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Contribution to the knowledge of the carabid genus *Chinapenetretus* Kurnakov, 1963 (Coleoptera, Carabidae)

by **A. Zamotajlov** & **R. Sciaky**

Abstract. The genus *Chinapenetretus* Kurnakov, 1963 is revised, including 3 new subgenera: *Grandipenetretus* subgen.n. (type-species *C. major* Zamotajlov & Wrase, 1997), *Robustopenetretus* subgen.n. (type-species *C. xilinensis* Zamotajlov & Wrase, 1997), and *Tibetopenetretus* subgen.n. (type-species *C. heinzi* Zamotajlov & Wrase, 1997). 13 species are recognized, 3 of which are polytypic and include 2 subspecies each. Alltogether, 6 species and 2 subspecies are described: *C.* (*C.*) *kryzhanovskii* sp.n. (SW Sichuan), *C.* (*C.*) *kryzhanovskii gyaisiensis* ssp.n. (SW Sichuan), *C.* (*C.*) *impexus* sp.n. (S Sichuan), *C.* (*C.*) *impressus* sp.n. (N Yunnan), *C.* (*C.*) *wittmeri* sp.n. (SW Sichuan, NW Yunnan), *C.* (*C.*) *salebrosus* sp.n. (N Yunnan), *C. (Robustopenetretus) kasantsevi* sp.n. (S Sichuan), and *C. (Grandipenetretus) major taibaiensis* ssp.n. (SW Shaanxi). Redescription of *C.* (*C.*) *quadraticollis* (Bates, 1891), based upon new material, is also given, downgrading *C.* (*C.*) *gongga* Zamotajlov & Sciaky to subspecies of it. A key to all known species of the genus is proposed and the known distribution of each species is mapped. Data on composition of this genus and on its relations with the other oriental groups of Patrobinae are presented. The taxonomic position of *Parapenetretus reticulatus* Zamotajlov, 1990 is discussed. *Deltomerodes sikkimensis* (Deuve & Ledoux, 1987) is transferred to the subgenus *Parapatrobus* Zamotajlov, 1992 of *Apatrobus* Habu & Baba, 1960.

Key words. Coleoptera Carabidae - *Chinapenetretus* - taxonomy - description - new taxa.

Introduction

Study of the new material of *Chinapenetretus* Kurnakov, 1963, recently accumulated by the authors, revealed its abundance in West China and allowed to define more precisely its relations with the other oriental groups of Patrobinae. As a result of this analysis, a new key to subgenera, species groups, and species, different from the one proposed in a previous work (ZAMOTAJLOV & SCIAKY, 1996), was elaborated and a series of new taxa described. Thanks to the collaboration of our colleagues and several institutions, we were able to study a large number of specimens and obtain reliable morphometric data. Study material was obtained from the following institutions or private collectors, each of which is designated by a coden used in this publication.

AZ	coll. A. Zamotajlov, Krasnodar
DW	coll. D. Wrase, Berlin
JF	coll. J. Farkač, Praha
MJ	coll. M. Janata, Praha
NHMB	Naturhistorisches Museum, Basel
RS	coll. R. Sciaky, Milan
SF	coll. S. Facchini, Piacenza
ZISP	Zoological Institute of Russian Academy of Sciences, St. Petersburg

Taxonomy

Preliminary notes

Chinapenetretus was originally described by KURNAKOV (1963) as a subgenus of *Apenetretus* Kurnakov, 1960. It is curious that *Parapenetretus* Kurnakov, 1960, the most closely related oriental group of Patrobinae, was placed in a different genus, that is as a subgenus of *Penetretus* Motschulsky, 1864. Such a confusion is not so strange, because these groups appear morphologically rather different. Basing upon this fact, ZAMOTAJLOV (1992) proposed a generic status for the taxa under discussion.

Further investigations revealed, however, the complexity and limitations of this approach. Actually, the Chinese representatives of the mentioned above groups compose three main and rather homogenous allopatric species groups, some of which already

recognized as genera: *Parapenetretus* (sensu ZAMOTAJLOV & SCIAKY, 1996), distributed in W and N Sichuan (approximately comprised between 29° and 34° N and between 102° and 105° E), the *potanini*-like species, distributed in W and S Sichuan and N Yunnan (approximately between 27° and 30° N and 99° and 102° E), and *Apatrobus*-like Chinese species, distributed in NW Sichuan, E and S Tibet (discussed in a separate paper) (Fig. 67). Besides, several detached species group are known, that are partially sympatric with some or all of the above groupings (*Dimorphopatrobus* Casale & Sciaky, 1994, the *microphthalmus*-like species, the *major*-like species, the *heinzi*-like species, etc.). The allopatry of the three main species groups seems to prove their common origin, the dispersal centre being placed in W Sichuan, housing the representatives of several main units of this complex: *Parapenetretus*, the *potanini* group, the *quadraticollis* group, the *microphthalmus*-like species. The latter are likely to be more closely related to the *potanini*- and the *quadraticollis* groups, their sympatry with *Parapenetretus* could indicate rather high divergence of both groups. In any case, since two of the groups that constitute this complex, *Parapenetretus* and *Chinapenetretus*, already received a taxonomic status, other groups showing a comparable level of difference should also be established as valid taxa.

The rank of these taxa depends upon the systematic weight of their features. Even though it is suggestive to treat all of them as subgenera, a character like the setation of submentum must be particularly considered in this respect. Most genera of Patrobine normally possess 2 setae on each side of submentum: the longer one, situated posteriorly and often moved to the middle, and the shorter one, situated in anterior angle, often very small or even invisible. Some specimens studied possess a supranumerary additional third seta, though it seems to be a very rare aberration. As far as we know, only three taxa normally possess numerous submental setae: the Mediterranean *Deltomerus* Motschulsky, 1850, the Beringian *Platidiolus* Chaudoir, 1878 and the *potanini* group of *Chinapenetretus*. This fact seems to testify a higher, generic rank of *Chinapenetretus*. The generic appurtenance of some small groups, possessing 2 submental setae (the *quadraticollis* group, etc.) is rather conventional, although, basing on some external features and similarity of habitus, we are inclined to treat them within *Chinapenetretus* as subgenera following our previous work (ZAMOTAJLOV & SCIAKY, 1996). Anyway this approach is still not absolute; for example, *Parapenetretus reticulatus* Zamotajlov, 1990, distributed near the NW limit of the distribution area of *Chinapenetretus* (Fig. 67), occupies a transitional position between *Parapenetretus* and *Chinapenetretus*: it possesses numerous orbital setae and 3 submental ones (see below). We leave it within *Parapenetretus* before further material will better precise its position. On the other hand, some species of *Parapenetretus* (e.g. *P. berezovskii* Kurnakov, 1963) often possess an additional third seta on submentum (even usually bundle-like combined with the main posterior one). However, this approach still seems the best for a description, at the light of our present knowledge, of the relationships among all the species.

It must be noted that both genera *Deltomerodes* Deuve, 1992 and *Maxipenetretus* Zamotajlov, 1998 stand apart from the complex in question, their sympatry probably proving this point of view. They will not be discussed in this paper. The *Apatrobus*-like members of the complex can be easily distinguished through the occurrence of a single

anterolateral pronotal seta and usually more slender appearance. *Chinapenetretus* (in the sense here proposed) and *Parapenetretus* can be separated by means of the following key:

1 Head between eye and neck-constriction with 2 pairs of setae, the hind one never placed beside neck-constriction, if the head bears more setae, submentum always with 4-6 setae on each side. Usually wider and more robust species, apical lamella of aedeagus simple or with small protuberance.....***Chinapenetretus* Kurnakov, 1963**

- Head between eye and neck-constriction with 3-6 pairs of setae, the hind one placed beside neck-constriction, submentum usually with 2, rarely 3 setae on each side. Usually narrower and more slender species, apical lamella of aedeagus with more or less strongly developed tooth- or horn-shaped protuberance ....***Parapenetretus* Kurnakov, 1960**

Finally, the probable relationships of two species previously described by us, namely *Apatrobus brancuccii* Zamotajlov, 1992 and *Parapenetretus wittmeri* Zamotajlov, 1992, to the *Parapenetretus-Chinapenetretus* complex must be mentioned. *Apatrobus (Parapatrobus) brancuccii* from Bhutan and its nearest relative *Apatrobus (Parapatrobus) sikkimensis* (Deuve & Ledoux, 1987) **comb.n.** from Sikkim appeared to be different both from the Japanese (MORITA, 1994) and the Tibetan species. *Parapatrobus* Zamotajlov, 1992 can be easily distinguished from *Apatrobus* through the following external differences: more robust and convex apterous species, temporae more convex, pronotum almost not cordate, strongly constricted at base, with distinct basal tooth, surface of pronotum glabrous, without evident punctuation. This group seems to have no close relationships with the complex here discussed. *Parapenetretus (Butanopenetretus) wittmeri* Zamotajlov, 1992, on the other hand, is evidently related to this complex, sharing with the other small taxa the same relations to *Chinapenetretus*. However, we will leave this species within *Parapenetretus* before a complete revision of the complex will be attained.

Genus *Chinapenetretus* Kurnakov, 1963

Apenetretus subgenus *Chinapenetretus* KURNAKOV, 1963: 410. **Type species.** *Apenetretus potanini* Kurnakov, 1963 (by original designation).

Apenetretus subgenus *Chinapenetretus* Kurnakov: ZAMOTAJLOV, 1990: 137.

Chinapenetretus Kurnakov: ZAMOTAJLOV, 1992: 255.

Chinapenetretus Kurnakov: ZAMOTAJLOV & SCIAKY, 1996: 5.

Chinapenetretus Kurnakov: ZAMOTAJLOV & WRASE, 1997: 1069.

Key to subgenera, species and subspecies of the genus *Chinapenetretus* Kurnakov

1 Metatarsomere 5 glabrous ventrally, sides of vertex strongly wrinkled-punctate, pronotum cordate, its lateral sides always distinctly rounded in front, submentum with 2 setae on each side (Fig. 18). Distribution: C and S Sichuan, Yunnan (***Robustopenetretus* subg.n.**).....2

- Metatarsomere 5 with setae ventrally, sides of vertex smooth to moderately wrinkled or punctate, pronotum usually subquadrate, its lateral sides usually faintly rounded or sinuate in front.....4

2 Larger (above 13 mm), pronotum more markedly constricted towards base, front angles more markedly projected forwards, front margin much more deeply emarginate, shoulders narrower, rounded, spermatheca with additional sclerotized structures near ring and between gonobasis. Distribution: C Sichuan ....10. ***C. xilinensis*** Zamotajlov & Wrase

- Smaller (below 13 mm), pronotum less markedly constricted towards base, front angles hardly projected forwards, front margin with shallow emargination, shoulders broader, prominently angulate, spermatheca without additional sclerotized structures 3

3 Eyes more markedly convex, temporae oblique, surface between frontal furrows and orbital keel coarsely rugose, pronotum prominently broadened anteriorly, lateral gutter narrower, elytra more elongate, its lateral explanate border narrower, spermathecal ring much larger (0.9 mm) (Fig. 66). Distribution: S Sichuan. ....11. ***C. kasantsevi*** **sp.n.**

- Eyes less markedly convex, temporae tumid, surface between frontal furrows and orbital keel more or less glabrous, pronotum not broadened anteriorly, lateral gutter broader, elytra more robust, its lateral explanate border broader, spermathecal ring much smaller (0.6 mm). Distribution: Yunnan....12. ***C. microphthalmus*** (Fairmaire)

4 Larger species, total length above 13.4 mm, marginal series composed of 16 or more setae, endophallus with long, pointed, tooth-like apical copulatory piece (Figs 52, 53), submentum with 2 setae on each side (Fig. 17). Distribution: Shaanxi, Qinling Mts (***Grandipenetretus*** **subg.n.**) (9. ***C. major*** Zamotajlov & Wrase) 5

- Smaller species, total length below 11.7 mm, marginal series composed of up to 14 setae, endophallus without long tooth-like apical copulatory piece, bearing only folded poorly sclerotized structures apically or small spot-like or dull apical body 6

5 More slender, elytra narrower (1.66-1.73× as long as wide), elytral striae with fine punctuation basally, marginal series composed of 18-22 setae, apical lamella of aedeagus somewhat broadened apically and more markedly twisted rightwards (viewed dorsally), spermathecal ring asymmetric ....9.1. ***C. major major*** Zamotajlov & Wrase

- More robust, elytra broader (1.56-1.64× as long as wide), elytral striae without prominent punctuation basally, marginal series composed of 16-18 setae, apical lamella of aedeagus more or less gradually constricted towards apex and less markedly twisted rightwards (viewed dorsally), spermathecal ring regularly ovate (Fig. 56) .....9.2.***C. major taibaiensis*** **ssp.n.**

6 Pronotum cordate and strongly constricted towards base, front angles rounded, not projected anteriorly, elytral interval 3 with large setiferous foveoles, shoulders narrow, rounded, aedeagus with prominent tooth-shaped protuberance apically, submentum with 2 setae on each side. Distribution: E Tibet (***Tibetopenetretus*** **subg.n.**) .....13. ***C. heinzi*** Zamotajlov & Wrase

