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## ***Apharinodes sinensis* sp. n. (Coleoptera: Staphylinidae: Pselaphinae) from China, and discovery of male wing dimorphism in Hybocephalini**

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**Abstract:** *Apharinodes sinensis* sp. n. is described from Yunnan, and represents the first named species of the tribe Hybocephalini Raffray from China. Male wing dimorphism is for the first time reported for a hybocephaline. An identification key to the four known *Apharinodes* species is given.

**Keywords:** Hybocephalini, *Apharinodes*, taxonomy, new species, male wing dimorphism, Asia.

### **INTRODUCTION**

The ant-loving beetle tribe Hybocephalini Raffray (Pselaphinae: Pselaphitae) comprises some 70 species grouped in 10 genera (Newton & Chandler, 1989; Besuchet 2008). Within this tribe most members are found from the tropical forested areas of Africa and Oriental region (Raffray, 1908; Newton & Chandler, 1989), with two species (of *Apharinodes* Raffray and *Stipesa* Sharp, respectively) occurring in eastern Palaearctic region (Sharp, 1874; Nomura, 1989), and one species (of *Stipesa*) from Australia (Chandler, 2001). Hybocephalines can be distinguished from those of all other tribes of the Pselaphitae by the generally compact and convex habitus, relatively robust antennae, small maxillary palpi, and more noticeably, squamous setae that may partially to entirely cover the body surface (Raffray, 1890a; Chandler, 2001). The number of the antennomeres by which the clubs are formed, relative length(s) of the abdominal segments, presence/absence and number of the abdominal paratergites, and presence/absence of elytral discal striae are frequently used to determine taxa at generic level (Raffray, 1908; Jeannel 1949a, b, 1959).

The genus *Apharinodes* Raffray is a small group currently including three species confined to East Asia (Raffray, 1911; Newton & Chandler, 1989; Nomura, 1989). Raffray (1890a) established *Apharinodes* with *A. squamosa* Raffray from Singapore (type species subsequently designated by Raffray, 1890b), and later described (Raffray, 1895) a second species *A. miranda* Raffray from the same country. Most recently, Nomura (1989)

described a third species *A. papageno* Nomura from Okinawa Island, Japan, from where additional collecting data for the same species was later added (Sugaya, 2003). The actual diversity of *Apharinodes* is expected to be much higher than currently documented. At least eight additional species from China, Malaysia and Thailand were listed in several reports on the local pselaphine fauna of these areas, though none of these has been formally named (Nomura 2000; Nomura & Idris, 2005; Nomura & Mohamed, 2008; Nomura *et al.*, 2008, 2010, 2013). *Apharinodes* has the antennal clubs composed of only the enlarged terminal antennomere (XI), the first two visible abdominal tergites (morphologically IV and V) are subequal in length, and almost the entire body surface is covered by thickened squamous setae. Such a combination of characters provides reliable means with regard to the identification of *Apharinodes* within the Hybocephalini.

Based on the third edition of the International Code of Zoological Nomenclature (ICZN, 1985), Nomura (1989) emended the gender of *Apharinodes* to masculine, and changed the suffixes of the two known species accordingly. But according to the latest (fourth) edition of the ICZN (1999), the name *Apharinodes* was originally combined with adjectival species-group names that are feminine (i.e. *squamosa* and *miranda*), thus the gender of *Apharinodes* should be remained as feminine (Article 30.1.4.4.).

Wing dimorphism is long- and well-known in insects. However, for the megadiverse polyphagan family Staphylinidae, sex-related wing dimorphism was only recently documented and discussed in detail. Thayer

(1992) firstly reported in *Omalium flavidum* Hamilton the presence of fully-winged and flightless males and flightless females, which belongs to a less common pattern of wing dimorphism. In Pselaphinae (formerly Pselaphidae, see Newton & Thayer, 1995), such pattern has been so far recorded for Batrisini (Nomura, 1991), Trichonychini (Nomura, 1988; Yin & Li, 2016), Bythinini (Kurbatov, 1994; Löbl *et al.*, 1998), and Tyrini (Nomura, 1997). In these groups, the males with normally developed hind wings tend to have larger eyes, longer elytra and metaventricle, and stronger elytral humeri. Recently, two male specimens of an undescribed *Apharinodes* were collected from southwestern China (Yunnan) exhibiting male wing dimorphism in a group of the Pselaphinae (Hybocephalini) in which such a phenomenon has never been recorded.

