

New species of the family Triozidae (Homoptera: Psylloidea) from China, and the first record of Psylloidea as host of Braconidae (Hymenoptera)

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Two new species of Triozidae (Psylloidea) from China producing sphere-shaped leaf galls on *Ficus hainanensis* Merr. & Shun., are illustrated and described. For the first time Psylloidea are reported as host of a species of Braconidae. The parasitoid belonging to the genus *Bracon* Fabricius, 1804, is illustrated and described as *Bracon psyllivorus* spec. nov.

Introduction

During field work in the Oriental southern provinces Yunnan and Guangxi of China the first and third author encountered psyllid leaf galls on a fig tree (*Ficus hainanensis* Merr. & Shun.) which contained two species of Triozidae (Homoptera: Psylloidea) new to science, and also a parasitoid. The parasitized host nymphs could move around, indicating that the host is not completely paralysed. Both younger and older nymphs were parasitized and the size of the parasitoid was related to the size of the host nymph (J. He, in litt.), suggesting that the parasitoid is nevertheless essentially an idiobiont. The parasitoid, which proved to be an aberrant species of *Bracon* Fabricius, 1804 (Hymenoptera: Ichneumonoidea: Braconidae), could be reared in small numbers out of the galls. It is the first record of an ichneumonoid parasitoid from a Psyllid host. Recently, the related genus *Ficobracon* van Achterberg, 2000, was reared from figs, which may be considered “pseudogalls” (van Achterberg & Weiblen, 2000).

In general, Psylloidea are mostly parasitized by Chalcidoidea: Encyrtidae, and especially in galls, by some species of Torymidae, Aphelinidae and Eulophidae. The Encyrtidae and Aphelinidae may be hyperparasitized by Signiphoridae (Chalcidoidea) and Charipinae (Cynipoidea: Figitidae).

For the identification of the plant galls Kieffer (1905), and Uichanco (1919) could be used, and for the Psyllidae Mathur (1975) and White & Hodkinson (1985).



Fig. 1, leaf galls of the *Pauropsylla gibberulosa* spec. nov. on *Ficus hainanensis* Merr. & Shun on fresh leaf.

Systematic part

Pauropsylla gibberulosa Li, spec. nov.
(figs 2-3)

Material.— Holotype, ♂ (CAUB), "China, Yunnan, Ruili Co[unty], 500 m, 29.iv.1981, Li Fasheng". Paratypes: 3 ♂♂ + 2 ♀♀, same data as holotype.

Description.— Length of body ♂ 2.45 mm, ♀ 2.68 mm, to tip of folded wing ♂ 4.43 mm, ♀ 5.00 mm. Head width 0.77-0.78 mm, narrower than thorax, strongly deflexed. Vertex width 0.43-0.46 mm; vertex length 0.23-0.24 mm; frons visible; medial ocelli situated at middle of frons; without genal cones; eye hemi-spherical, projecting laterally. Antenna long and slender, length ♂ 1.44 mm, ♀ 1.66 mm, about twice as long as width of head, fourth-ninth segments with a long seta apically, with a long and a short seta at tenth segment apically; relative length of antennal segments 1.25:1: 8.5: 4:3.25:4.25:3.25:3.25:1.75:1.5.

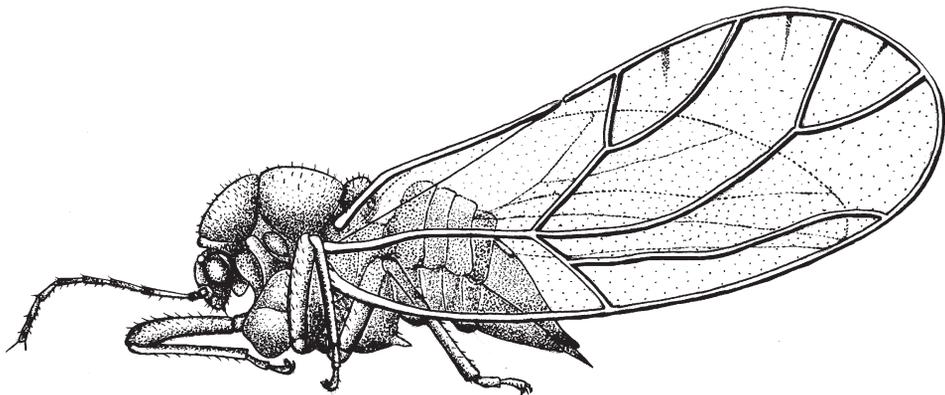


Fig. 2, *Pauropsylla gibberulosa* spec. nov., ♂, holotype, habitus, lateral aspect.