- Pronotum usually subquadrate to subcordate, faintly to moderately constricted towards base, front angles somewhat angulate and projected anteriorly, elytral interval 3 with fine setiferous punctures, shoulders rather broad, protruding, aedeagal apex simple, rarely with indistinct protuberance. Distribution: W Sichuan, N Yunnan

(***Chinapenetretus*** **s.str.**) 7

7 Body size on average smaller (below 9.7 mm), submentum with 2 setae on each side (Fig. 16), basal carina of pronotum long and prominent, outlining distinct outer basal fovea outside off inner one, elytral striae deeper, intervals more convex, endophallus with prominent apical copulatory piece. Distribution: W Sichuan (the ***quadraticollis*** **group**) (8. ***C. quadraticollis*** (Bates) 8

- Body size on average larger (above 9.4 mm), submentum with 3-6 setae on each side (Fig. 9), basal carina of pronotum missing, if present, shorter, outer basal fovea missing or indistinct, if present, broadly fused with inner one, elytral striae superficial, intervals less convex, usually flat, endophallus without distinct apical copulatory piece, only folded, irregularly and faintly sclerotized structures present (the ***potanini*** **group**) 9

8 Body size on average larger (8.3-9.7 mm), hind angles of pronotum less markedly projected laterally, nearly rectangular or obtuse, elytral striae without prominent punctuation, apical copulatory piece smaller, spot-like (Figs 48, 49). Distribution: W Sichuan, Kangding env. (Pauma Shan) 8.1. ***C. quadraticollis quadraticollis*** (Bates)

- Body size on average smaller (8.2-9.2 mm), hind angles of pronotum more markedly projected laterally, nearly acute, elytral striae with prominent fine punctuation, apical copulatory piece larger, elongate. Distribution: W Sichuan, Gongga Shan..... .....8.2. ***C. quadraticollis gongga*** Zamotajlov & Sciaky **stat.n.**

9 Head between eye and neck-constriction with a couple of setae only 10

- Head between eye and neck-constriction with 3-4 setae (at one side, at least) 16

10 Base of pronotum at least with traces of carina, proximal copulatory piece with no or faint and short basal flagellum.....11

- Base of pronotum without carina, proximal copulatory piece with long curved basal flagellum 15

11 Front angles of pronotum more markedly projected forwards, distinctly angulate, hind angles more markedly projected laterally, lateral sides stronger rounded in front, elytral intervals usually with numerous irregular foveoles besides usual discal pores, apical lamella of aedeagus with faint protuberance on the left broadened apically (viewed dorsally) (Figs 36, 37). Distribution: NW Yunnan .....5. ***C. impressus*** **sp.n.**

- Front angles of pronotum less markedly projected forwards, somewhat rounded, hind angles usually less markedly projected laterally, lateral sides less markedly rounded in front, elytral intervals without foveoles, only interval 3 bearing setiferous pores adjoining stria 3, apical lamella of aedeagus without protuberance, rather evenly constricted apically (viewed dorsally).....12

12 More robust, pronotum distinctly sinuate before acute hind angles, elytral intervals without microscopic punctures, aedeagus more markedly bent basally 13

- More slender, pronotum faintly sinuate before obtuse hind angles, often somewhat evenly constricted towards base, elytral intervals with microscopic punctures, aedeagus less markedly bent basally (Figs 20, 21, 24, 25) (1. ***C. kryzhanovskii*** **sp.n.**) 14

13 Vertex rugose, pronotum more markedly cordate, shoulders less distinct, rounded, elytral striae deep, with distinct punctuation, aedeagal apex somewhat turned

dorsally (viewed laterally). Distribution: N Yunnan.....4.***C. yunnanus*** (Fairmaire)

- Vertex smooth, pronotum less cordate, shoulders distinct, protruding, elytral striae superficial, with indistinct punctuation, aedeagal apex somewhat turned ventrally (viewed laterally) (Figs 28, 29). Distribution: W Sichuan ..2. ***C. potanini*** Kurnakov

14 Frontal furrows more or less smooth, with a raw of punctures only, discal pores complete, aedeagus more markedly bent basally, proximal copulatory piece larger (Figs 20, 21). Distribution: W Sichuan ..1.1. ***C. kryzhanovskii kryzhanovskii*** **ssp.n.**

- Frontal furrows with coarse and prominent oblique rugosity, discal pores often obliterated basally, aedeagus less markedly bent basally, proximal copulatory piece smaller (Figs 24, 25). Distribution: SW Sichuan. ....1.2. ***C. kryzhanovskii gyaisiensis*** **ssp.n.**

15 Eyes larger, temporae shorter, frontal furrows smooth, pronotum widest at anterior 1/3, its median line complete, basal foveae shorter and smaller, elytra broader, shiny, aedeagus less markedly curved ventrally, proximal copulatory piece with long lobes (Figs 40, 41). Distribution: NW Yunnan/SW Sichuan.....6. ***C. wittmeri*** **sp.n.**

- Eyes smaller, temporae longer, frontal furrows rugose, pronotum widest nearly at middle, its median line obliterated apically, basal foveae longer and deeper, elytra narrower, mat, aedeagus more markedly curved ventrally, proximal copulatory piece with short lobes (Figs 44, 45). Distribution: NW Yunnan 7. .....***C. salebrosus*** **sp.n.**

16 Base of pronotum at least with traces of carina, elytra shiny, setae between eye and neck-constriction stand apart, not forming close bundles, proximal copulatory piece with no or faint and short basal flagellum.....17

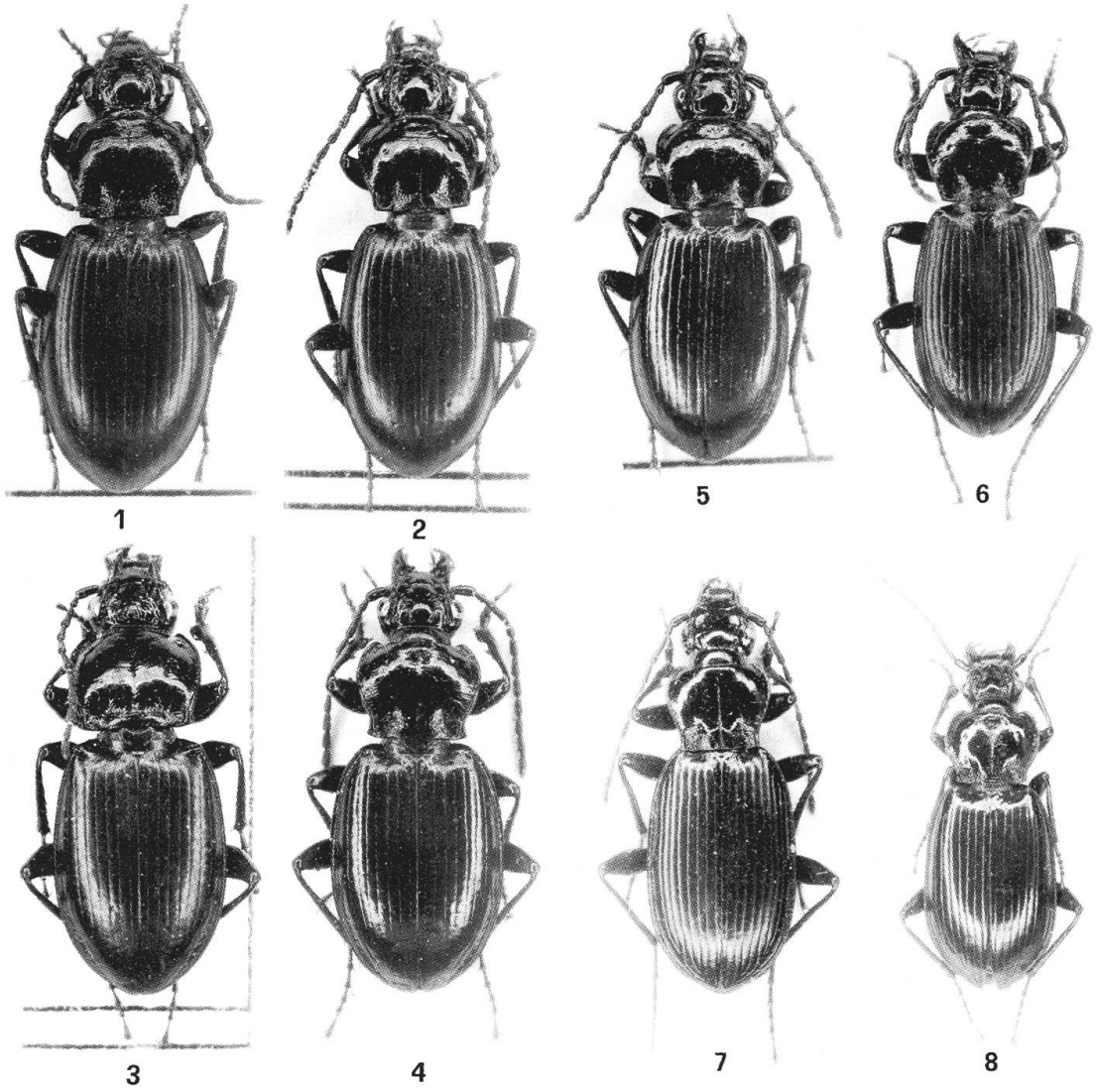
- Base of pronotum without carina, elytra mat, head between eye and neck-constriction with 1 anterior supraorbital seta and a bundle of 2 close setae posteriorly, proximal copulatory piece with long curved basal flagellum (see also thesis 15) (Figs 44, 45). Distribution: NW Yunnan. .....7. ***C. salebrosus*** **sp.n.**

17 More slender (elytra 1.51-1.61× as long as wide), hind angles of pronotum not or hardly projecting laterally, lateral margin with very faint sinuation before hind angles, marginal series composed of 7-11 setae, apical lamella of aedeagus gradually constricted towards apex (viewed dorsally), simple, proximal copulatory piece strongly sclerotized (Figs 20, 21, 24, 25) (1. ***C. kryzhanovskii*** **sp.n.**) 14

- More robust (elytra 1.48-1.52× as long as wide), hind angles of pronotum more or less distinctly projecting laterally, lateral margin with prominent sinuation before hind angles, marginal series composed of 12-14 setae, apical lamella of aedeagus broadened apically (viewed dorsally), with small protuberance on the left, proximal copulatory piece poorly sclerotized.....18

18 Body shape more robust and broader, pronotum subquadrate, with short but broad basal carina, elytra with faint luster in male, their intervals without foveoles or microscopic punctures, aedeagus larger, proximal copulatory piece longer (Figs 32, 33). Distribution: SW Sichuan.....3. ***C. impexus*** **sp.n.**

- Body shape slenderer and narrower, pronotum cordate, without distinct basal carina, elytra shiny in male, their intervals with sparse microscopic punctures and usually numerous irregular foveoles, aedeagus smaller, proximal copulatory piece shorter (Figs 36, 37). Distribution: NW Yunnan.....5. ***C. impressus*** **sp.n.**



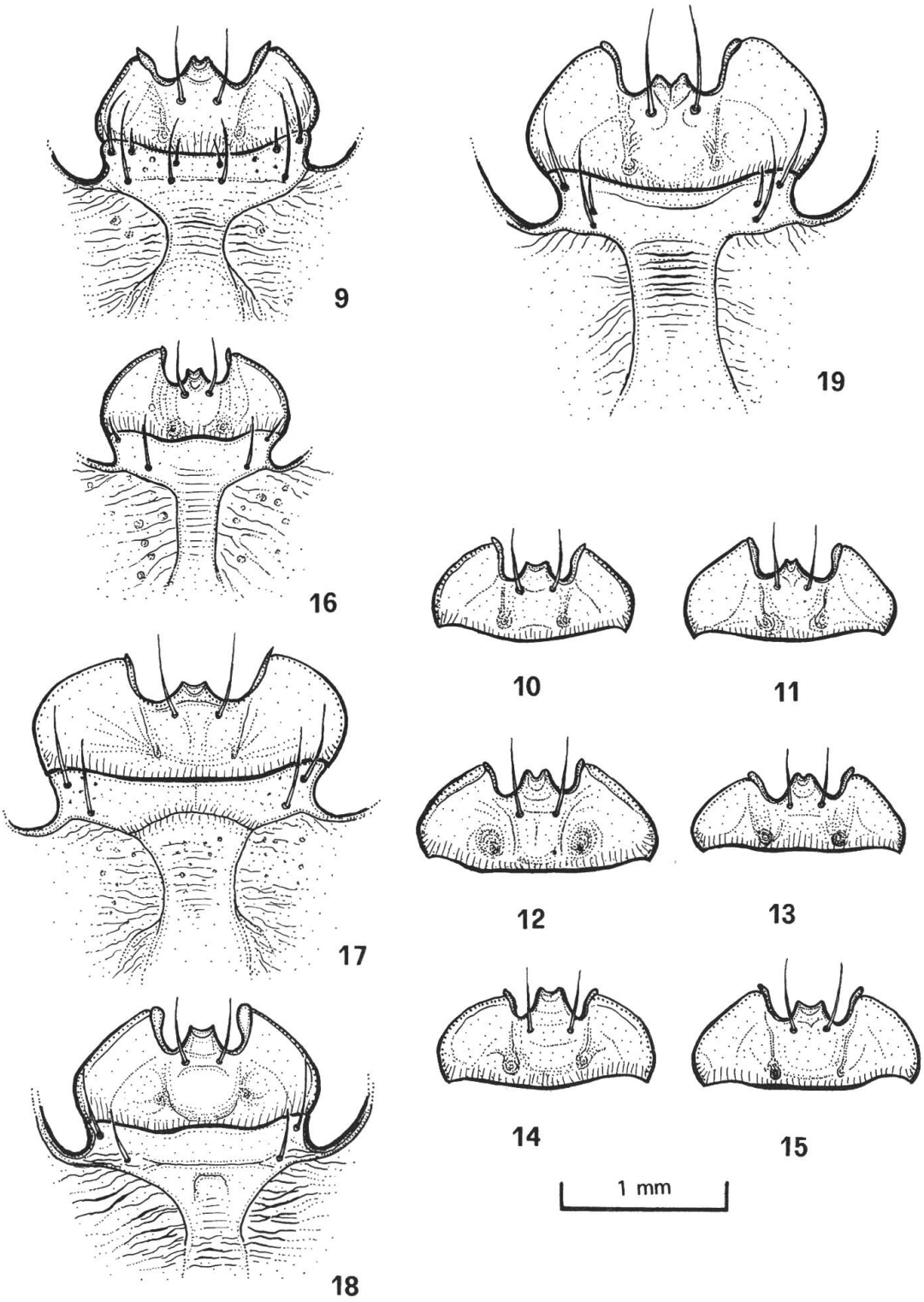
Figs 1-8: *Chinapenetretus*, general view. 1, *C. kryzhanovskii kryzhanovskii* ssp.n., paratype, ♀. 2, *C. kryzhanovskii gyaisiensis* ssp.n., paratype male. 3, *C. impexus* sp.n., holotype, male. 4, *C. impressus* sp.n., paratype, male. 5, *C. wittmeri* sp.n., paratype, male. 6, *C. salebrosus* sp.n., paratype, male. 7, *C. major taibaiensis* ssp.n., holotype, male. 8, *C. kasantsevi* sp.n., holotype, ♀.