## MATERIAL AND METHODS

Material studied in this paper is housed in the Insect Collection of Shanghai Normal University (SNUC).

Dissected parts were preserved in Euparal on plastic slides that were placed on the same pin with the specimen. The habitus image was taken using a Canon 5D Mark III camera in conjunction with a Canon MP-E 65 mm f/2.8 1-5X Macro Lens and a Canon MT-24EX Macro Twin Lite Flash. Images of the morphological details were made using a Canon G9 camera mounted on an Olympus CX31 microscope. Zerene Stacker (version 1.04) was used for image stacking. All images were modified and grouped in Adobe Photoshop CS5 Extended.

The label data of the material are quoted verbatim, with additional notes included in parentheses. The following abbreviations are applied: AL—length of the dorsally visible part of the abdomen (posterior to elytra) along the midline; AnL—length of the antenna; AnCL—length of the antennal club; AW—maximum width of the abdomen; EL—length of the elytra along the suture; EW—maximum width of the elytra; HL—length of the head from the anterior clypeal margin to the occipital constriction; HW—width of the head across eyes; PL—length of the pronotum along the midline; PW—maximal width of the pronotum. The length of the body (BL) is a combination of HL + PL + EL + AL. Terminology for morphological structures follows Chandler (2001) with the exception that the term ‘ventrite’ replaces ‘sternite’, except prosternum.

## TAXONOMY

### *Apharinodes sinensis*, new species

Figs 1-2

**Type material:** **Holotype:** macropterous male: ‘China: Yunnan Province, Lincang City, Yun Hsien (云县), Manwan Town (漫湾镇), Caozidicun (草子地村), 24°40′27″N, 100°23′09″E, under stone, 1757 m,

9.iv.2016, Zi-Chun Xiong leg.’ (SNUC). **Paratype:** 1 apterous male, same label data as the holotype (SNUC).

**Diagnosis:** BL 2.28-2.39 mm; postocular region longer than eye (Fig. 2A); anterolateral branches (Fig. 2A-1) of squamous scales on pronotum distinct but shorter than basolateral branches (Fig. 2A-2), basolateral branches and mediobasal branch (Fig. 2A-3) separated anteriorly; male antennomere XI with large, shallow semicircular excavation on mesal surface; aedeagus (Fig. 2G-H) weakly sclerotized, median lobe with large basal capsule, endophallus with three sclerites, parameres thick and short.

**Description:** *Macropterous male* (Fig. 1A). Body length 2.39 mm. Body light reddish brown, mouthparts and tarsi lighter in color (the light color of the two males available are possibly due to immature adult status); most part of dorsal surface covered with thick squamous setae.

Head (Fig. 2A) slightly longer than wide, HL 0.53 mm, HW 0.46 mm, small vertexal and frontal fovea largely covered by setae; eyes large, each composed of about 32 facets; postocular margins (Fig. 2B) longer than eyes, roundly narrowed toward head base; antennae (Fig. 2C) robust, scapes as long as combined length of next two antennomeres, antennomeres II transversely quadrate, III to X strongly transverse, successively wider, XI largest, mesal surface with large, shallow, semicircular excavation, AnL 0.95 mm, AnCL 0.33 mm, AnCL/AnL = 0.35; maxillary palpi small and short, three-segmented, with distinct conical palpal cone; gular area flat, densely covered with setae basolaterally.

Pronotum (Fig. 2A) slightly wider than long, PL 0.48 mm, PW 0.52 mm, lateral margins nearly straight at basal half, narrowed from middle toward apex; anterolateral branches of squamous scales distinct but short, extending less mesally than basolateral branches, mediobasal branch and basolateral branches clearly separated at anterior ends. Whole surface of prosternum (Fig. 2B) covered with dense setae.

