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New taxa of the tribe Patrobini (Coleoptera, Carabidae) from the East Himalayas

A.S. ZAMOTAJLOV & D.W. WRASE

Abstract: *Indopatrobis* gen. nov. and *Propenetretus* subgen. nov. (genus *Parapenetretus*) from Sela Pass (NE India, W Arunachal Pradesh, E Himalayas) are described based on *I. bashtai* spec. nov. and *P. selaensis* spec. nov., respectively. Status of the newly described taxa is substantiated by the means of cladistic analysis and similarity measurements.

Key words: Coleoptera, Carabidae, Patrobini, new taxa, East Himalayas.

Introduction

The East Himalayan Patrobini form a markedly diverse and peculiar though not very species-rich assemblage of the genus-group taxa. Total number of known species is now only 10, whereas the nearby Tibetan fauna currently totals 23 species (ZAMOTAJLOV 2005). The overwhelming majority of species belongs to the phylogenetically well-separated genus *Deltomerodes* DEUVE 1992 (ZAMOTAJLOV 2002) and inhabits mainly the Nepal Himalayas. Precise phylogenetic and taxonomic position of some other taxa (*Butanopenetretus* ZAMOTAJLOV 1992, "*Apatrobis*" *sikkimensis* DEUVE & LEDOUX 1987) has not yet been ascertained due to the lack of the material. Thus any addition to the regional fauna of Patrobini is of principle importance. This paper is based on the material originating from Sela Pass (first record of Patrobini for Arunachal Pradesh), recently obtained by the authors. Both species collected appear to be new, their description as well as brief discussion of their phylogenetic position and zoogeographic significance are given below.

Material

Abbreviations used below for depositories of studied material are as follows:

AZ Coll. A. Zamotajlov (Krasnodar)

CB Coll. J. Bašta (Brno)

DW Coll. D.W. Wrase (Berlin)

NHMB Naturhistorisches Museum (Basel)

PB Coll. P. Bulirsch (Prague)

Methods

Both phylogenetic study and similarity measurements implemented below are based on the same dataset, which was used by us earlier (see ZAMOTAJLOV 2002) and includes 75 morphological characters. A newly constructed, expanded by 2 new groups, matrix was processed in WinClada (version 1.00.08) (NIXON 2002). Heuristic analysis with the search strategy "multiple tree bisection-reconnection branch-swapping" was applied. To estimate consistency of the clades found, Majority Rule Consensus tree has been obtained, basing on the entire set of calculated trees. Analysis of the taxa with ambiguity was implemented as well. Similarity measurements and cluster analysis were conducted by the aid of Biodiv (version 4.1) (BAEV & PENEV 1995), using Czekanowski-Dice-Sørensen index and different clustering methods. Mapping was carried out using Microsoft® Encarta® Interactive World Atlas 2000.

All specimens studied have been measured for the following parameters: total length of the body from the tips of the mandibles to the apex of the elytra; cephalic, pronotal, and elytral widths in the broadest parts; maximum pronotal length along the axis; elytral length from the anterior edge of the basal border to the apex along the axis. Microscopic technics correspond to the earlier described (ZAMOTAJLOV 2005).

Results

Indopatrobis gen. nov.

Type species: *Indopatrobis bashtai* spec. nov., herewith designated.

Diagnostic features: Possesses all key features of the tribe Patrobini. In robust, moderately convex body and subcordate pronotum resembles the most readily smaller individuals of *Parapatrobis* ZAMOTAJLOV 1992 or larger ones of *Minypatrobis* UENO 1955 (the *P. darlingtoni*-group), hind angles of pronotum denticulate also like in *Parapatrobis*. However, *Indopatrobis* gen. nov. is distinguishable from the first genus by several important features: different shape of mesepimeron which is slightly broadened inward, with median process deeply penetrating between meso- and metathorax (fig. 5), male protarsomere 2 distinctly larger than protarsomere 3 (in *Parapatrobis* much larger), latter nearly triangular (in *Parapatrobis* faintly transverse), protarsomere 4 faintly emarginate apically (in *Parapatrobis* strongly emarginate), by presence of ventral setae of tarsomere 5, absence of scutellar pore puncture of elytra, fully developed elytral striae, indistinct anterolateral apophyse of female tergite 8 (fig. 7), base of tergite faintly exceeding epitergite (in *Parapatrobis* strongly exceeding), short transverse keels of tergite 8 (in *Parapatrobis* long), apical lamella of aedeagus gutter-shaped and open dorsally (figs 9, 10) (in *Parapatrobis* simply elongate, with lateral keels), absence of pronounced distal sclerite of female reproductive tract (fig. 19), and many others. *Indopatrobis* gen. nov. differs from the *P. darlingtoni*-group, first of all, in comparatively larger body size*, normal, not conical, apical palpomere of maxillary palpus, proportions of male protarsomeres 2 and 3, different shape of protarsomere 4, presence of ventral setae of tarsomere 5, absence of scutellar pore puncture of elytra, different apical

* Detailed description of the corresponding character states of mentioned taxa see ZAMOTAJLOV 2002.

lamella of aedeagus, presence of well-developed proximal sclerite of endophallus, and normal, fully developed parameres. In absence of prominent sinuation of the lateral margin of pronotum and umbilicate series subdivided into 3 more or less prominent groups *Indopatrobos* gen. nov. is similar also to "*Apatrobos*" *sikkimensis* (DEUVE & LEDOUX), but differs (so far it is known)* in robust and much more convex body of smaller size, different size and location of hind supraorbital seta, different shape of protarsomere 4, presence of ventral setae of tarsomere 5, and absence of scutellar pore puncture of elytra.

Some peculiarities of aedeagus, i.e. inflated and strongly asymmetric tube, resemble that of the *P. echigonus*-group of *Apatrobos* HABU & BABA 1960 (inhabiting Honshu) and, particularly, the *P. yushanensis*-group of *Apenetretus* KURNAKOV 1960 (from Taiwan), however it is distinguishable from both of them by numerous morphological features, from the *P. echigonus*-group it differs, first of all, in different shape of mesepimeron, proportion of male protarsomeres 2 and 3, shape of protarsomere 4, absence of scutellar pore puncture, different shape of female tergite 8, and different apical lamella of aedeagus. From the *P. yushanensis*-group it differs in the same features of external morphology (female remaining unknown for us). Shape of aedeagal apex is nearly similar to "*Apatrobos*" *sikkimensis* (DEUVE & LEDOUX), however, the latter possesses much less sclerotized proximal copulatory piece, tube is not inflated, apical projections of parameres longer. Sclerites of female reproductive tract also resemble the *P. echigonus*-group and *Apenetretus* (only Japanese species of the *P. ambiguus*-group were available for study), from the latter it is distinguishable by different shape of mesepimeron, proportion of male protarsomeres 2 and 3, presence of ventral setae of tarsomere 5, absence of scutellar pore puncture of elytra, and different shape of female tergite 8.