1. Subgenus *Chinapenetretus* s.str.

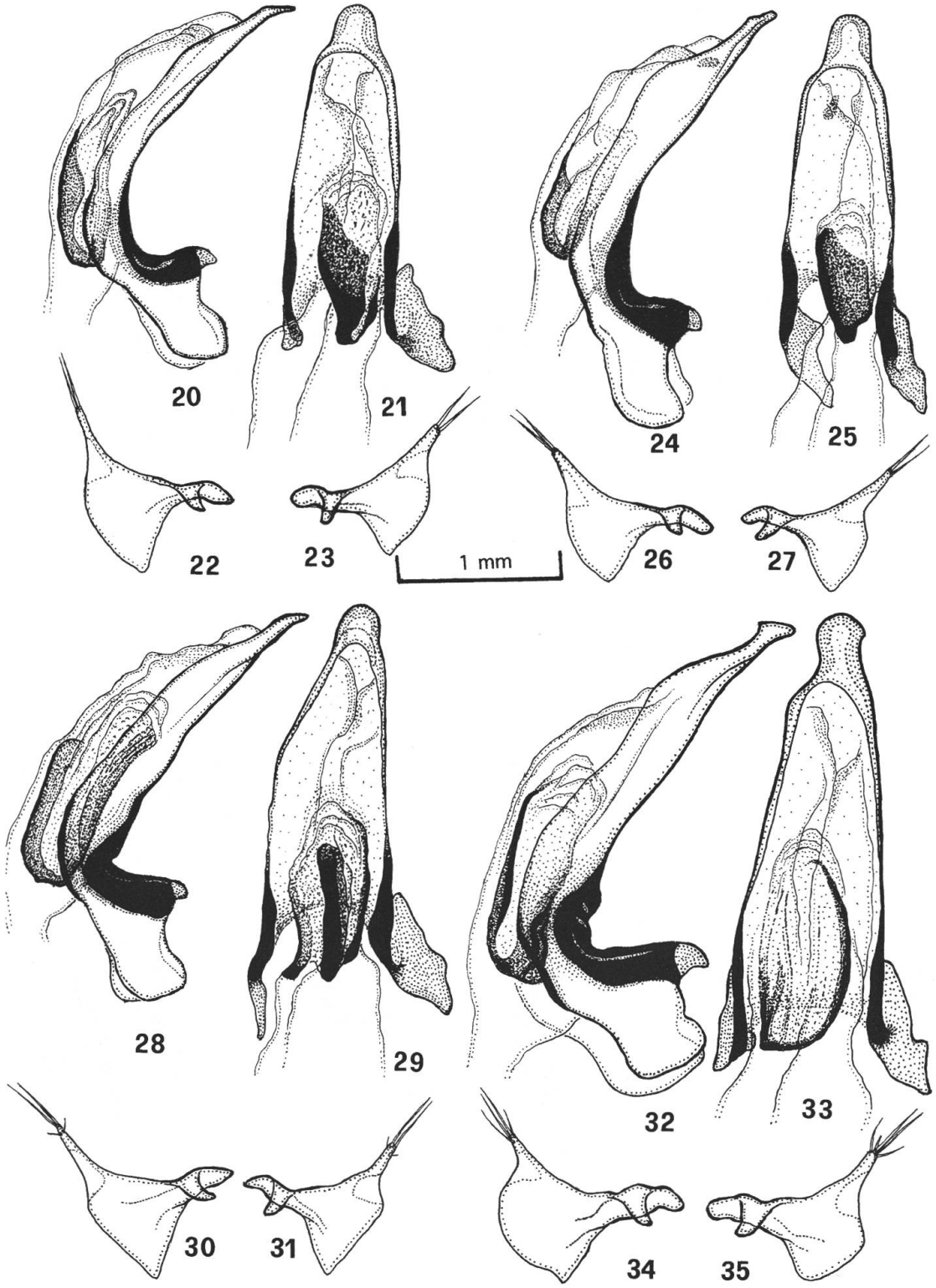
Description. 2-4 setae between eye and neck-constriction; submentum with 2-6 setae on each side. Pronotum subcordate to subquadrate, faintly to moderately constricted towards base; front angles angulate, usually projected anteriorly. Elytral interval 3 with fine setiferous punctures, shoulders rather wide, protruding, marginal series of 7-14 setae. Metatarsomere 5 ventrally with 2-3 couples of setae. Aedeagal apex simple, endophallus with proximal copulatory piece and sometimes an apical one, too.

Distribution. W Sichuan, N Yunnan.

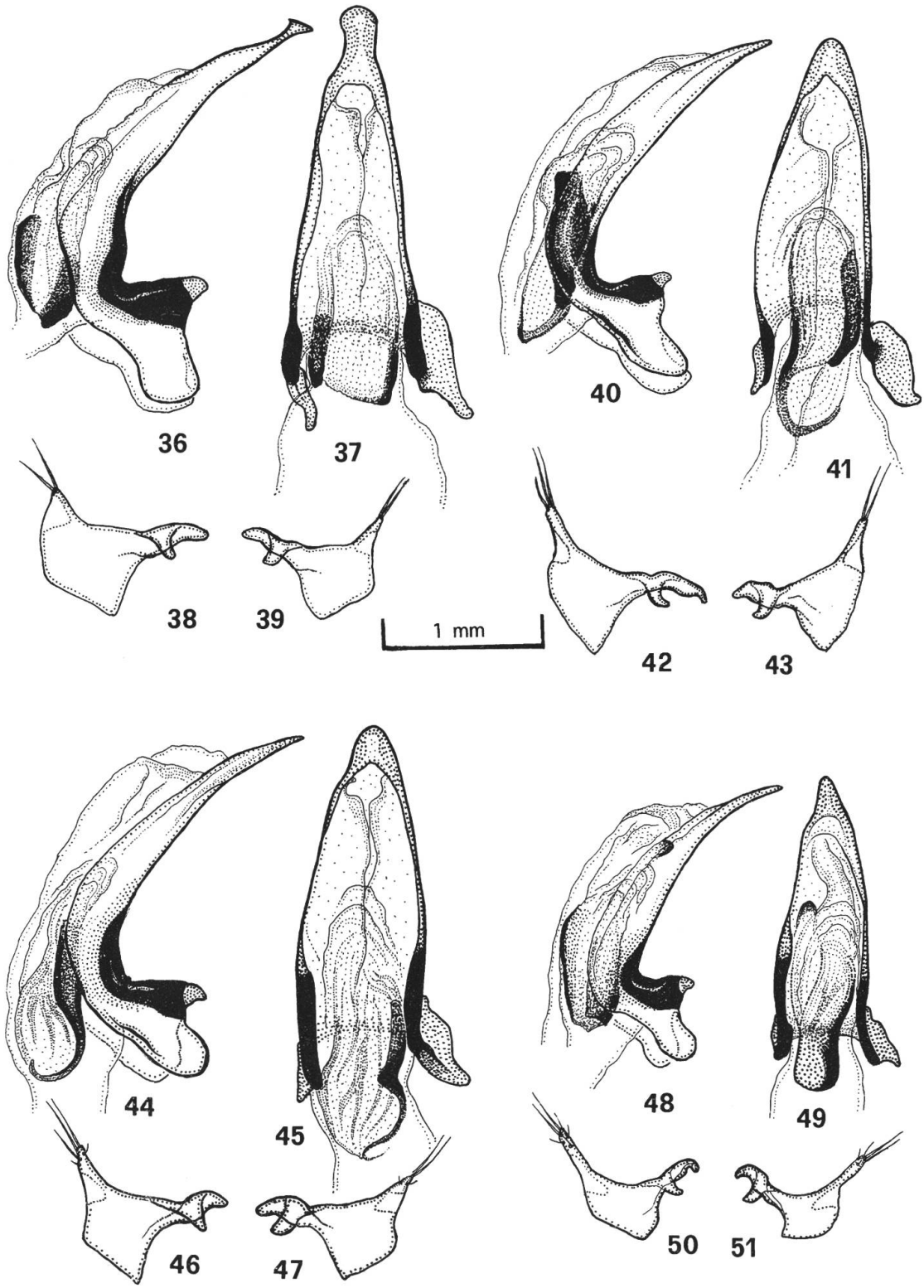
Composition. Comprises 2 species groups with 8 species.



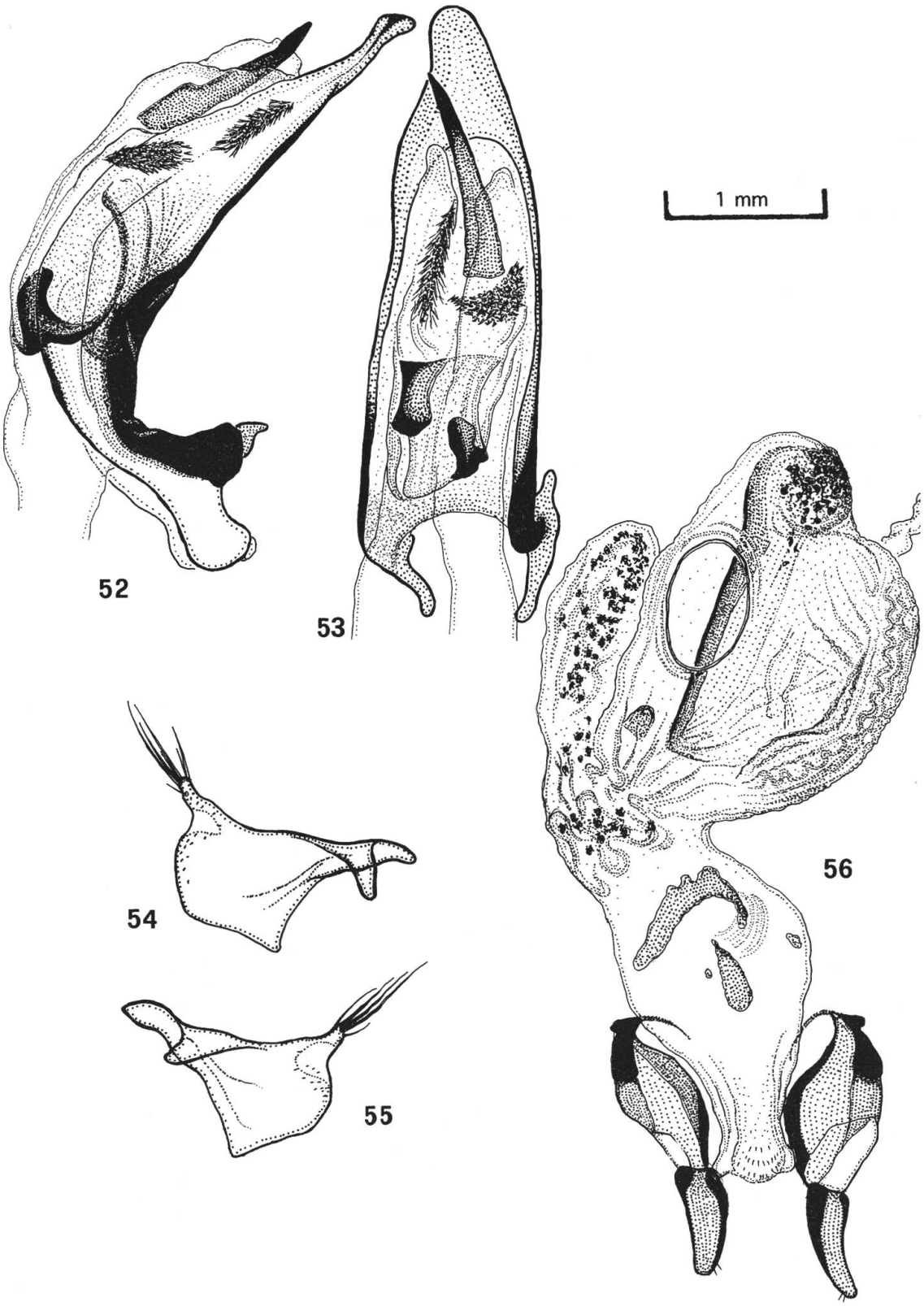
Figs 9-19: *Chinapenetreus* and related species, mentum and submentum. 9, *C. kryzhanovskii kryzhanovskii* ssp.n., paratype, male from Kangding vic. 10, *C. kryzhanovskii gyaisiensis* ssp.n., paratype, male. 11, *C. potanini* Kurnakov, paratype, male. 12, *C. impexus* sp.n., holotype, male. 13, *C. imressus* sp.n., paratype, male. 14, *C. wittmeri* sp.n., paratype, male. 15, *C. salebrosus* sp.n., paratype, male. 16, *C. quadraticollis quadraticollis* (Bates) from Pauma Shan. 17, *C. major taibaiensis* ssp.n., paratype, ♀. 18, *C. kasantsevi* sp.n., holotype, ♀. 19, *"Parapenetretus" reticulatus* Zamotajlov from "Yajiang-Litang".



