

## A New Genus and Species of Pteromalidae from China, with SEM Study of the Flagellar Sense Receptors

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**Hui Xiao and Da-Wei Huang (2001)** A new genus and species of Pteromalidae from China, with SEM study of the flagellar sense receptors. *Zoological Studies* 40(3): 189-192. *Angulifrons reticulata* gen. et sp. n. is described and figured in this paper. All specimens were collected from Tibet, China. SEM photos are also presented here to show morphological characters of the new genus and 6 types of sense receptors that occur on the flagellum of female *Angulifrons reticulata* sp. n.. The type specimens are deposited at the Institute of Zoology, Chinese Academy of Sciences, Beijing. <http://www.sinica.edu.tw/zool/zoolstud/40.3/189.pdf>

**Key words:** Taxonomy, Hymenoptera, Pteromalidae, *Angulifrons*.

Pteromalidae (Insecta: Hymenoptera) are mainly parasitoids of economically important pests. This paper describes a new genus and species of Pteromalidae. Although its biology is not known, its morphological features are of interest.

### MATERIALS AND METHODS

Specimens used in this study were collected from Tibet (Xizhang), China in July 1997. Several keys for identification of the genus were used (Graham 1969, Bouček 1988, Bouček and Rasplus 1991, Bouček and Heydon 1997). Detailed comparisons were made with known pteromalid genera.

Materials were prepared for scanning electron microscopy as follows: dry pinned specimens were transferred to phosphate buffer (pH 7.2), cleaned using an ultrasonic cleaner, and immersed in 1% KI solution for 72 h (changed once a day), followed by 3 rinses in distilled water. Then, the head, antennae, mesosoma, wings, and legs were separated from the body, air-dried, and mounted on a stub prior to sputter coating with gold. Specimens were examined using a Hitachi S2860N scanning electron microscope at 25 kV. The units of relative measurement

given in the descriptions can be converted to millimeters by multiplying with 0.016.

### SYSTEMATIC ACCOUNTS

#### Genus *Angulifrons* gen. n.

Type species: *Angulifrons reticulata* sp. n.

**Etymology:** The genus name is a Latin compound of 'angul-' (= angle) and 'frons' (= forehead). The gender is feminine.

**Biology:** Unknown.

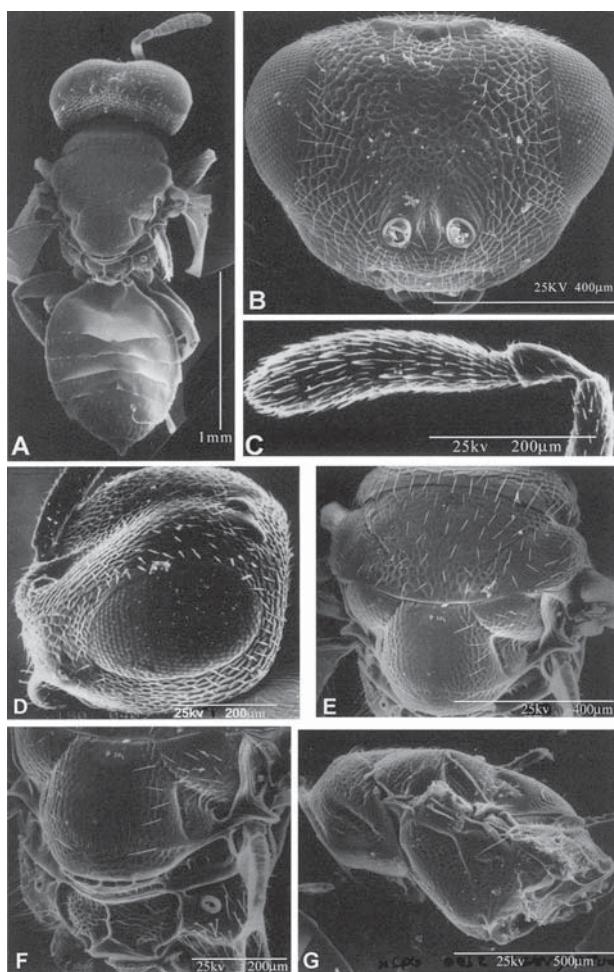
**Distribution:** China: Tibet.

