

A taxonomic revision of *Parallelodemus* Faust from South China (Coleoptera, Curculionidae, Baridinae), with notes on sexually dimorphic characters

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Abstract

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Nine species of *Parallelodemus* Faust are reported from China. In addition to the previously recorded *P. impar* Voss, we found *P. docile* Faust, *P. vicinum* Faust and the following six species newly described herein: *P. dimetans* **sp. n.**, *P. feae* **sp. n.**, *P. petilum* **sp. n.**, *P. plumosum* **sp. n.**, *P. setifrons* **sp. n.** and *P. tumens* **sp. n.** *Parallelodemus tarsale* Voss from Java is transferred to *Lepidomyctides* Yoshihara and Morimoto (**comb. n.**). Lectotypes are designated for *P. docile*, *P. imperfectum* Faust, *P. perfectum* Faust, *P. tardum* Faust and *P. vicinum*. Several morphological modifications with unknown functions are documented, illustrated and discussed. Males of some species have special setae on rostrum, antennal scape and mesotarsus. A medially notched epistome apparently occurs in both sexes but seems to wear off in females, probably during the preparation of oviposition sites. The mandible is unusual in having a convex, edentate inner face and incisor-like structures on the outer face.

Introduction

Among the currently accepted 548 genera of baridine weevils, *Parallelodemus* Faust is notable for having numerous morphological peculiarities. Faust (1894) noticed modified setae on the male mesotarsus of two of his five species and a loss of the two distal tarsites in another [actually present but minute]. Voss (1941) commented on the basally bifurcate prosternum of female *P. impar* Voss, and Marshall (1945) and Morimoto and Yoshihara (1996) on apparently abducent mandibles. To this one may add the frequently worn female epistome and marked sexual dimorphism of further body parts, such as rostrum, antennal scape and eye, in at least some species. However, this interesting genus is taxonomically challenging because of great morphological similarity of the species, pronounced sexual dimorphism and scarcity of material in collections. China is presently the only country with noteworthy collections of *Parallelodemus*. In this paper, we revise the Chinese species and document taxonomically important characters of the genus.

Material and methods

Our study is based primarily on specimens of the Institute of Zoology of the Chinese Academy of Sciences (IZCAS), which were collected during the past 60 years. Their collecting data are transcribed herein to Pinyin (original Chinese spelling is given for primary types) and we provide the unique IZCAS database identifiers in square bracket behind the collecting date. Additional specimens were studied from the following collections: Forschungsmuseum Alexander Koenig, Bonn, Germany (AKMB); Natural History Museum, London, UK (BMNH); Bernice P. Bishop Museum, Honolulu, Hawaii (BPBM); Canadian Museum of Nature, Ottawa, Canada (CMNC); Naturhistorisches Museum Basel, Switzerland (NHMB); Jens Prena personal collection, Rostock, Germany (JPPC); Museo civico di storia naturale Giacomo Doria, Genoa, Italy (MSNG); Senckenberg Naturforschendes Museum, Frankfurt a. Main, Germany (SFFM); Senckenberg Naturhistorische Sammlungen, Dresden, Germany (SNSD); Zhejiang A & F

University, Zhejiang, China (ZAFU) and Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia (ZIN). The above codens are used to refer to collections in the text. A total of 154 specimens was examined. Faust returned approximately half of the type series of his newly described species to L. Fea (the owner) and shared the rest with L. v. Heyden. Whenever possible, we designated as lectotype a male from the material returned to Fea and ignored the unpublished designations in Faust's retained material, which were made by museum staff subsequent to the acquisition of his collection.

If not provided on the label, coordinates of collecting sites were determined with GoogleEarth. Approximate collecting sites of Fea's specimens, from his 1885–89 journey to Myanmar, were estimated based on his travel itinerary (Vinciguerra 1890; Fea 1896). Descriptions are structured hierarchically, i.e., constant generic characters are not repeated in the descriptions of species. We found no evidence for a species with a sexually dimorphic epistome. However, the female epistome apparently wears off so we described it only for the male. Measurements of length were taken with an ocular micrometer in a stereomicroscope. Total length was measured from the anterior margin of eye to the abdominal apex in dorsal view. Length-width ratios of the penis are approximate values which do not take into account curvature. Illustrations were prepared from images taken with a Micropublisher 5.0 RTV digital CCD camera mounted on a Zeiss STEREO Discovery V12 or a Canon EOS 650D on a Leica DM2500 compound microscope. Aldus Freehand was used for vector graphics and Adobe Photoshop for pixel-based artwork. All genitalia illustrations were prepared from specimens collected in China. Explanations for morphological terms can be found at <http://weevil.info/glossary-weevil-characters>. Our weevil classification follows Oberprieler et al. (2014) except that we maintain Baridinae and Ceutorhynchinae as separate subfamilies.

Taxonomy

Genus *Parallelodemas* Faust

Parallelodemas Faust, 1894: 306. Type species *Parallelodemas perfectum* Faust, by subsequent designation (Morimoto and Yoshihara 1996). Gender originally female, changed to neuter because of the grammatical gender of the Ancient Greek base word δέμας (Alonso-Zarazaga and Lyal 1999).

Diagnosis. Species of *Parallelodemas* can be recognized by characteristically elongate body (Fig. 1), medially notched epistome (which often is worn in females) and exodontous mandibles with evenly convex inner face (Fig. 3). Superficially, they resemble species of the conoderine subtribe Phaenomerina (see Morimoto 1961), but those have incrassate, ventrally dentate femora and larger eyes. The characters on the mandible and epistome separate

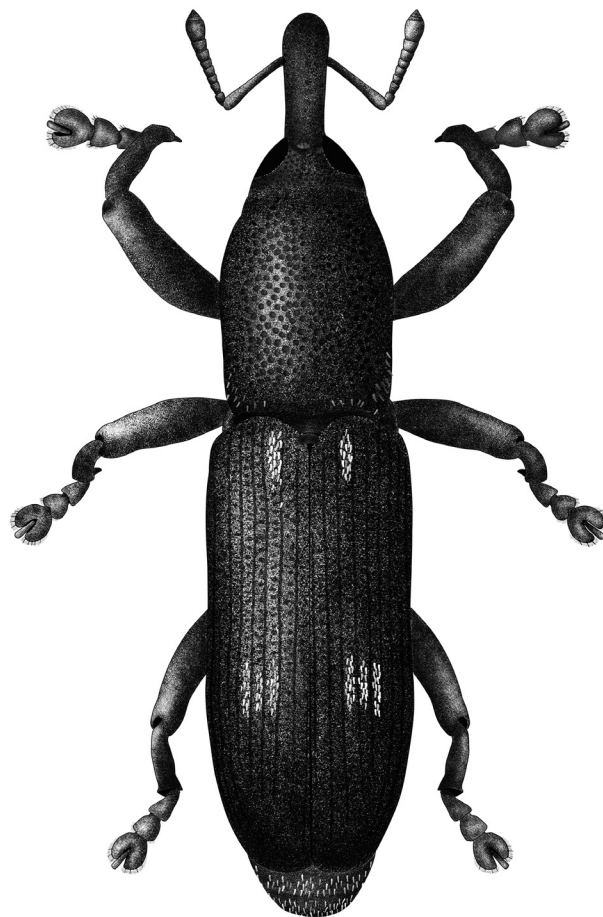


Figure 1. *Parallelodemas docile*, dorsal habitus (length 5.2 mm).

Parallelodemas from certain grass- and sedge-associated, primarily Palaeotropical Baridinae with similarly slender rostrum and elongate body. The latter complex includes *Eumycterus* Schönherr, 1838; *Trephognathus* Marshall, 1945; *Neosharpia* Hoffmann, 1956; *Caenobaris* Nasreddinov, 1980; *Lepidomyctides* Yoshihara & Morimoto, 1994 and several species currently placed in other genera.

Misplaced species. Yoshihara and Morimoto (1994) recognized that *Parallelodemas tarsale* Voss, 1937 is a species near *Eumycterus* and *Lepidomyctides* but they had very little material of those genera. We studied five Oriental species near *P. tarsale* (BPBM, IZCAS, SNSD, ZIN) and several species of *Caenobaris*, *Eumycterus*, *Neosharpia* and *Trephognathus* Marshall from Africa, Central Asia and India. While *Eumycterus* and its probable synonym *Trephognathus* can be distinguished by vertically moving mandibles (Marshall 1945; Korotyaev 2002), we were unable to recognize or to confirm the generic limits of the remaining species. We transfer here *P. tarsale* to *Lepidomyctides* in the widest sense, as *Lepidomyctides tarsalis* (Voss), new combination.

Redescription. Habitus: Total length 3.0–7.8 mm, width 0.8–2.2 mm; body slender subcylindrical (Fig. 1); integument black or brown, appendages and ventrites sometimes rufous; vestiture uniform or locally condensed to short vittae, setae either simple, squamiform, scalloped, deeply

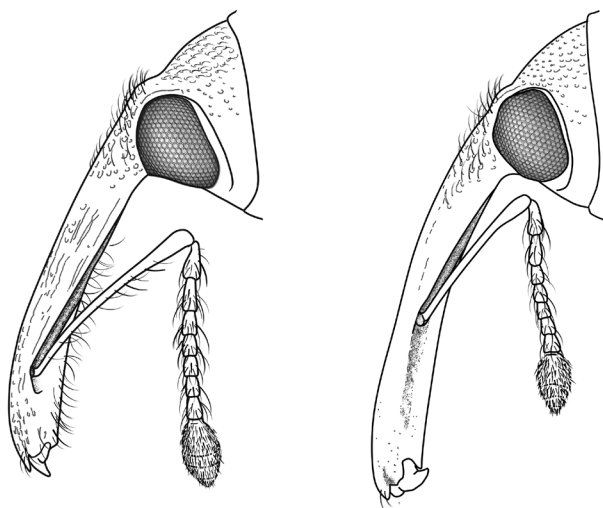


Figure 2. Rostrum of *P. impar*, male (left) and female (right), lateral view.

