

Linzer biol. Beitr.	41/2	1635-1657	18.12.2009
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Two new species of *Psychristus* subgenus *Psychristus* ANDREWES 1930 from Southeast Asia, India and Pakistan, with additions to the *Psychristus discretus* group (Col., Carabidae)

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Abstract: Two new species in the *Psychristus discretus* group of *Psychristus* subgenus *Psychristus* ANDREWES 1930 are described: *P. dentatus* nov.sp. from Thailand and northeast India (type locality: Thailand: Mae Hong Son, Ban Huai Po, 1600-2000 m) and *P. brunneus* nov.sp. from Pakistan, India, Thailand, Laos and Indonesia (type locality: Laos: Kham Mouan province: Ban Khoun Ngeun ~200 m, 18°07'N 104°29'E). Diagnoses for known species, and images, distribution maps and a revised key for all members of the *P. discretus* group are provided. Additional distribution records of *Psychristus discretus* ANDREWES 1930 from India (including the first record for Arunachal Pradesh), Nepal, Bhutan and Vietnam and of *P. shibatai* ITO 1985 from Taiwan are presented.

Key words: Coleoptera, Carabidae, Harpalini, Stenolophina, *Psychristus*, *Psychristus discretus* group, new species, identification key, new records, Laos, Thailand, Nepal, India, Pakistan, Indonesia, Taiwan.

Introduction

The *Psychristus* subgenus *Psychristus* ANDREWES 1930 comprises six species, which have been revised by JAEGER (1997). In contrast to the subgenus *Nipponobradycellus* HABU 1973, which also includes apterous species with restricted distributions in mountainous areas in China and Nepal (WRASE 1997, WRASE & JAEGER 2007), members of *Psychristus* s.str. are macropterous and more or less widely distributed in the Himalayas and Southeast Asia.

JAEGER (1997) divided the subgenus *Psychristus* s.str. into two species groups, representing at least informal identification groups. The *P. liparops* group comprises four species, characterized by antennomere 3 glabrous, except for usual apical setae; scutellar striae present, at least represented by punctures; and elytral striae punctate. The *P. discretus* group comprises two described species, characterized by antennomere 3 moderately pubescent, at least in apical half; scutellar striae lacking; and elytral striae impunctate. In addition to the previously described species of the latter group, *P. discretus* ANDREWES 1930 and *P. shibatai* ITO 1985, JAEGER (1997: 81) mentioned a third species from northeast India in the revision, which he did not describe, because only one female was available at that time. New collections from Thailand included a second specimen of this taxon, which confirmed its status as a distinct new species. A second undescribed

species of the *P. discretus* group has been found amongst collections from Laos, Thailand, India, Pakistan and Indonesia. The two new species described in this paper increase the number of species belonging to the *P. discretus* group from two to four. Descriptions of the new species, together with diagnoses for the previously known species, images, distribution data and maps, tables with ratios of various body dimensions and a new key for all members of the *P. discretus* group are presented here.

Material and Methods

Material

The study is based on specimens deposited in the following public institutions and private collections:

MHNG	Museum d'Histoire Naturelle, Geneva, Switzerland (Dr. I. Löbl)
MNHUB.....	Museum für Naturkunde, Berlin, Germany (Dr. M. Uhlig)
NHMB	Naturhistorisches Museum Basel, Switzerland (Dr. M. Brancucci)
NHMW	Naturhistorisches Museum Wien, Austria (Dr. H. Schönmann)
NME	Naturkundemuseum Erfurt, Germany (Dipl.-Biol. M. Hartmann)
SMNS.....	Staatliches Museum für Naturkunde, Stuttgart, Germany (Dr. W. Schawaller)
ZISP	Zoological Institute, Academy of Sciences, St. Petersburg, Russia (Dr. B.M. Kataev)
cITO	Coll. N. Ito, Kawanishi City, Japan
cJAE.....	Coll. B. Jaeger, Berlin, Germany
cSCHM	Coll. J. Schmidt, Admannshagen, Germany
cWEIG	Coll. A. Weigel, Wernburg, Germany
cWRA	Coll. D.W. Wrase, Berlin, Germany

Label data of examined type material are cited in full in the text, using a "/" to separate different lines of the label in question. Collecting data of revised non-type material are presented according to the following form: "locality, month, year, collector(s) (number of specimens – deposition)".

Methods

Measurements, defined in Fig. 32, were taken at magnifications of 30 times (body length, elytra and pronotum partly) or 70 times (head and pronotum) using an ocular micrometer attached to a stereomicroscope Nikon SMZ 1500. The following abbreviations were used in the text and in the tables 1 and 2.

BL - body length, **HW** – width of the head including eyes, **HWbE** - width of head between inner margins of eyes, **PL** - length of pronotum, **PW** - width of pronotum at its broadest point, **PBaW** - width of pronotal base between tips of hind angles, **EL** - length of elytra, **EW** - width of elytra.

Microsculpture was examined at magnification of 100 times.

Dissections were made, using standard techniques; genitalia were preserved in Euparal on acetate strips and pinned beneath the specimens from which they had been removed.

Photographs of habitus, head and pronotum were taken using a Canon Powershot G2 digital camera combined with a Promicron photo adapter attached to a Nikon SMZ 1500 stereomicroscope. Photographs of male and female genitalia were taken using the above-mentioned equipment attached to a Leica DM LB2 transmitted light microscope. In both cases several single images from different focal planes were taken, which were later combined, using the Combine ZM and Helicon Focus software. The head and pronotum of mounted specimens are often distinctly bent downward and therefore not at the same focal plane as the elytra. If so, separate images of each body part were produced, which were subsequently combined with Adobe Photoshop software.

Distribution maps were generated using the GMT (The Generic Mapping Tools) online mapping tool available at "www.aquarius.ifm-geomar.de".

Results

Psychristus (Psychristus) dentatus nov.sp. (Figs 1-3, 22, 26, 28)

Psychristus spec. 1: Jaeger 1997: 81.

Type material: Holotype: ♀ (NHMB) labelled "NW THAILAND, 9.-16.5. / Mae Hong Son, 1991 / Ban Huai Po, 1600-2000 m / J. Horák leg." and "HOLOTYPE ♀ / *Psychristus* (s.str.) / *dentatus* spec. nov. / des. B. Jaeger 2009". Paratype: 1 ♀ (CITO) labelled "NE India, Meghalaya state / West Garo hills, NOKREK Nat. Park / 9.-17.V.1996, alt. 1100 ± 150 m / GPS N25°29.6', E90°19.5' (WGS 84) / E. Jendek & O. Šouša leg.", "*Psychristus* / spec. nov. ??? / near shibatai / det. B. Jaeger 1996" and "PARATYPE ♀, *Psychristus* (s.str.) / *dentatus* spec. nov. / des. B. Jaeger 2009".

Description: General appearance as figured (Fig. 1). Body length 4.1 mm; width 1.6 mm.

Ground colour of dorsal surface dark reddish brown (holotype) to blackish brown (paratype), with elytral interval 1, pronotal base and apex medially and lateral margins of elytra and pronotum somewhat reddish. Labrum reddish, mandibles reddish brown, with outer margins and apex blackish brown, palpi yellowish. Ventral surface except paler mouthparts reddish brown (holotype) or dark reddish brown to blackish brown (paratype). Legs and antennae dark yellowish, femora slightly infuscated.

Head (Figs 2-3) including eyes, comparatively narrow, only 0.73 times as wide as pronotum, with eyes small and moderately prominent (head 1.42-1.43 times as wide as head between eyes). Apical margin of labrum distinctly emarginated. Mentum with epilobes (Fig. 28) moderately to distinctly projecting forward and distinctly acuminate at apices. Ligula narrowly rounded at apex, usual pair of setae inserted somewhat posterior to apical margin. Mental tooth sharp, more than half as long as epilobes. Mandibles of average size, not distinctly prolonged and curved, apices not truncate. Antennae 1.77-1.89 times as long as pronotum and 0.66-0.70 times as long as elytra, with antennomere 1 and 2 glabrous, except for usual setae, 3 moderately pubescent and 4-11 distinctly pubescent. Microsculpture restricted to distinct isodiametric meshes on labrum and less distinct meshes at sides behind eyes.

Pronotum (Figs 2-3) somewhat cordate, 1.23-1.25 times as wide as long, 1.38 times as wide as head, widest in first half of second third, lateral seta inserted just anterior to widest point. Surface somewhat convex on disc, distinctly bent downward to anterior angles and somewhat depressed at basal area. Anterior margin almost rectilinear to

weakly arcuate, faintly bordered laterally, angles only slightly projecting forward and narrowly rounded at tips. Sides convex in anterior three-quarters and at posterior quarter almost straight and parallel, or slightly constricted in front of pronotal base. Posterior angles sharp and somewhat obtuse, with a small denticle at tip. Base about 1.17-1.19 times as wide as apical margin between anterior angles and 0.84 times as wide as maximum pronotal width, arcuate medially and somewhat oblique to posterior angles. Lateral furrows distinct, confluent with lateral basal impressions at basal quarter. Basal foveae distinctly impressed, not separated by convexities from basal and lateral margin, the latter somewhat reflexed. Base in and between impressions coarsely punctate. Pronotal surface also in lateral furrows and along sides, and at anterior quarter with few scattered punctures. Median line distinctly to moderately impressed, reaching basal margin and disappearing in front of anterior margin, distinctly punctate in basal third and moderately punctate in remaining parts. Anterior transverse impression moderate to distinct. Microsculpture represented only by mesh rudiments in basal foveae, remaining surface smooth.