Elytra convex, wider than long, EL 0.73 mm, EW 0.88 mm, posterior margin with band of dense setae; two basal foveae covered by squamous scales; with complete discal and sutural striae. Metathoracic wings fully developed. Mesoventrite densely covered with small squamous setae; metaventricle densely covered with setae at middle, areas posterior to mesocoxae with two elongate projections that extend to metaventral posterior margin.

Abdomen subglobose, wider than long, AL 0.65 mm, AW 0.86 mm; tergite IV (first visible tergite) as long as tergite V, with pair of lateral sulci, tergites VI and VII slightly shorter than V, VIII (Fig. 2D) circular viewed posteriorly; sternite IV (second visible sternite) to VII successively shorter, VIII (Fig. 2E) shallowly emarginate at middle, IX (Fig. 2F) well-sclerotized at apex, membranous at posterior half.

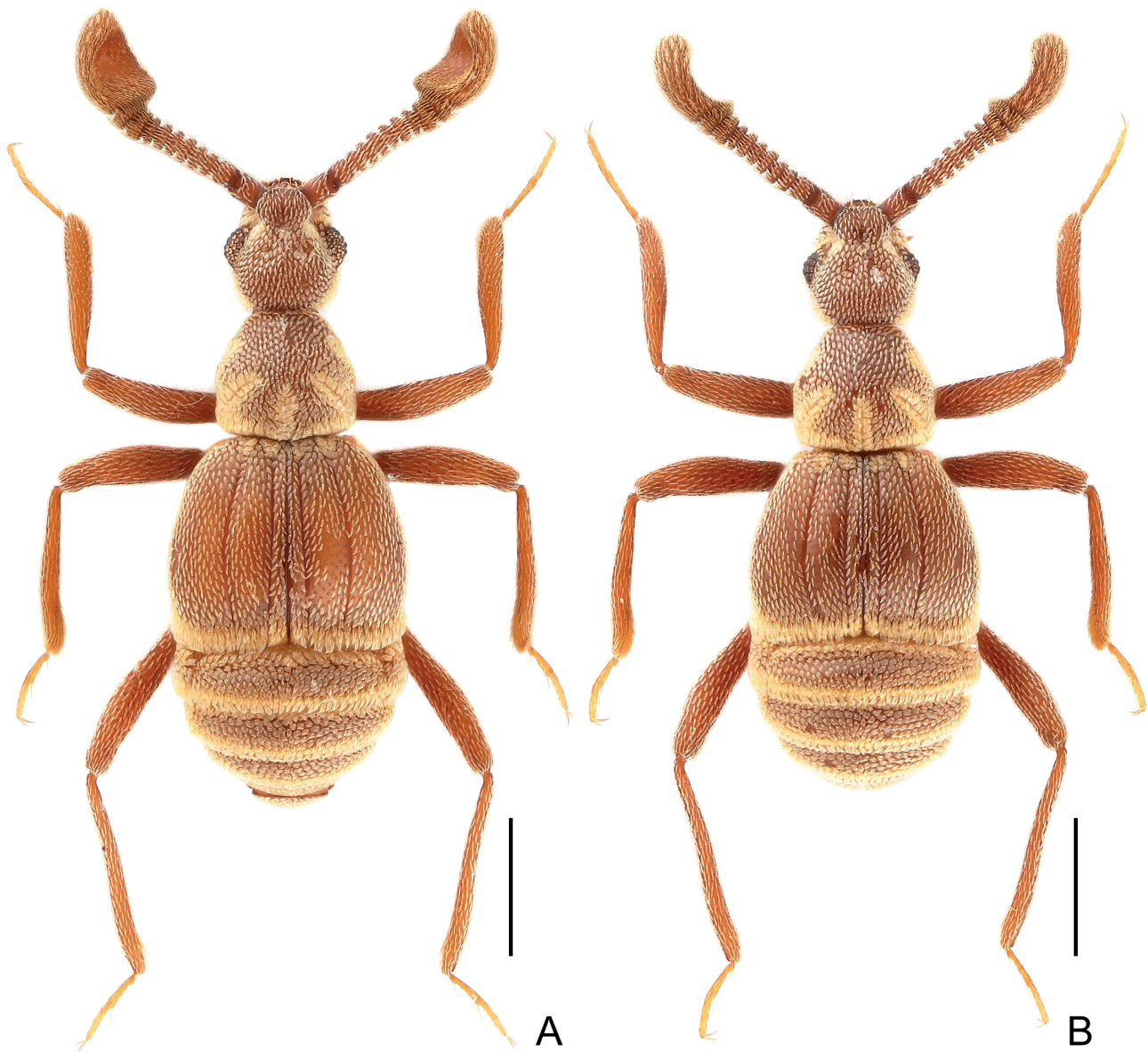


Fig. 1. Dorsal habitus of *Apharinodes sinensis*. (A) Macropterous male. (B) Apterous male. Scale bars: 0.5 mm.