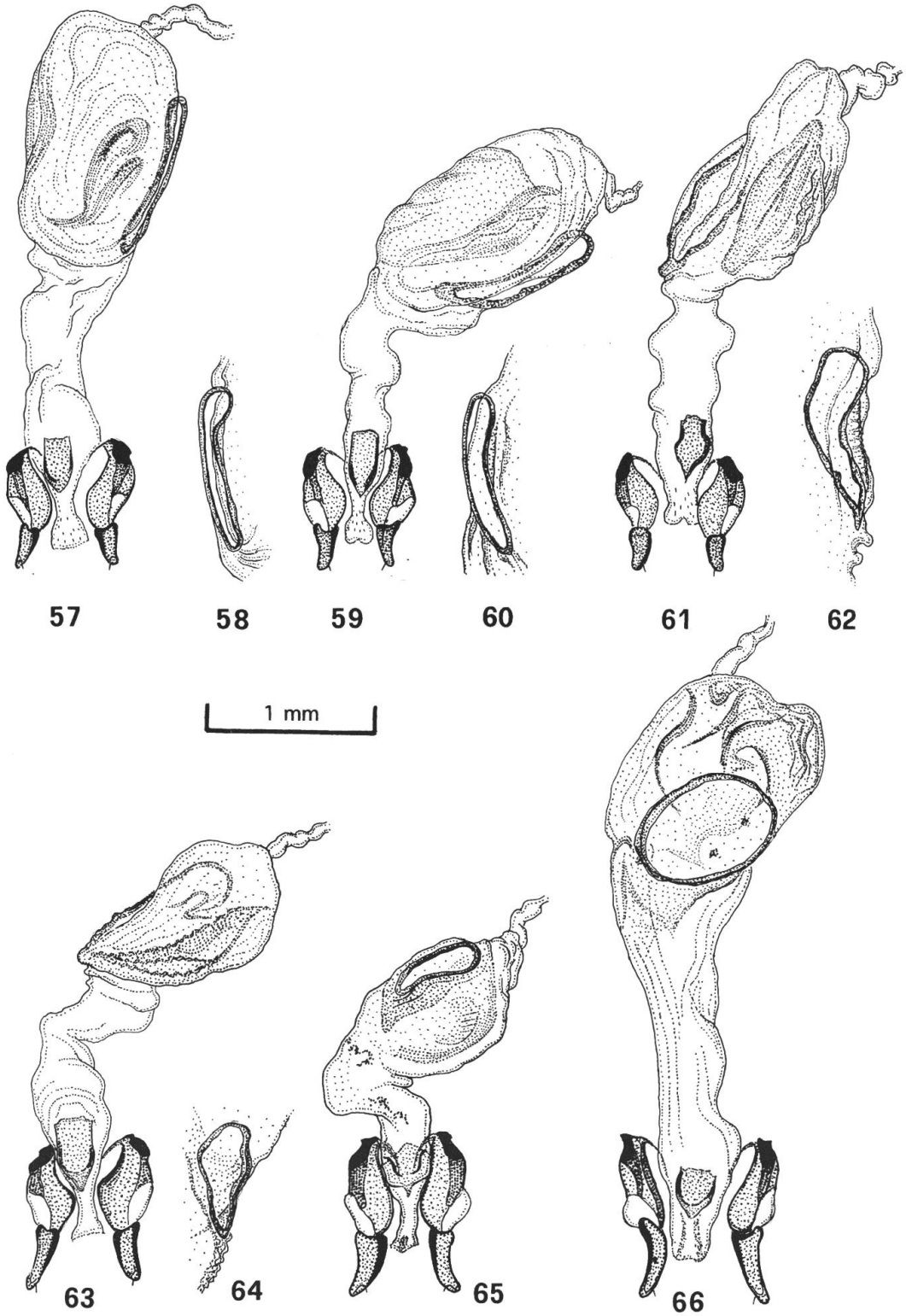
Figs 20-35: *Chinapenetretus*, male genitalia. 20-23, *C. kryzhanovskii kryzhanovskii* ssp.n., paratype from Kangding vic. 24-27, *C. kryzhanovskii gyaisiensis* ssp.n., paratype. 28-31, *C. potanini* Kurnakov, paratype. 32-35, *C. impexus* sp.n., holotype. 20, 24, 28, 32: aedeagus in left lateral view. 21, 25, 29, 33: aedeagus in dorsal view. 22, 26, 30, 34: left paramere, left lateral view. 23, 27, 31, 35, right paramere, right lateral view.



Figs 36-51: *Chinapenetretus*, male genitalia. 36-39, *C. imressus* sp.n., paratype. 40-43, *C. wittmeri* sp.n., paratype. 44-47, *C. salebrosus* sp.n., paratype. 48-51, *C. quadraticollis quadraticollis* (Bates) from Pauma Shan. 36, 40, 44, 48: aedeagus in left lateral view. 37, 41, 45, 49: aedeagus in dorsal view. 38, 42, 46, 50: left paramere, left lateral view. 39, 43, 47, 51: right paramere, right lateral view.



Figs 52-56: *Chinapenetretus major taibaiensis* ssp.n., genitalia. 52-55, male, holotype: 52, aedeagus in left lateral view. 53, aedeagus in dorsal view. 54, left paramere, left lateral view. 55, right paramere, right lateral view. 56, ♀, paratype: reproductive tract, dorsal view.



Figs 57-66: *Chinapenetretus*, female reproductive tract. 57, 58, *C. kryzhanovskii kryzhanovskii* ssp.n., paratype from Kangding vic. 59, 60, *C. kryzhanovskii gyaisiensis* ssp.n., paratype. 61, 62, *C. potanini* Kurnakov, paratype. 63, 64, *C. salebrosus* sp.n., paratype. 65, *C. quadraticollis quadraticollis* (Bates) from Pauma Shan. 66, *C. kasantsevi* sp.n., holotype. 57, 59, 61, 63, 65, 66: ovipositor and distal reproductive tract, dorsal view. 58, 60, 62, 64: ring of spermatheca, ventral view.

1.1. The *potanini* group

Description. 2-4 setae between eye and neck-constriction; submentum with 3-6 setae (usually 4 or more) on each side. Pronotum subcordate to subquadrate, basal carina short or missing, outer basal foveae indistinct or missing. Aedeagal apex simple, endophallus with proximal copulatory piece only. Total length 9.4-11.7 mm.
Distribution. W, SW Sichuan, NW Yunnan (Fig. 68).
Composition. Comprises 7 species.

***Chinapenetretus* (*Chinapenetretus*) *kryzhanovskii* sp.n.** Figs 1,9,20-23,57,58

Holotype,♂ (RS): China, W Sichuan, road Kangding-Xinduqiao, pass 16 km W Kangding, alp. reg., 4290 m, 3. viii. 1994, J. Kaláb. **Paratypes**: 1 ♂, 1 ♀ (RS); 3 ♂, 2 ♀ (SF); 2 ♂, 1 ♀ (AZ), same locality, together with holotype. 2 ♂, 1 ♀ (RS), China, W Sichuan, Kangding-Yajiang, Ka-Er-Sh-Shan, 4250 m, zona alp., viii. 1995, L. & Pf. Cavazzuti. 2 ♂ (DW); 1 ♀ (AZ), China, W Sichuan, Daxue Shan, 5 km W Tsheto-La Pass [= Zhedou Shankou] (W Kangding), 30° 04' N 101° 47' E, 3900-4000 m, 26. V. 1997, D. Wrase & M. Schülke.

Differential diagnosis. *C. kryzhanovskii* sp.n. is closely related to *C. potanini*. It can be distinguished through the much broader tooth of mentum (Figs 9, 11), narrower and less cordate pronotum with obtuse hind angles (acute in *C. potanini*), slenderer body, larger body size, occurrence of 3 or more setae between eye and neck-constriction (11 of 17 studied specimens have 3 or more setae, at least on one side), aedeagus less bent basally, apical lamella more markedly curved ventrally (in lateral view, figs 24, 28), much shorter ventral lobe of proximal copulatory piece and triangular dorsal one (in *C. potanini* the ventral lobe of proximal copulatory piece is much longer, and the dorsal one is more parallel-sided, see figs 28, 29), and narrower, more evidently longitudinally stretched spermathecal ring (Figs 57, 58, 61, 62).
Description. Body dark brown to black, shiny, antennae, mandibles, and legs dark-brown, palpi reddish-brown. Total length 10.4-11.7 mm.

Head ovate, 0.70-0.77 (0.74)× as wide as pronotum, eyes large, convex, temporae about as long as eye diameter, oblique to faintly tumid, neck constriction deep and prominent; frontal furrows more or less shallow, fairly divergent posteriorly; surface smooth, in frontal furrows sparsely punctate, in neck constriction faintly rugose; 2-4 setiferous pores between eye and neck-constriction (from Ka-Er-Sh-Shan we know 1 specimen with 3 setae on the left and 4 setae on the right, 1 with 3 setae on the left and 2 setae on the right, and 1 with 2 setae on the left and 3 setae on the right; from Tsheto-La we know 2 specimens with 3 setae on either side and 1 with 2 setae on the left and 3 setae on the right; from the vicinities of Kangding we know 6 specimens with 2 setae on either side, 2 with 2 setae on the left and 3 setae on the right, 2 with 3 setae on the left and 2 setae on the right, and 1 with 3 setae on either side). Tooth of mentum (Fig. 9) bifid, rather long and often broad, epilobes rather broad, foveae of sensory labial organ rather narrow; submentum with 4-5 setae on each side.

Pronotum often rather narrow, subquadrate to subcordate, 1.16-1.31 (1.24)× as wide as long, somewhat constricted towards base, faintly convex. Front margin almost straight, sides faintly rounded in front, often without prominent sinuation before hind angles, basal margin straight, front angles rounded to faintly angulate, hardly or not projecting anteriorly; hind angles obtuse, pointed, sometimes indistinctly denticulate, distinctly carinate; anterior transverse impression rather shallow or indistinct, sometimes

gently rugosely punctate; basal foveae rather deep, rugosely-punctate, disk smooth, median line deep, often obliterated apically, basal area and lateral gutter coarsely punctate; lateral gutter with 3-5 setae, basal seta present in hind angles. Proepisterna and lateral areas of mesosternum densely and coarsely punctate, meso- and metepisterna smoothly to coarsely punctate, pro- and metasternum smoothly punctate, lateral areas of sternites rather finely to coarsely punctate. Metatarsomere 5 ventrally with 2-3 couples of setae, 3rd seta very short, if present.

Elytra ovate, 1.51-1.61 (1.56)× as long as wide and 1.33-1.44 (1.39)× as wide as pronotum, widest in apical one-third; disk faintly convex, shoulders broad, prominent, angulate, denticulate; intervals faintly convex, striae deep; interval 3 with 2-3 setiferous pores adjoining stria 3, marginal series composed of 8-10 pores, forming more or less distinct basal (3 setae) and apical (5-7 setae) groups; microsculpture of isodiametric meshes and irregular dense minute punctures.

Aedeagus (Figs 20, 21) faintly and roundly bent at base, apical lamella fairly curved ventrally (viewed laterally), indistinctly twisted rightwards (viewed dorsally), apex widely rounded; armature of endophallus consists of a large proximal copulatory piece composed by two fused lobes, ventral one being small and indistinct; left paramere (Fig. 22) larger than right one (Fig. 23), both with rather long apical projections, often somewhat truncate apically, bearing 2-4 long apical setae. Spermatheca (Figs 57, 58) with strongly elongate, narrow asymmetric sclerotized ring ca. 1.03 mm in maximum diameter ventro-laterally and sclerotized body between gonobasis. Stylus bearing 1 minute seta subapically.