Macropterous. Elytra (Fig. 1) 1.57-1.58 times as long as wide, 2.69-2.71 times as long and 1.37-1.39 times as wide as pronotum. Surface moderately convex. Sides almost parallel or slightly diverging posteriorly, widest at about middle. Humeri distinctly angulate, with a large, sharp and somewhat projecting humeral tooth. Basal bead arcuately turning into humerus and forming a distinct angle with lateral margin. Scutellar pore puncture present, scutellar stria lacking. Elytral striae distinctly impressed and impunctate, intervals relatively flat to moderately convex, interval 2 and 3 at apex moderately convex, narrow and parallel or somewhat constricted. Interval 3 in posterior half with a setiferous pore at stria 2. Subapical sinuation moderate. Series umbellicata 6 (5+1 or 3+2-1) - 8 (4-2+2 or 1+3-2+2). Microsculpture anterior to basal margin and on scutellum quite distinct, consisting mostly of isodiametric meshes; behind basal margin distinct and almost transverse, becoming obsolete on disc, at outer intervals 8-9 with moderately impressed faintly transverse meshes, becoming very lightly impressed and somewhat isodiametric at intervals 5-7 and almost obsolete at intervals 1-4 (in the holotype the elytral microsculpture is generally less distinct and restricted to basal area and intervals 7-9).

Ventral side without pubescence. Proepisterna with a few single shallow punctures, prosternum laterally, mesosternum and mesepisterna with some coarser punctures, metasternum and abdomen impunctate. Prosternal process with two longer setae. Metepisterna distinctly narrowed posteriad, at inner margin about 1.6 times as long as basal margin. Abdominal sternites 3-5 with the usual pair of setae, sternite 6 at apical margin with two setae at each side in females (character state of male unknown).

Legs: Female pro- and mesotarsi not dilated, without a dentiform process and adhesive hairs ventrally, except pro- and mesotarsomere 4 each with two pairs of elongated, somewhat widened and flattened seta, which probably have adhesive function. Pro- and mesotibiae with average number and size of spines at outer margins (two smaller and one larger spine in protibiae and five to six smaller to medium sized spines in mesotibiae).

Female genitalia: Shape of hemisternite and basal and apical segment of gonocoxa as figured (Fig. 22). Male genitalia unknown.

C o m p a r i s o n s : *P. dentatus* nov.sp. (Figs 1-3) can be separated easily from all other members (Figs 4-12) of the *P. discretus* group by the narrow head with small and

only moderately protruding eyes ($HW/PW < 0.74$, $HW/HWbE < 1.44$); the deeply emarginated labral margin; the distinctly developed and projecting humeral tooth; the different shape of pronotum and weakly developed microsculpture of elytra, at least at outer intervals and behind base.

Additional characters separating the species from *P. brunneus* are the darker body colour; the smaller and less curved mandibles; the presence of a setiferous pore in the apical half of elytral interval 3; and the reduced size and number of spines at the outer margins of pro- and mesotibiae. From *P. discretus* it is distinguished additionally by the shape of the elytra, which are shorter and narrower relative to the pronotum ($EL/PL < 2.72$, $EW/PW < 1.40$), with dorsal surface less convex (seen in profile) and elytral intervals 2 and 3 narrowed and moderately convex at apex (instead of flat and somewhat dilated); and the antennae, which are longer relative to the elytra ($AL/EL > 0.65$). From *P. shibatai* it differs additionally by the larger size; the darker body colour; the elytra, which are longer ($EL/EW > 1.56$), but shorter and narrower relative to the pronotum ($EL/PL < 2.72$, $EW/PW < 1.40$); and the antennae, which are longer relative to the elytra ($AL/EL > 0.65$).

E t y m o l o g y : The Latin adjective *dentatus*, meaning toothed, refers to the distinct humeral tooth.

D i s t r i b u t i o n : Currently known from northwest Thailand and northeast India (Meghalaya State) (Fig. 26), where the species has been collected at 1600–2000 m and at 1100 m, respectively. Because *P. dentatus* is macropterous, it is obvious that it should be distributed more widely in South East Asia; at least it could be expected from Myanmar.

***Psychristus (Psychristus) brunneus nov.sp.* (Figs 4–6, 13–17, 23, 26, 29)**

T y p e m a t e r i a l : Holotype: ♂ (NHMB) labelled "LAOS-C; KHAM Mouan pr.; / Ban Khoun Ngeun; ~200 m; / 18°07'N 104°29'E / Pacholátko leg.; 24.-29.iv. 2001" and "HOLOTYPE ♂ / *Psychristus* (s.str.) / *brunneus* spec. nov. / des. B. Jaeger 2009".

P a r a t y p e s (12♂♂, 29♀♀): Laos: 2♂♂, 6♀♀ (NHMB, cJAE) with same label data as holotype. 3♀♀ (NHMB) with same label data, except date "19.-31.v. 2001". 1♂ (NHMB) labelled "LAOS, 1-18.v.2001, / Bolikhamzai prov., / 18°21'N 105°08'E / Ban Nape (8 km NE) / ~ 600 m, V. Kubán leg.". 1♂ (cWRA) labelled "N LAOS / 10 km N Luang Prabang / Mekong riv. (240 km N / Vientiane) XII 1992", "hilly country / sparse settled / primary vegetation / Insomsay Somsy leg." and "Coll. WRASE / BERLIN" (green label). 1♂, 3♀♀ (MNHUB) labelled "NORD LAOS xii. 1992 / 10 km N Luang-Prabang / Mekhong river, 240 km N / Vientiane, hills ca. 250m / poor settlem., prim veget / lux, leg. Insomsay Somsy"; 1♂ (MNHUB) with same label data, except date "xi. 1992"; 2♀♀ (MNHUB) with same label data, except date "ii. 1993", and 1♂, 6♀♀ (MNHUB, cJAE) with same label data, except date "iii. 1993".

Thailand: 2♀♀ (NHMB, cJAE) labelled "Thailand 91 / "Thanon Thong Chai" / D. Král & V. Kubán" and "THAI, 9.-14.V. 1991 / CHIANG DAO 350 m / 19°22'N 98°57'E / Vit Kubán leg."

1♂ (SMNS) labelled "NW THAILAND Soppong / 700 m, 23.IV.2004 / leg. W. SCHAWALLER".

India: 2♂♂, 6♀♀ (NHMB, cJAE) labelled "INDIA: Orissa state / Similipal N.P., Lulung / 21°56'N 86°32'E / 25.v.-13.vi.1998 / Karel & Simon Majer leg.". 1♂ (cWRA) labelled "N-INDIA / (Uttar Pradesh) / Rishikesh / 8.VII. 1989 A. Riedel".

Indonesia: 1♂ (cWRA) labelled "INDONESIA Tanimbar Isles / Yamdena Isle / Lorulun vill. env. / 20 km NE Saumlaki 150 m / 25.XI.-24.XII. 2006 St. Jakl" and "Coll. WRASE / BERLIN" (green label).

Pakistan: 1♀ (ZISP) labelled "PAKISTAN / Islamabad / 10.VII.2003 / S. Ovchinnikov leg.", "*Psychristus* / (? subg. n. ?) / sp. n." [red] and "Zoolog. Institute / RAN / ST. Petersburg".

All paratypes labelled additionally "PARATYPE ♂ or ♀ (as appropriate) / *Psychristus* (s.str.) / *brunneus* spec. nov. / des. B. Jaeger 2009"

D e s c r i p t i o n : General appearance as figured (Fig. 4). Body length 3.5–4.3 mm (holotype 3.9 mm); width 1.4–1.8 mm.

Ground colour of dorsal and ventral surface paler to darker yellowish to pale reddish brown. Head usually, except paler clypeus, labrum and mandibles, and often elytra, except paler sutural interval, darker brown. Apical half or third, often also the base of lateral margin of mandibles blackened. Legs, antennae and palpi yellowish brown.

Head (Figs 4-6) including eyes, comparatively broad, 0.82-0.92 times as wide as pronotum, with eyes large and hemispherically prominent (head 1.55-1.65 times as wide as head between eyes). Apical margin of labrum rectilinear or weakly emarginated with a small rounded projection medially. Mentum with epilobes (Fig. 29) only very weakly projecting forward, without distinctly acuminate apices. Mental tooth large and sharp, as long as or slightly longer than epilobes. Ligula triangularly acuminate at apex, usual pair of setae inserted distinctly posterior to apical margin. Mandibles large and markedly prolonged and curved, not truncate at apices. Antennae 1.74-1.94 times as long as pronotum and 0.64-0.70 times as long as elytra, with antennomere 1 and 2 glabrous, except for usual setae, 3 moderately pubescent and 4-11 distinctly pubescent. Microsculpture obsolete, except for isodiametric meshes on labrum.