Being a sister-group of *Platidiolus* CHAUDOIR, 1878 (see below), *Indopatrobos* gen. nov. is quite different externally, first of all, in larger and much more robust and convex body; besides it differs in the following important characters: absence of additional setae of antennomere 1 (normally), not conical apical palpomere of maxillary palpus, different shape of mentum (details see below), simple, not supernumerary, chaetotaxy of submentum, different shape of metepisternum, different shape of protarsomere 3, tarsi glabrous on upper surface, absence of scutellar pore puncture, different shape of apical lamella of aedeagus, and presence of proximal sclerite of endophallus.

Description: Body of medium size. Integument fully pigmented, dark, nearly monochromatic, without metallic lustre. Rather robust, with stout appendages.

Head normal; tempora well-developed, long; mandibles normal; antennomere 1 with single anterodorsal seta (exceptionally with a few minute additional setae), antennomere 2 with a corona of setae apically; apical palpomere of maxillar palpi broadest in the middle; mentum with deep furrows forming foveoles basally, mentum tooth with 2 setae subapically; submentum with 2 setiferous pores on each side; only 2 supraorbital setae present, hind one situated beside neck-constriction; tempora glabrous.

Disk of pronotum glabrous; lateral margin with 1 seta before its middle; median line simple; prothorax glabrous; suture separating mesepisternum and mesosternum (fig. 5) joins front edge of mesepimeron; latter narrow, slightly broadened laterally and hardly

* During previous study (examined 1 ♂, collection of G. Ledoux, Clamart, labelled "Sikkim Jalep Août 1901", "Paratype") some principle characters, utilized in the present analysis, remained unknown.

broadened inward, with median process deeply penetrating between meso- and metathorax, disjointed from middle coxal cavity by narrow area of meso- and metasternum; metepisternum short; front margin of metasternum near middle coxal cavities without swelling; inner side of profemur without tubercle; metatrochanter normal; male protarsomere 2 distinctly larger than protarsomere 3, latter longitudinal, protarsomere 4 faintly emarginate apically; tarsi glabrous on upper surface; tarsomere 5 with setae ventrally.

Elytra oblong-ovate, convex; scutellar pore puncture absent; elytral striae well-developed; setae arranged into discal series present only on interval 3.

Anterolateral apophyse of female tergite 8 indistinct (fig. 7), base of tergite hardly exceeding epitergite, longitudinal keels absent, transversal ones short, median sclerotization absent, both basal and apical longitudinal depigmentation absent; abdominal sternites glabrous.

Apical lamella of aedeagus long, gutter-shaped, open dorsally, membranous folders, bounding endophallus dorsally, not reaching as far as the aedeagal apex (figs. 9, 10); only proximal sclerotization of endophallus present; basal phlagellum absent; parameres fully developed, apical projections rather short, somewhat gradually tapering apically and pointed.

Distal sclerite of female reproductive tract indistinct or absent (fig. 19); bursal sclerite fine but well-developed, ovate; stylus with 1 seta subapically.

R e m a r k s : Cladistic analysis, based on both detruncated matrix, comprising taxa with all characters known (fig. 21), and complete dataset involving all groups (including units with ambiguity) (fig. 22) reveals that *Indopatrobus* gen. nov. represents an adelphotaxon of *Platidiolus*. This monophyletic group is observed at 84% of all resulting equally parsimonious trees, obtained during analysis without ambiguity. Results of the analysis with ambiguity permit to assume, that "*Apatrobus*" *sikkimensis* (DEUVE & LEDOUX) belongs to close clade, also comprising some Taiwanese and Japanese taxa.

Similarity dendrograms obtained by different clustering methods (UPGMA, WPGMA, complete linkage, example see fig. 24) possess a stable congregation comprising known species-groups of *Minypatrobus* and *Indopatrobus* gen. nov., the latter always occupies a position basal to other taxa.

It is noteworthy to report *Indopatrobus* gen. nov. does not share a remarkable feature of *Platidiolus*, namely the extremely large and deep foveoles of mentum (Character 18, State 1, after ZAMOTAJLOV 2002), however obviously approaches this character state. Thus, basing on all available evidence, *Indopatrobus* gen. nov. must be treated as different genus close to *Minypatrobus* and *Platidiolus*.

E t y m o l o g y : The generic epithet is derived from India, housing the state Arunachal Pradesh, where the Sela Pass (type locality of *Indopatrobus bashtai* spec. nov.) is situated.

***Indopatrobus bashtai* spec. nov. (figs 1, 3, 5, 7, 9-13, 19)**

Type material: Holotype ♂ (DW): NE India, W Arunachal Pradesh, Sela Pass, SE of Tawang, 27°30' N 92°06' E, 4200-4400 m, 29.-31.V.2004, R. Businský. **Paratypes:** 8♂♂, 8♀♀ (JB), 2♂♂, 2♀♀ (DW), 2♂♂, 2♀♀ (AZ), 2♂♂ (PB), same locality, together with holotype. 22♂♂, 12♀♀ (NHMB), 5♂♂, 2♀♀ (DW), 5♂♂, 2♀♀ (AZ), same locality but: 4400 m, 31.V.2004, L. Dembický.

Description: Habitus as in fig. 1. Body dark brown to nearly black, shiny, sutural area of elytra often somewhat paler, antennae, mandibles, and legs dark brown to brown, palpi reddish-brown. Total length 7.3-9.1 mm.

Head broad, ovate, 0.71-0.77 times wider than pronotum; eyes rather large, weakly convex; tempora longer than eye diameter, moderately to weakly tumid; neck-constriction moderately deep; frontal furrows rather deep, moderately divergent and broadened posteriorly, forming 2 shallow but distinct foveoles at vertex; surface mostly smooth, somewhat wrinkled-punctate in frontal furrows only, neck-constriction with rather fine and sparse punctures; 2 setiferous pores punctures present on each side, anterior one situated in supraorbital groove at mid-eye level, and posterior, represented as a large setiferous foveole, beside neck-constriction; besides the long anterodorsal seta antennomere 1 seldom bears 1-3 additional minute setae; tooth of mentum without peculiarities, bifid (fig. 3), epilobes narrow, median area of mentum strongly elevated, lateral lobes separated from it by deep furrows, forming basally distinct pore-like foveoles, submentum with 2 setae on each side.

Pronotum transverse, subcordate, 1.18-1.28 times wider than long, moderately convex; front margin almost straight to faintly rounded; sides widely rounded, arcuate almost from front to hind angles, with narrow explanate margin; basal margin usually nearly straight, seldom strongly rounded; front angles distinct, hardly projecting anteriorly, angulately rounded; hind angles obtuse, pointed, indistinctly to prominently denticulate, basal carina absent; anterior transverse impression shallow, finely and sparsely punctate; basal foveae small, rather shallow, rugous and finely punctate; disk faintly wrinkled to smooth, rugous-punctured in basal area, median line obliterated anteriorly and indistinct amongst basal puncturation; 1 marginal setae, basal seta present in hind angles.