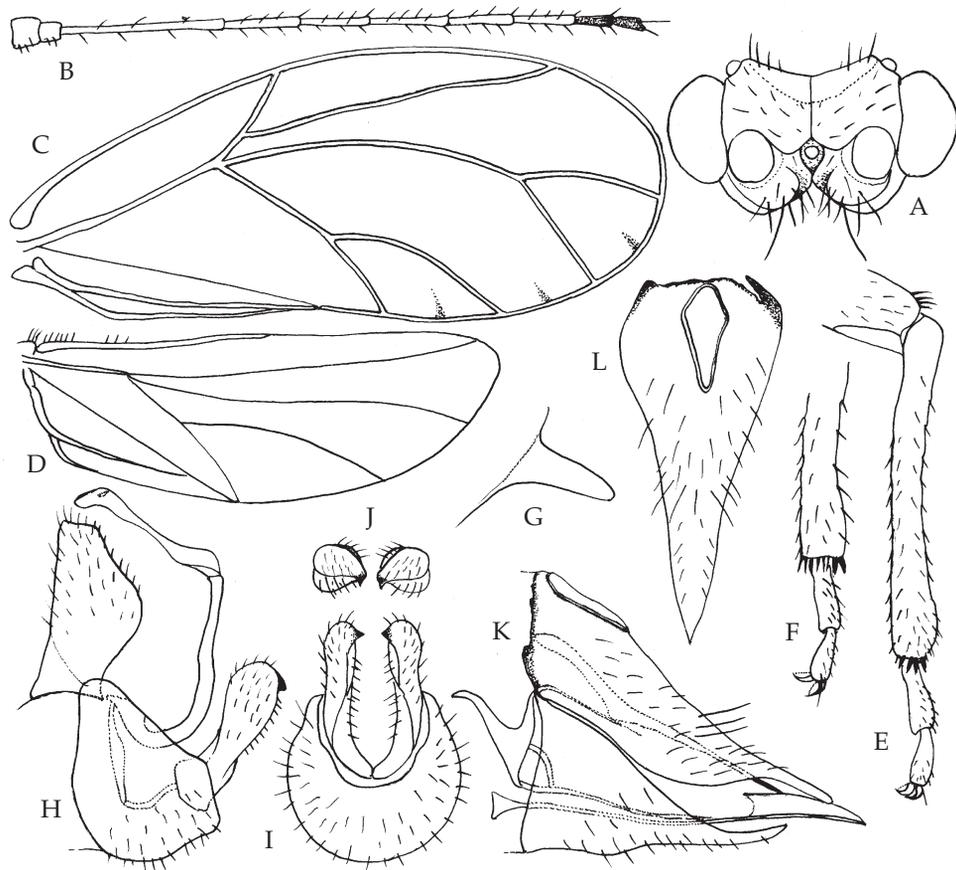


Fig. 3, *Pauropsylla gibberulosa* spec. nov. A, head, dorsal aspect; B, antenna; C, fore wing; D, hind wing; E, hind leg, inner side; F, hind tibia and tarsal segment, outer side; G, meracanthus; H, male genitalia, lateral aspect; I, parameres and hypandrium, posterior aspect; J, parameres, dorsal aspect; K, female genitalia, lateral aspect; L, proctiger, dorsal aspect.

Thorax strongly convex, pronotum short, vertical, in same arched plane with vertex, meso- and metanotum.

Legs pubescent; hind tibia without basal tooth, with two outer and three inner apical spurs; proximal segment of hind tarsus without apical spur; meracanthus large, cone-like.

Length of fore wing: ♂ 3.88 mm, ♀ 4.32 mm, width ♂ 1.68 mm, ♀ 1.82 mm, length/width 2.31-2.38 times; rounded at apex; with triozone venation, vein R_1 longer than vein R, vein R_s almost reaching wing apex; vein M long forked, 1.33 times as long as Cu_1 . Length of hind wing ♂ 2.85 mm, ♀ 3.18 mm, width 1.10-1.11 mm, length/width 2.59-2.89 times; with triozone venation.