split or plumose. Head: Subspherical, contour often slightly warped at rostral base; eyes large, slightly encroaching on rostrum, bulging or flush with head contour, dorsally separated by width of rostrum at base; frontal fovea small to moderate; rostrum moderately elongate and slender, slightly curved, female with apical portion slightly inflated (Fig. 2); epistome produced and more or less notched, often worn off in females (Fig. 3); scrobe laterally descending, antenna inserted between midlength and apical fourth; funicle with 7 desmomes; club compact, spindle-shaped, basal article approximately as long as remainder of club, not annexed to distal desmome; mandibles with apparently abducent movement (away from center line and slightly ventrad), outer face with 1 large and 1–2 small secondary teeth, inner face convex and without teeth (Fig. 3). Prothorax: Barrel-shaped, elongate, nearly as wide as elytra. Anterior margin of pronotum not projected over frons, subapical constriction absent; basal margin bisinuous to accommodate projecting base of elytron; postocular lobe feeble or absent. Prosternum without median channel, rarely slightly depressed in front of coxae; subapical constriction slight to moderate; basal lobe partially projected over mesosternum, with basal margin bifurcate or (rarely) truncate. Pterothorax: Mesoscutellum visible, trapezoid to subquadrate. Mesosternum unmodified. Mesepimeron smaller and narrower than mesepisternum, ascending between pronotum and elytron and visible in dorsal view. Metasternum medially depressed in male, flat or convex in female. Elytra: Elongate, sides subparallel, apices rounded individually, humerus developed, subapical callus feeble or absent, base at interstriae 3–6 slightly depressed and somewhat projected; striae 10, narrow but distinct, stria punctures not or slightly affecting edge of interstriae, stria setae absent; interstriae flat, punctate to transversely rugose, interstria setae uniform or heterogeneous, modified setae restricted to basal and submedian vittae if present. Hindwings: Fully developed, length-width ratio 3.4–3.7, fore margin basally concave, anal lobe moderate, hind margin with setal fringe; venation



Figure 3. Rostrum of *P. plumosum*, male (left) and female (right), dorsal view, showing apex with epistome and mandibles.

agreeing with modal arrangement of subfamily (Zherikhin and Gratshev 1995). Abdomen: Ventrites unmodified, not or indistinctly sexually dimorphic. Sclerolepidia small to medium-sized, densely packed, digitate. Stridulatory devices absent. Male genitalia and associated structures: Tergite VII without plectra for stridulation; tergite VIII shorter than wide, distally without transverse carina; sternite VIII laterally with sclerotized pyriform area, medially desclerotized; sternite IX variously strongly curved, distal prongs narrowly to widely diverging but always symmetrical; penis dorsoventrally depressed, longer than basal apodemes; internal sac extending approximately to midlength of apodemes when inverted, with sclerite at insertion of duct or with pigmented flagellum; tegmen with ring dorsally closed, basal apodeme obsolete, parameroid lobes developed. Female genitalia and associated structures: Tergite VII longer than wide, without transverse carina, setal vestiture squamiform basally and piliform distally, plectra for stridulation absent; sternite VIII distally forked into weakly sclerotized, widely dilated, U-shaped arms; hemisternite pigmented, stylus 1.9–2.2× as long as wide, distal setae half as long as stylus; bursa pouch-like, half as long as vagina; spermatheca sclerotized, collum short, often somewhat bulbous, ramus inserted on outer face of collum (facing away from cornu), rudimentary to long; spermathecal duct unpigmented, at most slightly longer than spermatheca, inserted distally in bursa. Legs: Procoxae separated by less than 1/3 diameter of coxa; pro- and mesofemora clavate, hindfemur less expanded and often partially sulcate ventrally; tibiae straight to curved (depending on ventral profile of femur), ventrodistal spine spiniform, robust and large on pro- and mesotibiae but somewhat smaller on metatibia; tarsus with 5 segments, third with anterior margin faintly to deeply excised, fifth long to greatly reduced, claws flat and basally fused, or miniaturized and medially fused to single blade.

Diversity and distribution. With the six new species described in this study, *Parallelodemas* includes now a total of twelve. The scarce material gives an unrepresentative picture of the distributional ranges of individual species. Species of *Parallelodemas* have been found

in China, India, Laos, Malaysia, Myanmar, Taiwan and Vietnam. Their distribution is primarily Oriental but several reach the Palaearctic part of China, northward up to Shaanxi and Zhejiang.

Biology. The host plant of *Parallelodemus* apparently is unknown. One specimen of *P. docile* is labeled as being taken from Buttontree, *Anogeissus acuminata* (Roxburgh ex Candolle) Guillemain et al. (Combretaceae). Other specimens were swept from low vegetation. Females with fully developed eggs occur from late April to early June.

Sexual dimorphism. Rostrum. Species of *Parallelodemus* exhibit marked sexual dimorphism of characters on the rostrum. Females generally have a longer and smoother rostrum than males, with a more basally inserted antenna and slightly inflated apical portion (Fig. 2). Gender-related differences in the basal width of the rostrum (Fig. 8) are apparent but often inconspicuous. The ventral side of the rostrum is setose in male *P. impar*, *P. petilum* and *P. plumosum*. However, the most striking difference, the length and shape of the epistome, may be acquired secondarily rather than being truly sexually dimorphic. Nearly all examined males have a projected, medially notched epistome, whereas it is almost always short and truncate in females (Fig. 3). However, the presence of projected epistomes in some female *P. feae*, *P. impar*, *P. imperfectum* and *P. setifrons* suggests a secondary loss, probably through abrasion during the preparation of oviposition sites, because the distally divergent mandibles afford no protection of the epistome as in other weevils. However, this needs to be confirmed with freshly emerged specimens and field observations.

Antenna. Males generally have a longer scape than females (usually as long as the funicle). The distal margins of the male scape can be setose, such as in *P. impar* (Fig. 2).

Mandible. At a first glance, it appears as if *Parallelodemus* has swapped the left with the right mandible or rotated them by 180 degrees (Fig. 3). The inner face not only lacks any trace of incisors, it also is evenly convex from base to apex and seems therefore dysfunctional. Moreover, the outer face is concave and armed with two apparently ordinary incisors, just like the inner mandibular face of most baridine weevils. However, three landmarks on the mandible leave no doubt that the seemingly abducent mandibular movement evolved by reversing the function of the abductor and adductor tendons rather than by rotating the mandible, a trend seen in some weevils with a very slender rostrum (Marshall 1945): (1) The dorsal and ventral mandibular sockets (prearticular and postarticular) are formed and located as in other Baridinae; (2) the mandibular setae are located on the outer face (between the basal incisors); and (3) the pharyngeal process is attached to the inner basal angle of the mandible. From this it follows that the incisors on the outer face are secondarily evolved structures and analogous to the inner incisors of other weevils. Morimoto and Yoshihara (1996) suggested an inversion of the mandibular movement from adducent to abducent. The laterally deeply excised mandibular articulation and widely divergent mandibles in many mounted specimens support this conclusion. Unfortunately,

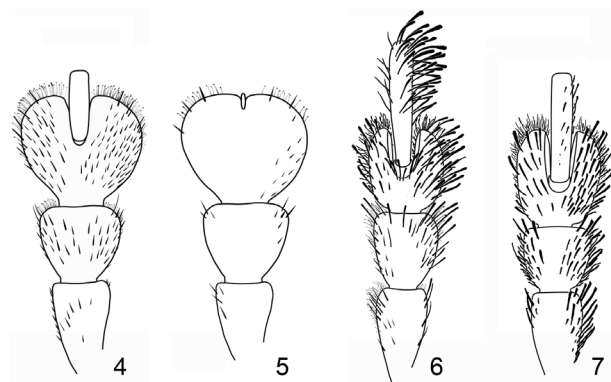
we could obtain neither direct field observations nor fresh specimens for scanning the abductor and adductor tendons.

Eye. While almost all Baridinae have eyes that are flush with the head contour, they are protruded in several *Parallelodemus* species. The eyes of male *P. setifrons* protrude more than those of females (Fig. 8), but the dorsal and ventral distance between them and their circumference are not affected. The increased eye surface affords more facets in the male but facet diameter is the same.

Leg. Several *Parallelodemus* species have large, deviant setae on the mesotarsus which crowd toward the distal (outer) half. These setae are arranged asymmetrically on the fifth (claw-bearing) tarsite and are much larger and more numerous in males than in females (Figs 6, 7). The individual tarsites, in particular the fifth, are often more elongate in males than in females. Males often have faintly thicker pro- and mesofemora than females.

Tergites. Like in other Baridinae, the eighth tergite is developed in males but internalized in females. Because the distal external tergite protrudes beyond the elytral apex well enough to expose the suture between the seventh and eighth tergites in males, this character is very useful for sexing specimens.

Ventrites. The male metaventrite is medially depressed and, together with the first abdominal ventrite, may have less setae than the female's. Voss (1941) mentioned a sexually dimorphic basal process on the prosternum of *P. impar*, but he either had a mixed series or his observation was incorrect.



Figures 4–7. Left mesotarsus of *Parallelodemus*, dorsal view: 4. *P. docile*; 5. *P. imperfectum*; 6. *P. vicinum*, male; 7. *P. vicinum*, female. Not to scale.

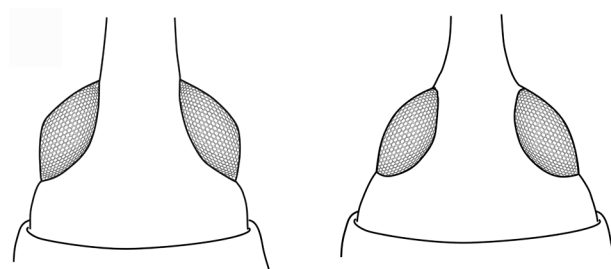


Figure 8. *Parallelodemus setifrons*, dorsal view of head showing sexually dimorphic protrusion of eyes and rostral width (left male, right female).