**Key to species of *Apharinodes* Raffray**

- 1 Body less than 2 mm; anterolateral branches of squamous scales on pronotum extending more mesal (closer to midline) than basolateral branches. (Singapore) ..... *A. squamosa* Raffray
- Body no less than 2 mm; anterolateral branches of squamous scales on pronotum shorter than basolateral branches (Figs 1, 3).....2
- 2 Male antennomere XI with large, shallow, quadrate excavation; pronotal mediobasal and basolateral branches of squamous scales fusing anteriorly (Fig. 3B). (Singapore)..... *A. miranda* Raffray
- Male antennomere XI with deep, rounded excavation (Figs 1, 2C, 3A); pronotal mediobasal and basolateral branches of squamous scales separated anteriorly (Figs 1, 2A, 3A) .....3
- 3 Excavation of male antennomere XI deeper (Fig. 3A); postocular margins slightly shorter than eye length (Nomura, 1989: fig. 1); pronotal anterolateral branches of squamous scales indistinct (Fig. 3A). (Japan: Okinawa)..... *A. papageno* Nomura
- Excavation of male antennomere XI shallower (Figs 1, 2C); postocular margins longer than eye length (Fig. 2A); pronotal anterolateral branches of squamous scales distinct (Figs 1, 2A). (China: Yunnan) ..... *A. sinensis*, **sp. n.**