**Generic characters:** The Pteromaline genus with sessile gaster, incomplete notauli (Fig. 1A). Body dark metallic green. Head stout, vertex not high, occiput without occipital carina. Head transverse in facial view (Fig. 1B), scrobe broad and nearly reaching median ocellus. Antennal insertion rather low on face, torulus at least slightly below lower ocular line. Mouth not large, both mandibles with 3 strong teeth. Clypeal margin straight, its surface smooth. Head in lateral view, lower face strongly protuberant at antennal insertion, almost right-angled with upper face (Fig. 1D). Antenna (Fig. 1C)

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stout and very short, scape not reaching median ocellus; flagellum clavate, formula 11263, first funicular segment about 1/2 as long as 2nd, all funicular segments transverse.

Mesosoma (Fig. 1E) slightly high and short, dorsally (to apex of produced scutellum) hardly more than 1.2 times as long as broad. Pronotum short, dorsally without distinct anterior edge but with smooth transverse strip posteriorly, laterally rounded; neck vertical. Mesoscutum rather smooth except for posterior part of mid lobe with distinctly raised reticulation (Fig. 1E); notauli incomplete, groove-like in anterior 2/3. Scutellum slightly convex, frenal line weak, middle of scutellum rather smooth, surrounding area and frenum with regular reticulation (Fig. 1E). Propodeum (Fig. 1F) with reticulation, covering at most 1/2 of scutellum length, median carina and plicae complete; inside of plicae with distinct raised

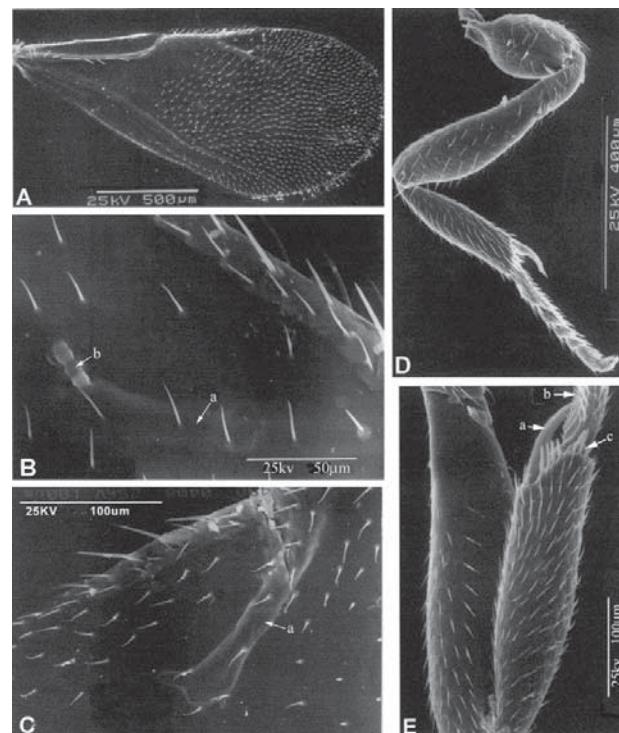


**Fig. 1.** *Angulifrons reticulata* sp. n. ♀: A, body in dorsal view; B, head in front view; C, antenna; D, head in lateral view; E, dorsal view of mesoscutum and scutellum; F, dorsal view of scutellum and propodeum; G, mesosoma in lateral view.

reticulation; nucha indistinct and with a smooth raised triangular area. Prepectus (Fig. 1G) nearly smooth, slightly longer than tegula. Mesoepisternum and lower epimeron reticulate, upper mesoepimeron smooth (Fig. 1G). Legs not very slender; hind legs (Fig. 2D) with short coxa, dorsally bare; with 1 spur on hind tibia; fore tibia with apical pegs and fore basitarsus with distinct strigil (Fig. 2E). Forewing (Fig. 2A) with short marginal fringe at apex; upper surface of costal cell bare, under surface with 2 rows of hairs; basal cell and basal line bare; speculum large and reaching marginal vein; proximal 1/3 of forewing almost completely bare; stigmal vein about as long as postmarginal vein, stigma with moderate knob (Fig. 2B, C).