Front margin of metasternum narrowly bordered; pro- and mesepisterna, mesosternum densely and coarsely punctate, punctures being large and rather deep, metepisterna and lateral sides of metasternum covered by similarly large but much sparser and smoothed punctures, median area of metasternum smooth, lateral areas of sternites 1 and 2 (urites 3 and 4) coarsely rugous-punctured, other sternites finely and smoothly wrinkled. Metatarsomere 5 with 2-3 setae beneath.

Elytra oblong-ovate, 1.53-1.59 times longer than wide and 1.37-1.46 times wider than pronotum, widest in apical one-third, contracting both anteriorly and posteriorly, strongly convex; sides rounded, narrowly bordered, margin gradually tapering behind; humeri rather broad and prominent, roundly angulate and markedly denticulate; striae distinct, basally rather coarsely punctate; intervals faintly convex, interval 3 with 3, seldom 2 setiferous pore punctures adjoining stria 3; marginal series highly variable in number of pores and extent of reduction of setae, composed of 6-11 large umbilicate pores, forming 3 more or less distinct groups, basal (2-5), median (0-1), and apical (3-6); microsculpture composed of fine transverse wrinkles and nearly isodiametric meshes, intervals rather densely covered by fine and sparse microscopic punctures. Hind wings reduced.

Aedeagus (figs 9, 10) sharply bent at base, tube somewhat inflated and curved medially, strongly asymmetric; apical lamella flattened dorso-ventrally, nearly straight, hardly curved ventrally at very apex, faintly reflexed and tuberculate dorsally (viewed laterally), gradually attenuating towards apex (viewed dorsally); armature of endophallus composed of rather large poorly sclerotized bilobed proximal copulatory piece, its distal ending gradually transforming to membranous folded structures; left paramere (fig. 11) larger

than right one (fig. 12), their apical projections short to rather long, gradually tapering towards apex bearing 2-4 (usually 3) long apical and 0-2 minute to rather long subapical setae. ♂ ventrite 9 as in fig. 13.

Female reproductive tract as in fig. 19; pronounced distal sclerite of female reproductive tract absent, membranous folders between gonocoxites 1 (gonobasis) near gonocoxal ramus only with some traces of sclerotization; bursal sclerite rather small and very fine, even distinct, ovate, ca. 0.4 mm in diameter.

E t y m o l o g y : The genitive patronym honors our colleague and friend Jaroslav Bašta (Brno) for providing the interesting and important material of Patrobini this paper deals with.

***Parapenetretus* KURNAKOV**

KURNAKOV 1960: 274 (*Penetretus* subgenus). Type species *Deltomerus szetschuanus* JEDLIČKA 1959.

KURNAKOV 1963: 411 (*Penetretus* subgenus).

ZAMOTAJLOV 1992: 260; 2002: 115; 2003: 284; 2005: 192.

ZAMOTAJLOV & SCIACKY 1996: 5.

LORENZ 1998: 226.

***Propenetretus* subgen. nov.**

Type species: *Parapenetretus selaensis* spec. nov., herewith designated.

D i a g n o s t i c f e a t u r e s : In its main features agrees with species of the genus *Parapenetretus*, being the most similar habitually to *P. (Ambigopenetretus) shimianensis* ZAMOTAJLOV from Sichuan. However, *Propenetretus* subgen. nov. is easily distinguishable from *Parapenetretus* (s. str.), *Butanopenetretus*, the bulk of *Robustopenetretus*-species, and *P. reticulatus* ZAMOTAJLOV by presence of only 2 (very seldom 3) supraorbital setae on each side of head. In this respect it resembles *Ambigopenetretus*-species and some species of *Robustopenetretus*. From the first subgenus it differs in polysetose lateral margin of pronotum, longer mesepisternum (fig. 6), absence of ventral setae of tarsomere 5, different shape of female tergite 8 (fig. 8), male and female genitalia. From the latter it differs, first of all, in its more slender body, head with much less developed puncturation and rugosity, and longer mesepisternum. From all hitherto described subgenera and groups of *Parapenetretus*, *Propenetretus* subgen. nov. differs in less cordate pronotum and more elongate, possessing lateral keels, apical lamella of aedeagus (only *P. reticulatus* ZAMOTAJLOV known upon female being unstudied in the latter respect) (figs 14, 15). In habitus strongly resembles also "*Apatrobus*" *sikkimensis* (DEUVE & LEDOUX), however, larger in average, body more slender, hind supraorbital seta located closer to neck-constriction, pore puncture larger, lateral margin of pronotum polysetose (in "*Apatrobus*" *sikkimensis* bears single seta), marginal series of elytra not forming distinct groups (in "*Apatrobus*" *sikkimensis* composed of 3 more or less distinctly separated groups, formula of series being 2 + 1 + 6), shape of apical lamella of aedeagus (see figs 14, 15) different, elongate, with lateral keels (in "*Apatrobus*" *sikkimensis* gutter-shaped and open dorsally). Aedeagus resembles the most closely that of *Parapatrobus brancuccii* (ZAMOTAJLOV), however, smaller, apical protuberance much longer, apical lamella broader (viewed laterally), not twisted leftward (viewed dorsally), proximal copulatory piece smaller, of different structure, apical projections of parameres shorter in

average. Being manifestly different in general appearance, it is distinguishable also in numerous important details of external morphology: lateral margin of pronotum polysetose, suture separating mesepisternum and mesosternum (fig. 6) joins lateral margin of metathorax, mesepimeron of different shape, only slightly broadened inward, mesepisternum longer, front margin of metathorax near middle coxal cavities valliculiform, male protarsomere 2 smaller than protarsomere 3 than in *Parapatrobis brancuccii*, latter nearly longitudinal, anterolateral apophyse of female tergite 8 indistinct (fig. 8), base of tergite moderately exceeding epitergite, etc. Elongate, complicated bursal sclerite and presence of distal sclerite of female reproductive tract outwardly resemble the *P. hikisanus*-group and the *P. hayachinensis*-group of *Apatrobis* from Japan, however, *Propenetretus* subgen. nov. differs from them in the same features as other subgenera of *Parapenetretus* (see key by ZAMOTAJLOV 2002).

Description: Body of medium size. Integument fully pigmented, dark, nearly monochromatic, without metallic lustre. Rather slender, with elongate appendages.

Head normal; tempora well-developed, long; mandibles normal; antennomere 1 with single anterodorsal seta (exceptionally with a few minute additional setae), antennomere 2 with a corona of setae apically; apical palpomere of maxillar palpi broadest in the middle; mentum (fig. 4) with moderately deep furrows, mentum tooth with 2 setae subapically; submentum with 2 setiferous pores on each side; only 2 (exceptionally 3) supra-orbital setae present, hind one situated beside neck-constriction; tempora glabrous.