Pronotum (Figs 4-6) somewhat cordate, 1.23-1.34 times as wide as long and 1.09-1.22 times as wide as head, widest just behind anterior third, lateral seta inserted somewhat anterior to this. Surface somewhat convex on disc, weakly bent downward to anterior angles and somewhat depressed at basal area. Anterior margin arcuate, faintly bordered at sides, angles not or weakly projecting forward and relatively broadly rounded at tips. Sides convex in anterior two-thirds and at posterior third rectilinear and weakly constricted, or almost parallel, or slightly sinuated in front of pronotal base. Posterior angles obtuse, but comparatively sharp, usually with a small denticle at tip. Base about as wide as or slightly wider than apical margin between anterior angles and 0.79-0.86 times as wide as maximum pronotal width, arcuate medially and somewhat oblique to posterior angles. Lateral furrows distinct, confluent with lateral basal impressions at basal quarter. Basal foveae varies in shape, somewhat roundly or linearly impressed, sometimes separated by a shallow convexity from lateral margin, sometimes flattened to basal and lateral margin, the latter somewhat reflexed. Base in, around and between basal foveae moderately punctured; punctuation often somewhat extended laterally by a few punctures at sides and in lateral furrows. Apical area before anterior impressions also with few scattered punctures. Median line moderately impressed, reaching basal margin and disappearing just in front of anterior margin, faintly to moderately punctate in basal quarter and finely punctate or impunctate in medial and apical part. Anterior transverse impression moderate. Microsculpture almost obsolete, rarely with few mesh rudiments in basal foveae.

Macropterous. Elytra (Fig. 4) 1.51-1.64 times as long as wide, 2.67-2.88 times as long and 1.32-1.45 times as wide as pronotum. Surface weakly convex. Sides slightly diverging posteriorly, widest at about middle or just behind this. Subapical sinuation moderate. Humeri distinctly developed, with a small, usually slightly projecting humeral tooth. Basal bead arcuately turning into humerus and forming a distinct angle with lateral margin. Scutellar pore puncture present, scutellar striae lacking. Elytral striae moderately impressed and impunctate, intervals flat to very lightly convex, intervals 2 and 3 comparatively flat and wide at apex, interval 2 sometimes somewhat dilated. Interval 3 in posterior half without a setiferous pore at stria 2. Series umbellicata 6 (5+1) - 8 (4-2+2). Microsculpture almost obsolete except isodiametric meshes on scutellum, and on base of elytra anterior to basal margin.

Ventral surface without pubescence and almost impunctate, rarely prosternum and proepisterna with few punctures (at proepisterna very shallow). Prosternal process with two longer setae. Metepisterna distinctly narrowed posteriad, at inner margin about 1.7 times as long as basal margin. Abdominal sternites 3-5 with usual pair of setae, sternite 6 at apical margin with two setae at each side in males and females.

Legs: Pro- and mesotarsi somewhat wider than in other species of *P. discretus* group, but in this respect without differences between males and females. Protarsomeres 2-3 of males ventrally each with one inner pair of longer modified setae (long and narrow, but somewhat flattened/widened), which probably have adhesive function, but differ distinctly from typical adhesive hairs known from other species of the genus. Protarsomeres of females and mesotarsomeres in both sexes without adhesive hairs ventrally, but in protarsomere 4 the apical setae sometimes somewhat flattened in both sexes. Protarsomeres 1-4 and sometimes also mesotarsomeres 3-4 medially with a distinct (in protarsi) or only suggested (in mesotarsi) dentiform process. Pro- and mesotibiae with spines at outer margins relatively large and usually more numerous than in other species (e.g. three, rarely four larger spines in protibiae and six to eight medium to large sized spines in mesotibiae).

Median lobe of aedeagus (Figs 13-17) small and stout, apex widely rounded without apical lamella. Internal sac with characteristic fine structures, consisting of patches of fine triangular spines medially and apically. Female hemisternite and basal and apical segment of gonocoxa as figured (Fig. 23).

Comparisons: *P. brunneus* nov.sp. (Figs 4-6) differs from all other members (Figs 1-3, 7-12) of the *Psychristus discretus* group by the general appearance; the light brown ground colour; the large and broad head ($HW/PW > 0.81$) with strongly protruding eyes and distinctly prolonged and curved mandibles; the mentum with epilobes less projecting and mental tooth relatively large; ligular sclerite triangularly acuminate at apex; the shape of pronotum, with less strongly punctate base; the lack of a setiferous puncture in posterior half of elytral interval 3; protarsomeres 1-4 in both sexes ventrally with a dentiform process medially, in females protarsomeres also more distinctly dilated, spines at outer margins of pro- and mesotibiae stronger and sometimes more numerous (e.g. protibiae with three to four spines, instead of two to three, and mesotibiae with seven to eight spines) and the shape and internal structures of median lobe of aedeagus (Figs 13-17).

The species differs additionally from *P. discretus* by having the pronotal anterior margin arcuate, with anterior angles more widely rounded and not or only weakly projecting; the elytral surface somewhat depressed and less convex; the elytra narrower and shorter relative to pronotum ($EW/PW < 1.46$, $EL/PL < 2.89$), with humeri more distinctly angulate and humeral tooth more distinctly developed and often slightly projecting (in *discretus* usually no more than suggested) and antennae longer relative to elytra (see ratio $AL/EL > 0.63$). From *P. shibatai* it is also separated by the comparatively longer elytra ($EL/EW > 1.50$), which are narrower relative to pronotum ($EW/PW < 1.46$) and the antennae, which are longer relative to elytra ($AL/EL > 0.63$). For additional characters separating *P. brunneus* from *P. dentatus* see above.

Etymology: The Latin adjective *brunneus*, meaning brown, refers to the brown body colour of the species.

Distribution: The known distribution area (Fig. 26) reaches from northeast

Pakistan in the west across northern India and northern Thailand to north and eastern Laos.

In addition to the above-mentioned distribution, a single record is known from the Tanimbar Islands in the Wallacea region. This record is very far from any other known record and must therefore be confirmed by other collections from the same area.

D i s c u s s i o n : Within the genus *Psychristus* the species has been placed into the *P. discretus* group of the subgenus *Psychristus* s.str., because it displays all the characters defining these taxonomic units. However, this placement is provisional, because within the subgenus or partly even within the genus, *P. brunneus* has some unique features of probably higher taxonomic value, e.g. mandibles distinctly prolonged, shape of mentum and ligula modified, protarsi 1-4 in both sexes ventrally with a dentiform process and male protarsi without typical adhesive hairs. However, a detailed cladistic analysis of all members of the genus should be done to find apomorphic character states useful for defining monophyletic species groups. Depending on the proved sister group relations then the subgeneric classification of *Psychristus* should be revised, and if appropriate, a formal supraspecific rank (e.g. subgenus) can be proposed for *P. brunneus*.

***Psychristus* (s.str.) *discretus* ANDREWES 1930** (Figs 7-9, 18-19, 24, 27, 30)

Psychristus discretus ANDREWES 1930: 22 (type locality: India: Sikkim: Phadam Chen).

Bradycellus ponderosus LINDROTH 1939: 117-119 (type locality: Russia: Karelia: "Fennia, Kuusamo, See Paanajärvi").

The original description given by ANDREWES (1930: 22) and the re-description and illustrations given by JAEGER (1997: 70-71, 87, and 89) include most main characters important for recognition of the species. Therefore, only a diagnosis, including characters that separate the species from others of the *P. discretus* group, additional images and ratios of various body dimensions (see table 1 and 2) are presented below.

D i a g n o s i s : The largest species in the *P. discretus* group with general appearance as figured (Fig. 7). Body length 3.8-4.6 mm and width 1.6-1.9 mm. Ground colour of dorsal surface usually blackish brown, sometimes dark reddish brown, with elytral interval 1 (often indistinct or partly), pronotal base and apex medially, and lateral margins of elytra and pronotum paler reddish. Clypeus, labrum and mandibles reddish (with inner and partly outer margins, and apex of mandibles blackish), palpi yellowish. Ventral surface dark reddish- to blackish brown. Legs and antennae yellowish to pale reddish brown. Head including eyes (Figs 7-9) of medium width, 0.75-0.81 times as wide as pronotum, with eyes distinctly prominent (head 1.54-1.63 times as wide as head between eyes). Apical margin of labrum usually weakly emarginated, sometimes almost rectilinear. Mentum with epilobes (Fig. 30) strongly projecting forward and distinctly acuminate at apices. Mental tooth sharp, usually about half as long as epilobes. Ligular sclerite with apex, narrowly or widely rounded, sometimes somewhat acuminate. Mandibles of average size, not markedly prolonged and curved in apical half. Antennae 0.56-0.64 times as long as elytra and 1.70-2.04 times as long as pronotum, with antennomere 3 with scattered pubescence in apical half, at least with few additional setae. Pronotum with shape and punctuation as figured (Figs 7-9), 1.23-1.35 times as wide as long and 1.24-1.33 times as wide as head. Base about 1.1-1.2 times as wide as apical margin between anterior angles and 0.83-0.91 times as wide as maximum pronotal width. Median line distinctly punctate in basal third, impunctate, or rarely very faintly punctate in medial third, and moderately punctate in apical third. Macropterous. Elytra (Fig. 7)

1.48-1.60 times as long as wide, 3.00-3.25 times as long and 1.51-1.63 times as wide as pronotum, with surface strongly convex. Humeri less angulate than in other species, with humeral tooth very small, usually no more than suggested. Setiferous pore in posterior half of interval 3 present. Elytral intervals 2-3 comparatively wide and flat at apex, 3 often somewhat dilated. Microsculpture almost absent, except for isodiametric mesh patterns on scutellum and anterior to basal margin. Pro- and mesotarsomeres in both sexes ventrally without a dentiform process, protarsomeres 1-4 of males only very weakly dilated, with typically dilated adhesive hairs beneath. Number and size of spines in pro- and mesotibiae unmodified. Median lobe of aedoeagus (Figs 18-19) large, and elongate, with a distinctly developed apical lamella. Female genitalia as figured (Fig. 24). For ratios representing various body proportions see table 1 and 2.

