A review of Eunotinae (Hymenoptera: Chalcidoidea: Pteromalidae) from China

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Five genera of Eunotinae are included in this paper. Ophelosia, Moranila, Cephaleta, Eunotus are reviewed and a new genus Cavitas is described. Four new species, Cavitas concava sp. nov., Eunotus applanatus sp. nov., E. strenus sp. nov. and E. aequalivenus sp. nov. are described. The type specimens are deposited in the Zoological Museum, Institute of Zoology, the Chinese Academy of Sciences.

KEYWORDS: Hymenoptera, Pteromalidae, Eunotinae, new genus, new species, China.

Introduction

Walker (1872) first mentioned Eunotus as ‘an example of a small distinct family’. Ashmead (1904) proposed the subfamily Eunotinae. Bouček (1988) created Tomocerodini and Moranilini and recorded 20 genera from Australia and Asia. LaSalle et al. (1997) created Idioporini. Together with Eunotini, four tribes are included in Eunotinae.

So far, only two species Cephaleta purpureiventris (Motschulsky, 1859) [= Anysis sissetiae (Ashmead)] (Liao et al., 1987) and Scutellista caerulea (Fonscolombe, 1832) (Graham, 1969; Bouček, 1988) were recorded in China. We recognized six genera and 13 species in the present study.

Diagnosis of the Eunotinae

Vertex carinate or sharply angulate (in Idioporus) behind ocelli; gena posteriorly carinate (occasionally angulate, in Scutellista); posterior ocelli touching or close to hind edge of vertex; between pedicellus and clava usually with five (female) or four (male) segments, the first of which is often anelliform; notauli always complete; scutellum usually longer than mesoscutum; first gastral tergal usually at least half length of gaster.

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Biology

Eunotines are associated with Hemiptera: Sternorrhyncha, such as Aleyrodidae, Aphididae, Asterocheniidae, Coccidae, Dactylopiidae, Diaspididae, Eriococcidae, Lecaniodiaspididae, Margarodidae, Pseudococcidae, mainly as predators of eggs, some as adult parasitoids, egg parasitoids, larva-pupal parasitoids, and sometimes as hyperparasitoids via Encyrtidae (Hymenoptera), Coccinellidae (Coleoptera) and Gracillariidae (Lepidoptera). Some species of *Scutellista* and *Cephaleta* have been used in the biological control of certain coccid pests.

Key to the genera

1. Mesoscutum and scutellum without pairs of strong bristles, but with many scattered short hairs .................................................. 2
   - Mesoscutum and scutellum with pairs of strong bristles, but without distinctly short hairs .................................................. 5

2. Scutellum produced as a roof, over gaster about two-thirds length .................................................. Scutellista Motschulsky
   - Scutellum only produced over propodeum .................................................. 3

3. Mesoscutum and scutellum without raised reticulation, smooth or shiny .................................................. 4
   - Mesoscutum and scutellum with raised reticulation, and regular pilosity, without long bristles (figure 47); propodeum with tooth-like median carina (figure 48); fore wing completely with dense hairs, body black .................................................. Eunotus Walker

4. Scrobe distinctly concave and the whole scape encased in scrobe (figures 1, 34); thorax with slight punctures bearing loose hairs; basal area of fore wing bare; posterior ocellus not touching hind margin of vertex; temple distinct, antenna without anelli, formula 11043; .................................................. Cavitas gen. nov.
   - Scrobe slightly concave and only base of scape encased in scrobe; thorax with dense hairs, basal area of fore wing pilose; vertex sharply angulate behind ocelli, posterior ocellus touching hind margin of vertex; temple indistinct, antenna with one anelli, formula 11143; .................................................. Cephaleta Motschulsky

5. Propodeum about one-half length of scutellum, and reaching the hind coxae; mesoscutum without short hairs except pairs of strong bristles, body usually black .................................................. Moranila Cameron
   - Propodeum slightly longer than scutellum, extending beyond hind coxa; mesoscutum without short hairs, with two pairs of strong bristles, most of the body surface yellowish to brown colour .................................................. Ophelosia Riley

Descriptions

*Cavitas* gen. nov.

*Type-species.* *Cavitas concava* sp. nov.

The genus is named because of its extremely concave scrobe; feminine gender.

*Diagnostic characters.* Scrobe very deep, distinctly hollowed (figures 1, 32), scapes completely sunk in it; antenna short, thick and clavate, antennal formula 11043; mandible small, formula 2.2; vertex slightly convex; lateral area outside of scrobe in upper face with conspicuous projection (figures 2, 5, 33), temple distinct; thorax convex; pronotum collar not margined; frenum with large and conspicuous aveolations (figures 37, 38); propodeum short and nucha distinct (figure 38); marginal vein longer, postmarginal vein slightly shorter than stigmal vein; first gastral tergite about half length of gaster.