Key to the species of *Parallelodemus* found in China

- 1 Thoracic sternites with plumose or deeply split setae 2
- Thoracic sternites with simple or scalloped, indistinctly split setae 5
- 2 Thoracic sternites with bi- and trifold setae, plumose setae absent 3
- Thoracic sternites with plumose setae 4
- 3 Eyes slightly bulging; male rostrum glabrous ventrally; total length 3.6–4.3 mm *P. dimetans*
- Eyes distinctly bulging; male rostrum hirsute ventrally; total length 3.0–3.7 mm *P. petilum*
- 4 Frons at most with a few setae; eyes slightly bulging in both sexes; penis with apex gradually rounded (Fig. 14), internal sac with harpoon-shaped sclerite; total length 3.6–5.4 mm *P. plumosum*
- Frons hirsute; eyes distinctly bulging in male; penis with apex distinctly pointed and produced (Fig. 15), internal sac medially with small, fennel-seed-like sclerite and near duct with sclerotized area with spinose lateral projection; total length 3.0–3.9 mm *P. setifrons*
- 5 Tarsite 3 large, anterior margin slightly to moderately excised (Figs 4, 5); claws miniaturized, not longer than fifth tarsomere wide 6
- Tarsite 3 small, anterior margin deeply excised beyond middle (Figs 6, 7); claws longer 7
- 6 Tarsite 5 inserted near middle and exceeding anterior margin of tarsite 3 by half its own length (Fig. 4); male rostrum distinctly shorter than pronotum; total length 4.5–6.2 mm *P. docile*
- Tarsite 5 minute, inserted in distal fifth and barely exceeding margin of tarsite 3 (Fig. 5); male rostrum as long as pronotum; total length 5.4–6.4 mm; Myanmar *P. imperfectum*
- 7 Eyes bulging; profemur slender, subdistally gradually converging; male rostrum ventrally setose; male antenna inserted in apical third of rostrum *P. impar*
- Eyes nearly flush with head contour; profemur clavate, subdistally noticeably constricted in lateral view; male rostrum ventrally glabrous; male antenna inserted in mid-third of rostrum 8
- 8 Male mesotarsus without clavate setae; male antenna with scape glabrous along proximal edge; prosternum in front of coxa often tumescent in lateral view; aedeagus apically lancet-shaped 9
- Male mesotarsus with clavate setae; male antenna with scape setose along proximal edge; prosternum in front of coxa usually gradually sloping in lateral view; aedeagus subparallel 10
- 9 Rostrum shorter (male $<0.95\times$, female $1.04\times$ length of pronotum); male antenna inserted more distally (prorostrium $0.33\times$ length of rostrum); total length 5.4–6.6 mm; Myanmar *P. tardum*
- Rostrum longer (male $>1.05\times$, female $1.20\times$ length of pronotum); male antenna inserted more basally (prorostrium $0.42\times$ length of rostrum); total length 3.8–4.8 mm; China (Guizhou) *P. tumens*
- 10 Profemur hirsute ventrally; metepisternum with squamiform setae rather evenly distributed; total length 4.9–6.5 mm *P. feae*
- Profemur squamose ventrally; metepisternum with squamiform setae increasingly larger and denser in distal section; total length 6.4–7.8 mm 11
- 11 Metepisternum distally with imbricate squamiform setae; male profemur moderately expanded ventrally; penis with apex truncate (Fig. 20) *P. vicinum*
- Metepisternum distally with more widely spaced squamiform setae; male profemur strongly clavate, ventrally almost angular; penis with apex narrowly rounded (as *P. feae*, Fig. 19); Myanmar *P. perfectum*

***Parallelodemus dimetans* Prena & Zhang, sp. n.**

<http://zoobank.org/596CADD7-085B-42F5-A76D-7DF7F6B4CDC2>

Diagnosis. This small species can be recognized by the presence of slender, bi- or trifold setae on the thoracic ventrites and ventrally glabrous male rostrum. *Parallelodemus petilum* is the only other known species with such setae but the male rostrum is hirsute.

Description. Length 3.6–4.3 mm, width 1.0–1.2 mm; integument dark brown, antenna, tarsus, apex of female rostrum and often other parts of leg brown or rufous; ventral side and pygidium with simple, slender setae, thoracic sterna also with bi- and some trifold setae, basic vestiture of fine setae on pronotum and elytron, somewhat larger white setae at base of elytral interstria 3 and postmedially on interstriae 3 and 4; eyes slightly bulging;

frons and base of rostrum with some recumbent setae; male rostrum $1.07\times$ as long as pronotum, ventrally without setae, prorostrium $0.41\text{--}0.42\times$ rostral length, slightly spatulate and apically diverging in dorsal view, epistome slightly notched, antennal scape with a few long setae, club $1.7\times$ as long as wide; female rostrum $1.02\text{--}1.11\times$ as long as pronotum, prorostrium $0.47\text{--}0.51\times$ rostral length; prosternum gradually sloping in front of coxa, basal lobe notched; all femora hirsute ventrally; tarsus with tarsite 3 relatively small and excised to basal third, tarsite 5 shorter than 2+3 and distinctly protruding beyond anterior margin of 3, male mesotarsus with long, distally pointed setae; penis $2.5\times$ as long as wide, apex roundly narrowed and slightly projected medially (Fig. 12), internal sac with harpoon-like sclerite and small sclerotized area near duct; spermatheca with nodulus and ramus short (Fig. 21).

Distribution. The species is known only from China (Guizhou).

Material examined. Holotype: China, Guizhou Province, Suiyang County, Kuankuoshui [宽阔水] Natural Reserve, Xiangguang Village [香广山村], 27.9798 N 107.1661 E, 1550 m, 4.vi.2010 [#1500871], Wang Zhiliang [王志良], male (IZCAS). Paratypes (3 males, 10 females): CHINA. Guizhou: Suiyang, Kuankuoshui Natural Reserve, Forestry Station Holiday Center, 1206 m, 5.vi.2010 [#1500879], Wang Zhiliang (IZCAS 1); Suiyang, Kuankuoshui Natural Reserve, Gongtong ravine, 6.vi.2010 [#1500880], Nie Cuie (IZCAS 1); Suiyang, Kuankuoshui Natural Reserve, Jinzi Village, 3.vi.2010 [#1500876–78], Wang Zhiliang (IZCAS 3); Suiyang, Kuankuoshui Natural Reserve, Xiangguang Village, 4.vi.2010 [#1500872–74], 8.vi.2010 [#1500875], Wang Zhiliang (IZCAS 4); Suiyang, Kuankuoshui Natural Reserve, 3.vi.2010 [#1500867–68], 4.vi.2010 [#1500869], Liu Wangang (IZCAS 3); Suiyang, Kuankuoshui Natural Reserve, Baishao ravine, 8.vi.2010 [#1500882], Nie Cuie (IZCAS 1).

Etymology. The name is a participle presence active of *dimeto* (=to delimit, to mark-off; Latin).

***Parallelodemas petilum* Prena & Zhang, sp. n.**

<http://zoobank.org/ED12DF0F-C531-4943-B5CA-14C8AECAAB0A>

Diagnosis. Our material includes seven small specimens from three sites (3 Shaanxi, 1 Sichuan, 3 Vietnam), which form a close-nit complex of probably three species. They have bulging eyes, thoracic ventrites with bifid setae, a ventrally setose male rostrum and a slender penis with very long flagellum. Differences occur in the apical shape of the penis (Shaanxi – triangular; Sichuan – narrowly rounded; Vietnam – slightly projected) and the first abdominal ventrite (Vietnamese specimens with a pair of tubercles between the metacoxae). We describe the three specimens from Shaanxi as *P. petilum* and informally assign to this complex the four others. Similar species are *P. dimetans* (with nearly flush eyes) and *P. setifrons* (with plumose setae).

Description. Length 3.0–3.7 mm, width 0.8–1.0 mm; integument dark brown to nearly black, appendages partially light brown; meso- and metathoracic sternites with bi- and trifid setae, pronotum and elytron with basic vestiture of very fine setae; eyes bulging; frons and base of rostrum with recumbent setae; male rostrum 0.93–1.12× as long as pronotum, ventrally with long setae, prorostrum 0.39–0.40× rostral length, slightly spatulate and apically diverging in dorsal view, epistome moderately deeply notched, antennal scape with a few long setae, club 2.6× as long as wide; female rostrum 1.14× as long as pronotum, prorostrum 0.50× rostral length; prosternum gradually sloping in front of coxa, basal lobe moderately notched; all femora hirsute ventrally; tarsus with tarsite 3 excised to basal third, tarsite 5 as long as 2 and distinctly protruding beyond anterior margin of 3, male mesotarsus

with moderately long, clavate, outward directed setae; penis 7× as long as wide, apex triangularly narrowed (as *P. plumosum*, Fig. 14), with sclerotized flagellum almost as long as penis and apodemes combined; spermatheca with collum and nodulus forming poorly differentiated bulbous unit, ramus as long as wide (Fig. 22).

Distribution. The species (in the strict sense) is known from the Chinese province Shaanxi.

Material examined. Holotype: China, Shaanxi Province, Huoditang forest farm [火地塘林场], 1559 m, 33.4343 N 108.4480 E, 14.viii.2013, Jiang Chunyan [姜春燕], male, dissected, #1941160 (IZCAS). Paratypes (1 male, 1 female): same data as holotype, male, #1941162 (IZCAS 1), female, #1941161 (IZCAS 1). Other material: CHINA. Sichuan: Mount E'mei, Jiulao cave, 1800–1900 m, 1.viii.1957 [#1500865], Lu Youcai, male (IZCAS 1). VIETNAM. Cao Bang Prov.: Mount Pia Oac, 7.vi.2011, S. Lingafelter, 2 males, 1 female (IZCAS 1, JPPC 2).

Etymology. The name is a Latin adjective for slender or gaunt.

***Parallelodemas plumosum* Prena & Zhang, sp. n.**

<http://zoobank.org/1D130D15-F6BC-4F76-AC26-78B10E438383>

Diagnosis. This species can be distinguished from *P. setifrons*, the other known species with plumose setae, by glabrous frons and slightly protruding eyes in both sexes. *Parallelodemas dimetans* and *P. petilum* have at most trifid setae.

Description. Length 3.6–5.4 mm, width 1.0–1.4 mm; integument black, antenna and tarsi dark brown; ventral side with plumose setae, pygidium with bifid setae, pronotum and elytron with basic vestiture of very fine setae, elytron also with short vittae of plumose white setae at base of interstria 3 and postmedially on interstriae 3–5; eyes very slightly bulging; frons and base of rostrum with a few recumbent setae; male rostrum 0.94–1.06× as long as pronotum, ventrally without setae, prorostrum 0.40–0.43× rostral length and slightly spatulate in dorsal view, epistome moderately notched, antennal scape with a few long setae, club 1.8× as long as wide; female rostrum 1.00–1.04× as long as pronotum, prorostrum 0.49–0.51× rostral length; prosternum gradually sloping in front of coxa, basal lobe truncate; pro- and mesofemora hirsute ventrally; tarsus with tarsite 3 moderately large and excised to basal third, tarsite 5 nearly as long as 1 and distinctly protruding beyond anterior margin of 3, with long, distally unmodified setae in both sexes; penis 3× as long as wide, roundly narrowed to subtriangular tip (Fig. 14), internal sac with harpoon-like sclerite; spermatheca with nodulus short and thick, ramus as long as wide (Fig. 24).

Distribution. The species occurs in China (Fujian, Hainan) and Taiwan.