Disk of pronotum glabrous; lateral margin before its middle polysetose (usually with 2 seta); median line simple; prothorax glabrous; suture separating mesepisternum and mesosternum (fig. 6) joins lateral margin of metasternum; mesepimeron narrow, slightly broadened laterally and hardly broadened inward, without median process penetrating between meso- and metathorax, disjointed from middle coxal cavity by rather broad area of meso- and metasternum; metepisternum rather long and narrow; front margin of metasternum near middle coxal cavities valliculiform (see fig. 6); inner side of profemur without tubercle; metatrochanter normal; male protarsomere 2 distinctly larger than protarsomere 3, latter longitudinal, protarsomere 4 strongly emarginate apically, bilobed; tarsi glabrous on upper surface; tarsomere 5 glabrous ventrally.

Elytra elongate, somewhat depressed; scutellar pore puncture present; elytral striae well-developed; setae arranged into discal series present only on interval 3.

Anterolateral apophyse of female tergite 8 indistinct (fig. 8), base of tergite moderately exceeding epitergite, longitudinal keels absent, transversal ones long, median sclerotization absent, both basal and apical longitudinal depigmentation absent; abdominal sternites glabrous.

Apical lamella of aedeagus moderately elongate, with lateral keels (figs 14, 15); only proximal sclerotization of endophallus present; basal phlagellum absent; parameres fully developed, apical projections rather short, somewhat gradually tapering apically and pointed.

Distal sclerite of female reproductive tract present (fig. 20); bursal sclerite well-developed, asymmetric; stylus with 1 seta subapically.

Remarks: Judging from the bulk of characters known, *Propenetretus* subgen. nov. must be undoubtedly placed close to other taxa of the genus *Parapenetretus*. Cladistic analysis, based on the detruncated matrix comprising taxa with all characters known,

proves its affiliation with the other groups of *Parapenetretus* (fig. 21) (tree remained unresolved as concerns relationships of *Ambigopenetretus* and *Propenetretus* subgen. nov.). This monophyletic group of *Parapenetretus* taxa is observed at 100% of all resulting equally parsimonious trees. Analysis involving all groups (including units with ambiguity) (fig. 23) reveals that *Propenetretus* subgen. nov. represents an adelphotaxon of the entire complex of the known groups of *Parapenetretus*.

Similarity dendrograms obtained by different clustering methods (UPGMA, WPGMA, single linkage, complete linkage, etc., example see fig. 24) possess a stable congregation comprising all groups of *Parapenetretus* and *Propenetretus* subgen. nov., the latter always occupies a position basal to other taxa.

Thus, basing on both phylogenetic and phenetic analysis, in spite of some pronounced habitual differences, above described taxon must be attributed to the genus *Parapenetretus*, though deserves separation as a different subgenus.

E t y m o l o g y : The subgeneric epithet refers to the phylogenetic position of this subgenus, basal to other subgenera of *Parapenetretus*.

***Parapenetretus (Propenetretus) selaensis* spec. nov. (figs 2, 4, 6, 8, 14-18, 20)**

T y p e m a t e r i a l : Holotype: ♂ (DW), NE India, W Arunachal Pradesh, Sela Pass, SE of Tawang, 27°30'N 92°06'E, 4200-4400 m, 29.-31.V.2004, R. Businský. Paratypes: 4♂♂, 2♀♀ (JB), 1♂ (DW), 1♂, 2♀♀ (AZ), 3♂♂, 2♀♀ (PB), same locality, together with holotype. 11♂♂, 17♀♀ (NHMB), 3♂♂, 4♀♀ (DW), 2♂♂, 4♀♀ (AZ), same locality but: 4400 m, 31.V.2004, L. Dembický.

D e s c r i p t i o n : Habitus as in fig. 2. Body dark brown, shiny, antennae, mandibles, and legs brown, palpi brown to reddish-brown. Slender, with long appendages. Total length 9.7-11.2 mm.

Head ovate, 0.78-0.82 times wider than pronotum; eyes rather large, moderately convex; tempora about as long as eye diameter, moderately to faintly tumid; neck-constriction deep; frontal furrows rather deep, moderately divergent posteriad; surface mostly smooth, densely punctate in frontal furrows, neck-constriction finely and sparsely punctate; 2, very seldom 3 setiferous pore punctures present on each side, anterior one situated in supraorbital groove nearly at mid-eye level, median (present in 1 ex. only) between posterior margin of eye and neck constriction, and posterior, represented as a rather large setiferous foveole, beside neck-constriction; besides long anterodorsal seta antennomere 1 seldom bears 1-2 additional minute setae; tooth of mentum without peculiarities, bifid (fig. 4), epilobes narrow, median area of mentum moderately elevated, lateral lobes separated from it by rather deep oblique furrows, submentum with 2 setae on each side.

Pronotum transverse, cordate, 1.25-1.38 times wider than long, weakly convex; front margin almost straight; sides widely rounded, weakly sinuate just before hind angles, with rather broad explanate margin; basal margin nearly straight to weakly rounded; front angles distinct, strongly projecting anteriad, rounded; hind angles usually obtuse, seldom rectangular, pointed, more or less distinctly denticulate, basal carina absent; anterior transverse impression rather deep to shallow, coarsely punctate; basal foveae rather deep, densely and coarsely punctured; disk faintly wrinkled to smooth, coarsely punctate in basal area and lateral gutters, median line obliterated at both extremities; 2 marginal setae (seldom 3), basal seta present in hind angles.

Front margin of metasternum with prominent swelling; pro- and metepisterna, lateral sides of metasternum densely and rather smoothly punctured, punctures being of medium size, mesosternum and mesepisterna covered by more or less dense, large, sharp punctures, lateral areas of sternite 1 (urite 3) rugous-punctured, other sternites almost smooth, finely wrinkled.

Elytra oblong-ovate, 1.53-1.59 times longer than wide and 1.41-1.52 times wider than pronotum, widest in the middle, weakly convex; sides somewhat rounded, narrowly bordered, margin gradually tapering behind; humeri rather narrow but prominent, rounded and indistinctly denticulate; striae deep and distinct, basally finely punctured; intervals weakly convex, interval 3 with 3-4 setiferous pore punctures adjoining stria 3; marginal series composed of 12-16 small setiferous pore punctures, rarefied in the middle; microsculpture composed of fine transverse meshes and wrinkles and very sparse and fine microscopic puncturation. Hind wings reduced.

Aedeagus (figs 14, 15) sharply bent at base; apical lamella moderately curved ventrally (viewed laterally), rather sharply attenuating towards apex, which is narrowly rounded to nearly pointed (viewed dorsally), with long horn-shaped protuberance on the right side dorsally; armature of endophallus composed of large poorly sclerotized bilobed proximal copulatory piece, its distal ending gradually transforming to membranous folded structures; left paramere (fig. 16) larger than right one (fig. 17), their apical projections rather short but distinct, bearing 2-3 long apical and 0-3 smaller or minute subapical setae. ♂ ventrite 9 as in fig. 18.