Remarks. 3 populations from different localities are hitherto known, different in some minor features. The specimens from the vicinity of Kangding are more robust and have a wider pronotum, with more markedly rounded lateral margins; the populations from "Ka-Er-Sh-Shan" and Tsheto-La are quite similar in appearance, but the former one has a larger aedeagus, more evidently bent basally, thus approaching *C. potanini* (KURNAKOV, 1963). If we suppose a common origin of the two species, their geographical position can explain these differences (Fig. 68).

Etymology. We dedicate this species to the memory of late Prof. Dr. Oleg L. Kryzhanovskij, famous specialist in carabidology and teacher of the first author, who constantly encouraged us in our work on Patrobinae.

Chinapenetretus (*Chinapenetretus*) *kryzhanovskii gyaisiensis* ssp.n.

Figs 2,10, 24-27, 59, 60

Holotype,♂ (RS): China, W Sichuan, road Sabde-Jiulong, pass 40 km N Jiulong, 3000 m, *Picea* forest, 25. vi. 1994, J. Kaláb. **Paratypes**: 1 ♀ (RS); 2 ♂, 1 ♀ (AZ); 2 ♂, 2 ♀ (SF), same locality, together with holotype.

Description. Total length 10.2-11.5 mm.

Head ovate, 0.70-0.75 (0.73)× as wide as pronotum; frontal furrows fairly divergent posteriorly, with coarse oblique rugosity; 2-3 setiferous pores between eye and neck-constriction (2 specimens studied have 3 setae on either side, 1 has 2 setae on the left and 3 setae on the right, and 6 have 2 setae on either side). Tooth of mentum bifid, similar to that of the nominotypical subspecies (Fig. 10), although usually broader; submentum with 4 setae on each side.

Pronotum 1.22-1.31 (1.27)× as wide as long; lateral gutter with 3-4 setae. Metatarsomere 5 ventrally with 2 couples of setae.

Elytra 1.55-1.64 (1.60)× as long as wide and 1.31-1.38 (1.35)× as wide as pronotum; discal pores usually obliterated basally, so that interval 3 bears 1-2 (seldom 3) setiferous pores adjoining stria 3, marginal series composed of 7-11 setae.

Aedeagus (Figs 24, 25) very faintly and roundly bent basally, armature of endophallus similar to that of the nominotypical subspecies, but proximal copulatory piece smaller. The parameres (Figs 26, 27) are similar to those of the nominotypical subspecies. Sclerotization of spermatheca as in the nominotypical subspecies (Figs 59, 60).

Remarks. Being distributed much southwards of the nominotypical subspecies (Fig. 68), *C. kryzhanovskii gyaisiensis* ssp.n. has surprisingly few (but constant) distinguishable morphological or morphometric characters (Tab. 1): frontal furrows somewhat broader, with prominent coarse oblique rugosity, basal discal pores often obliterated, leaving only 1-2 apical ones (a character unusual in *Chinapenetretus*), aedeagus less bent basally, with smaller proximal copulatory piece.

Etymology. The subspecific epithet refers to the old name "Gyaisi" of Jiulong, the type locality of the present form.

***Chinapenetretus* (*Chinapenetretus*) *impexus* sp.n.** Figs 3, 12, 32-35

Holotype, ♂ (RS): China, S Sichuan, pass 20 km S Muli/Bowa, 27°45' N 101°13' E, ca. 3500 m, mixed forest, 25. vii. 1995, J. Turna.

Description. Body black, shiny, antennae and tarsi dark brown, palpi brown. Total length 11.7 mm.

Head ovate, 0.69× as wide as pronotum, eyes large, convex, temporae shorter than eye diameter, tumid, neck constriction deep and prominent; frontal furrows more or less shallow, almost parallel; surface smooth, in frontal furrows and in neck constriction rugose; head bears 4 setiferous pores between eye and neck-constriction: 1 close to anterior margin of eye, 2 between mid-eye level and posterior margin of eye, and 1 nearly equidistant between posterior margin of eye and neck-constriction. Tooth of mentum (Fig. 12) bifid, broad, with rather deep apical emargination, epilobes rather broad, foveae of sensory labial organ extremely broad and deep; submentum with 6 setae on each side.

Pronotum broad, subquadrate, 1.27× as wide as long, faintly convex. Front margin faintly rounded, sides widely rounded almost to hind angles, basal margin faintly emarginated in the middle, front angles angulate, fairly projecting anteriorly; hind angles obtuse, pointed, with very short but broad carina, fairly projecting laterally; anterior transverse impression indistinct; basal foveae rather deep, rugose, punctate, disk smooth, median line deep, obliterated apically, basal area and posterior half of lateral gutter sparsely punctate; lateral gutter with 4 setae, basal seta present in hind angles. Episterna and sternum very smoothly and finely punctate, only lateral sides of mesosternum with rather distinct coarse punctation, lateral areas of sternites rather finely rugosely punctate. Metatarsomere 5 ventrally with 2 couples of setae.

Elytra ovate, 1.52× as long as wide and 1.33× as wide as pronotum, widest near

middle; disk convex, shoulders broad, prominent, angulate, denticulate; intervals flat, striae fine, without distinct punctuation; interval 3 with 4 setiferous pores adjoining stria 3, marginal series composed of 13-14 pores; microsculpture forming small isodiametric meshes.

Aedeagus (Figs 32, 33) large, strongly bent at base, apical lamella faintly curved ventrally (viewed laterally), slightly twisted rightwards and broadened apically (viewed dorsally), apex widely rounded, with small protuberance on the left; armature of endophallus consisting of long but rather poorly sclerotized proximal copulatory piece composed by two fused lobes; left paramere (Fig. 34) larger than right one (Fig. 35), both with rather short apical projections, bearing 3 long apical and 1-2 short subapical setae. Female unknown.

Remarks. This species seems to be rather isolated within the subgenus *Chinapenetretus*, due to the large and robust appearance and very fine punctuation of both upper- and underside, these features easily distinguishing it from the other forms with supernumerary setation on vertex and near eyes (i.e. *C. kryzhanovskii* sp.n., *C. impressus* sp.n., and *C. salebrosus* sp.n.). Basing upon male genitalia, *C. impexus* sp.n. seems near *C. impressus* sp.n. from Yunnan, but differs in several important characters (see key).

Etymology. The specific epithet refers to the dense setation of both head between eyes and neck-constriction and submentum, characteristic of this species (from the Latin *impexus*: meaning disheveled, rough).

***Chinapenetretus* (*Chinapenetretus*) *impressus* sp.n.** Figs 4, 13, 36-39

Holotype,♂ (NHMB): China, Yunnan, Yulong Mts, 27°10' N, 100°13' E, 3900 m, 16.-19.vi.1993, Bolm. **Paratypes**: 1 ♂ (AZ), same locality, together with holotype. 2 ♂ (RS), same locality, together with holotype, V. Kubáň.

Description. Body dark brown to black, shiny, antennae, mandibles, tibiae, tarsi, and palpi brown. Total length 10.3-11.0 mm.

Head ovate, 0.68-0.71 (0.70)× as wide as pronotum, eyes large, moderately convex, temporae about as long as eye diameter, faintly tumid, neck constriction deep and prominent; frontal furrows more or less shallow, nearly parallel; surface smooth, in frontal furrows and in neck constriction finely rugose and sparsely punctate; 1-2 setiferous pores between anterior margin of eye and mid-eye level and 1-2 setiferous pores nearly equidistant between neck constriction and posterior margin of eye (in 4 specimens studied 2 have 1 anterior and 1 posterior supraorbital setae on either side, 1 has 2 anterior and 1 posterior setae on the left and 1 anterior and 2 posterior setae on the right, and 1 has 2 anterior setae and 1 posterior seta on the left and 1 anterior and 1 posterior setae on the right). Tooth of mentum (Fig. 13) bifid, broad, epilobes rather broad, foveae of sensory labial organ deep, though narrow; submentum with 6 setae on each side.

Pronotum broad, cordate, 1.29-1.34 (1.32)× as wide as long, faintly convex. Front margin faintly rounded to almost straight, sides widely rounded in front, strongly sinuate before hind angles, basal margin almost straight, front angles rounded, fairly projecting anteriorly; hind angles obtuse, pointed, strongly projecting laterally, without distinct carina; anterior transverse impression very shallow, almost indistinct, sometimes gently rugose; basal foveae deep, rugose, coarsely punctate, disk smooth, median line deep,

obliterated apically, basal area and lateral gutter coarsely rugosely punctate; lateral gutter with 4 setae, basal seta present in hind angles. Pro-, meso- and metepisterna densely and coarsely, but smoothly punctate, lateral areas of mesosternum and metasternum coarsely punctate, lateral areas of sternite 1 punctate. Metatarsomere 5 ventrally with 2 couples of setae.

Elytra ovate, 1.48-1.50 (1.49)× as long as wide and 1.36-1.38 (1.37)× as wide as pronotum, widest near middle; disk convex, shoulders broad, prominent, more or less distinctly angulate, denticulate; intervals faintly convex, striae deep, without distinct punctuation; interval 3 with 3-4 setiferous pores adjoining stria 3, marginal series composed of 12-13 pores; microsculpture forming transverse wrinkles basally, isodiametric meshes and irregular minute punctures, in 3 specimens studied intervals bear also numerous wide irregular foveoles.

Aedeagus (Figs 36, 37) strongly bent at base, apical lamella faintly curved ventrally (viewed laterally), very faintly twisted rightwards and broadened apically (viewed dorsally), apex widely rounded, with small protuberance on the left; armature of endophallus consists of rather short proximal copulatory piece composed by two fused lobes; left paramere (Fig. 38) larger than right one (Fig. 39), both with rather short and hardly separated apical projections, bearing 2 long apical setae. Female unknown.

Remarks. This species seems to be most closely related to *C. yunnanus* (Fairmaire, 1886) and previous one. It differs from the first one in many characters, particularly strongly projected laterally hind angles of pronotum, intensive elytral microscopic punctuation, and details of male genitalia structure. Unfortunately, since the exact locality of *C. yunnanus* is unknown, we have no distribution evidences concerning relations of both species. Being close to *C. impexus* sp.n. in male genitalia structure, *C. impressus* sp.n. differs in cordate pronotum, strong elytral luster, intensive microscopic punctuation and presence of irregular foveoles on elytra.

Etymology. The specific epithet refers to characteristic surface structure of elytra, possessing numerous irregular foveoles (from the Latin *impressio*: meaning impression, stamping).

Chinapenetretus (*Chinapenetretus*) *wittmeri* sp.n. Figs 5, 14, 40-43

Holotype,♂ (RS): China, NW Yunnan / SW Sichuan border area, road Xiangcheng-Zhongdian, 35 km S Xiangcheng (15 km N Wengshui), 3500 m, alp. reg. and *Picea* forest, 10. vii. 1994. **Paratypes**: 1 ♂ (RS), 2 ♂ (AZ), 2 ♂ (SF), same locality, together with holotype.

Description. Body dark brown to black, shiny, antennae, mandibles, and tibiae dark brown, palpi and tarsi reddish-brown. Total length 9.4-11.3 mm.

Head ovate, 0.68-0.76 (0.72)× as wide as pronotum, eyes large, convex, temporae a little shorter than eye diameter, faintly tumid, neck constriction moderately deep, prominent; frontal furrows more or less shallow, slightly divergent posteriorly; surface smooth, in frontal furrows and in neck constriction almost smooth; 1 setiferous pore near anterior margin of eye and 1 setiferous pore usually closer to posterior margin of eye than to neck constriction. Tooth of mentum (Fig. 14) bifid, broad, epilobes rather broad, foveae of sensory labial organ deep and narrow; submentum with 3-4 setae on each side.

Pronotum rather broad, subcordate, 1.31-1.36 (1.34)× as wide as long, somewhat

constricted towards base, faintly convex, widest in anterior one-third. Front margin almost straight, sides widely rounded in front, gently sinuate before hind angles, basal margin straight, front angles rounded, hardly projecting anteriorly; hind angles obtuse, pointed, without distinct carina; anterior transverse impression shallow, indistinct, sometimes smoothly punctate; basal foveae short and shallow, punctate, disk smooth, median line rather deep, complete, basal area and lateral gutter sparsely punctate; lateral gutter with 3 setae in anterior half, basal seta present in hind angles. Pro-, mesepisterna, and lateral areas of metasternum coarsely punctate, metepisterna, lateral areas of pro- and mesosternum rather sparsely and smoothly punctate, lateral areas of sternites rather finely punctate. Metatarsomere 5 ventrally with 2-3 couples of setae.

Elytra oblong-ovate, broad, 1.52-1.58 (1.55)× as long as wide and 1.27-1.45 (1.36)× as wide as pronotum, widest near middle; disk faintly convex, shoulders broad, prominent, angulate, denticulate; intervals faintly convex, striae deep, with indistinct punctuation basally; interval 3 with 2-3 setiferous pores adjoining stria 3, marginal series composed of 7-11 pores; microsculpture forming isodiametric meshes and sometimes irregular sparse minute punctures.

Aedeagus (Figs 40, 41), strongly bent at base, apical lamella fairly curved ventrally (viewed laterally), apex widely rounded; armature of endophallus consists of a large proximal copulatory piece bearing long curved basal flagellum, composed by two fused lobes, left one being more markedly sclerotized; left paramere (Fig. 42) larger than right one (Fig. 43), both with rather short and hardly separated apical projections, bearing 2 long apical and often 1 short subapical setae. Female unknown.