Material examined. Holotype: China, Fujian Province, Jianyang [建阳], Chong'an Xin Village [崇安新村], Sangang [三港], 740 m, 27.7489 N 117.6831 E, Pu Fuji [蒲富基], 14.v.1965, male, dissected, #1799537 (IZ-

CAS). Paratypes (13 males, 6 females): CHINA. Fujian: Jianyang, Chong'an Xin Village, Qili Bridge, 12.vii.1963 [#1500864], Zhang Youwei (IZCAS 1); Jianyang, Chong'an Xin Village, Sangang, 29.v.1960 [#1799132], 4.vi.1960 [#1500862], 7.vi.1960 [#1799540], Jiang Shengqiao (IZCAS 3), 6.vii.1960 [#1799529], Pu Fuji (IZCAS 1), Zhang Yiran (IZCAS 1), 14.v.1965 [#1500863]; Jianyang, Chong'an Tongmuguan Guanping, 22.v.1960 [#1799136], Jiang Shengqiao (IZCAS 1); Mount Wuyi, Guadun, 3.vii.1982 [#1500861], Jiang Fan (IZCAS 1). Hainan: Qiongzong, Mount Wuzhi, ancient plant path, 29.vii.2009 [#1500852], Liang Hongbin (IACAS 1), 30.xi.2009 [#1879661–62, #1879689], Zhang Kuiyan & Lin Meiyang (IZCAS 3); Qiongzong, Mount Wuzhi, main peak, 28.xi.2009 [#1879660], Huang Lina (IZCAS 1); Qiongzong, Mount Wuzhi, Shuiman Village, 30.vii.2009 [#1500853–54], Huang Xinglei (IZCAS 2); Mount Diaoluo, Holiday Village, 12.xii.2008 [#1500851], Wang Zhiliang (IZCAS 1). TAIWAN. Nanjing: Wushe, 3.v.1983 (2×), 10.v.1983, H. Townes (CMNC 3).

Etymology. The name is a Latin adjective meaning plumed, or with feathers.

***Parallelodemas setifrons* Prena & Zhang, sp. n.**

<http://zoobank.org/3F48D0AF-32EE-47DE-A838-8B37AECD3F7B>

Diagnosis. Useful characters for identification are plumose setae, hirsute frons and sexually dimorphic eyes. *Parallelodemas petilum* is similar but has at most trifid setae and a ventrally hirsute male rostrum.

Description. Length 3.0–3.9 mm, width 0.9–1.0 mm; integument dark brown, antenna, legs and apex of rostrum light brown; meso- and metathoracic sterna with plumose setae (condensed on metepisternum), prosternum, abdominal ventrites and pygidium mostly with bi- and trifid setae, pronotum and elytron with basic vestiture of fine setae, elytron also with short vittae of white, moderately wide, simple or bifid setae at base and postmedially on interstriae 3–5; eyes distinctly (male) or slightly (female) bulging; frons and base of rostrum with recumbent setae; male rostrum 0.84–0.90× as long as pronotum, ventrally with long setae, prorostrum 0.43–0.48× rostral length and slightly spatulate in dorsal view, epistome slightly notched, antennal scape without long setae, club 1.4–2.4× as long as wide (depending on length of rostrum); female rostrum 0.84–1.00× as long as pronotum, prorostrum 0.49–0.57× rostral length; prosternum gradually sloping in front of coxa, basal lobe notched; all femora hirsute ventrally; tarsus with tarsite 3 relatively small and excised to basal third, tarsite 5 nearly as long as 1 and distinctly protruding beyond anterior margin of 3, male mesotarsus with moderately long, clavate, outward directed setae; penis 2.5× as long as wide, with small, apically rounded projection (Fig. 15), internal sac medially with small, fennel-seed-like sclerite and with sclerotized area with spinose lateral projection near duct; spermatheca (Fig. 24)

with nodulus as long as wide and perpendicular to long axis of collum, ramus as long as nodulus.

Distribution. The species is known from China (Fujian, Guangdong, Guizhou, Hunan).

Material examined. Holotype: China, Fujian, Jianyang, Chong'an Xin Village [崇安星村], Sangang [三港], 27.7489 N 117.6831 E, 740 m, 29.v.1960, Zuo Yong [左永], male, dissected, #1799533 (IZCAS). Paratypes (5 males, 14 females): CHINA. Fujian: Dazhulan, Shaowu, 19.–25.v.1945 [#1941180] (IZCAS 1); Kuatun [=Guatun], 5.v.1938 (2×), 5.vi.1938, J. Klapperich (AKMB 3); Jianyang, Huangkeng Changba, 8.iv.1960 [#1500856], Jiang Shengqiao (IZCAS 1); Jianyang, Huangkeng Guilin, 5.iv.1960 [#1799536, #1799549], 14.iv.1960 [#1799139, #1799158], Jiang Shengqiao (IZCAS 4); Jianyang, 17.v.1965 [#1500855] (IZCAS 1); Jianyang, Sangang, Chong'an Xin Village, 14.v.1960 [#1799135], Pu Fuji (IZCAS 1), 29.v.1960 [#1799533], Zuo Yong (IZCAS 1). Guangdong: Ruyuan, Huangling, Mount Xiaohuang, 18.vii.2008 [#1799020], Li Yingchao (IZCAS 1); Nanling, Ruyang Natural Reserve Station, 19.vii.2008 [#1799016], Li Yingchao (IZCAS 1). Guizhou: Kuankuoshui Natural Reserve, Gongtong ravine, 7.vi.2010 [#1500866], Nie Cuie (IZCAS 1); Suiyang, Kuankuoshui Natural Reserve, Jinzi Village, 3.vi.2010 [#1500859], Wang Zhiliang (IZCAS 1); Suiyang, Kuankuoshui Natural Reserve, Xiangguang Village, Suiyang, 4.vi.2010 [#1500857–58], Wang Zhiliang (IZCAS 2); Suiyang, Kuankuoshui Natural Reserve, 4.vi.2010 [#1500860], Liu Fanggang (IZCAS 1). Hunan: Yizhang, Mount Mang, forest park west gate, 17.vii.2008 [#1799015], Li Yingchao (IZCAS).

Etymology. The name is a Latin noun in apposition composed of *seta* and *frons*.

***Parallelodemas docile* Faust**

Parallelodemas docilis [sic] Faust 1894: 309. Lectotype male, designated here, labeled “Carin Cheba/ 900-1100 m/ L. Fea V XII-88”, “docilis/ Faust”, “P./ docilis/ sp. n.”, “*Parallelodemas/ docilis/ ♂ sp. n.*”, “SYNTYPUS/ *Parallelodemas/ docilis/ Faust, 1894*”, “Museo Civico/ di Genova”, “Lectotype/ *Parallelodemas docile/ Faust (Prena & Zhang/ design. 2014)*” (MSNG). Paralectotypes 6: Carin Cheba, Myanmar (MSNG 3, SFFM 1, SNSD 2).

Diagnosis. The large, subcordate third and relatively short fifth tarsite (Fig. 4) are diagnostic for this species. *Parallelodemas imperfectum* Faust, the only other species with enlarged third tarsite, has an extremely miniaturized fifth tarsite (incorrectly stated to be absent by Faust 1894). Other useful characters are the short male rostrum and presence of dense vestiture on the distal three fourths of the metepisternum.

Redescription. Length 4.5–6.2 mm, width 1.1–1.6 mm; integument black, teneral specimens with ventrites

and legs partially dark rufous; ventral side with undivided setae, basic vestiture inconspicuous on pronotum and elytron, imbricate white squamiform setae at base of elytral interstria 3, postmedially on interstriae 3–5, on dorsal apex of mesepimeron, distal 3/4 of metepisternum, flank of prosternum, ventral face of pro- and mesofemora, dorsal face of metafemur and occasionally on basolateral angles of pronotum; eyes flush with head contour; frons and base of rostrum glabrous; male rostrum $0.78\text{--}0.83\times$ as long as pronotum, ventrally without setae, prorostrum $0.38\text{--}0.41\times$ rostral length and subcylindrical in dorsal view, epistome very slightly notched, antennal scape ventrally without long setae, club $1.6\times$ as long as wide; female rostrum $1.02\text{--}1.13\times$ as long as pronotum, prorostrum $0.50\text{--}0.53\times$ rostral length; prosternum gradually sloping in front of coxa, basal lobe slightly notched; pro- and mesofemora ventrally with recumbent squamiform setae; tarsus with tarsite 3 moderately large, subcordate and excised to middle, tarsite 5 as long as 3 and only moderately protruding beyond anterior margin of 3 (Fig. 4), inconspicuously setose in both sexes; penis $2.5\times$ as long as wide, apex subtriangular (Fig. 16), internal sac without discernible sclerite; spermatheca with nodulus and ramus short (Fig. 25).

Distribution. The species is known from China (Yunnan) and Myanmar.

Material examined. CHINA. Yunnan: Xishuangbanna Prefecture, Menglun, 12.iv.1994, 13.vi.1994 [#1799526, #1941179], Yang Long (IZCAS 2); Xishuangbanna Prefecture, Menglun, Highway G213, 21.xi.2009 [#1500899–901], 22.xi.2009 [#1500902–05], 26.xi.2009 [#1500906–07], Tang Guo & Yao Zhiyuan (IZCAS 9); Xishuangbanna Prefecture, Tropical Plant Garden, 19.viii.2007 [#1500898], Zheng Guo (IZCAS 1). MYANMAR. Kaya: Karen Hills, Iadó [=Yahku?], XII/1887 (MSNG 2). Kayin: Karen Hills, Leitó [=Leiktho], V/1888, L. Fea (MSNG 2, SFFM 1, SNSD 1).

Parallelodemas imperfectum Faust

Parallelodemas imperfecta [sic] Faust 1894: 310. Lectotype male (dissected), designated here, labeled “Carin Cheba/ 900-1100 m/ L. Fea V XII-88”, “*imperfecta*/ Faust”, “*P./ imperfecta*/ sp. n.”, “*Parallelodemas/ imperfecta*/ ♂ ♀”, “SYNTYPUS/ *Parallelodemas/ imperfecta*/ Faust, 1894”, “Museo Civico/ di Genova”, “Lectotype/ *Parallelodemas imperfectum*/ Faust (Prena & Zhang/ design. 2014)” (MSNG). Paralectotypes 2: Carin Cheba, Myanmar (MSNG 1, SNSD 1).

Diagnosis. This species can be recognized by its characteristic tarsus: the enlarged third tarsite is barely excised anteriorly and the fifth is greatly reduced (Fig. 5). *Parallelodemas docile* has a larger fifth tarsite and is more elongate.

Redescription. Length 5.4–6.4 mm, width 1.5–2.1 mm; integument black, antenna and sometimes parts of

legs and ventrites brown; ventral side with undivided setae, basic vestiture on pronotum and elytron absent, imbricate yellowish white squamiform setae at base of elytral interstria 3, postmedially on interstriae 3–4, ventrally and laterally on thorax and abdomen (including basolateral angles of pronotum) and on ventral face of pro- and mesofemora; eyes flush with head contour; frons and base of rostrum glabrous; male rostrum $0.94\times$ as long as pronotum, ventrally without setae, prorostrum $0.35\times$ rostral length and slightly spatulate in dorsal view, epistome moderately notched in 1 female [worn in other specimens including male], antennal scape ventrally without long setae, club $1.4\times$ as long as wide; female rostrum $1.02\text{--}1.07\times$ as long as pronotum, prorostrum $0.50\times$ rostral length; prosternum gradually sloping in front of coxa, basal lobe slightly notched; pro- and mesofemora ventrally with recumbent squamiform setae; tarsus with tarsite 3 moderately enlarged, subcordate, anterior margin straight and only indistinctly excised, tarsite 5 minute (Fig. 5); penis $3.0\times$ as long as wide, slightly tapering in apical third as in *P. docile* (Fig. 16) but with apex more pointed, internal sac with Y-shaped sclerite; spermatheca with nodulus and ramus short (as *P. docile*, Fig. 25).