C o m p a r i s o n s : Within the *P. discretus* group the species (Fig. 7) is in general appearance most similar to *P. shibatai* (Fig. 10) from which it can be separated usually by the larger size; darker, blackish brown body colour; the pronotum (Figs 7-9) with medial third of median line usually impunctate and anterior angles more projecting forward; the elytra, which are longer relative to the pronotum ($EL/PL > 2.99$), with humeral tooth very small and not projecting, and dorsal surface strongly convex; the large, elongated median lobe of aedoeagus with developed apical lamella (Figs 18-19) and the different shape of hemisternite (Fig. 24) of female genitalia.

For differentiation from *P. brunneus* and *P. dentatus* see these species and the key.

D i s t r i b u t i o n : The species occurs from northwest India (Uttar Pradesh) in the West, across Nepal, north India (West Bengal, Sikkim), Bhutan, northeast India (Arunachal Pradesh), Myanmar to northwest Vietnam in the East. It has been collected at elevations of about 1500-2800 m. Figure 27 shows the known distribution, based on revised records (see JAEGER 1997: 72 and records below).

LINDROTH (1939) described the species also as *Bradycellus ponderosus* from Karelia. However, due to zoogeographical reasons an occurrence of the species in this northeast European region seems to be impossible. JAEGER (1999: 968) suspected that the type species was mislabelled and originated from collections from former British India, probably from a large series from Burma collected by R. Malaise in 1934 during the Swedish expedition to British India and Burma.

Since the revision of the species (JAEGER 1997: 72) the following additional material, including the first record for the Indian state of Arunachal Pradesh, has been studied:

N e p a l : Far-Western Region: Darchula District: 1 km NE Batar, Chamliya Khola, 2100 m, 29°51'29"N 80°54'34"E, LF, VI. 2005, Weigel (1 - cWEIG). - Western Region: Kaski District: Annapurna, Krapa Danda, 2500 m, V. 1997, Schmidt (1 - cSCHM); Lamjung Himal, unt. Taunja Danda, oberh. Hogo-Kh., W-Hang, 2350 m, V. 1996, Jäger (17 - cSCHM, cJAE). - Central Region: Dolakha District: Cherakapti, nördl. Jiri, 1500-1800 m, IV. 1973, Martens (1 - SMNS); E Ting Sang La, 2600 m, 627, VI. 2000, Schawaller (4 - SMNS), N slope of Khare Kola, 2200 m, 612, V./VI. 2000, Schawaller (1 - SMNS); Serukapti, 2400 m, 605, V. 2000, Schawaller (5 - SMNS). - Sindhupalchok District: SW below Dolangsa, 2300 m, 631, VI. 2000, Schawaller (1 - SMNS); Pokhare NE Barabhise, 2700 m, V. 1981, Löbl & Smetana (1 - MHNG). - Lalitpur District: 106 KTM Phulchoki 2000-2300 m, Quercus, III. 1980, Martens & Ausobsky (2 - SMNS). - Eastern Region: Solukhumbu District: Junbesi, 2700 m, 514, V. 1997, Schawaller (1 - SMNS). - Terhathum District: Basantapur env., 27.11N 87.27E, 2190 m, VI. 2000, Farkač (5 - NHMB, cJAE). - Region/District not traced: Syabnu [Sic! Probably meaning Syabru?], VI. 1978, Bhakta (1 - NHMB).

B h u t a n : Timphu Umg., 2500 m, VII. 1988, Holzschuh (1 - NME).

I n d i a : Arunachal Pradesh: W of Bomdila, 2600 m, 27°16'N 92°24'E, V. 2004, Dembický (16 - NHMB, cJAE).

V i e t n a m : Sa Pa (Lao Cai), 22°20'N 103°50'E, V.-VI. 1991, Jendek (3 - NHMW, cJAE).

***Psychristus* (s.str.) *shibatai* (ITO 1985) (Figs 10-12, 20-21, 25-26, 31)**

Bradycellus (*Taiwanobradycellus*) *shibatai* ITO 1985: 62-63 (type locality: Taiwan: Roshan).

T y p e m a t e r i a l : The holotype and one male paratype were studied by JAEGER (1997: 72). The remaining paratypes of the type series have been examined more recently:

P a r a t y p e s : 1 ♂, 1 ♀ (cITO) labelled "MUSHA / TAIWAN / 20. IV. 1970 / Y. KIYOYAMA", "PARATYPE" [printed on red label], "*Bradycellus* / (*Taiwanobradycellus*) / *shibatai* / (N. ITO)" and "*Psychristus* (s.str.) / *shibatai* Ito, 1985 / det. B. Jaeger 2009". The female with additional label "L 87".

The original description given by ITO (1985: 62-63) and supplemented by JAEGER (1997: 86-87, 90) with some figures and measurements, included most main characters important for recognition of this species. Thus, only a diagnosis, including characters that differentiate the species from one or more other species of the *P. discretus* group, additional images and ratios for various body dimensions (see Tables 1 and 2) are presented here.

D i a g n o s i s : The smallest species in the *P. discretus* group with general appearance as figured (Fig. 10). Body length 3.4-3.7 mm and width 1.6 mm. Ground colour of dorsal surface dark reddish brown (one non-type specimen from Taiwan, darker but not yet blackish brown as in *P. discretus* or *P. dentatus*), with elytral interval 1, pronotal base and apex medially, lateral margins of pronotum and elytra, labrum, mandibles (base of lateral margin, inner margin and apex blackish) paler reddish. Ventral side, particularly abdomen, sometimes somewhat paler reddish. Legs, antennae and palpi yellowish brown or pale brown. Head (Figs 11-12) including eyes, of medium width, 0.75-0.80 times as wide as pronotum, with eyes distinctly prominent (head 1.64-1.71 times as wide as width between eyes). Apical margin of labrum very weakly emarginated, with a weakly suggested projection medially. Mentum with epilobes (Fig. 31) strongly projecting forward and distinctly acuminate at apices. Mental tooth sharp, its size varies from as long as to half as long as epilobes. Ligular sclerite narrowly rounded at apex. Mandibles of average size, not distinctly prolonged and curved. Antennae 1.72-1.80 times as long as pronotum and 0.60-0.63 times as long as elytra, with antennomere 3 moderately pubescent. Pronotum with shape and punctuation as figured (Fig. 11-12), 1.25-1.32 times as wide as long, 1.25-1.33 times as wide as head. Base about 1.17-1.20 times as wide as apical margin between anterior angles and 0.86-0.90 times as wide as maximum pronotal width. Median line moderately to distinctly punctate along its entire length, sometimes in basal third more distinct. Macropterous. Elytra (Fig. 10), 1.47-1.52 times as long as wide, 2.81-2.92 times as long and 1.46-1.58 times as wide as pronotum, with dorsal surface moderately convex (see lateral profile). Humeri more distinctly angulate than in *P. discretus*, but less than in other species, with humeral tooth small and weakly projecting. Setiferous pore in apical half of interval 3 present. Elytral intervals 2 and 3 relatively flat and almost parallel or faintly dilated in front of apex. Microsculpture on dorsal surface mostly absent, except for isodiametric meshes on labrum, scutellum and on base of elytra anterior to basal margin. Pro- and mesotarsomeres in both sexes ventrally without a dentiform process, protarsomeres 2-4 (perhaps, also 1, but difficult to observe) of males

ventrally with typically dilated adhesive hairs. Number and size of spines in pro- and mesotibiae unmodified. Median lobe of aedoeagus short, without apical lamella (Figs 20-21). Female genitalia as figured (Fig. 25). For ratios representing various body proportions see Tables 1 and 2.