Female reproductive tract as in fig. 20; distal sclerite of female reproductive tract large, of regular symmetric shape; bursal sclerite large, elongate, of complicated irregular shape, its length at maximum diameter ca. 1.1 mm.

E t y m o l o g y : The specific epithet refers to the name of locality where this species was collected, the Sela Pass.

Discussion

Direct faunogenetic connections of the East Himalayan Patrobini with some Taiwanese, Japanese, and even boreal Siberian taxa were proposed by us earlier, basing on the phylogenetic and component analysis of the entire subfamily Patrobinae (ZAMOTAJLOV 2005). Phylogenetic position of the above described *Indopatrobis bashtai* spec. nov. also supports this hypothesis and testifies to the important role of the East Himalayas in the phylogenesis of the tribe in question. On the other hand, presence of the second *Parapenetretus*-species in the East Himalayas, namely *P. selaensis* spec. nov., proves correct affiliation of this zoogeographic unit to so called "East Asian Center" of dispersal of patrobines (this genus being the most abundant in Sichuan zoogeographic province). Still distribution of non-*Deltomerodes* patrobines in the East Himalayas is studied quite insufficient (see map 1). Lengthy territorial gaps may be later filled by quite unexpected species. The only regularity observed by now seems to be stable association of all known species with peripheral ranges of the Lesser Himalayas (Black Mountains in Bhutan,

etc.), neither one being known from the Great Himalayas*. Different taxa, inhabiting this territory, in the moment demonstrate a kind of unordered "mixture" of several phylogenetically important characters. It could reflect probable important contribution of the East Himalayas to an initial radiation of the tribe Patrobini. Being, as many other patrobines, true cryophile hypsobiont, *Indopatrobis bashtai* spec. nov. seems to bear some features peculiar to different life form, however, we have no yet enough material for more concrete assumptions.

Consequently, this work contributed little in way of precision of the taxonomic position of the somewhat enigmatic "*Apatrobis*" *sikkimensis* (DEUVE & LEDOUX). It may be nearly equally probably attributed either to the grouping (clade), including *Parapatrobis*-, *Apatrobis*-, *Apenetretus*-, *Minypatrobis*-, and *Platidiolus*-species (basing on the cladistic analysis with ambiguous groups) or to *Parapenetretus*-like taxa (differences between them being rather slight at the present level of knowledge).

Anyway, the East Himalayas appear to be very promising in solution of numerous problems still existing in taxonomy and phylogeny of Patrobini.

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Zusammenfassung

Aufgrund der Auswertung von wichtigen Körpermerkmalen und fußend auf cladistischen Analysen werden aus dem Ost-Himalaya (Nordost-Indien, West-Arunachal Pradesh, Sela Pass) eine neue Gattung und eine neue Untergattung aus der Tribus Patrobini beschrieben: *Indopatrobis* gen. nov. (Typus-Art: *I. bashtai* spec. nov.) und *Propenetretus* subgen. nov. (Gattung *Parapenetretus*; Typus-Art: *P. selaensis* spec. nov.).

Резюме

На основании изучения признаков внешней морфологии, реконструкции филогенеза и расчета показателей сходства описываются новый род и подрод трибы Patrobini из Восточных Гималаев (Северо-восточная Индия, Западный Арунчал Прадеш, перевал Села): *Indopatrobis* gen. nov. (типовой вид *I. bashtai* spec. nov.) и *Propenetretus* subgen. nov. (род *Parapenetretus*, типовой вид *P. selaensis* spec. nov.).

* The northernmost of all known E Himalayan species, *Parapatrobis brancuccii* (ZAMOTAJLOV), was described from "Kidiphu Forest" in Bhutan. This name is an erroneous spelling of the forest nearby Lame Gompa, slopes of Mountain Range Kiki-phu (4133 m) in C Bhutan, W of Jakar Dzong (GODI 1995).

References

- BAEV P.V. & L.D. PENEV (1995): Biodiv. Program for calculating biological diversity parameters, similarity, niche overlap and cluster analysis. Version 5.1. — Sofia-Moscow: Pensoft: 1-42.
- CHAUDOIR M. DE (1878): Description de genres nouveaux et d'espèces inédites de la famille des carabiques. — Bulletin de la Société Impériale des Naturalistes de Moscou **53** (3): 1-80.
- DEUVE T. (1992): *Deltomerodes memorabilis* n. gen., n. sp., carabique Patrobinae des hautes montagnes de Yunnan. — Revue Française d'Entomologie **14**: 82.
- DEUVE T. & G. LEDOUX (1987): Description d'un nouveau Patrobinae de l'Himalaya (Col., Trechidae). — Nouvelle Revue d'Entomologie (N.S.) **4**: 258.
- GODI N. (1995): The conifer forests of Lame Gompa research forest Bumthang, Bhutan (Report). — Lame Gompa: 1-74.
- HABU A. & K. BABA (1960): A new species of *Patrobis* from mts. Iide, with the key to the *Patrobis*-species of Japan (Coleoptera, Carabidae). — Akitu **9**: 1-10.
- JEDLIČKA A. (1959): Weitere Neuigkeiten aus den Sammlungen des Museums G. Frey in Tutzing (Coleoptera-Carabidae). — Entomologische Arbeiten aus dem Museum G. Frey **10**: 515-522.
- KURNAKOV V.N. (1960): Contribution à la faune des carabiques du Caucase. 2, Description de nouveaux *Deltomerus* du Caucase et note préliminaire sur la systématique des Deltomerini. — Revue Française d'Entomologie **27**: 267-277.
- KURNAKOV V.N. (1963): New species of the tribe Deltomerini (Coleoptera, Carabidae) from China. — Entomologicheskoe Obozrenie **42**: 410-414. [In Russian].
- LORENZ W. (1998): Nomina Carabidarum. A directory of the scientific names of ground beetles (Insecta Coleoptera „Geodephaga”: Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae). 1st ed. — Tutzing: W. Lorenz, iv + 937 pp.
- NIXON K.C. (2002): WinClada ver. 1.00.08. — Ithaca, New York: K.C. Nixon.
- UENO S.I. (1955): *Minypatrobis darlingtoni* (new genus and new species), a notable addition to the Carabid-fauna of Japan. — Memoirs of the College of Science, University of Kyoto (Series B) **22**: 51-56.
- ZAMOTAJLOV A.S. (1992): Notes on classification of the subfamily Patrobinae (Coleoptera, Carabidae) of the Palaearctic Region with description of new taxa. — Mitteilungen der Schweizerischen Entomologischen Gesellschaft **65**: 251-281.
- ZAMOTAJLOV A.S. (2002): Inferring phylogenetic system of the carabid subfamily Patrobinae (Coleoptera, Carabidae). — St-Petersburg: Zoological Institute of Russian Academy of Sciences (Meetings in memory N.A. Chlodkovsky; Iss. 55): 1-145. [In Russian].
- ZAMOTAJLOV A.S. (2003): Tribe Patrobini KIRBY, 1837, pp. 21-22, 280-286. — In: LÖBL I. & A. SMETANA (eds), Catalogue of Palaearctic Coleoptera. Vol. **1**. — Stenstrup: Apollo Books: 1-819.
- ZAMOTAJLOV A.S. (2005): Geographic and ecological evolution of the carabid subfamily Patrobinae (Coleoptera, Carabidae). — Maykop: Adygei State University Publishers: 1-208. [In Russian].
- ZAMOTAJLOV A. & R. SCIACKY (1996): Contribution to the knowledge of Patrobinae (Coleoptera, Carabidae) from south-east Asia. — Coleoptera **20**: 1-63.