Distribution. The species is known from one site in Myanmar.

Material examined. MYANMAR. Kayin: Karen Hills [ca. 25–35 km NE of Taungoo, 900–1100 m], V/1888, L. Fea (MSNG 2, SNSD 1).

Parallelodemas impar Voss

Parallelodemas impar Voss 1941: 895. Holotype female, Tienmushan, China (NKMB). Paratype retained by Voss not traceable and probably destroyed (see Weidner 1979: 400).

Diagnosis. The ventrally hirsute male rostrum separates *P. impar* from all other Chinese species with simple, undivided setae. Another good character is the absence of wide setae on elytron and metepisternum.

Redescription. Length 4.4–5.8 mm, width 1.0–1.5 mm; integument dark brown, antenna, tarsus and apex of female rostrum light brown; vestiture consisting of inconspicuous, evenly distributed, simple, cupreous setae; eyes slightly bulging; frons and base of rostrum with recumbent setae; male rostrum $0.98\text{--}1.07\times$ as long as pronotum, ventrally with long setae, prorostrum $0.28\text{--}0.30\times$ rostral length and spatulate in dorsal view, epistome deeply notched, antennal scape ventrally with long, cupreous setae, club $2.0\times$ as long as wide; female rostrum $1.13\text{--}1.16\times$ as long as pronotum, prorostrum $0.48\text{--}0.49\times$ rostral length; prosternum gradually sloping in front of coxa, basal lobe notched; all femora hirsute ventrally; tarsus with tarsite 3 relatively small and excised to basal third, tarsite 5 as long as 1 and moderately protruding beyond anterior margin of 3, male mesotarsus with long, clavate, outward directed setae; penis $3.0\times$ as long as wide, apex

with narrowly rounded, subtriangular projection (Fig. 17), internal sac with thick, tubular, basally curved sclerite; spermatheca with nodulus long and perpendicular to long axis of collum, ramus obsolete (Fig. 26).

Distribution. The species is known from China (Sichuan, Yunnan, Zhejiang) and Laos. The record from Guatun in Fujian, by Voss (1956), applies to *P. setifrons*.

Material examined. CHINA. Sichuan: Wushan County, Liziping, 2.vii.1993 [#1941174] (IZCAS 1). Yunnan: Xishuangbanna Prefecture, Menghun, 17.v.1958 [#1500892], Meng Xuwu (IZCAS 1). Zhejiang: West Lin'an, Mount Tianmu, 15.6.1957 [#1799534], 28.6.1957 [#1500891, #1500893, #1799531] (IZCAS 4), 9.vi.2012 (ZAFU 1); Kaishanlaodian, Mount Tianmu, 23.vi.1998 [#1941175–76] (IZCAS 2); Mount Tianmu (NHMB 1). LAOS. Luang Prabang: Ban Kiukacham env., 19.vi.2009, M. Geiser & D. Hauck (NHMB 5). Xieng Khouang: Phonsavan to Phu Padaeng, 30/31.v.2009, M. Geiser (NHMB 2).

Parallelodemus tardum Faust

Parallelodemus tarda [sic] Faust 1894: 309. Lectotype male, designated here, labeled “Carin Cheba/ 900–1100 m/ L. Fea V XII-88”, “tarda/ Faust”, “P./ tarda/ sp. n.”, “Parallelodemus/ tarda/ ♂ sp. n.”, “SYNTYPUS/ Parallelodemus/ tarda/ Faust, 1894”, “Museo Civico/ di Genova”, “Lectotype/ Parallelodemus tardum/ Faust (Prena & Zhang/ design. 2014)” (MSNG). Paralectotypes 3 (2 males, 1 female), same data (MSNG 2, SNSD 1).

Diagnosis. Two of the eight known species with undivided setae have an unmodified male mesotarsus, i.e., they lack special setae and the fifth tarsite is not enlarged. One is *P. tardum* described from Myanmar, the other is *P. tumens* from China. *Parallelodemus tardum* is larger than *P. tumens* (5.4–6.6 mm vs. 3.8–4.8 mm) and has a shorter rostrum with a more distally inserted antenna. The females may be distinguished by body length. A difference between female *P. perfectum* and *P. tardum* is not apparent (each with one known specimen). Female *P. feae* are very similar but have ventrally hirsute femora.

Redescription. Length 5.4–6.6 mm, width 1.6–1.9 mm; integument black; ventral side and pygidium with undivided setae, basic vestiture of fine setae on pronotum and elytron, moderately wide white setae at base of elytral interstria 3 and postmedially on interstriae 3–5, on metepisternum and basolateral angles of pronotum; eyes flush with head contour; frons and base of rostrum glabrous; male rostrum $0.89\text{--}0.94\times$ as long as pronotum, ventrally without setae, prorostrum $0.32\text{--}0.33\times$ rostral length, apically slightly diverging in dorsal view, epistome short and slightly notched, antennal scape glabrous, club $1.8\times$ as long as wide; female rostrum $1.04\times$ as long as pronotum, prorostrum $0.50\times$ rostral length; prosternum slightly tumescent in front of coxae (apparently not in female), basal lobe notched; pro- and mesofemora

ventrally with erect squamiform setae; tarsus with tarsite 3 of moderate size and excised to basal third, tarsite 5 slightly longer than 3 and distinctly protruding beyond anterior margin of 3, male mesotarsus without specialized setae; penis $2.3\times$ as long as wide, apex lancet-shaped and broadly rounded (as *P. tumens*, Fig. 18), internal sac with 2 small sclerites (hook and paired hook); spermatheca with collum bulbous, ramus short, nodulus obsolete (as *P. dimetans*, Fig. 21).

Distribution. Besides the type series from Myanmar, we have seen one female from India that might be this species.

Material examined. INDIA. Sikkim: Gopaldhara, Rungbong Valley, H. Stevens (BMNH 1). MYANMAR. Kayin: Karen Hills [ca. 25–35 km NE of Taungoo, 900–1100 m], V/1888, L. Fea (MSNG 3, SNSD 1).

Parallelodemus tumens Prena & Zhang, sp. n.

<http://zoobank.org/2295F76C-0867-4E0C-980C-1CFB6E45ACE0>

Diagnosis. Besides *P. tardum*, this is the only known species without split setae on the metepisternum and without a modified male mesotarsus. *Parallelodemus tumens* is smaller (<5 mm) than *P. tardum* and has a longer rostrum with a more basally inserted antenna. Differences in the genitalia are not apparent. Female *P. tumens* may be distinguished from female *P. perfectum* and *P. tardum* by smaller body size. All three species have specimens with a more or less tumescent prosternum.

Description. Length 3.8–4.8 mm, width 1.1–1.3 mm; integument black, antenna, tarsus, apex of female rostrum and often other parts of leg brown or rufous; ventral side and pygidium with undivided setae, basic vestiture of fine setae on pronotum and elytron, moderately wide white setae at base of elytral interstria 3 and postmedially on interstriae 4 and 5, on thoracic flank and basolateral angles of pronotum; eyes flush with head contour; frons and base of rostrum glabrous; male rostrum $1.06\text{--}1.08\times$ as long as pronotum, ventrally without setae, prorostrum $0.41\text{--}0.42\times$ rostral length, slightly spatulate and apically diverging in dorsal view, epistome short and truncate, antennal scape glabrous, club $1.8\times$ as long as wide; female rostrum $1.20\times$ as long as pronotum, prorostrum $0.53\times$ rostral length; prosternum tumescent in front of coxae, basal lobe notched; pro- and mesofemora hirsute ventrally; tarsus with tarsite 3 of moderate size and excised to basal third, tarsite 5 slightly longer than 3 and distinctly protruding beyond anterior margin of 3, male mesotarsus without specialized setae; penis $2.5\times$ as long as wide, apex lancet-shaped and broadly rounded (Fig. 18), internal sac with 2 small sclerites (hook and paired hook); spermatheca with nodulus and ramus short (as *P. dimetans*, Fig. 21).

Distribution. The species is known from the Chinese province Guizhou.

Material examined. Holotype: China, Guizhou Province, Libo County, Banzhai Village [板寨村], 24.v.1998,

Zhang Runzhi [张润志], #1500884, male, dissected (IZCAS). Paratypes (2 males, 1 female): CHINA. Guizhou: Libo County, Banzhai Village, 24.v.1998, Zhang Runzhi [#1500883] (IZCAS 1); Yunyi Prefecture, Suiyang County, Kuankuoshui Natural Reserve, 3.vi.2010 [#1500881], 4.vi.2010 [#1500870], Nie Cuie (IZCAS 2).

Etymology. The name is a participle presence active of *tumeo* (=to inflate, to distend; Latin).

***Parallelodemas feae* Prena & Zhang, sp. n.**

<http://zoobank.org/09E6371C-7BC3-4E5F-B117-C66FB9976068>

Diagnosis. From other species with undivided setae, *P. feae* can be separated by having ventrally hirsute femora and nearly flush eyes. Female *P. tardum* and *P. tumens* are very similar but have shorter and wider setae on the pro- and mesofemora.

Description. Length 4.9–6.5 mm, width 1.3–1.8 mm; integument dark brown to black, antenna and tarsus brown; ventral side and pygidium with undivided setae, basic vestiture of fine setae on pronotum and elytron, moderately wide white setae at base of elytral interstria 3, postmedially on interstriae 3 and 4 and on thoracic flank; eyes very slightly bulging; frons and base of rostrum glabrous; male rostrum 1.02–1.20× as long as pronotum, ventrally without setae, prorostrum 0.39–0.42× rostral length, slightly spatulate and apically diverging in dorsal view, epistome slightly notched, antennal scape with long setae, club 1.8× as long as wide; female rostrum 1.04–1.20× as long as pronotum, prorostrum 0.50–0.54× rostral length; prosternum gradually sloping in front of coxa, basal lobe notched; all femora hirsute ventrally; tarsus with tarsite 3 relatively small and excised to basal third, tarsite 5 nearly as long as 2+3 and distinctly protruding beyond anterior margin of 3, male mesotarsus with clavate, outward directed setae; penis 3.5× as long as wide, apex roundly narrowed and medially projected (Fig. 19), internal sac with thick, rod-like sclerite; spermatheca with nodulus long and perpendicular to collum (Fig. 27).