C o m p a r i s o n s : In general appearance (Fig. 10) the species is very similar to *P. discretus* (Fig. 7) and usually differs from the latter by characters given under that species and in the key. However, atypical darker coloured females, if from India, are probably difficult to separate by external characters. The shape of the female hemisternite (Fig. 25) seems to be different (basal half less projecting as in *P. discretus*) according to two available females from Taiwan, which were compared with females of *P. discretus*, but additional females of *P. shibatai* are necessary to verify the constancy of this difference.

For separation of *P. shibatai* from *P. brunneus* and *P. dentatus* see these species and key.

D i s t r i b u t i o n : So far known only from Taiwan and one single record from India, Uttar Pradesh (see Fig. 26).

In addition to the previously studied type and non-type material (JAEGER 1997: 72-73) and paratypes mentioned in the type section above, one additional female from Taiwan has been studied:

T a i w a n : Mt. Kwena, IV. 1986, N. Ito (1 – cITO).

Key to species of the *P. discretus* group of *Psychristus* subgenus *Psychristus*

- 1 Ground colour pale brown. General appearance as figured (Fig. 4). Head (Figs 4-6) broad, with large and hemispherically protruding eyes ($HW/PW > 0.81$). Mandibles markedly prolonged and curved. Mentum with epilobes less projecting forward (Fig. 29). Shape of pronotum (Figs 4-6) as figured. Elytral interval 3 without setiferous pore in apical half. Median lobe (Figs 13-17) short and stout with characteristic internal structures. Female hemisternite and gonocoxa as figured (Fig. 23). — 3.5-4.3 mm. From northeastern Pakistan, across northern India and Thailand to eastern Laos and one isolated record from Indonesia, Tanimbar Islands..... *P. brunneus* nov.sp.
- Ground colour dark reddish or blackish brown. General appearance different (Figs 1, 7, 10). Head (Figs 2-3, 8-9, 11-12) narrower, with small and moderately, or large and distinctly protruding eyes ($HW/PW < 0.82$). Mandibles shorter and less curved. Mentum with epilobes moderately to strongly projecting (Figs 28, 30-31). Shape of pronotum different (Figs 2-3, 7-9, 11-12). Elytral interval 3 with a setiferous pore in apical half. Median lobe (Figs 18-21) and female genitalia (Figs 22, 24-25) different.....2
- 2 General appearance as figured (Fig 1). Head (Figs 2-3) narrower, with small and moderately protruding eyes ($HW/PW 0.73$, $HW/HWbE 1.42-1.43$). Pronotum (Figs 2-3) somewhat cordate. Elytra (Fig. 1) in relation to pronotum shorter and narrower ($EL/PL 2.69-2.71$, $EW/PW 1.37-1.39$), with surface less convex. Humeral tooth distinctly developed and projecting. Antennae longer relative to elytra ($AL/EL 0.66-0.70$). Female genitalia as figured (Fig. 22). — 4.1 mm. Known from northwest Thailand and northeast India..... *P. dentatus* nov.sp.
- General appearance different (Fig 7, 10). Head (Figs 7-9, 11-12) broader, with larger and distinctly protruding eyes ($HW/PW 0.75-0.81$, $HW/HWbE 1.54-1.71$). Pronotum (Figs 7-9, 11-12) less cordate. Elytra (Figs 7, 10) in relation to pronotum longer and broader ($EL/PL 2.81-3.25$, $EW/PW 1.46-1.63$), with surface more convex. Humeral tooth finer and less projecting or only suggested. Antennae shorter relative to elytra ($AL/EL 0.56-0.63$). Female genitalia different (Figs 24, 25)3

- 3 Larger species, 3.8-4.6 mm. Body colour darker, blackish brown. Head (Fig. 7-9) 1.54-1.63 times as wide as head between eyes. Pronotum with anterior angles usually more projecting forward; median line impunctate or less punctate at medial third. Elytra longer relative to pronotum (EL/PL 3.00-2.25), with dorsal surface distinctly convex and humeral tooth often only suggested and not projecting. Median lobe large and elongate, with different shape and a developed apical lamella (Figs 18-19). Hemisternite of female genitalia distinctly projecting in basal half (Fig. 24). — From northwestern India, across Nepal, Bhutan, northeast India, Myanmar to northwest Vietnam..... *P. discretus* ANDREWES 1930
- Smaller species, 3.3-3.7 mm. Body colour lighter, usually dark reddish brown (specimens from India darker). Head (Fig. 11-12) 1.64-1.71 times as wide as head between eyes. Pronotum with anterior angles less projecting; median line usually distinctly punctate at medial third. Elytra shorter relative to pronotum (EL/PL 2.81-2.92), with dorsal surface less convex and humeral tooth more distinctly developed and projecting. Median lobe smaller, with different shape and without apical lamella (Figs 20-21). Hemisternite of female genitalia less projecting in basal half (Fig. 25). — Known from Taiwan and one record from north India..... *P. shibatai* (ITO 1985)

Acknowledgements

I thank all curators and colleagues mentioned in the material section, who lent the material, which formed the basis for this paper. I am also very grateful to Dr. Roger Booth (Natural History Museum London) for comments on a draft of the manuscript and improving my English.

Zusammenfassung

Zwei neue Arten aus der *Psychristus discretus*-Gruppe der *Psychristus*-Untergattung *Psychristus* ANDREWES 1930 werden beschrieben: *P. dentatus* nov.sp. aus Thailand und Nordost-Indien (loc. typ.: Thailand: Mae Hong Son, Ban Huai Po, 1600-2000 m) und *P. brunneus* nov.sp. aus Pakistan, Indien, Thailand, Laos und Indonesien (loc. typ.: Laos: Kham Mouan province: Ban Khoun Ngeun ~200 m, 18°07'N 104°29'E). Diagnosen für bereits beschriebene Arten, sowie Photos, Verbreitungskarten und eine Bestimmungstabelle werden für alle Arten der Artengruppe vorgestellt. Für *Psychristus discretus* ANDREWES 1930 werden weitere Nachweise aus Indien (Erstnachweis für den Bundesstaat Arunachal Pradesh), Nepal, Bhutan und Vietnam, sowie für *P. shibatai* ITO 1985 ein weiterer Nachweis für Taiwan bekannt gemacht.

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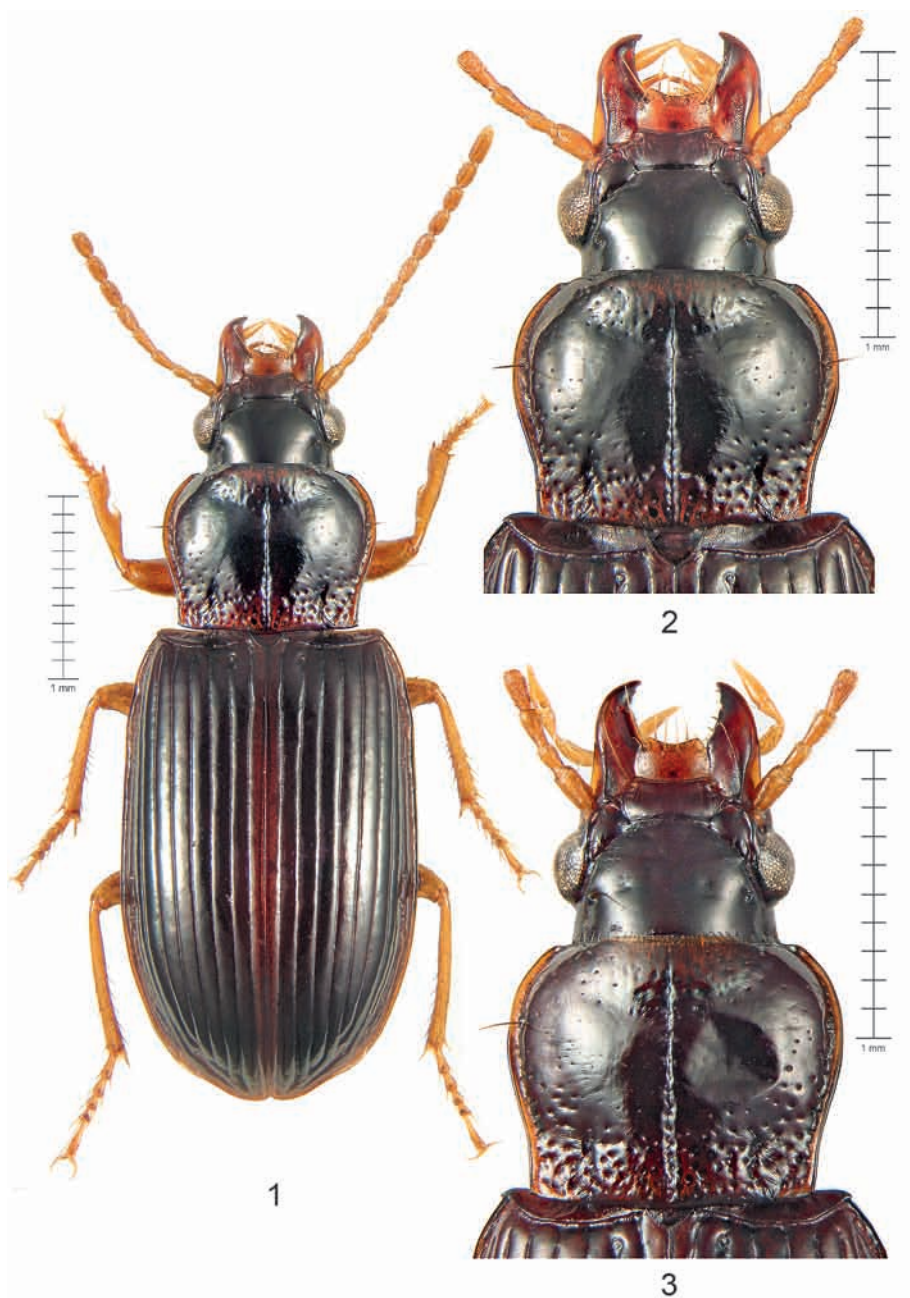
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Table 1. Ranges of ratios between different body measurements for male specimens of the *P. discretus* group. Means in parentheses. See Figure 32 and Methods for definition of parameters.