Remarks. Absence of prominent basal carina near hind angles of pronotum and presence of long curved basal flagellum of proximal copulatory piece make this species easily distinguishable among other members of the *potanini* group. The only species, sharing these characters, is *C. salebrosus* sp.n., however, the latter differs in many characters, particularly mat elytral surface (see below).

Etymology. We cordially dedicate this species to the memory of late Dr.phil.h.c. Walter W. Wittmer, our elder friend and colleague, remarkable coleopterologist and organizer of scientific researches in Basel and many other lands.

***Chinapenetretus* (*Chinapenetretus*) *salebrosus* sp.n.** Figs 6, 15, 44-47, 63, 64

Holotype,♂ (RS): China, N Yunnan, Xue Shan n. Zhongdian, 27°49' N 99°34' E, 4050 m, 24.vi.1996, J. Farkač, P. Kabátek, A. Smetana. **Paratypes**: 5 ♂, 2 ♀ (NHMB); 2 ♂, 2 ♀ (RS); 1 ♂ (AZ), same locality, together with holotype. 3 ♂ (RS); 3 ♂, 2 ♀ (NHMB), same locality, 4000-4100 m, 23.vi.1996, J. Farkač, P. Kabátek, A. Smetana. 7 ♂, 2 ♀ (JF); 2 ♂, 1 ♀ (AZ), China, N Yunnan, mts 15 km W of Zhongdian, 27°49' N 99°34' E, 4200-4700 m, 23.vi.1994, D. Král & J. Farkač.

Description. Body dark brown, with faint luster, antennae, mandibles, tibiae, and tarsi brown, palpi reddish-brown. Total length 10.2-11.6 mm.

Head ovate, 0.69-0.76 (0.73)× as wide as pronotum, eyes rather small, though convex, temporae about as long as eye diameter, oblique to faintly tumid, neck constriction deep and prominent; frontal furrows more or less deep, slightly divergent posteriorly; surface smooth, in frontal furrows rugose; 1 setiferous pore near anterior margin of eye and usually 1 setiferous pore or rarely a bundle of 2 closely situated setae much closer to to posterior margin of eye than to neck constriction (in 21 specimens

studied 17 have only 2 setae on either side, 2 have 3 setae on either side, 1 has 3 setae on the left and 2 setae on the right, and 1 has 2 setae on the left and 3 setae on the right). Tooth of mentum (Fig. 15) bifid, broad, epilobes rather broad, foveae of sensory labial organ rather shallow and narrow; submentum with 4 setae on each side.

Pronotum rather narrow, subcordate, 1.17-1.38 (1.28)× as wide as long, somewhat constricted towards base, faintly convex. Front margin almost straight, sides widely rounded in front, gently sinuate before hind angles, basal margin straight, front angles rounded, faintly projecting anteriorly; hind angles obtuse, pointed, without distinct carina; anterior transverse impression rather shallow, though distinct, finely punctate, sometimes with few larger coarse punctures; basal foveae deep and rather long, rugose, finely punctate, disk smooth, median line deep, obliterated at both extremities, basal area and lateral gutter rather finely punctate; lateral gutter with 3-4 setae, basal seta present in hind angles. Pro-, meso- and metepisterna, lateral areas of mesosternum and metasternum densely and coarsely punctate, lateral areas of sternite 1 punctate. Metatarsomere 5 ventrally with 2-3 couples of setae.

Elytra mat in both sexes, oblong-ovate, 1.59-1.72 (1.66)× as long as wide and 1.33-1.45 (1.39)× as wide as pronotum, widest near middle; disk flat, shoulders rather broad, prominent, angulate, denticulate; intervals faintly convex, striae deep, distinctly punctate basally; interval 3 with 2-4 setiferous pores usually adjoining stria 3, marginal series composed of 8-11 pores; microsculpture forming isodiametric meshes.

Aedeagus (Figs 44, 45) strongly bent at base, evenly arcuate ventrally (viewed laterally), apical lamella faintly twisted rightwards (viewed dorsally), apex rather narrowly rounded; armature of endophallus consists of rather short proximal copulatory piece composed by two fused lobes; left paramere (Fig. 46) larger than right one (Fig. 47), both with rather short apical projections, sometimes truncate apically, bearing 2-3 long apical or subapical setae and sometimes 1 short subapical seta. Spermatheca (Figs 63, 64) with elongate asymmetric sclerotized ring ca. 1.03 mm in maximum diameter ventrally and sclerotized body between gonobasis. Stylus bearing 1 minute seta subapically.

Remarks. Male genitalia structure, particularly presence of long basal flagellum of proximal copulatory piece, indicates the close relations of this species and the previous one. It can be easily distinguished by several important characters: more slender body, smaller eyes, pronounced rugosity of frontal furrows, shape of pronotum, widest in the middle, median line obliterated apically, longer and deeper basal foveae, aedeagus arcuate ventrally, and shorter lobes of proximal copulatory piece. From all known species of the subgenus differs in mat elytral surface in both sexes.

Etymology. The specific epithet refers to the rugged, mat surface structure of elytra (lat. *salebrosus*: rugged, rough).

1.2. The *quadraticollis* group

Description. 2 setae between eye and neck-constriction; submentum with 2 setae on each side. Pronotum subquadrate, basal carina long and prominent, outer basal foveae distinct. Metatarsomere 5 with 3 couples of setae ventrally. Aedeagal apex simple, endophallus with both proximal and apical copulatory pieces. Total length 8.2-9.7 mm.

Distribution. W Sichuan (Fig. 68).
Composition. Comprises 1 species.

Chinapenetretus (*Chinapenetretus*) *quadraticollis quadraticollis* (Bates)

Figs 16, 48-51, 65

Penetretus quadraticollis BATES, 1891: 70.
Penetretus quadraticollis Bates: JAKOBSON, 1906: 305.
Penetretus quadraticollis Bates: CSIKI, 1928: 344.
Apenetretus (Chinapenetretus) quadraticollis (Bates): KURNAKOV, 1963: 410.
Chinapenetretus quadraticollis (Bates): ZAMOTAJLOV, 1992: 255.
Chinapenetretus quadraticollis (Bates): ZAMOTAJLOV & SCIAKY, 1996: 5.
Chinapenetretus gongga ZAMOTAJLOV & SCIAKY, 1996: 3 (partim).

Material examined. 1 ♂, 1 ♀ (RS); 1 ♂, 1 ♀ (AZ); 3 ♂, 2 ♀ (JF), China, W Sichuan, Pauma Shan mts, 29°55' N 102°02'E, 4200-4900 m, 12.-14.vii.1994, D. Král & J. Farkač.

Description. Total length 8.3-9.7 mm.

Head ovate, 0.69-0.73 (0.71)× as wide as pronotum; 2 setiferous pores between eye and neck-constriction, tooth of mentum (Fig. 16) bifid, short, epilobes narrow, foveae of sensory labial organ rather shallow and narrow; submentum with 2 setae on each side.

Pronotum 1.37-1.44 (1.41)× as wide as long, hind angles faintly projected laterally, nearly rectangular or obtuse; lateral gutter with 3 setae before middle.

Elytra 1.56-1.63 (1.60)× as long as wide and 1.27-1.33 (1.30)× as wide as pronotum; striae without prominent punctuation, interval 3 with 3-4, seldom 2 setiferous pores adjoining stria 3, marginal series composed of 8-11 setae, sometimes forming basal and apical groups.

Aedeagus (Figs 48, 49) strongly bent basally, apical lamella fairly curved ventrally (viewed laterally), apex simple, pointed, armature of endophallus consists of large proximal copulatory piece composed of 2 fused lobes and small apical copulatory piece. Parameres (Figs 50, 51). Spermatheca (Fig. 65) with ovate sclerotized ring.

Remarks. Type specimens of *C. quadraticollis* (Bates, 1891) are missing in the Bates collection (British Museum, Natural History). Material from the Muséum National d'Histoire Naturelle, Paris, described by Kurnakov (KURNAKOV, 1963), agrees completely with the above described specimens from Pauma Shan in Kangding vicinities.

C. quadraticollis is closely related to *C. gongga* Zamotajlov & Sciaky, 1996, both forms obviously belonging to the same species. However, there are some constant characters, different in populations from Gongga Shan and Pauma Shan, testifying to their subspecific rank, i.e. they must be treated as *C. quadraticollis quadraticollis* (Bates, 1891) and *C. quadraticollis gongga* Zamotajlov & Sciaky, 1996, stat.n.

The nominotypical subspecies can be easily distinguished by larger (in average) body size, hind angles of pronotum less markedly projected laterally, nearly rectangular or obtuse (in *C. quadraticollis gongga* nearly acute), elytral striae without prominent punctuation, and smaller spot-like apical copulatory piece (in *C. quadradicollis gongga* larger, elongate, tooth-like).

2. Subgenus *Grandipenetretus* subg.n.

Type species: *Cinapenetretus major* Zamotajlov & Wrase, 1997.

Description. 2 setae between eye and neck-constriction; submentum with 2 setae on each side. Pronotum subcordate. Elytral interval 3 with setiferous punctures, shoulders rather broad, protruding, marginal series of 16-22 setae. Metatarsomere 5 with 3-4 couples of setae ventrally. Aedeagal apex simple, endophallus with proximal and apical copulatory pieces. Total length 13.4-16.6 mm.
Distribution. Shaanxi: Qin Ling.
Composition. Comprises 1 politypical species (*C. major* Zamotajlov & Wrase, 1997).

Chinapenetretus (*Grandipenetretus*) *major taibaiensis* ssp.n. Figs 7, 17, 52-56

Holotype, ♂ (MJ): China, SW Shaanxi, Qinling mts, Houzhenzi, 2600 m, 7.vii.1996, M. Janata. **Paratypes**: 6 ♂, 3 ♀ (MJ), 1 ♀ (RS); 1 ♀ (AZ), same locality, together with holotype. 2 ♂ (RS); 1 ♀ (AZ), China, SW Shaanxi, Qinling mts, Taibai Shan mass., 3300 m, vii. 1996, M. H·ckel.

Description. Total length 13.4-16.6 mm.

Head ovate, stout, 0.72-0.75 (0.74)× as wide as pronotum; 1 setiferous pore near anterior margin of eye and 1 setiferous pore between eye and neck-constriction. Tooth of mentum (Fig. 17) bifid, moderately broad, with shallow apical emargination, epilobes comparatively narrow, foveae of sensory labial organ shallow and narrow, hardly distinguishable; submentum with 2 setae on each side.

Pronotum 1.20-1.29 (1.25)× as wide as long; lateral gutter with 4 setae.

Elytra 1.56-1.64 (1.60)× as long as wide and 1.43-1.53 (1.48)× as wide as pronotum; interval 3 with 3-4 setiferous pores adjoining stria 3, striae without prominent punctuation at base, marginal series composed of 16-18 setae. Metatarsomere 5 ventrally with 4 couples of setae.

Aedeagus (Figs 52, 53) similar to that of the nominotypical subspecies, but with apical lamella more or less gradually constricted towards apex and less markedly twisted rightwards (viewed dorsally), proximal copulatory piece similar to that of the nominotypical subspecies, but different in some details. Parameres (Figs 54, 55). Spermatheca (Fig. 56) with regularly ovate ring.
Remarks. Being distributed about 100 km westwards from the nominotypical subspecies, the new one differs from it in some prominent features: body shape more slender, tooth of mentum narrower, apical emargination more shallow, foveae of sensory labial organ smaller, epilobes narrower, elytra broader, striae without prominent punctuation basally, marginal series less numerous, apical lamella of aedeagus more or less gradually constricted towards apex (in the nominotypical subspecies somewhat broadened apically), less markedly twisted rightwards, proximal copulatory piece differs in some details, spermathecal ring more regularly rounded.
Etymology. The specific epithet refers to the name of locality where this subspecies was collected, Mt Taibai.

3. Subgenus *Robustopenetretus* subg.n.

Type species: *Chinapenetretus xilinensis* Zamotajlov & Wrase, 1997.

Description. Sides of vertex strongly wrinkled-punctate, 2 setae between eye and neck-constriction; submentum with 2 setae on each side. Pronotum cordate. Elytral interval 3 with setiferous punctures, shoulders rather broad, protruding, marginal series of 10-19 setae. Metatarsomere 5 glabrous ventrally. Aedeagal apex with large protuberance, endophallus with proximal copulatory piece and teeth-patch. Total length 11.6-13.7 mm.
Distribution. C and S Sichuan, Yunnan (Fig. 68).
Composition. Comprises 3 species (*C. xilinensis* Zamotajlov & Wrase, 1997, *C. microphthalmus* (Fairmaire, 1888) and *C. kasantsevi*, herewith described).

***Chinapenetretus* (*Robustopenetretus*) *kasantsevi* sp.n.** Figs 8, 18, 66

Holotype,♀ (AZ): China, S Sichuan, Luojishan, 2200-2800 m, 16.-25. VII. 1996, S. Kasantsev.

Description. Body black, shiny, antennae, palpi, and tarsi dark brown. Total length 12.5 mm.

