and with apex not button-shaped (fig. 28).

Affinities: This is one of the largest species of the subgenus. Several characters seem to indicate its pertinance to this group, even though in external aspect it looks isolated. In particular, two characters are very unusual for *Morphohaptoderus*, namely the glabrous onychium and the long right paramere, but as many more characters are shared with the other known species, I beleive that these autoapomorphies should not be overevaluated.

Geographical notes: This species is known only of the type locality, where it is sympatric, and probably syntopic, with *P. cervenkai*. It is one of the two species of this subgenus known from Yunnan, where probably many more remain to be discovered.

Distributional and ecological notes

Of the fourteen species composing this subgenus, nine are known from Sichuan, and two each from Gansu, Yunnan and Shaanxi. Although the two species from Shaanxi are geographically distant, they are closely related to some of the species known from Sichuan.

This subgenus is distributed in the mountain areas surrounding the Sichuan basin, but it does not reach the Tibetan plateau in any point (see fig. 29).

The occurrence of two species of *Morphohaptoderus* in Shaanxi is certainly interesting, as it

shows a continuity between the fauna of this region and that of the neighbouring ones. As Shaanxi is certainly very little known from a faunistic point of view, I hope that these discoveries will stimulate new researches in this interesting region, whose Carabid fauna has certainly many taxa to be discovered. Among the species of other subgenera of *Pterostichus*, I have seen several undescribed species of *Neohaptoderus*, all from Sichuan, Gansu and Yunnan, while from Shaanxi I have seen only two more species of *Pterostichus*, one of which related to a subgenus distributed in Sichuan and Yunnan (SCIÁKY 1994, in press), the other of unclear relationships.

The species of *Morphohaptoderus* seem to be often sympatric and syntopic: in southern Shaanxi *P. huashanus* has been found with *P. dundai*, in northern Sichuan *P. straneellus* with *P. pseudoplatyderus* and *P. expeditus*; in western Sichuan *P. straneellus* with *P. saueri* and *P. kalabi* and *P. emei* with *P. irideus* and *P. kalabi*; in northern Yunnan *P. cervenkai* with *P. megaloderus*. In spite of this it is difficult to clearly identify within the subgenus two or more groups clearly separated with superposed areals. On the other hand, whatever the character chosen to separate some groups, two species sharing that character are found together in some areas.

From an ecological point of view, all the species recently collected have been found in forest, or in clearings, but always below the upper limit of forests, never in alpine meadows. The species collected at lowest elevation known to me are *P. huashanus* and *P. dundai*, whose type locality, Hua Shan, is a mountain hardly reaching 2000 m a.s.l. On the other hand, some of the other species have been collected at elevations beyond 4000 m. This means that the subgenus has an altitudinal range of more than 2000 m.

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Zusammenfassung

Die Untergattung *Morphohaptoderus* der Gattung *Pterostichus* wird revidiert, die vier bisher bekannten Arten werden wiederbeschrieben und zehn Arten werden für die Wissenschaft neu beschrieben: *P. (M.) dundai* und *P. (M.) huashanus* aus Shaanxi, *P. (M.) irideus*, *P. (M.) saueri*, *P. (M.) kalabi*, *P. (M.) emei*, *P. (M.) pseudoplatyderus* und *P. (M.) giacomazzo* aus Sichuan, *P. (M.) cervenkai* und *P. (M.) megaloderus* aus Yunnan. Diese Untergattung ist in China endemisch und bisher aus Gansu, Sichuan, Yunnan und Shaanxi bekannt.

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