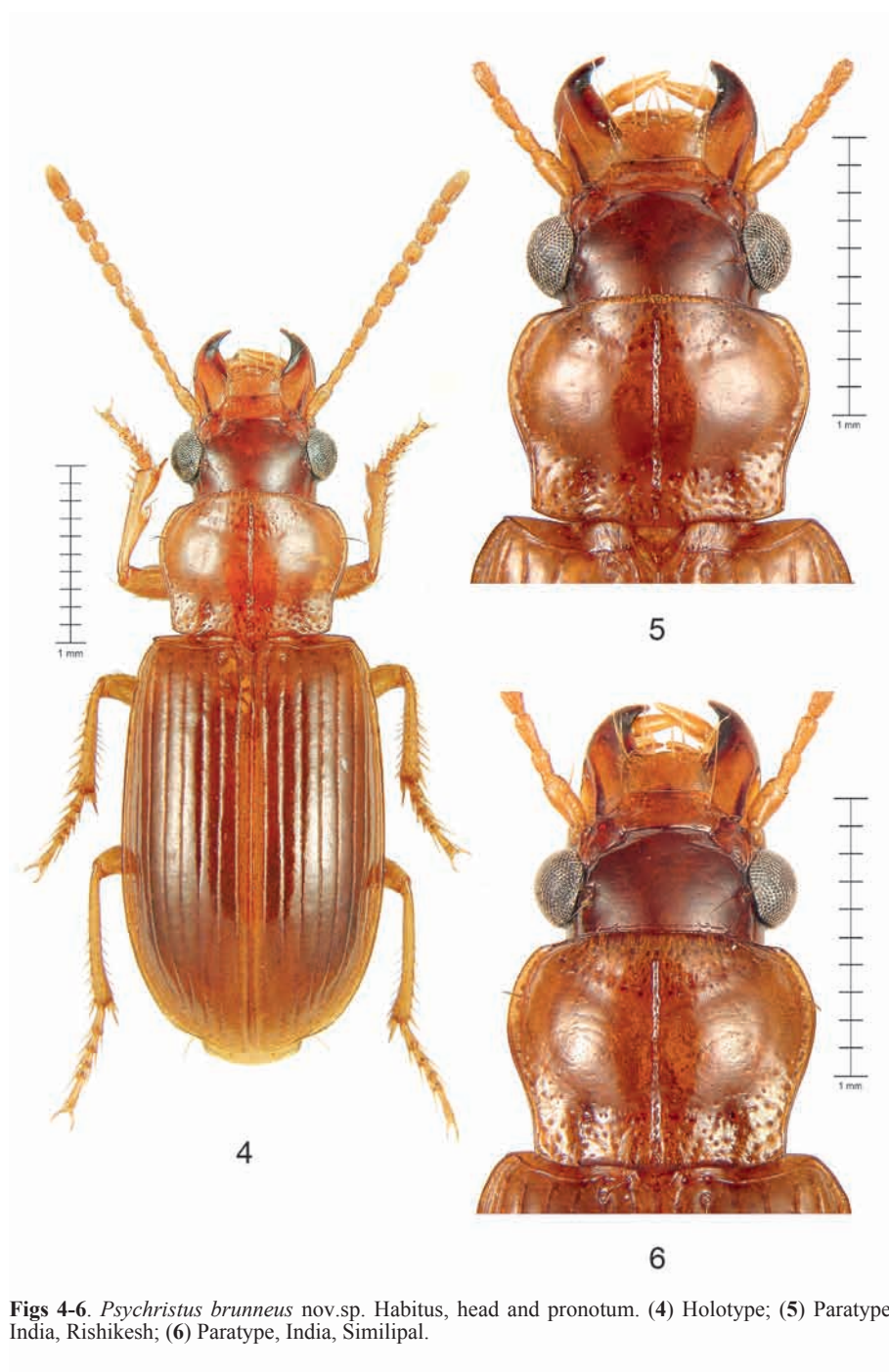
	<i>P. brunneus</i>	<i>P. discretus</i>	<i>P. shibatai</i>
specimens	11	20	3 (only Taiwan)
BL	3.5-4.3 (3.8)	3.8-4.6 (4.2)	3.6-3.7 (3.7)
HW/PW	0.82-0.92 (0.87)	0.75-0.81 (0.79)	0.75-0.80 (0.78)
PW/HW	1.09-1.22 (1.15)	1.24-1.33 (1.27)	1.25-1.33 (1.29)
PW/PL	1.24-1.29 (1.27)	1.27-1.35 (1.30)	1.25-1.28 (1.26)
EW/PW	1.33-1.45 (1.40)	1.52-1.63 (1.58)	1.50-1.58 (1.54)
EL/EW	1.51-1.64 (1.57)	1.49-1.60 (1.53)	1.47-1.52 (1.49)
EL/PL	2.67-2.88 (2.79)	3.04-3.21 (3.13)	2.82-2.92 (2.88)
AL/PL	1.80-1.94 (1.87)	1.88-2.04 (1.92)	1.75-1.80 (1.77)
AL/EL	0.65-0.70 (0.67)	0.59-0.64 (0.61)	0.60-0.63 (0.62)
PBaW/PW	0.80-0.86 (0.84)	0.84-0.91 (0.88)	0.86-0.88 (0.87)
HW/HWbE	1.57-1.65 (1.61)	1.55-1.63 (1.59)	1.64-1.67 (1.65)

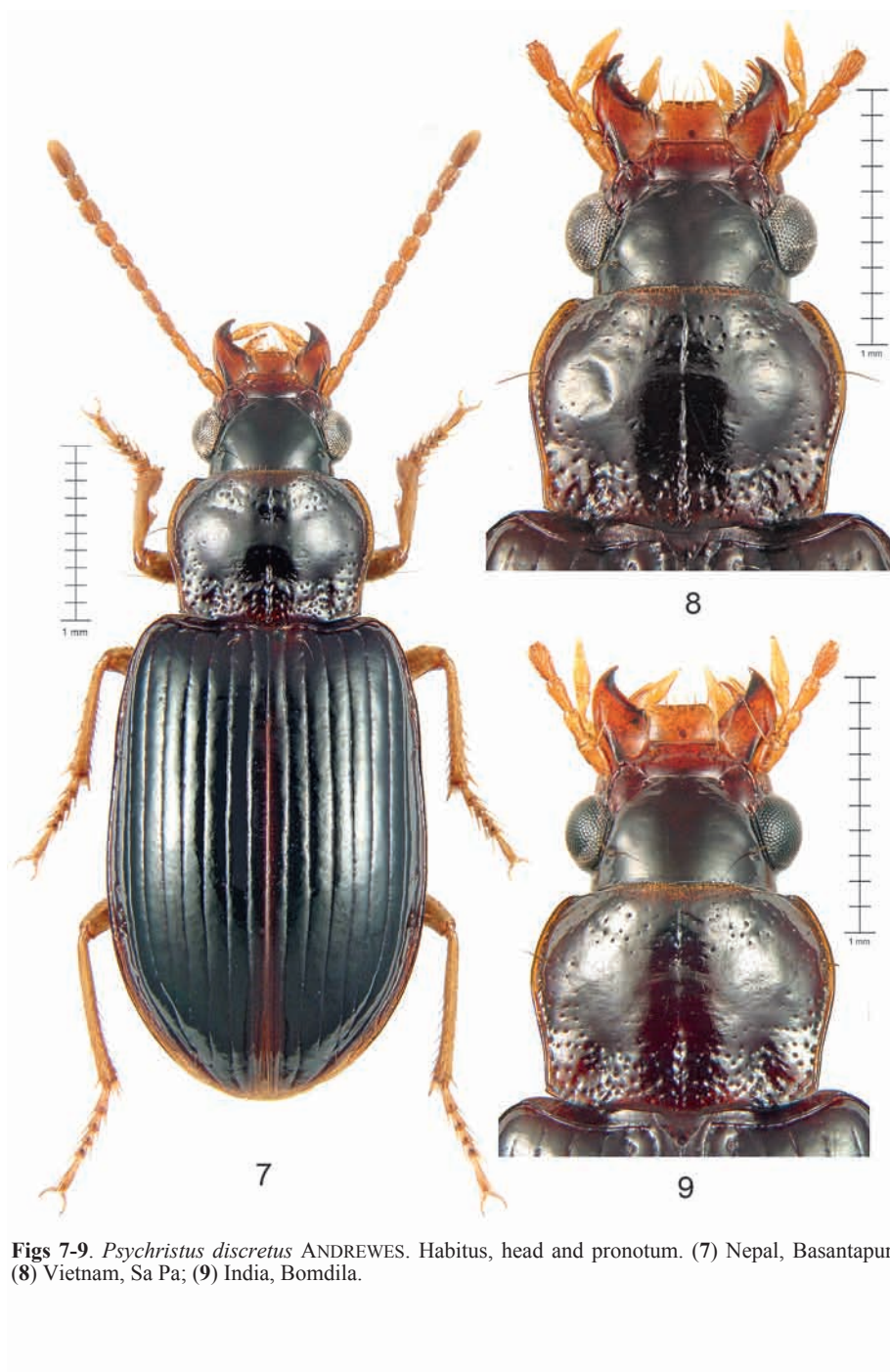
Table 2. Ranges of ratios between different body measurements for female specimens of the *P. discretus* group. Means in parentheses. See Figure 32 and Methods for definition of parameters.