Male proctiger simple, parameres slight dilated at apex; aedeagus long, apical segment shorter than basal segment, slightly swollen at apex. Female genital segment cone-like; proctiger longer than subgenital plate; proctiger narrow and apically slender,

anus about 0.25 times as long as proctiger; subgenital plate triangular and acuminate.

Colour.— Head dark brown, ocelli orange, compound eyes blackish-brown. Antenna yellow-brown, two apical segments black. Thorax and legs yellowish-brown. Wing transparent, veins dark brown, antero-apically black, with three alar radulae markings dark brown. Abdomen yellowish-brown, female darker than male.

Distribution.— China (Yunnan).

Biology.— This species makes light green to red-brown spherical galls on dorsal surface of leaves of *Ficus hainanensis* Merr. & Shun. The nymphs feed inside the galls and produce a large amount of waxy matter. The galls usually are solitary, sometimes with as many as 38 galls on one leaf. Occasionally, several galls are fused together and become a big mass and the individual galls are indistinguishable. The galls are closed before the emergence of the adult; after emergence there is an apical opening where the wall was split. The galls become larger as the nymph grows, and usually measure 2-8 mm, sometimes up to 10 mm, in diameter.

Notes.— Similar to members of the genus *Rhinopsylla* Riley, 1883, but the latter have one outer and three inner apical hind tibial spurs, and vein R_1 shorter than vein R. The new species is aberrant in the genus *Pauropsylla* Rübсаamen, 1899, because it has the veins M and Cu_1 of fore wing with a short common petiole and vein R_1 of fore wing not longer than vein R.

Pauropsylla braconae Li, spec. nov.
(fig. 4)

Material.— Holotype ♀ (CAUB), "China, Guangxi, Longzhou Co., Longgang, 200 m, 18.v.1982, Li Fasheng". Paratype: 1 ♀, same data as holotype.

Description of ♀.— Length of body 2.90-3.00 mm, to tip of folded wing 4.63-4.75 mm. Head slightly deflexed, width 0.88-0.94 mm; vertex width 0.49-0.50 mm, vertex length 0.21-0.22 mm; with three ocelli, medial ocellus visible from above; genal cones entirely wanting. Antenna length 1.33 mm, about 1.5 times as long as head width, with one short and one long apical setae, four sensoria present on segments 4, 6, 8 and 9, relative length of antennal segment 1.2:1:4.4:2:1.8:2.2:1.8:2:2:2.8.

Thorax strongly arched, broad, sparsely pubescent; pronotum short, vertical, strongly depressed below plane of vertex.

Legs long, posterior tibia without basal tooth, with two outer and nine other apical spurs, proximal segment of posterior tarsi without apical spur.

Length of fore wing 3.43-3.93 mm, width 1.63-1.83 mm, length/ width 2.11-2.15 times; broad, rounded at apex; without pterostigma and break of fore margin; vein R_1 , about as long as vein R; vein Rs long, reaching wing apex; veins M and Cu_1 with a short common petiole; vein M shortly forked, about 2.6 times as long as vein M_{1+2} and vein Cu_1 as long as cell Cu_{1a} . Length of hind wing 2.80-2.95 mm, width 1.15-1.18 mm, ratio 2.38-2.57 times; veins M and Cu_1 with a short common petiole.

Female genitalia short; dorsal margin of proctiger with numerous stiff setae, medially concave, apically slender and subacute; anus rounded, length about 0.45 times as long as proctiger; subgenital plate triangular, broad at base, acuminate and slightly protruding apically.

Colour.— Head brown, fore margin of vertex black; ocellar triangular field black,