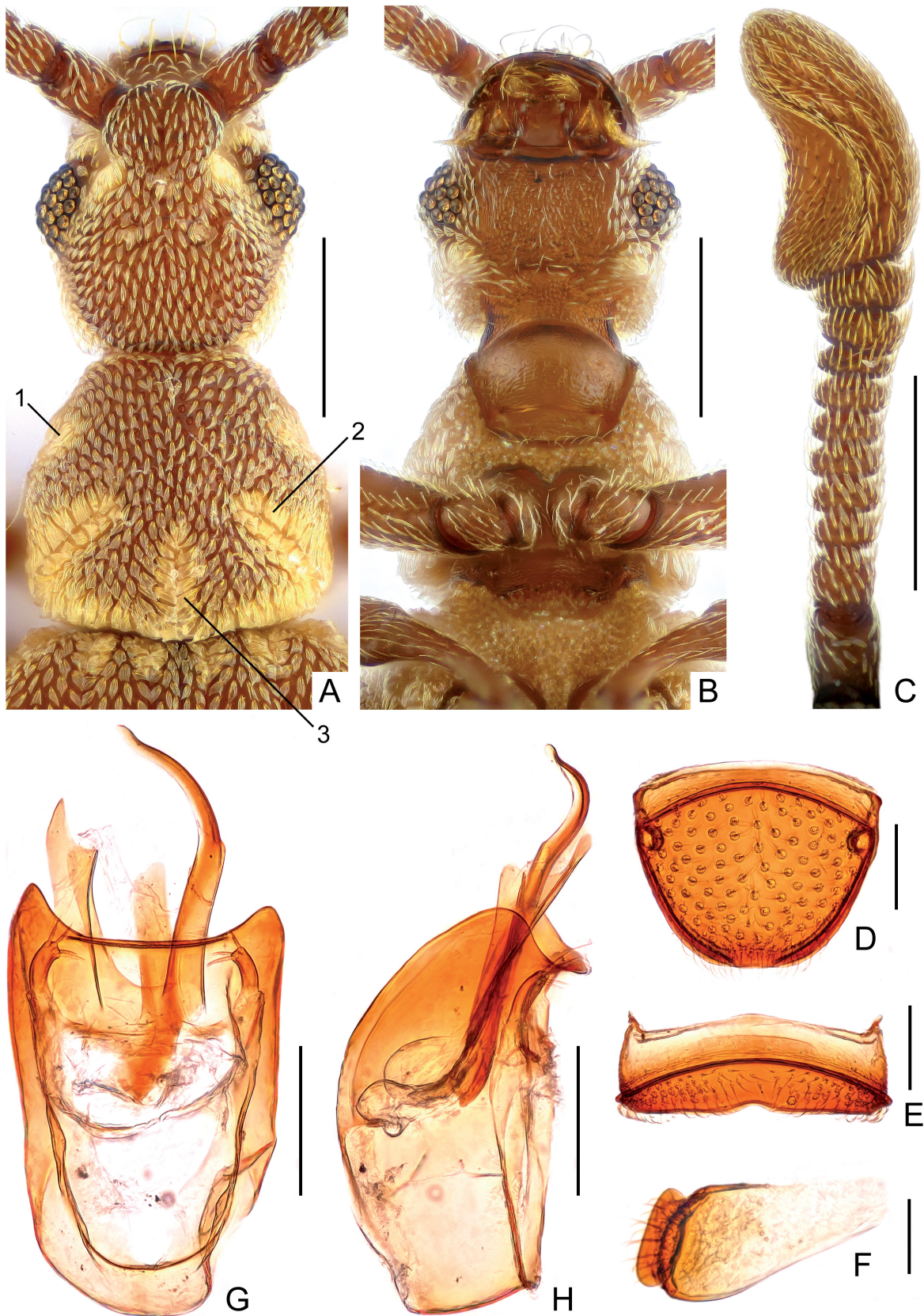


Fig. 2. Details of male *Apharinodes sinensis*. (A) Head dorsum and pronotum (numbers indicate branches of squamous scales: 1. anterolateral branch; 2. basolateral branch; 3. mediobasal branch). (B) Head venter and prosternum. (C) Right antenna. (D) Tergite VIII. (E) Sternite VIII. (F) Sternite IX. (G) Aedeagus, in ventral view. (H) Same, in lateral view. Scale bars: A-C = 0.3 mm; D, E, G, H = 0.1 mm; F = 0.05 mm.