	<i>P. brunneus</i>	<i>P. dentatus</i>	<i>P. discretus</i>	<i>P. shibatai</i>
specimens	20	2	20	2 (only Taiwan)
BL	3.6-4.2 (3.9)	4.1	4.0-4.6 (4.3)	3.6-3.7 (3.7)
HW/PW	0.84-0.92 (0.87)	0.73	0.76-0.81 (0.78)	0.77-0.79 (0.78)
PW/HW	1.09-1.19 (1.15)	1.38	1.25-1.32 (1.29)	1.26-1.30 (1.28)
PW/PL	1.23-1.34 (1.28)	1.23-1.25 (1.24)	1.23-1.35 (1.31)	1.29-1.32 (1.30)
EW/PW	1.32-1.42 (1.38)	1.37-1.39 (1.38)	1.51-1.61 (1.56)	1.46-1.52 (1.49)
EL/EW	1.51-1.61 (1.57)	1.57-1.58 (1.58)	1.48-1.57 (1.53)	1.47-1.48 (1.47)
EL/PL	2.70-2.85 (2.78)	2.69-2.71 (2.70)	3.00-3.25 (3.12)	2.81-2.88 (2.84)
AL/PL	1.74-1.88 (1.81)	1.77-1.89 (1.83)	1.70-1.89 (1.80)	1.72-1.75 (1.74)
AL/EL	0.64-0.68 (0.65)	0.66-0.70 (0.68)	0.56-0.60 (0.58)	0.61-0.61 (0.61)
PBaW/PW	0.79-0.85 (0.82)	0.84	0.83-0.91 (0.88)	0.88-0.90 (0.89)
HW/HWbE	1.55-1.65 (1.61)	1.42-1.43 (1.43)	1.54-1.63 (1.59)	1.68-1.71 (1.69)



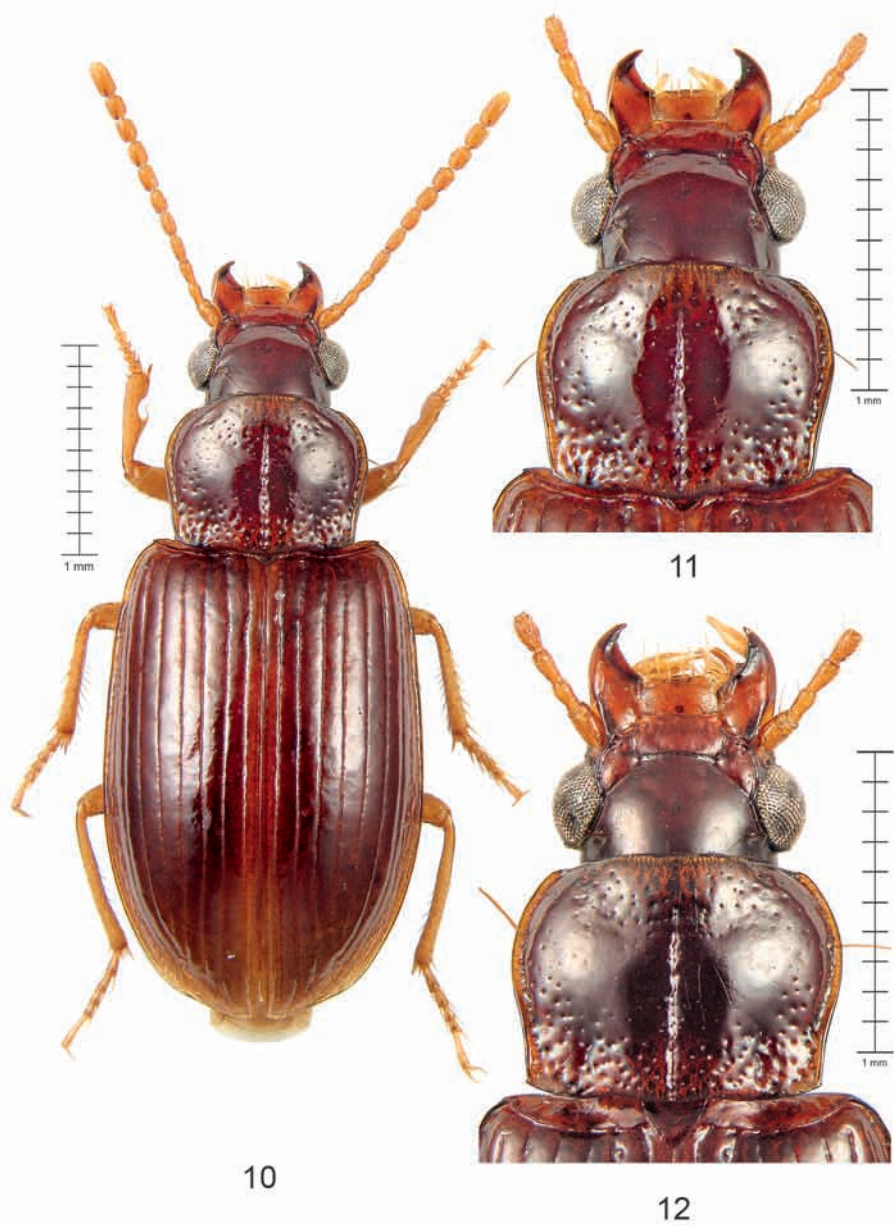
Figs 1-3. *Psychristus dentatus* nov.sp. Habitus, head and pronotum. (1-2) Paratype; (3) Holotype.





Figs 7-9. *Psychristus discretus* ANDREWES. Habitus, head and pronotum. (7) Nepal, Basantapur; (8) Vietnam, Sa Pa; (9) India, Bomdila.

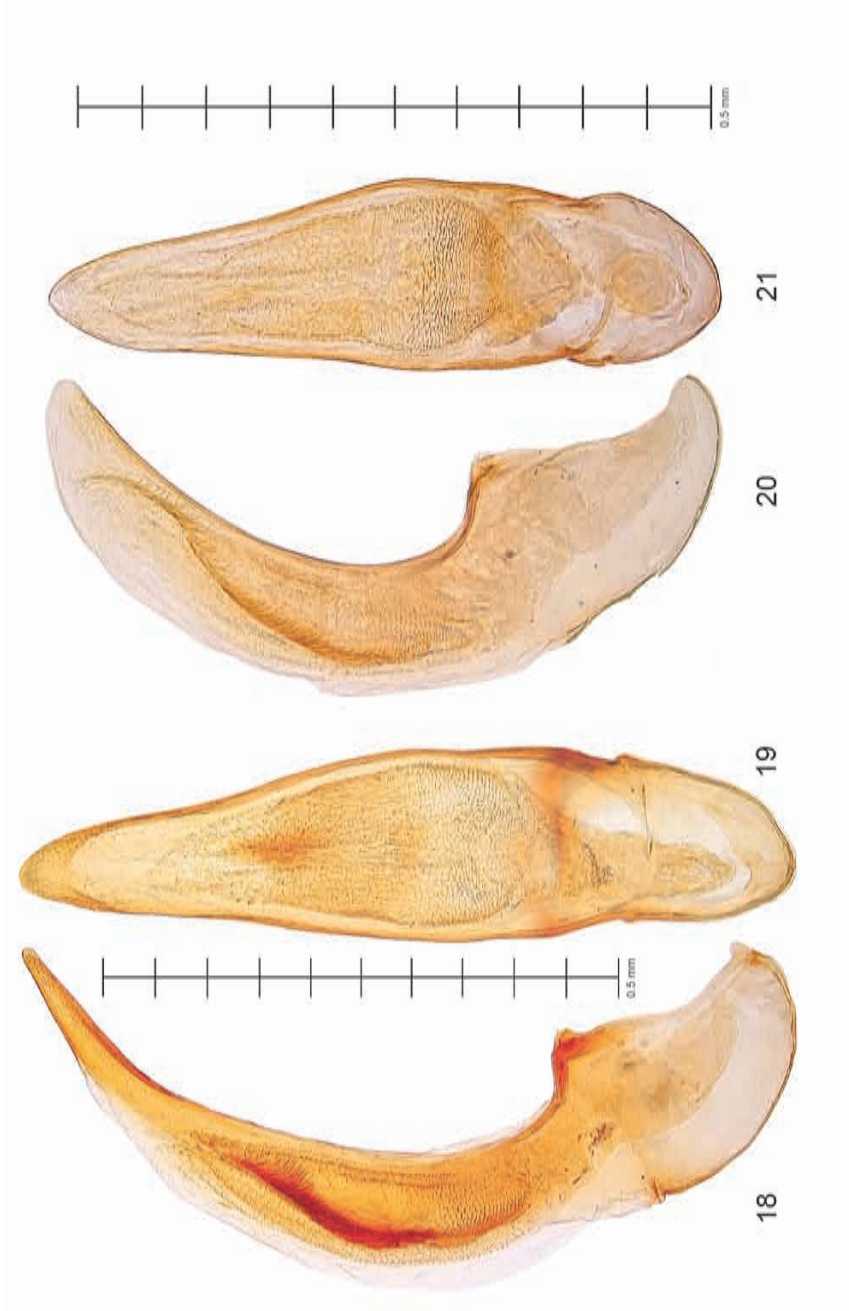
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Figs 10-12. *Psychristus shibatai* ITO. Habitus, head and pronotum. (10-11) Paratype, Taiwan, Wushe; (12) Female, Mt. Kwena.