Author's addresses: Prof. Dr. Alexandr S. ZAMOTAJLOV
Kuban State Agrarian University
ul. Kalinina 13, 350044 Krasnodar, Russia
E-Mail: kubento@mail333.com; a_zamotajlov@mail.ru.

David W. WRASE
Dunckerstr. 78, D-10437 Berlin, Germany
E-Mail: carterus@gmx.de.

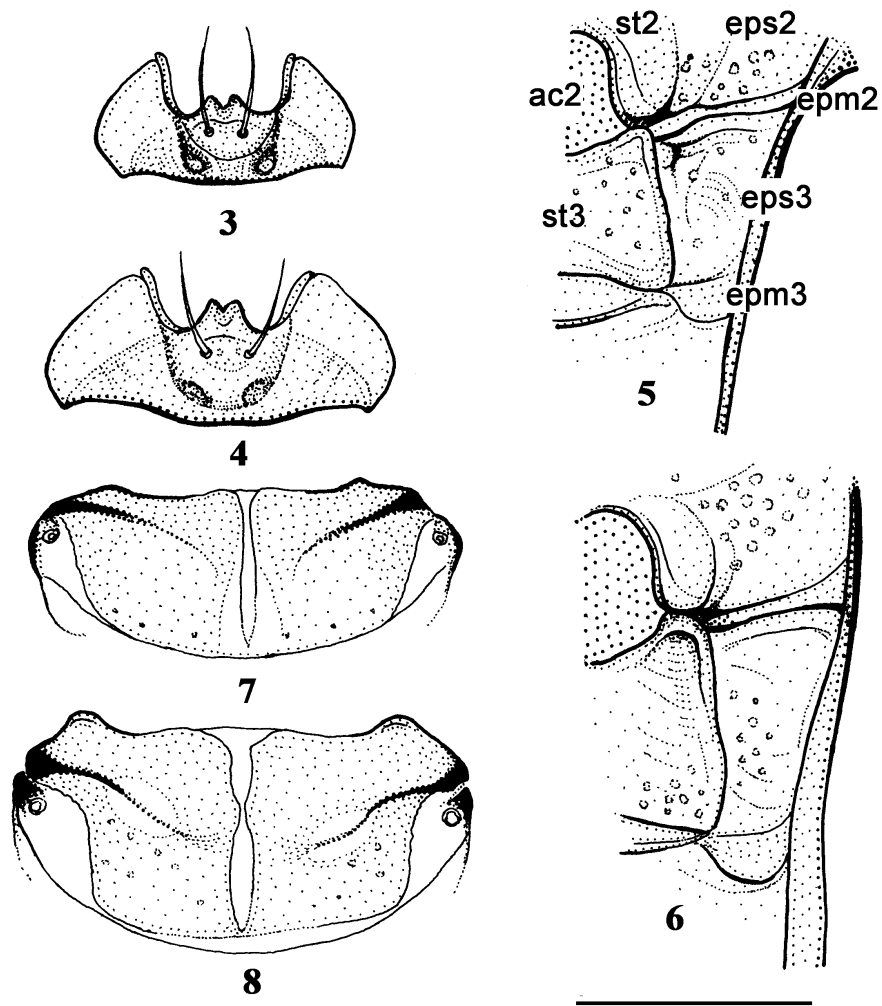


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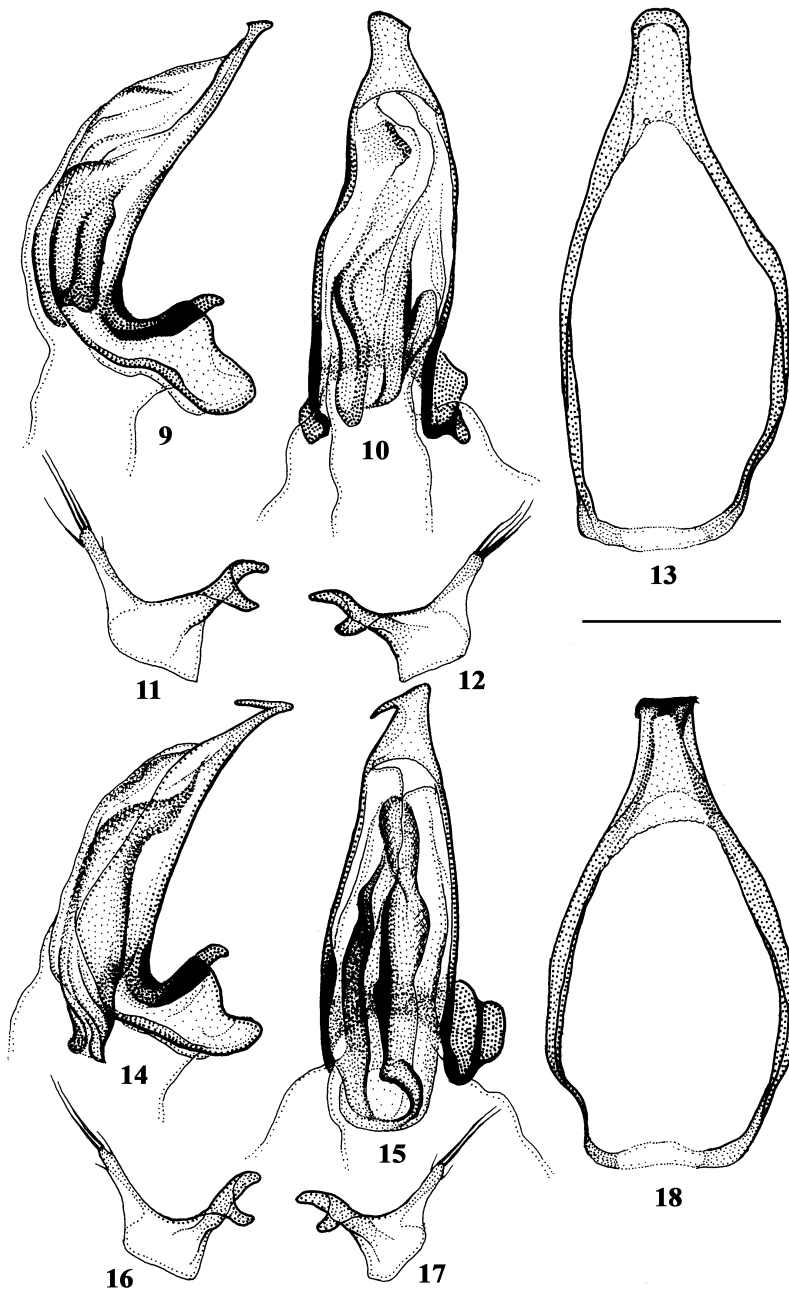