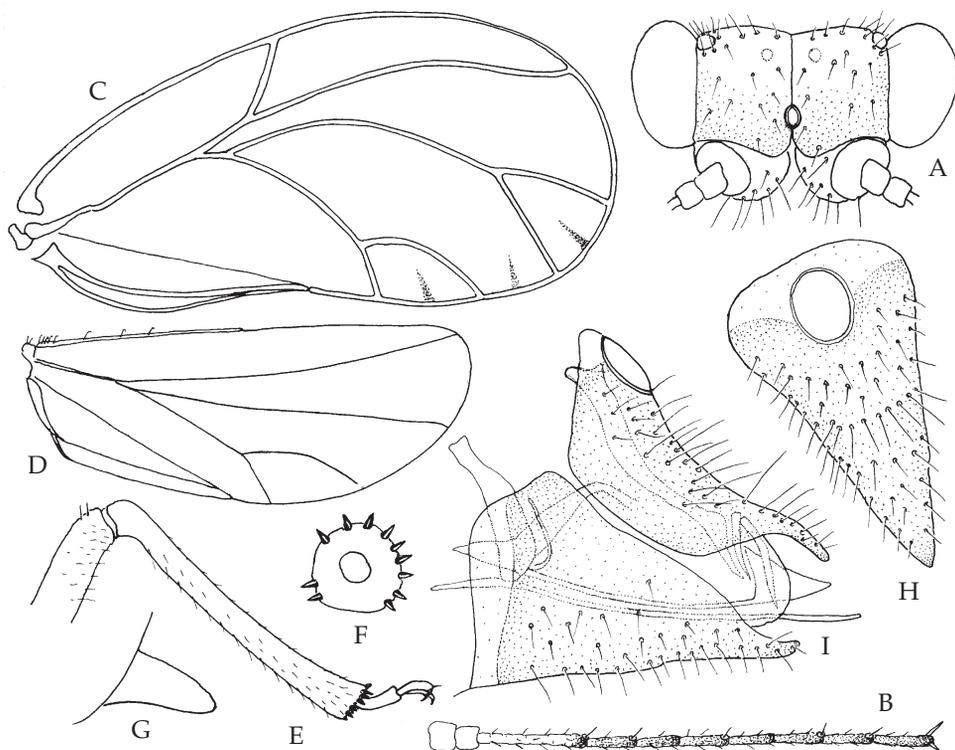


Fig. 4, *Pauropsylla braconae* spec. nov., ♀, holotype. A, head, dorsal aspect; B, antenna; C, fore wing; D, hind wing; E, hind leg; F, apex of hind tibia, apical aspect; G, meracanthus; H, female genitalia, lateral aspect; I, proctiger, dorsal aspect.

eyes red brown; antenna yellow, apex of third segment and entire fourth-tenth segments black. Thorax black, pronotum posteriorly and mesoscutellum basally brown, mesocutellum and metatergum yellow; legs pale-yellow, with tarsal segments black to dark-brown; wings hyaline, veins yellow brown. Abdomen black, with yellow intersegmental bands, genital segment yellow.

Host plant.— *Ficus hainanensis* Merr. & Shun.

Notes.— This new species is closely related to *Pauropsylla ficicola* Mathur, 1975, but differs from the latter, by having seven hind tibial spurs apically, the dorsal margin of the proctiger straight and the anus situated near its middle (Mathur, 1975).

Biology.— The galls of this species are similar to those of the above species on *Ficus hainanensis* Merr. & Chun., but about 80% of the galls are parasitized by Braconidae. The galls are light green to red brown and spherical, and situated on the dorsal surface of the leaf; the nymphs produce a large amount of waxy matter.

Bracon psyllivorus van Achterberg, spec. nov.
(figs 5-16)

Material.— Holotype, ♀ (ZUH), "China: Guangxi, Longzhou, Nonggang, c 200 m, 18.v.1982, ex Psyl-

loid leaf galls on *Ficus hainanensis* M. & S., Li Fasheng, no. 008". Paratypes (3 ♂♂; RMNH, ZUH); same data as holotype.

Holotype, ♀, length of body 3.2 mm, of fore wing 3.0 mm.

Head.— Antennal segments 23, antenna 0.9 times as long as fore wing, third segment 1.3 times longer than fourth segment, length of third, fourth and penultimate segments 3.0, 2.3, and 2.1 times their width, respectively (figs 7-9); scapus short, subovoid (fig. 9), apically truncate; pedicellus medium-sized (fig. 9); length of maxillary palp 0.6 times height of head; length of eye in dorsal view 1.8 times temple (fig. 6); temples gradually narrowed posteriorly (fig. 6); OOL:diameter of ocellus:POL = 16:5:6; frons granulate medially and smooth laterally, nearly flat, with weak median groove; face slightly convex and largely granulate; clypeus with some punctures, narrow and its ventral rim thin, concave and upcurved; width of hypoclypeal depression 0.55 times width of face; vertex smooth; length of malar space 1.2 times basal width of mandible; malar suture indistinct, granulate; occipital flange rather narrow (fig. 7).