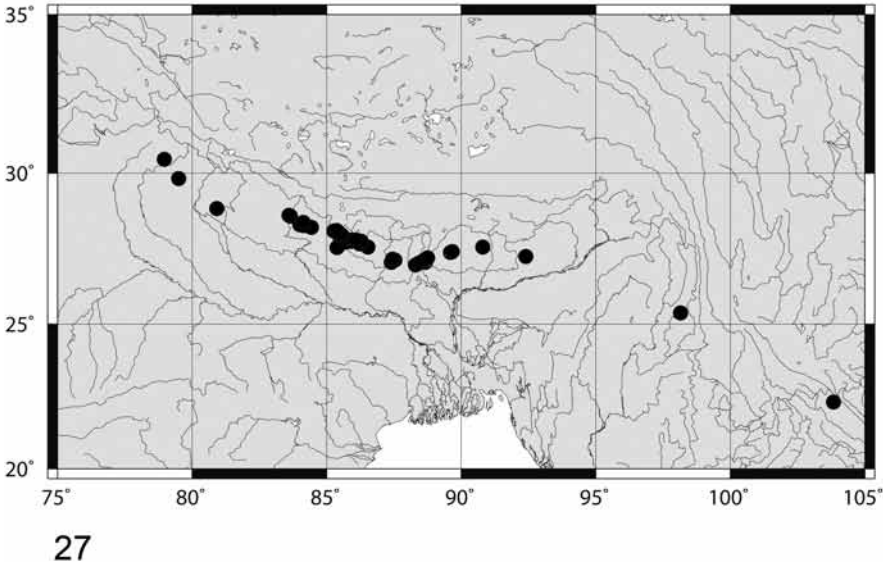
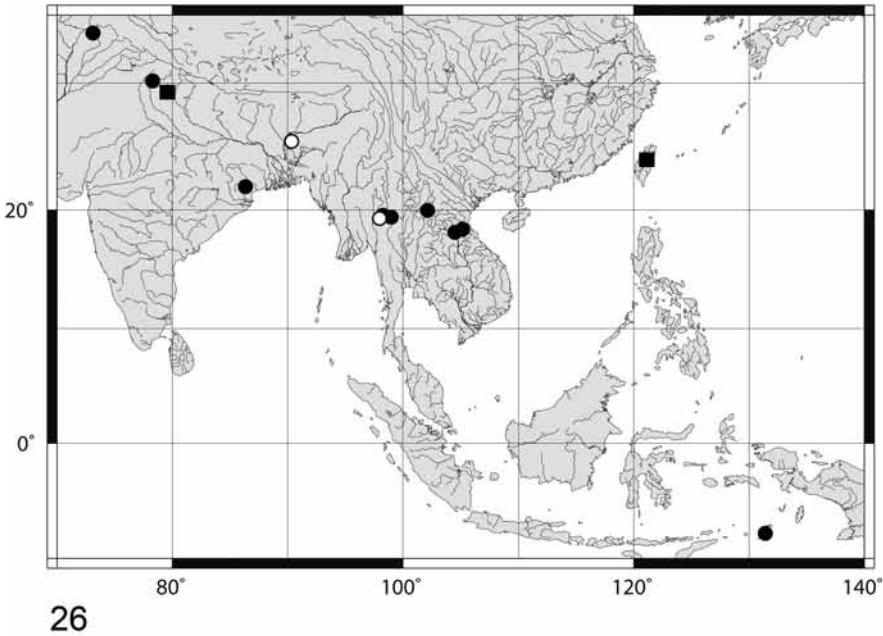
Figs 13-17. *Psychristus brunneus* nov. sp. Median lobe of aedeagus, lateral and dorsal aspect. (13, 17) Paratypes, India, Simlipal; (14) Paratype, Indonesia, Tanimbar Islands; (15) Paratype, Thailand, Soppong; (16) Holotype.



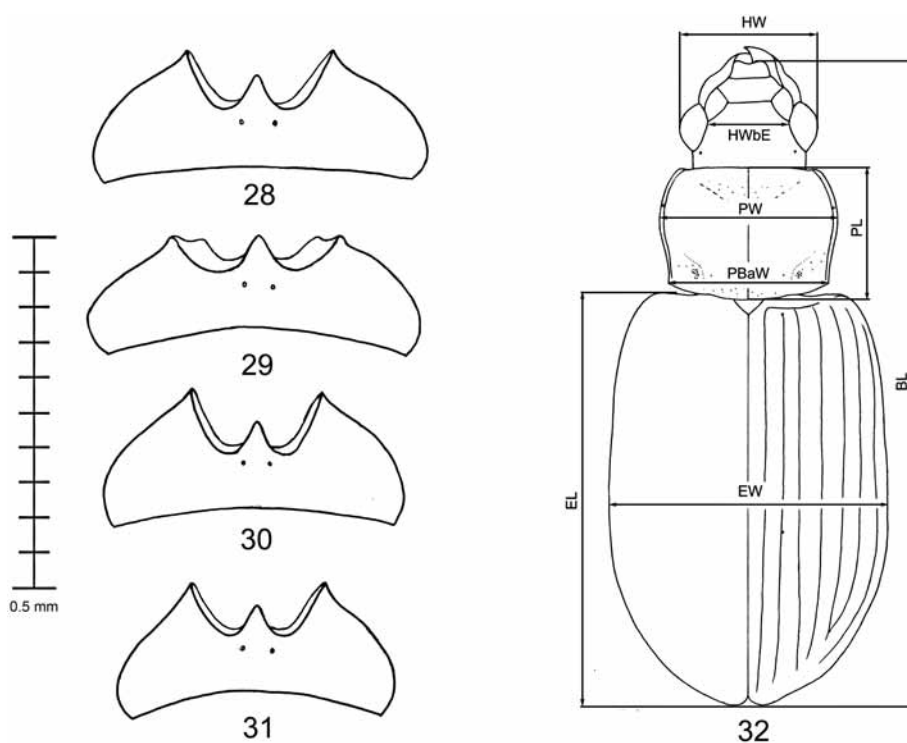
Figs 18-21. Median lobe of aedeagus, lateral and dorsal aspect. (18-19) *Psychristus discretus* ANDREWES (India, Bomdila); (20-21) *P. hibatai* ITO (Paratype, Taiwan, Wushe).



Figs. 22-25. Female genitalia. Hemisternite and gonocoxa. (22) *Psychristus dentatus* nov.sp., (Holotype); (23) *P. brunneus* nov.sp. (Paratype, Laos, Ban Khoun Ngeun); (24) *P. discretus* ANDREWES (India, Bomdila); (25) *P. shibatai* ITO (Taiwan, Mt. Kwena).



Figs 26-27. Distribution. (26) *P. dentatus* nov.sp. (open circles), *P. brunneus* nov.sp. (filled circles) and *P. shibatai* ITO (filled squares); (27) *P. discretus* ANDREWES.



Figs 28-32. Mentum and definition of measurements. **(28)** *Psychristus dentatus* nov.sp. (Holotype); **(29)** *P. brunneus* nov.sp. (Paratype, India, Similipal); **(30)** *P. discretus* ANDREWES (Nepal, Lamjung Himal); **(31)** *P. shibatai* ITO (Taiwan, Mt. Kwenä).

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Autor(en)/Author(s): Jaeger Bernd

Artikel/Article: [Two new species of *Psychristus* subgenus *Psychristus* ANDREWES 1930 from Southeast Asia, India and Pakistan, with additions to the *Psychristus discretus* group \(Col., Carabidae\) 1635-1657](#)