Distribution. The species is known from China (Fujian, Guangxi, Hainan, Hunan, Yunnan), India, Laos and Vietnam.

Material examined. Holotype: China, Hainan Province, Jianfeng [尖峰], Tianchi [天池], 18.iii.1980, Wang Shuyong [王书永], #1799133, male, dissected (IZCAS). Paratypes (9 males, 10 females): CHINA. Fujian: Jiangle County, Mount Longxi, 21.i.1991 [#1500887], Yang Longlong (IZCAS 1), 19.v.1991 [#1500886], Zhang Runzhi (IZCAS 1); Jianyang, Chong'an Xin Village Longdu, 7.v.1960 [#1799553], Ma Youcai (IZCAS 1); Jianyang, Chong'an Xin Village Sangang, 17.vi.1960 [#1799530], Jiang Shengqiao (IZCAS 1), 26.vi.1960 [#1799542], Zuo Yong (IZCAS 1); Jianyang, Huangkeng Dazhulan, 11.vi.1960 [#1500885], Zuo Yong (IZCAS 1), 24.vii.1960 [#1799535], Jiang Shengqiao (IZCAS 1); Jianyang, Huangkengguilin, 14.iv.1960 [#1799157], Zhang Yiran (IZCAS 1). Guangxi: Jinxiuhawang

Mountain Village, 20.v.1999 [#1799153], Han Hongxiang (IZCAS 1). Hainan: Jianfeng, Tianchi, 18.iii.1980 [#1500888], Wang Shuyong (IZCAS 1); Ledong County, Jianfengling Natural Reserve, 10.iv.1980 [#1500890], Wang Shuyong (IZCAS 1), 4.v.2007 [#1500889, #1854471], Ge Deyan (IZCAS 2); Gaotuo Shan [高陀山, not located], 17.v.1963 [#1799532], Zhou Yao (IZCAS 1). Hunan: Yanling County, Shidu Shennong Valley waterfall, 7.vii.2008 [#1799013], Jiao Tianyang (IZCAS 1). Yunnan: Xishuangbanna Prefecture, Meng'a, 11.v.1958 [#1799522], Hong Chunpei (IZCAS 1). LAOS. Houa Phan: Phou Pane Mountains, 1350–1500 m, 1.–16.vi.2009, M. Brancucci (NHMB 1). Xieng Khouang: Phou Sane Mountains, 30 km NE Phonsavan, 1400–1500 m, 10.–30.v.2009, Z. Kraus (NHMB 1). VIETNAM. Tinh Vinh Phuc: Tam Dao, 25.v.1995, A. V. Gorochoy (ZIN 1).

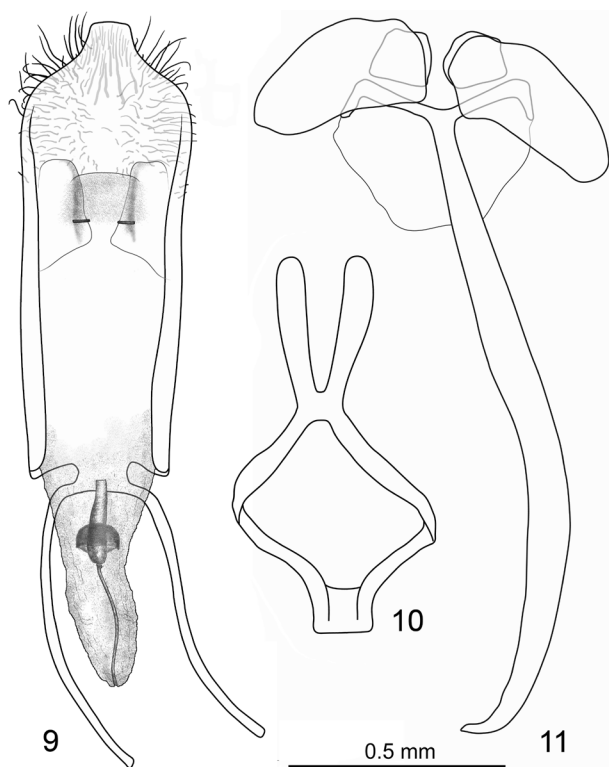
Etymology. The name is a patronym honoring the Italian zoologist and artist Leonardo Fea.

***Parallelodemas vicinum* Faust**

Parallelodemas vicina [sic] Faust 1894: 308. Lectotype male, designated here, labeled “Carin Cheba/ 900-1100 m/ L. Fea V XII-88”, “vicina/ Faust”, “P./ vicina/ sp. n.”, “Parallelodemas/ vicina/ ♂ sp. n.”, “SYNTYPUS/ Parallelodemas/ vicina/ Faust, 1894”, “Museo Civico/ di Genova”, “Lectotype/ Parallelodemas vicinum/ Faust (Prena & Zhang/ design. 2014)” (MSNG). Paralectotypes 9: Carin Cheba, Carin Ghecu and Teinzó, Myanmar (MSNG 4, SFFM 2, SNSD 3). Lyal and King (1996), elythro-tergal stridulation.

Diagnosis. A generally useful character for recognizing *P. vicinum* is the presence of imbricate squamiform setae on the distal half of the metepisternum. *Parallelodemas docile* has similar vestiture on the distal two thirds and an enlarged third tarsite. Small *P. vicinum* with more widely spaced setae on the metepisternum differ from the otherwise very similar *P. perfectum* by the apically truncate aedeagus and less curved female rostrum. These two and *P. feae*, a species with ventrally hirsute femora, are the only known species with undivided setae, flush eyes and clavate setae on the male mesotarsus.

Redescription. Length 6.4–7.8 mm, width 1.6–2.2 mm; integument black, teneral specimens with ventrites and legs partially dark rufous; ventral side with undivided setae, basic vestiture inconspicuous on pronotum and elytron, imbricate white squamiform setae at base of elytral interstria 3, postmedially on interstriae 3 and 4, on dorsal apex of mesepimeron, distal half of metepisternum, flank of prosternum, ventral face of pro- and mesofemora, dorsal face of metafemur and occasionally on basolateral angles of pronotum; eyes flush with head contour; frons and base of rostrum glabrous; male rostrum 1.06–1.15× as long as pronotum, ventrally without setae, prorostrum 0.36–0.38× rostral length and spatulate in dorsal view,

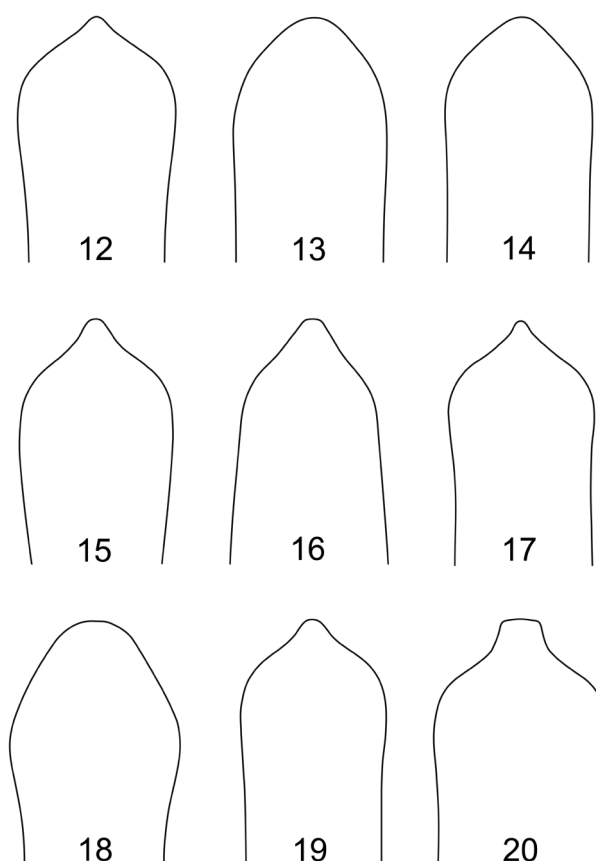


Figures 9–11. Male terminalia of *P. vicinum*: **9.** Penis, dorsal view; **10.** Tegmen; **11.** Sternites 8 and 9, ventral view.

epistome very slightly notched, antennal scape with long, cupreous setae, club 1.6× as long as wide; female rostrum 1.14–1.24× as long as pronotum, prorostrum 0.57–0.58× rostral length; prosternum gradually sloping in front of coxa, basal lobe notched; pro- and mesofemora ventrally with slender (male) or squamiform (female) setae; tarsus with tarsite 3 relatively small and excised to basal third, tarsite 5 as long as 2+3 and distinctly protruding beyond anterior margin of 3, male mesotarsus with moderately long, clavate, outward directed setae; penis 2.5× as long as wide, apex bottle-shaped (Fig. 9), internal sac with thick, tubular, basally curved sclerite; spermatheca with nodulus long and usually perpendicular to collum, ramus similarly long (as Fig. 27).

Distribution. The species is known from China (Yunnan), India and Myanmar.

Material examined. CHINA. Yunnan: Xishuangbanna Pref., Anma Xinzhai, 26.iv.2009 [#1941164], Meng (IZCAS 1); Xishuangbanna Pref., Menglun, Highway G213, 21.xi.2009 [#1500895–96]; 22.xi.2009 [#1500894], Tang Guo & Yao Zhiyuan (IZCAS 3); Xishuangbanna Pref., Menglun, 12.iv.1994 [#1500897], Chen Xiaolin (IZCAS 1); Xishuangbanna Pref., Meng'a, 6.vi.1958 [#1799544–45], Wang Shuyong (IZCAS 2); Cangyuan County, Banlao township, Dongnanhai, 2.v.2011 [#1941163], Huang Xinlei (IZCAS 1). INDIA. Sikkim: Gopaldhara, Rungbong Valley, H. Stevens (BMNH 3). West Bengal: Namsu River, 21.vi.1918, H. Stevens (BMNH 1); Nurbong [Estate], 1910s, W. K. Webb (BMNH 1). MYANMAR. Kachin: Teinshaw, V/1886, L. Fea (MSNG 1). Kayah:



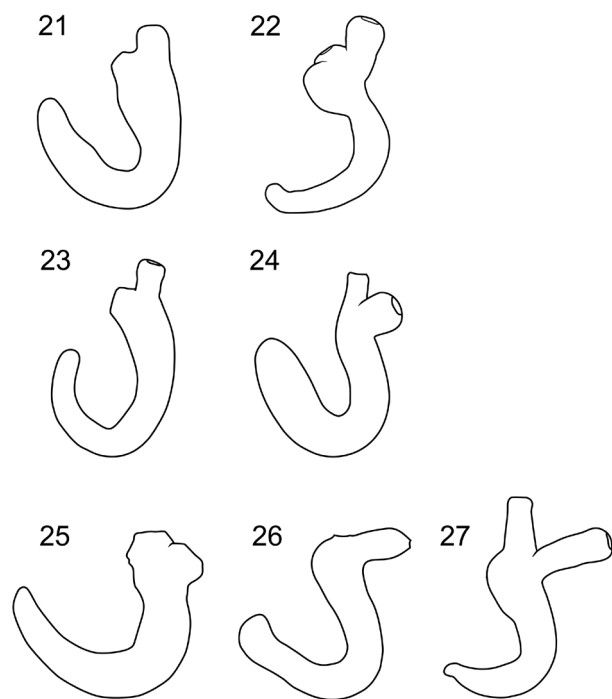
Figures 12–20. Male genitalia of *Parallelodemas*, apex of penis, dorsal view: **12.** *P. dimetans*; **13.** *P. petilum*; **14.** *P. plumosum*; **15.** *P. setifrons*; **16.** *P. docile*; **17.** *P. impar*; **18.** *P. tumens*; **19.** *P. feae*; **20.** *P. vicinum*. Not to scale.