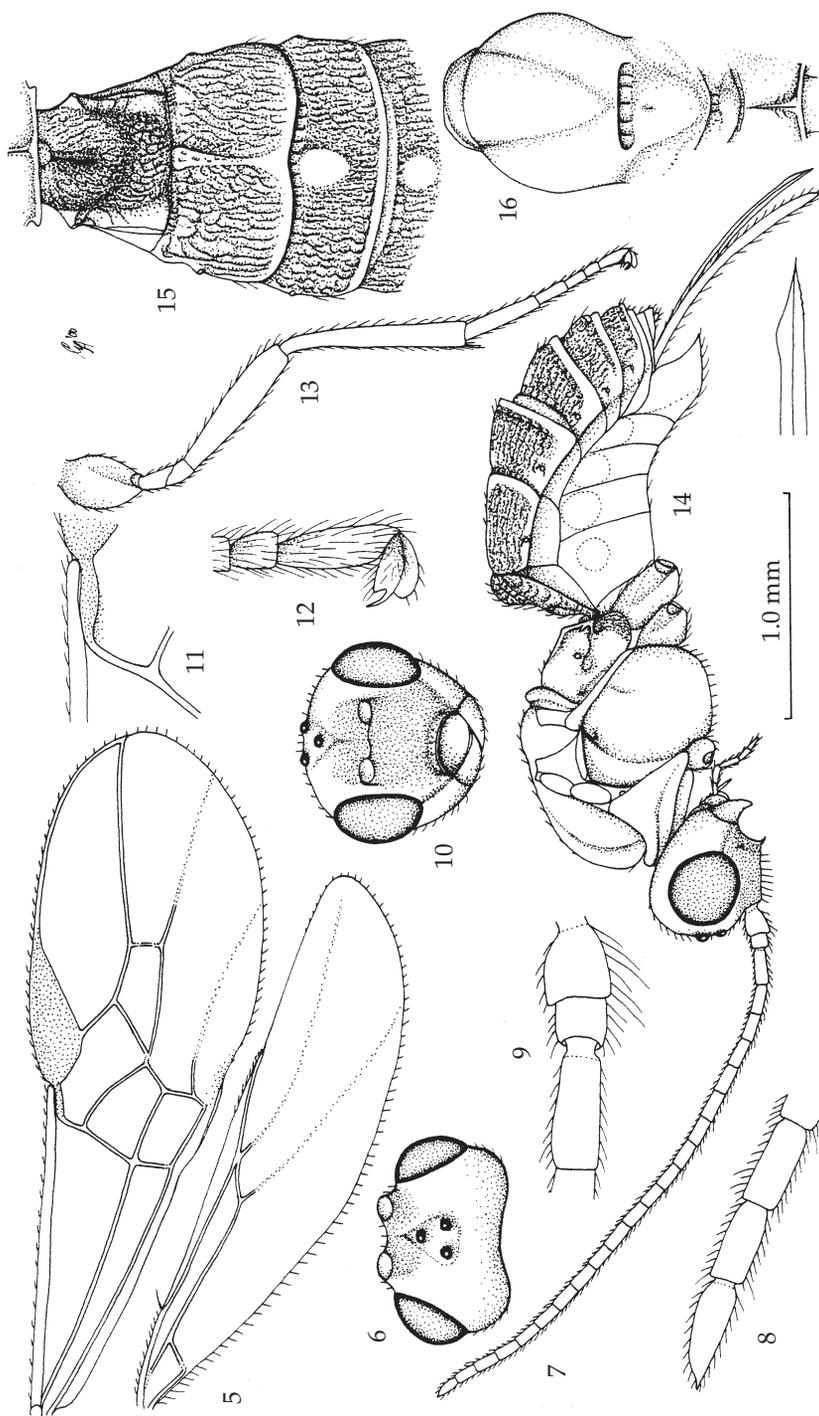
Mesosoma.— Length of mesosoma 1.2 times its height; antescutal cleft present (fig. 7); side of pronotum smooth; mesopleuron smooth; mesosternal suture deep, narrow and smooth; pleural sulcus present, smooth; metapleuron smooth, but ventrally with wide rugulose flange (fig. 7); notauli only anteriorly distinctly impressed, smooth, weakly indicated on disc, setae only near notaulic area; scutellum smooth except for small antero-medial puncture (fig. 16); metanotum tuberculate (figs 7, 16); surface of propodeum smooth, except for a strong median carina (connected to protruding posterior rim of propodeum (figs 7, 15), but carina absent anteriorly (fig. 16).