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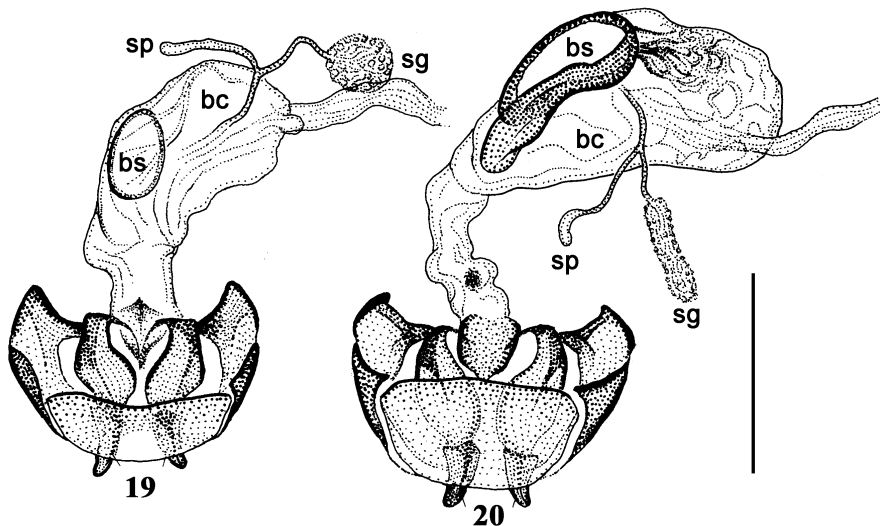
Figs 1-2: Patrobini, general view. *Indopatrobus bashtai* spec. nov., paratype, ♂ (1). *Parapenetretus selaensis* spec. nov., paratype, ♂ (2).



Figs 3-8: Patrobini, details of external morphology (3-4 - mentum, dorsal view, 5-6 - lateral part of thorax, lateroventral view, 7-8 - female tergite 8, dorsal view, **ac2** - middle coxal cavity, **epm2** - mesepimeron, **epm3** - metepimeron, **eps2** - mesepisternum, **eps3** - metepisternum, **st2** - mesosternum, **st3** - metasternum). *Indopatrobis bashtai* spec. nov., paratype, ♀ (3, 5, 7). *Parapenetretus selaensis* spec. nov., paratype, ♀ (4, 6, 8). Scale bar: 1 mm.



Figs 9-18: Patrobini, male genitalia (**9, 14** - aedeagus, left lateral view, **10, 15** - aedeagus, dorsal view, **11, 16** - left paramere, left lateral view, **12, 17** - right paramere, right lateral view, **13, 18** - ♂ ventrite 9, dorsal view). *Indopatrobis bashtai* spec. nov., paratype, ♂ (**9-13**). *Parapenetretus selaensis* spec. nov., paratype, ♂ (**14-18**). Scale bar: 1 mm.



Figs 19-20: Patrobini, ♀ reproductive tract (**bc** - bursa copulatrix, **bs** - bursal sclerite, **sg** - spermathecal gland, **sp** - spermatheca). *Indopatrobus bashtai* spec. nov., paratype, ♀ (**19**). *Parapenetretus selaensis* spec. nov., paratype, ♀ (**20**). Scale bar: 1 mm.

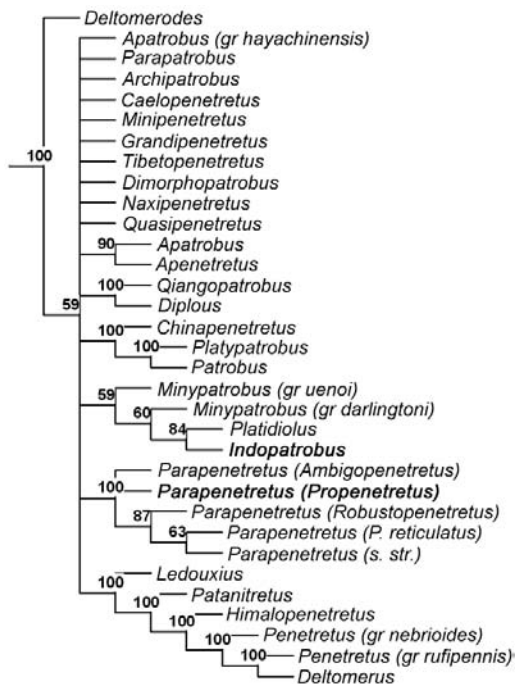


Fig. 21: Simplified majority rule consensus cladogram of the tribe Patrobini, including *Indopatrobus* gen. nov. and *Propenetretus* subgen. nov. Length=297, CI=0,29, RI=0,71. Numbers are the percentage of coincidence.

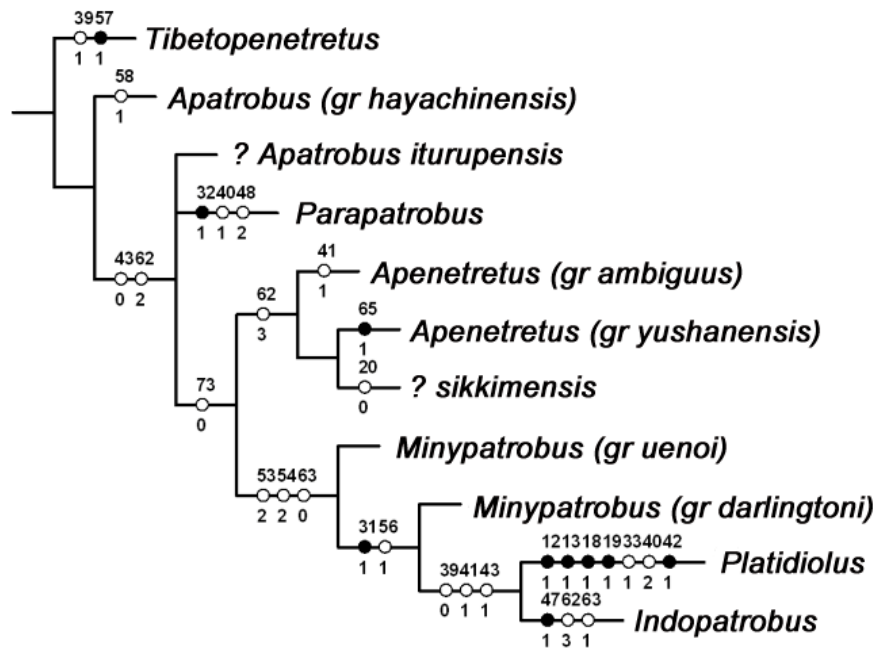


Fig. 22: Reconstruction of possible phylogeny of the *Indopatrobis*-branch on one of the most parsimonious trees of Patrobini including units with ambiguity. Length=342, CI=0,26, RI=0,66. White circles indicate homoplasies, black circles indicate aut- or synapomorphies, character numbers indicated above lines, character states below lines (numbers expansion s. ZAMOTAJLOV 2002).