Petiole invisible. Gaster stout, oval, wider than breadth of mesosoma and head; hardly as long as head plus mesosoma, dorsum flat and shiny; hind margin of 1st tergite curved in middle. Hypopygium not produced.

**Diagnosis:** The new genus, with its antennae inserted below ocular line and lower face distinctly protuberant at antennal insertion, is similar to *Tritneptis* Girault, but differs from the latter greatly in the form



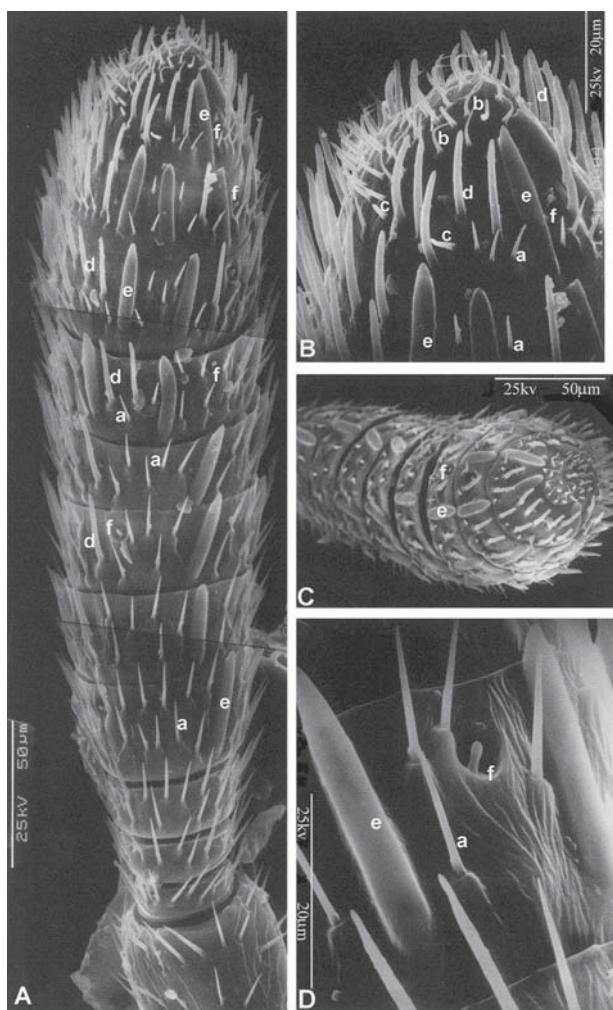
**Fig. 2.** *Angulifrons reticulata* sp. n. ♀: A, forewing; B, stigmal vein on upper surface of forewing: a = stigmal vein, b = circular sensilla; C, stigmal vein on lower surface of forewing: a = stigmal vein; D, fore leg; E, fore leg showing tibia with apical pegs and basitarsus with strigil: a = tibial spur, b = strigil, c = apical pegs.

of the antennae, the head, and the sculptured mesoscutum. Differences in the 2 genera are given in the following key:

1. First funicular segment ring like, about 1/2 length of 2nd; all funicular segments transverse; mesoscutum rather smooth except posterior part of mid lobe with distinctly raised reticulation; postmarginal vein as long as stigmal vein ..... *Angulifrons* gen. n.
- First funicular segment as long as or slightly shorter than 2nd; 2-3rd funicular segments at least quadrate; mesoscutum with distinct reticulation; postmarginal vein at least slightly longer than stigmal vein ..... *Tritneptis* Girault

### *Angulifrons reticulata* sp. n.

(Figs. 1, 2, 3)



**Fig. 3.** *Angulifrons reticulata* sp. n. ♀: A, flagellar segments 1-11; B, flagellar segment 11, lateroventral view; C, medioventral view of antenna; D, lateroventral view of flagellar segment 9. a = slender, sharp-tipped hair; b = short, curved tactile hair; c = thick-walled chemoreceptor; d = thin-walled chemoreceptor; e = plate organ; f = basiconic capitate pegs.

**Holotype:** ♀. China: Tibet, Gyaca, 28 June 1997, collected by Chao-Dong Zhu.

**Paratypes:** China: Tibet, Lhasa, 5 ♀♀, 21 June 1997; 3 ♀♀, 1 ♂, 22 June 1997; 2 ♀♀, 23 June 1997, collected by Chao-Dong Zhu; China: Tibet, Nêdong Co., 3650 m, 1 ♀, 24 June 1997; China: Tibet, Nang Co., 3100 m, 1 ♀, 21 June 1997, collected by Chao-Dong Zhu.