Carin Ghécú [between Taó and Chialá, II–IV/1888] (MSNG 1). Kayin: Karen Hills [ca. 25–35 km NE of Taungoo], V/1888, L. Fea (MSNG 3, SFFM 2, SNSD 3).

Parallelodemas perfectum Faust

Parallelodemas perfecta [sic] Faust 1894: 307. Lectotype male, designated here, labeled “♂ Carin/ Cheba”, “perfecta/ Faust”, “Coll. J. Faust/ Ankauf 1900”, “Typus”, “Staatl. Museum für/ Tierkunde Dresden”, “Lectotype/ *Parallelodemas perfectum*/ Faust (Prena & Zhang/ design. 2014)” (SNSD). Paralectotypes 1 (female), Carin Cheba, 900–1100 m, V XII.1888 (MSNG). Morimoto and Yoshihara (1996: 17), designation as type species for *Parallelodemas*.

Diagnosis. Only two specimens of the sexually dimorphic *P. perfectum* are known, one of each gender. The species forms a complex with *P. feae*, *P. tardum*, *P. tumens* and *P. vicinum*, all of which have flush eyes, thoracic ventrites with undivided setae and a male mesotarsus with outward-directed clavate setae (Fig. 6). The profemur of the male *P. perfectum* is ventrally more expanded than in the other species. *Parallelodemas feae* has ventrally



Figures 21–27. Female genitalia of *Parallelodemas*, spermatheca: **21.** *P. dimetans*; **22.** *P. petilum*; **23.** *P. plumosum*; **24.** *P. setifrons*; **25.** *P. docile*; **26.** *P. impar*; **27.** *P. feae*. Not to scale.

hirsute femora; *P. tardum* has a shorter male rostrum; *P. tumens* is smaller (<5 mm); *P. vicinum* usually has denser vestiture on the mesepisternum and a less curved female rostrum. The few available female *P. perfectum* and *P. tardum* could not be distinguished with confidence.

Redescription. Length 7.0–7.8 mm, width 1.8–1.9 mm; integument black; ventral side with undivided setae, basic vestiture inconspicuous on pronotum and elytron, white squamiform setae at base of elytral interstriae 3 and 4, postmedially on interstriae 3–5, on dorsal apex of mesepimeron, metepisternum, prosternum, ventral face of pro- and mesofemora, dorsal face of metafemur and occasionally on basolateral angles of pronotum; eyes flush with head contour; frons and base of rostrum glabrous; male rostrum $1.06\times$ as long as pronotum, ventrally without setae, prorostrum $0.36\times$ rostral length and slightly spatulate in dorsal view, epistome very slightly notched, antennal scape with long, cupreous setae, club $1.6\times$ as long as wide; female rostrum $1.02\times$ as long as pronotum, prorostrum $0.58\times$ rostral length; prosternum slightly tumescent (male) or gradually sloping (female) in front of coxa, basal lobe notched; pro- and mesofemora ventrally with slender (male) or squamiform (female) setae, male profemur somewhat angularly produced ventrally; tarsus with tarsite 3 relatively small and excised to basal third, tarsite 5 longer than 3 and distinctly protruding beyond anterior margin of 3, male mesotarsus with moderately long, clavate, outward directed setae; penis $3.1\times$ as long as wide, apex roundly narrowed with slightly produced tip (as *P. feae*, Fig. 19), internal sac with short, complex sclerite (double hook); spermatheca with nodulus long

and perpendicular to long axis of collum, ramus obsolete (as *P. impar*, Fig. 26).

Distribution. The species is known from one site in Myanmar.

Material examined. MYANMAR. Kayin: Karen Hills [ca. 25–35 km NE of Taungoo], V/1888, L. Fea (MSNG 1, SNSD 1).

Discussion

Species of *Parallelodemas* display an unusually diverse and complex suite of deviant morphological structures. Several occur in only a few species, such as the enlarged third tarsite or the deeply split setae on the ventrites. Others are male-specific, such as the setal fringes on rostrum, scape and mesotarsus, or the tubercles found on the first ventrite of an undescribed species near *P. dimetans*. The structural heterogeneity is increased further by the apically exposed epistome that often is worn off in females but rarely in males. Most of these traits can be found also in other tropical weevils, particularly in Dryophthorinae and Baridinae (Davis 2009; Anderson et al. 2014; Prena et al. 2014), although not as accumulated as in *Parallelodemas*. Very little is known about their functions and the few available observations may not always be transferable to other species.

It is long-known that numerous weevil species lack incisors on the mandible (Lacordaire 1865; Ting 1936; Günther 1938). In some cases, the mandible moves almost vertically rather than transversely opposed as in most other beetles (Horn 1873; McClenahan 1904; Marshall 1945; Morimoto 1962; Pelsue and O'Brien 2011). However, distally diverging mandibles with a convex inner face and incisor-like structures on the outer face are uncommon. They occur in several Dryophthorinae, such as *Cyrtotrachelus* Schönherr, *Macrocheirus* Schönherr, *Otidognathus* Lacordaire, *Protocerius* Schönherr, *Rhinostomus* Rafinesque and, among the Baridinae, in *Parallelodemas* and some *Geraeus* Pascoe (Casey 1922; Vaurie 1970; Morimoto and Yoshihara 1996). Many Rhynchitinae (Attelabidae) and some Cholini, Erihrhini, Tychiini and Platypodinae (Curculionidae) have similar exodontous mandibles (Ting 1936; Hamilton 1990; Thompson 1992) but with normal interior incisors and decussate apices. Three functions have been attributed to exodontous mandibles. Daanje (1964) was the first to point out that they occur in Rhynchitinae that pupate in soil but not in Attelabinae that pupate in leaf rolls. He concluded that the exterior tooth supports the weevil's emergence to the surface. Depending on the species group, the teeth are sheared off after emergence of the beetle or are retained in one or both sexes (Daanje 1964; Dieckmann 1974; Riedel 2014). A second function of the exterior tooth is its usage during the preparation of the leaf roll in some Rhynchitinae (Daanje 1964, 1975). A third possible function is related to oviposition. Kissinger (in litt., quoted by Vaurie 1970) conjectured that the exterior tooth might be used for making oviposition holes, by rip-

ping through fibrous tissue of the monocotyledonous host plant. Eberhard (1983) observed that female *Rhinostomus barbirostris* (Fabricius) chew the oviposition hole and then withdraw the rostrum with a series of sharp jerks. The exodontous mandible may serve during the latter action for enlarging or cleaning the hole. While the mandibles of the above-mentioned dryophthorines have a thick, excavated outer face (Vaurie 1970), they are thin and blade-like in the baridines. It is conceivable that female *Parallelodemas* employ the outer face for ripping and cutting through plant tissue as suggested by Kissinger, perhaps on culms hollow inside or filled with pith, but chewing is necessary to at least initiate the oviposition hole. Our own observations showed that baridines without incisors are primarily pollen feeders and use their mandibles like pincers. Oviposition behavior has not been documented so far for any baridine with exodontous mandibles. The worn epistome of many female *Parallelodemas* may or may not be related to the aberrant morphology and movement of the mandible. Even though the epistome of *Rhinostomus* species is similarly exposed and unprotected as in *Parallelodemas*, we found no sign of wear in female *R. barbirostris* and *R. niger* (Drury). However, similar wear is apparent in female *Apostasimerus serrirostris* Boheman, a palm-associated Neotropical baridine with straight incisor area.

Gender-specific setae or setal patches occur relatively frequently on tibiae and ventrites of weevils (Eberhard 1983; Lyal 1993; Schat et al. 2007) but are less common on the rostrum. Short fringes or fuzzy patches occur for instance in *Datonychus* Wagner, *Mogulones* Reitter (Dieckmann 1972), *Metamasius* Horn (Vaurie 1968, 1970) and *Pterocolus* Say (Hamilton 1998). We noticed long setal fringes, like those present on the ventral rostrum of some male *Parallelodemas* species, in male *Acythopeus barbatus* Pascoe, *Conoproctus longipes* (Casey), *C. quadripustulatus* (Fabricius), *Mycterus barbirostris* Pascoe and *M. imberbis* Lea (probably a synonym of the former; all Baridinae). Observations on the usage of these setae are available only for one species of *Rhinostomus*, the “bottle brush weevil”. Eberhard (1983) described how male *R. barbirostris* gently wipe the rostrum on the female’s pronotum and elytron thereby apparently pacifying or immobilizing their chosen mate. Because this did not explain the presence of setae on the dorsal side of the rostrum, the author speculated that other sensory functions may be involved. However, his observations provided evidence that the setae have a behavioral, mating-related function. If and how this applies to the exterior setae on the fifth mesotarsite of some male *Parallelodemas* species remains unknown. Similar setae occur in other weevils on the interior (proximal) face of the basal three tarsites or all around, particularly on the protarsus, but not on the exterior face of the fifth.

The weevil tarsus typically is cryptopentamerous (with a miniaturized fourth tarsite) but there are a few exceptions and numerous modifications. The fourth and fifth tarsites are lost in species of genera such as *Anoplobaris* Morimoto and Yoshihara, *Anoplus* Germar,

Atelicus Waterhouse, *Diabathrarius* Schönherr, *Macrobaris* Champion, *Syarbis* Pascoe and *Viticis* Lea, and are greatly reduced in several others. An enlarged third tarsite is particularly common in African Dryphthorinae (e.g., *Belorhynus* Guérin-Méneville, *Ichthyopisthen* Aurivillius, *Korotyaevius* Alonso-Zarazaga and Lyal) and American grass-associated Baridinae (e.g., *Macrobaris*, *Nertinus* Voss, *Trachymeropsis* Champion). In many cases, the enlargement of the third tarsite is accompanied by a reduction of the fifth. Many if not all of these species live on swaying parts of their host plants and it is perceivable that the adhesive strength of the tarsus is increased by enlarging the surface of individual tarsites.