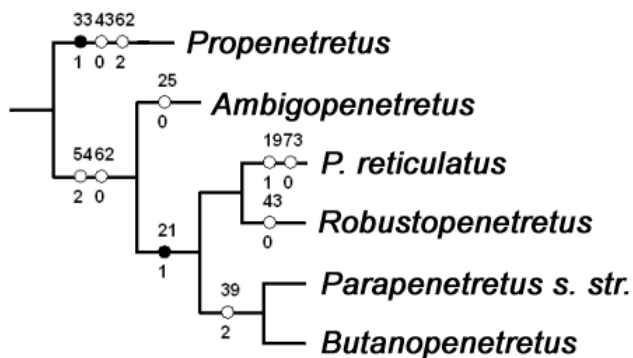


Fig. 23: Reconstruction of possible phylogeny of the genus *Parapenetretus* on one of the most parsimonious trees of Patrobini including units with ambiguity. Length=342, CI=0,26, RI=0,66. White circles indicate homoplasies, black circles indicate aut- or synapomorphies, character numbers indicated above lines, character states below lines (numbers expansion s. ZAMOTAJLOV 2002).

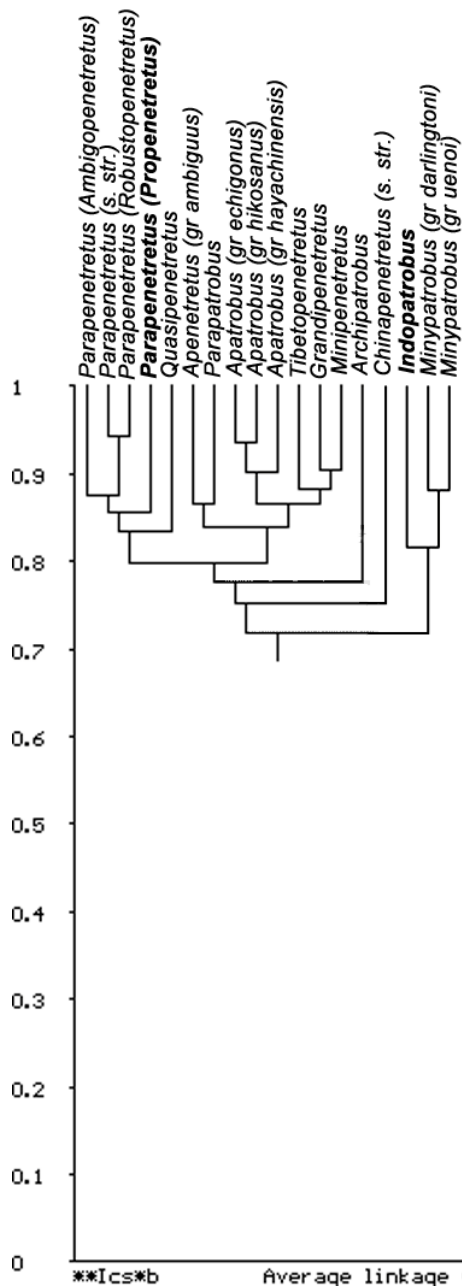
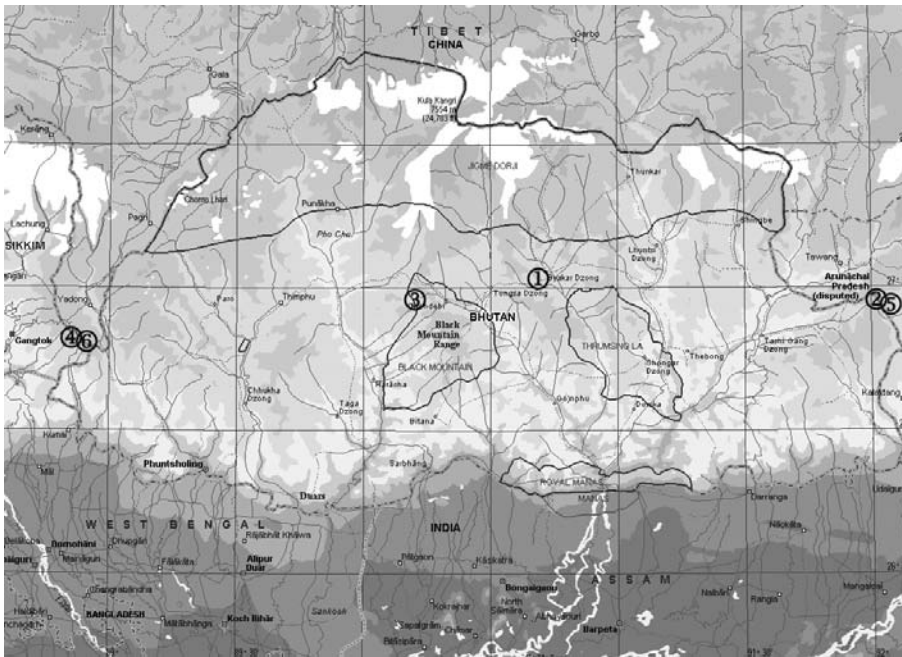


Fig. 24: Similarity of several Patrobini units on the dendrogram of the tribe constructed using UPGMA method. Scale indicates similarity indices.



Map 1: Collection records for several Patrobini-species in the East Himalayas. *Parapatrobis brancuccii* (ZAMOTAJLOV) (Jakar Dzong, "Kikiphu") (1). *Parapenetretus selaensis* spec. nov. (Sela Pass) (2). *Parapenetretus wittmeri* ZAMOTAJLOV (Gogona, "Muelhagang") (3). "*Apatrobis*" *sikkimensis* (DEUVE & LEDOUX) (SE Sikkim, "Jalep" [=Jelep La]) (4). *Indopatrobis bashtai* spec. nov. (Sela Pass) (5). *Deltomerodes stenomus* (ANDREWES) (SE Sikkim, "Jalep" [=Jelep La]) (6).