**Description:** ♀. Body length 2.5 mm. Dark green and metallic, gaster brownish black; antennal scape, all tibia and tarsi 1-4 deep yellow, tegulae and coxae concolorous with body, all legs brownish yellow; wings hyaline, venation brownish yellow.

**Relative measurements:** Head width 51, height 65, dorsal length 36, frontal width 34, OOL:POL as 8:11, toruli to clypeal margin 7.5, toruli to median ocellus 23, malar space 7, scape 19, flagellum plus pedicel 28, mesosoma from pronotal edge to apex of propodeum 50, pronotum length 5 and width 38, mesoscutum length 13 and width 45, scutellum length 22 and width 24, medial length of propodeum 10; costal cell length 42 and width 5, marginal vein 19, postmarginal vein 12 (narrower than marginal vein), stigmal vein 12; gaster flat, width 55 and length 65.

Pilosity on head and mesosoma thin, short, pale brown. For the characteristic head see Fig. 1B, D. Antenna (Figs. 1C, 3A) with 1st funicular segment without sensilla, 2-6 funicular segments transverse and with a row of sensilla, 1st funicular segment slightly wider than 2nd anellus and 1/2 as long as 2nd funicular segment. Circular sensilla (Fig. 2B) in uncus of stigmal vein on forewing very distinct on upper surface of forewing, but absent on lower surface of forewing (Fig. 2C). For many other features see the description of the genus above.

**Male:** Body smaller than female; other characters are very similar to female except for antennae brownish yellow. Mesoscutum reticulate, mid lobe reticulate distinctly. Petiole subquadrate; gaster oval.

**Biology:** Unknown.

### SEM study on flagellar sense receptors

Slifer (1969) treated 5 types of sense receptors of *Nasonia vitripennis* (Walker) based on light microscopic studies: 2 kinds of tactile hairs (a slender hair with sharp tip, a short, curved hair) and 3 types of chemoreceptors (a thick-walled chemoreceptor, a thin-walled chemoreceptor, and a plate organ).

Miller (1972) confirmed the 5 types of sense receptors based on scanning electron microscopic studies. Meanwhile, he observed other 2 types of

chemoreceptors: basiconic capitate pegs and campaniform sensilla.

The examination with SEM reconfirmed the 5 types of sense receptors on the flagellum of *Nasonia vitripennis* (Walker), which Slifer described and Miller confirmed. *A. reticulata* has 2 kinds of tactile hairs: slender, nearly straight, sharp-tipped hairs (Fig. 3A-B, D, a), and short, curved hairs (Fig. 3B, b); and 3 types of chemoreceptors: a thick-walled chemoreceptor (Fig. 3B, c), a thin-walled chemoreceptor (Fig. 3A-B, d), and plate organs (Fig. 3A-D, e). We also observed basiconic capitate pegs (Fig. 3A-D, f) as Miller did on *Nasonia vitripennis* (Walker). But the new species has no campaniform sensilla.

Observations of the pattern of receptors on the antennae of female *A. reticulata* reveal that:

1. Slender sharp-tipped hairs are present on each flagellar segment except micropilosity;
2. Curved hairs are only on micropilosity;
3. Thick-walled pegs are on flagellar segment 11 and micropilosity;
4. Thin-walled chemoreceptors are on flagellar segments 5-11;
5. Plate organs are on flagellar segments 4-11; and
6. Basiconic capitate pegs are on flagellar segments 4-11.

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## 金小蜂科一新屬(*Angulifrons*)與一新種，兼記觸角感覺器 (昆蟲綱：膜翅目)

肖暉 黃大衛

本文記錄並詳細描述了中國金小蜂科一新屬 *Angulifrons* gen. n. 及一新種 *Angulifrons reticulata* sp. n.，並利用掃描電鏡發現該新種觸角上分布的 6 種感覺器。所有研究標本均採自中國西藏，模式標本保存在中國科學院動物研究所。

**關鍵詞：**分類學，膜翅目，金小蜂科，角額金小蜂屬。

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