Wings.— Fore wing: angle between 1-SR and C+SC+R 62° (fig. 11); r long, emerging before middle from pterostigma (fig. 6); 1-SR+M slightly curved; r:3-SR:SR1 = 9:11:41; cu-a interstitial and straight; SR1 long and straight (fig. 6); 2-SR:3-SR:r-m = 12:11:6; CU1b much shorter than 3-CU1. Hind wing: cu-a nearly vertical; SC+R long (fig. 5); membrane setose near cu-a; 1r-m slightly curved as apex of 1-M.

Legs.— Hind coxa smooth; tarsal claws with rather acute lobe (fig. 12); length of femur, tibia and basitarsus of hind leg 4.0, 7.7 and 5.4 times their width, respectively; hind tibial spurs 0.25 and 0.30 times hind basitarsus; hind tibia distinctly compressed; fore tarsus slender.

Metasoma.— Length of first tergite 0.8 times its apical width, its surface largely coarsely reticulate-rugose (including depressed anterior part (fig. 15)), medio-anteriorly with deep groove, its dorsal carinae absent; second tergite largely coarsely rugose, antero-medially with weakly developed, largely smooth, elongate area, and medio-posteriorly smooth; second metasomal suture rather wide, distinctly crenulate and slightly sinuate (fig. 15); third and fourth tergites without antero-lateral grooves, coarsely rugose, but smooth medio-anteriorly and rugulose medio-posteriorly; fifth and sixth tergites finely rugose medially and remainder largely rugose; third-sixth tergite rather convex in lateral view (fig. 7), third-fifth tergites with shallow transverse subposterior groove; second, third and base of fourth tergites with sharp lateral crease; length of ovipositor sheath 0.35 times fore wing; ovipositor normal, but ventral teeth very minute (fig. 14); hypopygium medium-sized, apically acute (fig. 7).

Colour.— Blackish dark brown; head (but frons (except near eyes) and occiput dorsally blackish), pronotum dorso-posteriorly, small patch below base of fore wing



Figs 5-16, *Bracon psyllivorus* spec. nov., ♀, holotype. 6, head, dorsal aspect; 8, habitus, lateral aspect; 9, apex of antenna; 10, base of antenna; 11, head, frontal aspect; 12, detail of vein 1-SR of fore wing; 13, inner hind claw; 14, hind leg; 15, apex of ovipositor, lateral aspect; 16, first-third metasomal tergites, dorsal aspect; 17, mesosoma, dorsal aspect. 7, 11, 16, 17: 1.4 ×; 9, 10, 13, 15: 3.4 ×; 12: 2.5 ×.

yellowish-brown; palpi, legs (but apical half of hind tibia and most of hind tarsus, and telotarsi largely dark brown), mesopleuron ventrally, metasoma ventrally (except for the large dark brown patches of the sternites dorsally (fig. 7)), second-fifth tergites narrowly laterally and medio-anterior areas of third and fourth tergites pale yellowish; veins brown; pterostigma and parastigma dark brown; wing membrane subhyaline.

Variation.— Male paratypes: antennal segments 22(1), 23(10 or 24(1)); length of fore wing 2.5-2.6 mm, of body 2.4-3.3 mm; whole mesopleuron may be dark brown; propodeum somewhat rugose near median carina; smooth areas of second-fourth tergites may be obsolete or present and ivory; mesosoma largely dark brown or largely (yellowish-)brown.

Notes.— The new species is an aberrant member of the large genus *Bracon* Fabricius, 1804; it is aberrant because of the antemesoscutal cleft, the tuberculate metanotum, the convex tergites, the first tergite basally rugose, the second tergite with an elongate area, the third and fourth tergites with weakly developed medio-anterior areas, the weakly developed teeth of ovipositor, vein 1-M of the hind wing slightly widened and the narrow clypeus.

Abbreviations

CAUB stands for the China Agricultural University, Beijing; RMNH for the Nationaal Natuurhistorisch Museum, Leiden; and ZUH for the Zhejiang University, Hangzhou.

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