Head ovate, 0.69× as wide as pronotum, eyes small, but rather strongly convex, temporae longer than eye diameter, tumid, neck constriction deep; frontal furrows deep, broadened and prominently divergent posteriorly; surface smooth, in frontal furrows and in neck constriction punctate, between frontal furrows and orbital keel coarsely rugose, sides of vertex strongly rugosely punctate; 1 setiferous pore near anterior margin of eye and 1 setiferous pore nearly equidistant between neck constriction and posterior margin of eye. Tooth of mentum (Fig. 18) bifid, rather broad and short, epilobes broad, foveae of sensory labial organ rather broad, but shallow; submentum with 2 setae on each side.

Pronotum broad, cordate, 1.24× as wide as long, faintly convex. Front margin slightly emarginate, sides widely rounded and moderately explanate, sinuate a little before hind angles, basal margin straight, front angles faintly projecting anteriorly, rounded; hind angles obtuse, pointed, indistinctly denticulate; anterior transverse impression rather deep, coarsely punctate, with 2 long setae on each side; basal foveae small but rather deep, densely and coarsely punctate, disk faintly rugose, median line punctate, obliterated at both extremities, basal area and lateral gutter coarsely punctate; lateral margins with 5 setae, basal seta present in hind angles. Pro-, meso-, and metepisterna, metasternum densely and finely punctate, lateral sides of prosternum and mesosternum coarsely punctate, lateral areas of sternite 1 rugose and finely punctate. Metatarsomere 5 ventrally glabrous.

Elytra oblong-ovate, 1.61× as long as wide and 1.37× as wide as pronotum, fairly convex, sides nearly parallel, lateral margins narrowly bordered; shoulders rather broad and prominent, protruding, indistinctly denticulate; intervals faintly convex, almost flat, striae smooth; interval 3 with 3 setiferous pores adjoining stria 3, marginal series composed of 12-13 pores; microsculpture fine, forming isodiametric meshes.

Spermatheca (Fig. 66) with ovate sclerotized ring about 0.9 mm in diameter dorsally and sclerotized body between gonobasis; stylus bearing 1 minute seta subapically. Male unknown.
Remarks. This species seems to be most closely related to *C. microphthalmus*

(Fairmaire, 1888), but is easily distinguishable by much stronger rugosity of frontal furrows and adjoining area between them and orbital keel, oblique temporae, pronotum broadened anteriorly, narrower lateral gutter of pronotum, more elongate elytra with narrower lateral explanate border, and much larger spermathecal ring. From the second constituent of the group, *C. xilinensis* Zamotajlov & Wrase, 1997, it differs by the same characters, different shape of pronotum, much less markedly constricted towards base, and different type of spermathecal sclerotization.

This find makes more clear distribution of the subgenus in question, stretching from C Sichuan to Yunnan and apparently populating east peripheral ranges of Tibetan uplands.

Etymology. This species is named after our colleague and friend, restless investigator of Oriental beetles, Mr. Sergei V. Kasantsev of Moscow, who kindly forwarded us his material for study.

4. Subgenus *Tibetopenetretus* subg.n.

Type species: *Chinapenetretus heinzi* Zamotajlov & Wrase, 1997.

Description. 2 setae between eye and neck-constriction; submentum with 2 setae on each side. Pronotum subcordate, strongly constricted towards base, front angles rounded, not projected anteriorly. Elytral interval 3 with large setiferous foveoles, shoulders narrow, rounded, marginal series of 8-12 setae. Metatarsomere 5 with 2-4 couples of setae ventrally. Aedeagal apex with small protuberance, endophallus with proximal copulatory piece. Total length 8.3-9.5 mm.

Distribution. E Tibet.

Composition. Comprises 1 species.

Chinapenetretus (*Tibetopenetretus*) *heinzi* Zamotajlov & Wrase

Chinapenetretus heinzi ZAMOTAJLOV & WRASE, 1997: 1069-1077.

Material examined. 1 ♂, 1 ♀ (RS); 1 ♂ (SF), China, E Tibet, Serkyimla, 25 km E of Nyingtri, 11. vi. 1997, A. Wrzecionko.

Remarks. The above specimens agree completely with the type series.

Incertae Sedis

"*Parapenetretus*" *reticulatus* Zamotajlov, 1990 Fig. 19

Parapenetretus reticulatus ZAMOTAJLOV, 1990: 137. **Holotype**,♀ (ZISP), China, W Sichuan, "btw. Khonchuka and Spolo", 16. vi. 1893, G. Potanin.

Parapenetretus reticulatus Zamotajlov: ZAMOTAJLOV, 1992: 260.

Parapenetretus reticulatus Zamotajlov: ZAMOTAJLOV & SCIAKY, 1996: 6, 20.

Additional material examined. 1 ♀ (RS), China, W Sichuan, Yajiang-Litang, "Il Colle, 4200 m, prat. alp.", viii. 1995, L. & Pf. Cavazzuti.

Remarks. Taxonomic position of this species remained unclear till now, because of its some peculiar characters. Distribution reasons also contribute to its detached position from *Parapenetretus* (Fig. 68), since it occurs much westwards from the main range of the genus, closer to *Chinapenetretus*-species.

The second studied specimen agrees in its main morphometric characters with the holotype (Tab. 1), but it has only 3 setae between eye and neck-constriction and 2 setae

on metatarsomere 5 ventrally (character states approaching to normal within the *potanini* group). Both known specimens have 3 setae on each side of submentum, comparatively narrow epilobes, bifid, extremely broad tooth of mentum, somewhat emarginate in the middle, unlike other species attributed here to *Chinapenetretus*, and rather small and shallow foveae of sensory labial organ (Fig. 19).

Even though some characters mentioned above are typical of *Chinapenetretus*, we cannot draw more definite conclusion concerning the generic affiliation of this species before the study of the male, unknown until now. Most probably, "*Parapenetretus*" *reticulatus* occupies a position transitional between *Parapenetretus* and the *potanini* group of *Chinapenetretus*.

Ecology

Chinapenetretus seems to be a quite characteristic element of the zonal interfluve fauna and is not strictly connected with intrazonal riverside or glacial communities, unlike many other Patrobine groupings. However, many of its species prefer wet and rather cool biotopes, even at low elevations.

Representatives of the *potanini* group inhabit rather large scale of mountain zones, ranging from the mixed and *Picea* forests at 2500-3500 m (*C. kryzhanovskii gyaisiensis* ssp.n., *C. impexus* sp.n., *C. wittmeri* sp.n.) to alpine zone (*C. kryzhanovskii kryzhanovskii* ssp.n., *C. impressus* sp.n.) and even subnival zone at about 4700 m (*C. salebrosus* sp.n.) (Tab. 2).

The *quadraticollis* group, distributed from 2500 to 4900 m, is quite close in this respect to the previous group.

The *Grandipenetretus*-forms occur in forest and alpine communities.

The *Robustopenetretus*-species seem to be comparatively low mountainous ones, their known altitudinal distribution ranging from 1500 to 2800 m.

Finally, *C. (Tibetopenetretus) heinzi* Zamotajlov & Wrase is probably a mostly nival species, distributed from 3400 to 4900 m.

Rather wide adaptations of *Chinapenetretus* to interfluve communities could probably be regarded as adaptive primitivism.

Discussion

Basing upon our previous speculations concerning the common origin of *Parapenetretus* and *Chinapenetretus* and about their dispersal centre, a south-west direction can be hypothesized as the main pathway of expansion of the *potanini* group (Fig. 67). It seems interesting to observe that there is a certain correlation between distribution and chaetotaxy, although there is still not complete agreement on the value and weight of several characters concerning the latter (Casale & Sciaky, 1994). It is interesting to note that northern and eastern species, the most primitive according to their geographical position, possess numerous setae between eye and neck-constriction, while western species, both in the north (*C. potanini* Kurnakov, 1963) and in the south (*C. wittmeri* sp.n. and generally *C. salebrosus* sp.n.) of the group range, have only 2 orbital setae. Thus, presence of additional tactile setae near eyes and vertex could be regarded as a plesiomorphic character state within this group of species, but since it is an

Table 1. Variability of the morphometric characters and setation in several *Chinapenetretus* and related species and subspecies.

Explanations:

1	2	3	4	5	6	7	8	WP WH	WP LP	WE WP	LE WE	9	10	11	12
A	11	10.4- 11.7 11.1*	2.1- 2.3 2.2	2.3- 2.6 2.5	2.8- 3.1 3.0	5.9- 6.6 6.3	3.8- 4.3 4.1	1.31- 1.42 1.37	1.20- 1.31 1.26	1.33- 1.40 1.37	1.51- 1.61 1.56	2-3	8-10	2-3	8-9
B	3	10.8- 11.2 11.0	2.1- 2.2 2.2	2.4- 2.5 2.5	2.8- 2.9 2.9	6.1- 6.5 6.3	4.0- 4.2 4.1	1.32- 1.33 1.33	1.18- 1.22 1.20	1.34- 1.44 1.39	1.52- 1.54 1.53	2-4	8	2-3	9-10
C	3	10.4- 10.8 10.6	2.1	2.3- 2.5 2.4	2.8- 2.9 2.9	6.0- 6.1 6.1	3.8- 4.0 3.9	1.30- 1.38 1.34	1.16- 1.22 1.19	1.36- 1.38 1.37	1.53- 1.59 1.56	2-3	8	2-3	8
D	9	10.2- 11.5 10.9	2.0- 2.2 2.1	2.2- 2.4 2.3	2.8- 3.0 2.9	5.9- 6.5 6.2	3.7- 3.9 3.8	1.34- 1.42 1.38	1.22- 1.31 1.27	1.31- 1.38 1.35	1.55- 1.64 1.60	2-3	8	1-3	7-11
E	6	9.6- 10.4 10.0	1.9- 2.3 2.1	2.2- 2.6 2.4	2.7- 3.2 3.0	5.5- 6.5 6.0	3.7- 4.2 4.0	1.40- 1.48 1.44	1.23- 1.30 1.27	1.27- 1.36 1.32	1.49- 1.57 1.53	2	8-12	3-4	7-10
F	1	11.7	2.3	2.6	3.4	6.8	4.5	1.44	1.27	1.33	1.52	4	12	4	13-14
G	4	10.3- 11.0 10.7	2.1	2.3	2.9- 3.0 3.0	5.8- 6.3 6.1	3.9- 4.2 4.1	1.41- 1.47 1.44	1.29- 1.34 1.32	1.36- 1.38 1.37	1.48- 1.50 1.49	2-3	12	3-4	12-13
H	6	9.4- 11.3 10.4	1.9- 2.1 2.0	1.8- 2.4 2.1	2.5- 3.2 2.9	5.5- 6.3 5.9	3.5- 4.1 3.8	1.31- 1.48 1.40	1.31- 1.36 1.34	1.27- 1.45 1.36	1.52- 1.58 1.55	2	6-8	2-3	7-11
I	21	10.2- 11.6 10.9	1.9- 2.1 2.0	2.0- 2.3 2.2	2.6- 2.9 2.8	5.9- 6.7 6.3	3.5- 4.1 3.8	1.32- 1.45 1.39	1.17- 1.38 1.28	1.33- 1.45 1.39	1.59- 1.72 1.66	2-3	8	2-4	8-11
J	9	8.3- 9.7 9.0	1.6- 1.9 1.8	1.9- 2.1 2.0	2.3- 2.6 2.5	4.8- 5.5 5.2	3.0- 3.4 3.2	1.37- 1.44 1.41	1.18- 1.28 1.23	1.27- 1.33 1.30	1.56- 1.63 1.60	2	4	3-4	8-11
K	5	13.4- 16.6 15.0	2.5- 2.9 2.7	2.7- 3.2 3.0	3.5- 3.9 3.7	7.7- 9.7 8.7	5.0- 5.9 5.5	1.33- 1.38 1.36	1.20- 1.29 1.25	1.43- 1.53 1.48	1.56- 1.64 1.60	2	4	3-4	16-18
L	1	12.3	2.3	2.6	3.3	7.3	4.5	1.46	1.24	1.37	1.61	2	4	3	12-13
M	2	13.0- 13.4 13.2	2.6	2.7- 2.8 2.8	3.5	7.9	4.6	1.35- 1.38 1.37	1.28- 1.29 1.29	1.31- 1.33 1.32	1.71	3-4	6	3-4	12-13

1: Provenance of specimens; **2**: Number of specimens studied; **3**: Total length, mm; **4**: Width of head, mm; **5**: Length of pronotum, mm; **6**: Width of pronotum, mm; **7**: Length of elytra, mm; **8**: Width of elytra, mm; **9**: Setae between eyes and neck; **10**: Setae on submentum; **11**: Setae on elytral interspace 3; **12**: Setae of marginal series;

WH - width of head; LP - length of pronotum; WP - width of pronotum; LE - length of elytra; WE - width of elytra.