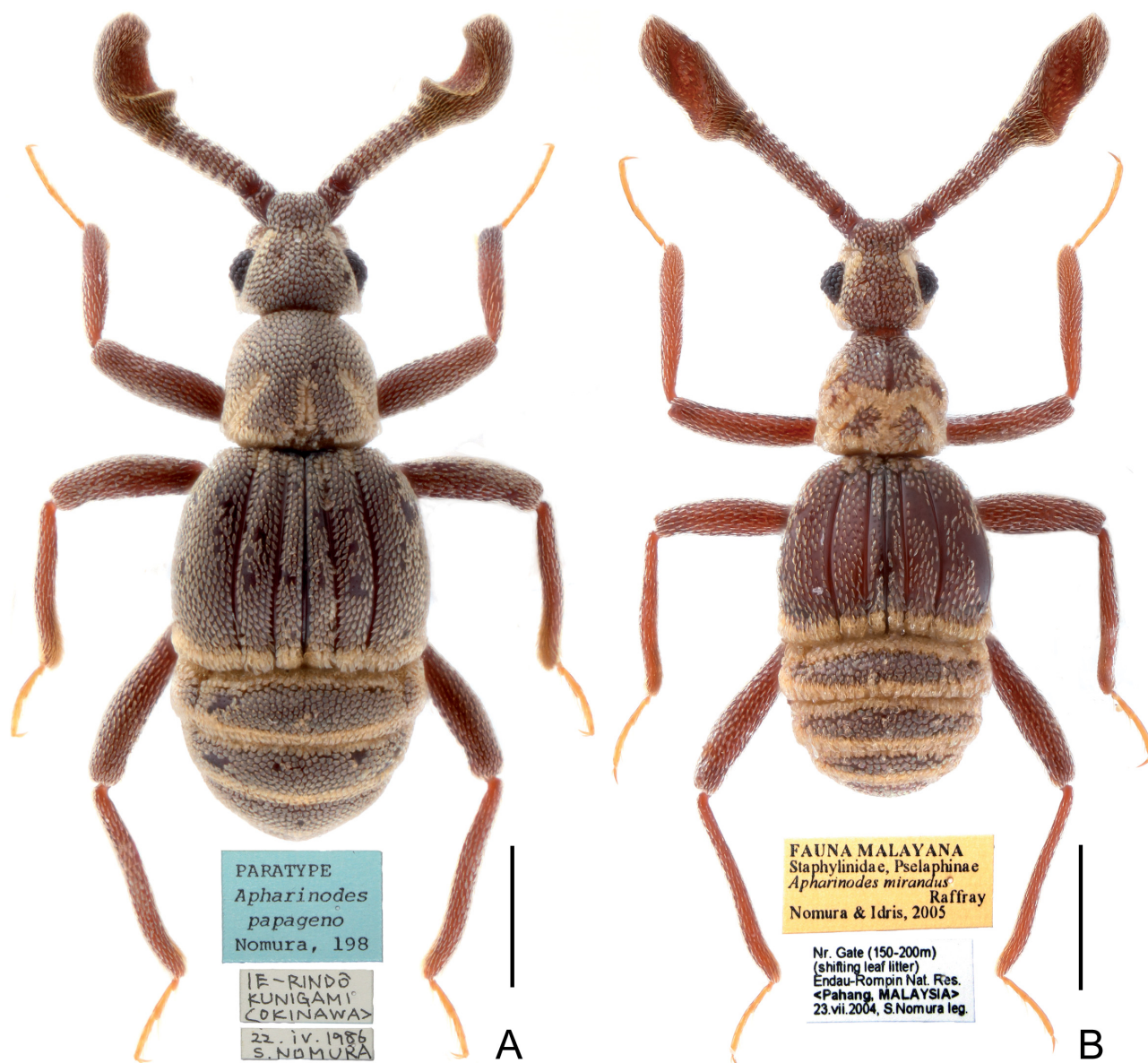


Fig. 3. Dorsal habitus of *Apharinodes* species. (A) *A. papageno*, male paratype. (B) *A. miranda*, male. Scale bars: 0.5 mm.

Aedeagus (Fig. 2G-H) weakly sclerotized, length 0.38 mm; median lobe broad, with large basal capsule, broadly emarginate along apical margin; parameres short and thick, each with three thick apical setae; endophallus composed of three sclerites, left sclerite longest, curved toward right, middle sclerite shortest, membranous, right sclerite broad, weakly sclerotized, narrowed at apex.

*Apterous male* (Fig. 1B). Similar to macropterous male in general habitat, except eyes smaller, each composed of about 11 facets; elytra and metaventrite shorter; and metathoracic wings absent. Measurements: BL 2.28 mm, HL 0.50 mm, HW 0.44 mm, PL 0.47 mm, PW 0.52 mm, EL 0.65 mm, EW 0.87 mm, AL 0.66 mm, AW 0.85 mm,

AnL 0.97 mm, AnCL 0.34 mm, AnCL/AnL = 0.35, length of aedeagus 0.35 mm.

*Female*. Unknown.

**Distribution:** Southwestern China: Yunnan.

**Etymology:** The specific epithet indicating the country where the new species was collected.

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