Although the structural diversity of these predominantly tropical weevils is appealing for morphological and behavioral studies, systematic fieldwork is greatly hampered by the still prevailing paucity of taxonomical and ecological information. Even the functions of rather ubiquitous structures, like the “prosternal horns” (Davis 2009; Davis and Engel 2010) present in Anthribidae, Nemomychidae and the curculionid subfamilies Baridinae, Conoderinae, Curculioninae and Molytinae, have remained largely unknown or were interpreted as being generally indicative for ritual fighting, even though the latter usage has been observed in just one species (Eberhard and Garcia 2000; own observations) while similar structures have other functions (Lacordaire 1863, p. 5; Lesne 1899, p. 143; Wood 1969, p. 43; Daanje 1975, p. 288; Thompson 1992, p. 869). It is our hope that increased taxonomic and biogeographic knowledge will stimulate interest among local researchers to conduct their own research on these fascinating aspects of weevil diversity.

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References

- Alonso-Zarazaga MA, Lyal CHC (1999) A world catalogue of families and genera of Curculionoidea (Insecta: Coleoptera) (Excepting Scolytidae and Platypodidae). Entomopraxis SCP, Barcelona.
- Anderson RS, Marvaldi AE (2014) Dryophthorinae Schoenherr, 1825. In: Leschen RAB, Beutel RG (Eds) Handbook of Zoology, Coleoptera, Vol. 3. DeGruyter, Berlin, 477–483.
- Casey TL (1922) Studies in the rhynchophorous subfamily Barinae of the Brazilian fauna. Memoirs on the Coleoptera 10: 1–520.
- Daanje A (1964) Über die Ethologie und Blattrolltechnik von *Deporaus betulae* L. und ein Vergleich mit den anderen blattrollenden Rhynchitiden und Attelabinen-Coleoptera, Attelabinae. Verhandelingen der Koninklijke Nederlandse Akademie van Wetenschappen, Afdeling Natuurkunde 56: 1–215.
- Daanje A (1975) Some special features of the leaf-rolling technique of *Byctiscus populi* L. (Coleoptera: Rhynchitini). Behaviour 53: 285–316. doi: 10.1163/156853975x00236
- Davis SR (2009) Morphology of Baridinae and related groups (Coleoptera, Curculionidae). ZooKeys 10: 1–136. doi: 10.3897/zookeys.10.47
- Davis SR, Engel MS (2010) Antiquity and evolution of prosternal horns in baridine weevils (Coleoptera: Curculionidae). Journal of Paleontology 84: 918–926. doi: 10.1666/09-160.1
- Dieckmann L (1972) Beiträge zur Insektenfauna der DDR: Coleoptera – Curculionidae: Ceutorhynchinae. Beiträge zur Entomologie 22: 3–128.
- Dieckmann L (1974) Beiträge zur Insektenfauna der DDR: Coleoptera – Curculionidae (Rhinomacerinae, Rhynchitinae, Attelabinae, Apoderinae). Beiträge zur Entomologie 24: 5–54.
- Eberhard WG (1983) Behavior of adult bottle brush weevils (*Rhinostomus barbirostris*) (Coleoptera: Curculionidae). Revista Biología Tropicales 31: 233–244.
- Eberhard WG, Garcia-C JM (2000). Ritual jousting by horned *Pariso-schoenus expositus* weevils (Coleoptera, Curculionidae, Baridinae). Psyche 103: 55–84. doi: 10.1155/2000/16361
- Faust J (1894) Viaggio di Leonardo Fea in Birmania e regioni vicine. LX. Curculionidae. Annali del Museo civico di storia naturale di Genova 34: 153–370. doi: 10.5962/bhl.title.48832
- Fea L (1896) Quattro anni fra i Birmani e le tribù limitrofe. Hoepli, Milano.
- Günther K (1938) Revision der Gattung *Otidognathus* Lac. (Coleoptera Curculionidae Calandrinae). Temminckia 3: 45–108.
- Hamilton RW (1990) A revision of the weevil genus *Eugnamptus* Schoenherr (Coleoptera: Rhynchitidae) in America north of Mexico. Transactions of the American Entomological Society 115: 475–502.
- Hamilton RW (1998) Taxonomic revision of the New World Pterocolinae (Coleoptera: Rhynchitidae). Transactions of the American Entomological Society 124: 203–269.
- Horn GH (1873) Contributions to a knowledge of the Curculionidae of the United States. Proceedings of the American Philosophical Society 13: 407–469.
- Korotyaev BA (2002) The weevil tribe Neosharpiini Hoffmann belongs in the subfamily Baridinae (Coleoptera: Curculionidae). Zoosystematica Rossica 11: 192.
- Lacordaire T (1863) Histoire naturelle des insectes. Genera des Coléoptères ou exposé méthodique et critique de tous les genres proposés jusqu'ici dans cet ordre d'insectes. Vol. 6. Roret, Paris, 637 pp. doi: 10.5962/bhl.title.67686
- Lacordaire T (1865) Histoire naturelle des insectes. Genera des Coléoptères ou exposé méthodique et critique de tous les genres proposés jusqu'ici dans cet ordre d'insectes. Vol. 7. Roret, Paris [1866], 620 pp. doi: 10.5962/bhl.title.67686
- Lesne P (1899) Sur l'usage des appendices mandibulaires caducs des Brachyrrhinidae [Col.]. Bulletin de la Société Entomologique de France 68: 143–144.
- Lyal CHC (1993) Cryptorhynchinae (Insecta: Coleoptera: Curculionidae). Fauna of New Zealand. Vol. 29. Manaaki Whenua Press, Lincoln.
- Lyal CHC, King T (1996) Elytro-tergal stridulation in weevils (Insecta: Coleoptera: Curculionoidea). Journal of Natural History 30: 703–773. doi: 10.1080/00222939600770391
- Marshall GAK (1945) On *Trephognathus*: a new genus of African Baridinae (Col. Curc.). Proceedings of the Royal Entomological Society of London (B) 14: 21–24. doi: 10.1111/j.1365-3113.1945.tb00005.x
- McClenahan EM (1904) The development of the rostrum in the rhynchophorous Coleoptera. Psyche 11: 89–102. doi: 10.1155/1904/95750
- Morimoto K (1961) On new Curculionidae from Japan (Coleoptera). Kontyû 29: 22–27.
- Morimoto K (1962) Comparative morphology and phylogeny of the superfamily Curculionidae of Japan (Comparative morphology, phylogeny and systematics of the superfamily Curculionidae of Japan. I). Journal of the Faculty of Agriculture, Kyûshû University 11: 331–373.
- Morimoto K, Yoshihara K (1996) On the genera of the Oriental Baridinae (Coleoptera, Curculionidae). Esakia 36: 1–59.
- Oberprieler RG, Anderson RS, Marvaldi AE (2014) Curculionoidea Latreille, 1802: Introduction, Phylogeny. In: Leschen RAB, Beutel RG (Eds) Handbook of Zoology, Coleoptera, Vol. 3. DeGruyter, Berlin, 285–300.
- Pelsue FW Jr, O'Brien CW (2011) A redefinition of the Curculionini of the world, with a key to subtribes and genera, and two new genera: *Pseudoculio* and *Megaoculis* (Coleoptera: Curculionidae: Curculioninae). Zootaxa 3102: 27–49.
- Prena J, Colonnelli E, Hespeneide HA (2014) Conoderinae Schoenherr, 1833. In: Leschen RAB, Beutel RG (Eds) Handbook of Zoology, Coleoptera, Vol. 3. DeGruyter, Berlin, 577–589.
- Riedel A (2014) Attelabidae Billberg, 1820. In: Leschen RAB, Beutel RG (eds). Handbook of Zoology, Coleoptera, Vol. 3. DeGruyter, Berlin, 328–355.
- Schat M, Sing SE, Peterson RKD (2007) External rostral characters for differentiation of characters in the biological control agent *Mecinus janthinus* (Coleoptera: Curculionidae). Canadian Entomologist 139: 354–357. doi: 10.4039/n06-033
- Thompson RT (1992) Observations on the morphology and classification of weevils (Coleoptera, Curculionidae) with a key to major groups. Journal of Natural History 26: 835–891. doi: 10.1080/00222939200770511
- Ting PC (1936) The mouth parts of the coleopterous group Rhynchophora. Microentomology 1: 93–114.
- Vaurie P (1968) New weevils of the genus *Metamasius* from Central and South America (Coleoptera, Curculionidae, Rhynchophorinae). Novitates Zoologicae 2316: 1–10.
- Vaurie P (1970) Weevils of the tribe Sipalini (Coleoptera, Curculionidae, Rhynchophorinae) Part 1. The genera *Rhinostomus* and *Yuccaborus*. American Museum Novitates 2419: 1–57.
- Vinciguerra D (1890) Viaggio di Leonardo Fea in Birmania e regioni vicine. XIV. Pesci. Annali del Museo civico di storia naturale di Genova 9: 129–362, 1 map, plates VII–XI.

- Voss E (1937) Ein weiterer Beitrag zur Kenntnis der Curculioniden Javas. *Tijdschrift voor Entomologie* 80: 127–166.
- Voss E (1941) Bemerkenswerte und unbeschriebene Rüsselkäfer aus China und Japan (Col., Curc.). (92. Beitrag zur Kenntnis der Curculioniden). *Mitteilungen der Münchener Entomologischen Gesellschaft* 31: 887–902.
- Voss E (1956) Über einige in Fukien (China) gesammelte Rübler, V, nebst einer neuen Gattung und Art aus Yunnan. (Col., Curc.) 115. Beitrag zur Kenntnis der Curculioniden. *Entomologische Blätter* 51 [1955]: 21–45.
- Weidner H (1979) Die Entomologischen Sammlungen des Zoologischen Instituts und Zoologischen Museums der Universität Hamburg. Nachtrag zum IX. Teil Insecta VI. *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 76: 395–468.
- Wood SL (1969) Additions to the horned bark beetle genus *Cactopinus* Schwarz (Scolytidae). *Coleopterists Bulletin* 23: 42–51.
- Yoshihara K, Morimoto K (1994) A new genus of the subfamily Bari-dinae (Coleoptera, Curculionidae) from East Asia. *Japanese Journal of Entomology* 62: 723–729.
- Zherikhin VV, Gratshev VG (1995) A comparative study of the hind wing venation of the superfamily Curculionoidea, with phylogenetic implications. In: Pakaluk J, Ślipiński SA (Eds) *Biology, Phylogeny, and Classification of Coleoptera: Papers celebrating the 80th Birthday of Roy A. Crowson*. Muzeum i Instytut Zoologii PAN, Warszawa, 634–777.