A: *C. kryzhanovskii kryzhanovskii* (Kanding, type series); **B**: *C. kryzhanovskii kryzhanovskii* (Ka-Er-Sh-Shan, type series); **C**: *C. kryzhanovskii kryzhanovskii* (Tsheto-La, type series); **D**: *C. kryzhanovskii gyaisiensis* (Jiulong, type series); **E**: *C. potanini* (Khon-Chu-Ka, Spo-La, Tsa-Ma-La, type series); **F**: *C. impexus* (Muli, holotype); **G**: *C. impressus* (Yulong Shan, type series); **H**: *C. wittmeri* (Wengshui, type series); **I**: *C. salebrosus* (Xue Shan, type series); **J**: *C. quadraticollis quadraticollis* (Pauma Shan); **K**: *C. major taibaiensis* (Taibai Shan, type series); **L**: *C. kasantsevi* (Luoji Shan, holotype); **M**: *"Parapenetretus" reticulatus* (Khon-Chu-Ka, holotype, and Yajiang)

* The bottom line indicates average value

apomorphic character in the subfamily as a whole, its loss in this genus could be interpreted as a reversal. This character is shared by *Parapenetretus* (which normally possesses additional setae near eyes and on the sides of vertex) and could represent a proof of their relationship. On the other hand, supranumerary setae of submentum must probably be regarded as an apomorhic character within *Chinapenetretus*, independently emerging in several groups of Patrobine.

The complex most derived and remote from the W Sichuan dispersal centre, the *Apatrobus*-like group, possesses only two orbital setae and a single one in lateral gutter of pronotum, this character state being observed in several distal species of different oriental Patrobines, regarded as the latest derivatives of the respective groups. On the other hand, the most primitive male genital characters within the complex in question, i.e. simple apex of aedeagus and presence of single proximal copulatory piece in endophallus, are also characteristic of the *potanini* group. Other subgenera and species groups, attributed here or related to *Chinapenetretus*, show different stages of transition between two extreme cases of head chaetotaxy (*Parapenetretus*- and *Apatrobus*-like) and gradual complication of genital structures, accompained by some peculiar apomorphies (the latter being most pronounced in *Dimorphopatrobus* Casale & Sciaky, 1994).

Therefore, it looks now evident that each group of this complex combines some clearly plesiomorphic and some apomorphic characters, their ratio not correlating exactly with distance from the hypothesized dispersal centre. Thus, a correct estimation of the evolutionary state of each taxon is difficult to assess unequivocally; however, *Chinapenetretus* (the *potanini* group) still seems to be one of the most primitive within this complex, as it was pointed out earlier (ZAMOTAJLOV, 1992).

Table 2. Distribution and habitats of the Chinapenetrus species and subspecies

No.	**Species and subspecies**	**Subgenus and Species-Group**	**Distribution**	**Altitude, m**
1.	*C.kryzhanovskii* sp.n.	s.str., *potanini*	W, SW Sichuan	3000-4290
1.1.	*C. k. kryzhanovskii* ssp.n.	s.str., *potanini*	W Sichuan	3900-4290
1.2.	*C. k. gyaisiensis* ssp.n.	s.str, *potanini*	SW Sichuan	3000
2.	*C.potanini* Kurnakov,1963	s.str, *potanini*	W Sichunan	?
3.	*C.impexus* sp.n.	s.str, *potanini*	SW Sichuan	3500
4.	*C.yunnanus* (Fairmaire, 1886)	s.str, *potanini*	Yunnan	?
5.	*C.impressus* sp.n.	s.str, *potanini*	NW Yunnan	3500-4000
6.	*C.wittmeri* sp.n.	s.str, *potanini*	NW Yunnan	3500
7.	*C.salebrosus* sp.n.	s.str, *potanini*	NW Yunnan	4000-4700 m
8.	*C.quadraticollis* (Bates, 1891)	s.str, *quadraticollis*	W Sichuan	2500-4900
8.1.	*C.q.quadraticollis* (Bates, 1891)	s.str, *quadraticollis*	W Sichuan	4200-4900
8.2.	*C.q.gongga* (Zamotaljov & Sciaky, 1996)	s.str, *quadraticollis*	W Sichuan	2500-3500
9.	*C. major* Zamotaljov & Wrase, 1997	*Grandipenetrus*	Shaanxi:Qin Ling	2500-3300
9.1.	*C. m. major* Zamotaljov & Wrase, 1997	*Grandipenetrus*	Shaanxi:Qin Ling	2500-2600
9.1.	*C. m. taibalensis* ssp.n.	*Grandipenetrus*	Shaanxi:Qin Ling	2600-3300
10.	*C. xilinensis* Zamotaljov & Wrase, 1997	*Robustopenetrus*	C. Sichuan	1500
11.	*C. kasantsevi* sp.n.	*Robustopenetrus*	S. Sichuan	2200-2800
12.	*C.microphthalmus* (Fairmaire, 1888)	*Robustopenetrus*	Yunnan	?
13.	*C. heinzi* Zamotaljov & Wrase, 1997	*Tibetopenetrus*	E Tibet	3400-4900

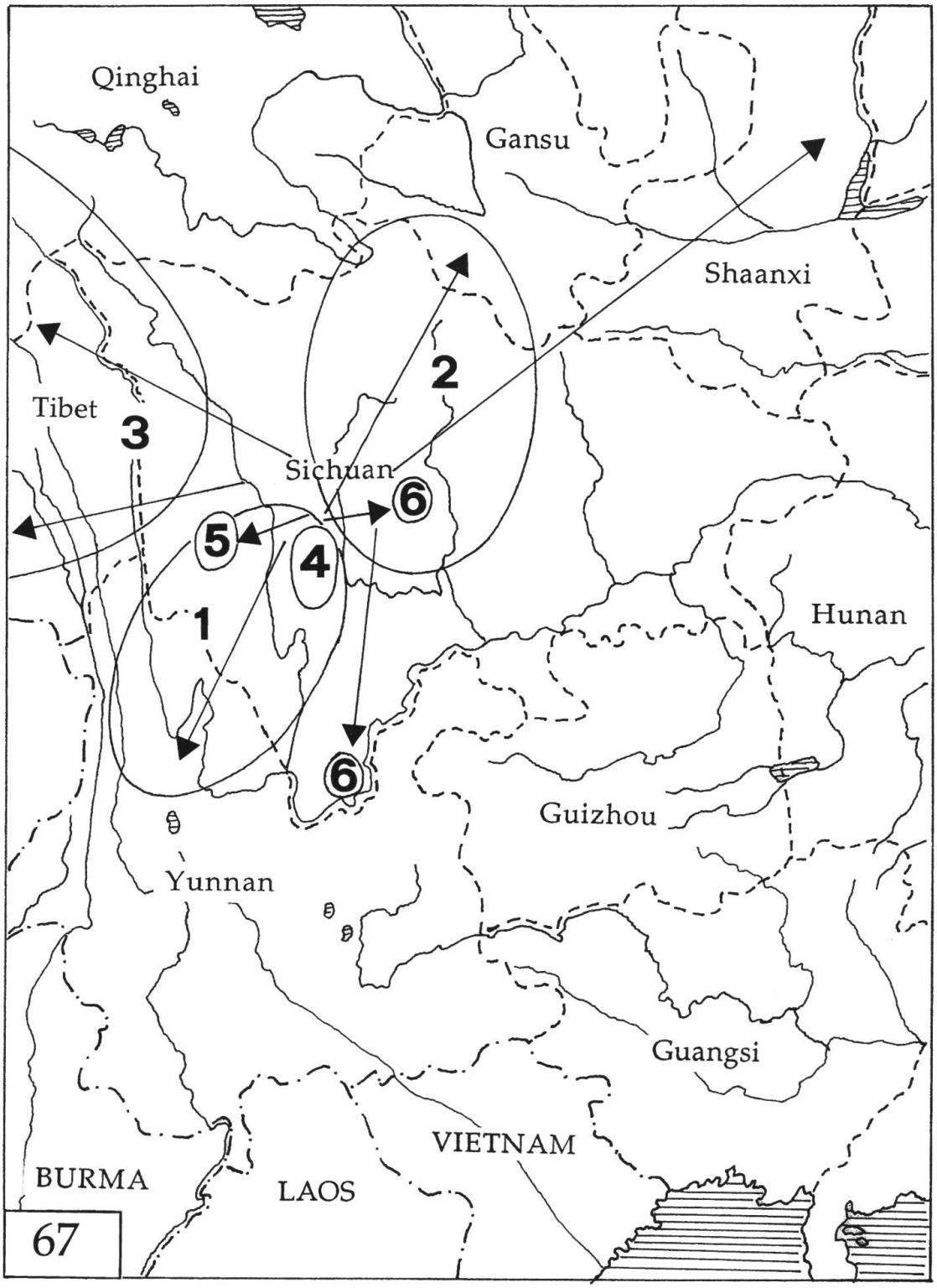


Fig. 67: General distribution of the genus *Chinapenetretus* and related groups and hypothesized pathways of their expansions in West China. 1, range of the *potanini* group. 2, range of the genus *Parapenetretus* Kurnakov. 3, range of the *Apatrobus*-like species. 4, range of the *quadraticollis* group. 5, range of *"Parapenetretus" reticulatus* Zamotajlov. 6, range of the subgenus *Robustopenetretus* n.

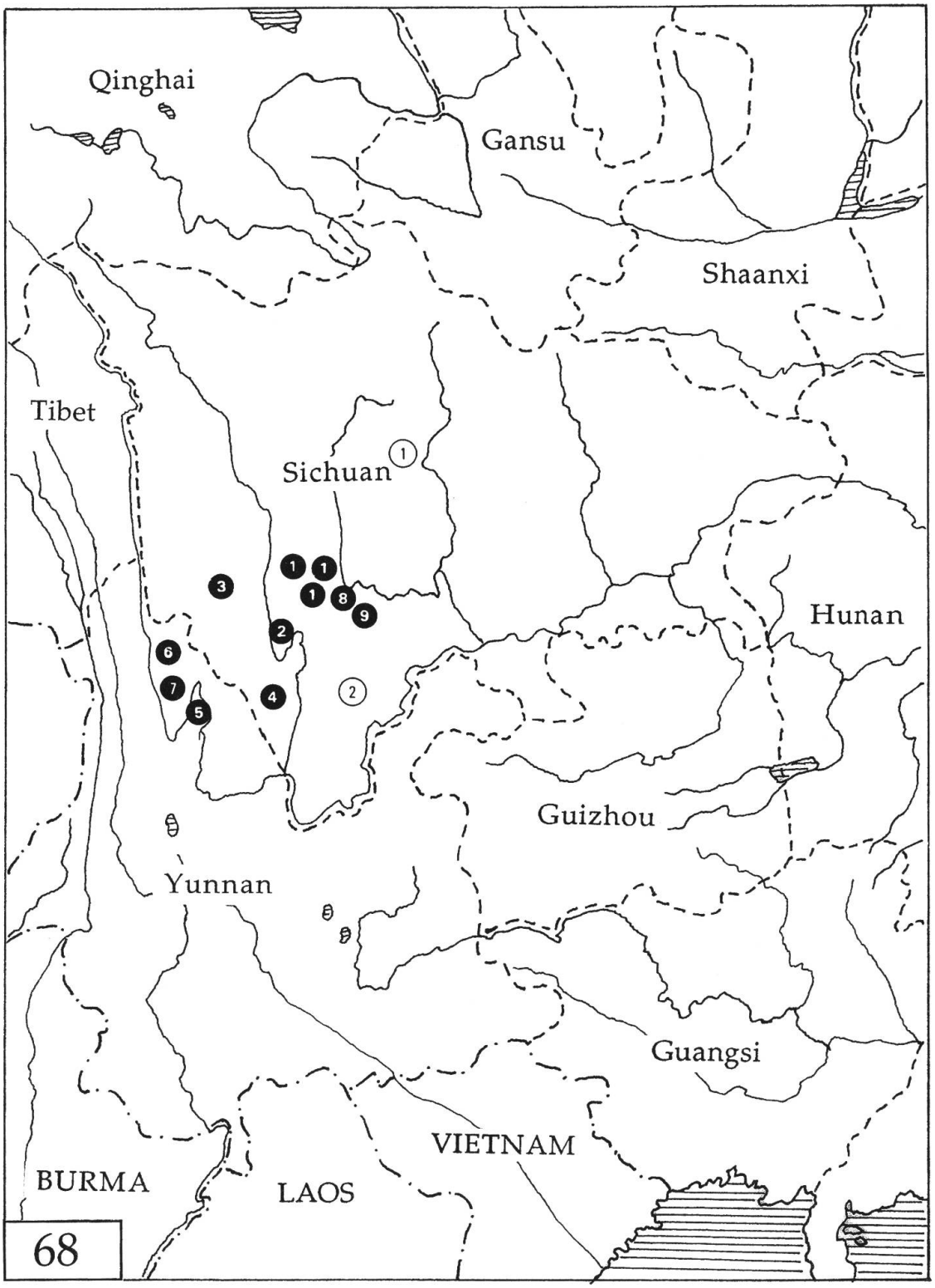


Fig. 68: Distribution of *Chinapenetretus* species and subspecies in West China. Black circles (*Chinapenetretus* s.str.): 1, *C. kryzhanovskii kryzhanovskii* ssp.n. 2, *C. kryzhanovskii gyaisiensis* ssp.n. 3, *C. potanini* Kurnakov. 4, *C. impexus* sp.n. 5, *C. impressus* sp.n. 6, *C. wittmeri* sp.n. 7, *C. salebrosus* sp.n. 8, *C. quadraticollis quadraticollis* (Bates). 9, *C. quadraticollis gongga* Zamotajlov & Sciaky. White circles (*Robustopenetretus* subgen.n.): 1, *C. xilinensis* Zamotajlov & Wrase. 2, *C. kasantsevi* sp.n.

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