The gaster is very distinctive in the following characters: scrobe very concave
and whole scape encased in the scrobe; thorax shiny and with slight punctures bearing short hairs; antennae without anelli, formula 11043. Some of its features suggest a possible relationship with *Idioporus* and *Cephaleta*. The differences with the first genus are the tarsi and antennae, the differences with the second genus are shown in the preceding key.

**Biology.** Reared from pupae of coccids.

**Distribution.** China (Hainan).

*Cavitas concava* sp. nov.

(figures 1–5, 33–42)

**Female.** Body (figures 5, 33) length 1.5 mm. Head and thorax dark green, gaster brown; antennae yellow; hind coxae concolorous with thorax, fore and mid legs brown excepting tibia yellow.

Head (figures 1–3) in front view subtriangle; clypeus small and lower margin emarginate, gena strongly converging to mouth; scrobe very deep, cavity-like (figure 34); scape completely encased in scrobe, vertex slightly convex and lateral area outside of scrobe in upper face with conspicuous projection (figures 2, 5, 35). Antennal (figures 36, 37) insertion below ventral line of eyes; scape not reaching the median ocellus; pedicellus about 1.3 times as long as broad, much longer than first funicular segment; each funicular segment broader than long; clava as long as the
Figs 6–11. *Ophelosia crawfordi* Riley; (6–10) female, (11) male. (6) Head in front view; (7) antenna; (8) head in dorsal view; (9) thorax and gaster in dorsal view; (10) fore wing; (11) antenna. Scale bars = 0.1 mm.

Figs 12–14. *Moranila californica* (Howard) ♀; (12) thorax and gaster in dorsal view; (13) antenna; (14) fore wing. Scale bars = 0.1 mm.

last three funicular segments together; flagellum plus pedicellus shorter than the head width. Relative measurements: head width 34, height 26, length 20, eye space 21, eye height 11, malar space 14, POL: OOL as 11: 4.

Thorax convex (figures 5, 39), with weak reticulations. Pronotum narrower than mesoscutum, collar not margined. Notauli shallow and complete. Frenum with large and conspicuous areolations (figures 39, 40). Propodeum with short median carina, nucha distinct (figure 38). Fore wing about 2.2 times as long as broad; basal cell bare and lower margin open; basal vein without hairs. Fore leg (figures 41, 42) short,
Figs 15–19. *Eunotus strenus* sp nov. ♀; (15) head in front view; (16) antenna; (17) head in dorsal view; (18) body in dorsal view; (19) fore wing. Scale bars = 0.1 mm.

tibia with one spur which is shorter than basitarsus; basitarsus with setae in serrate series and literally with three clavate pegs (figure 51). Gaster sessile, ovate, first gastral tergite half length of gaster (figure 33). Relative measurements: pronotum length 4, mesoscutum length 15, scutellum 17 long, 24 wide, length of propodeum 5, marginal vein 13, postmarginal 2.5, stigmal vein 3 (figure 4); gaster width 33, length 40.

**Male.** Body smaller than female; others very similar to female except antennae: funicular segments yellow and first two or three subquadrate, last one slightly broader than long (figure 38), clavae brown, distinctly shorter than last three funicular segments together; head in dorsal view with weak reticulation.

**Holotype** female, China, Hainan, Danxian (Nada), 24 May 1964, from coccids on litchi (Chen Tai-Lu).

**Paratype,** 1♀1♂, same as holotype; China: Hainan, Danxian (Nada), 1 May 1964, 12♀2♂, from coccids (Chen Tai-Lu); Hainan, Danxian (Nada), 14 May 1964, 1♀, from coccids (Chen Tai-Lu), Hainan, Qiongshan, 18 May 1964, 3♀1♂, from coccids on litchi (Chen Tai-Lu).
Figs 20–26. (20, 21) *Eunotus aequalivena* sp. nov. ♂; (20) antenna; (21) venation of fore wing. (22, 23) *Eunotus cretaceus* Walker ♂; (22) antenna; (23) gaster in dorsal view. (24) *Eunotus applanatus* sp. nov. ♀, head in dorsal view. (25) *Eunotus acutus* Kurdjumov ♀, antenna. (26) *Eunotus parvalus* Masi ♀, antenna. Scale bars = 0.1 mm.

Figs 27–32. (27, 28) *Cephaleta australiensis* (Howard) ♀; (27) antenna; (28) venation of fore wing. (29, 30) *Cephaleta brunniventris* Motschulsky ♂; (29) antenna; (30) body in dorsal view. (31, 32) *Scutellista caerulea* (Fonscolombe) ♀; (31) antenna; (32) body in dorsal view. Scale bars = 0.1 mm.
**Biology.** Reared from coccids.

**Distribution.** China (Hainan).

**Ophelosia** Riley, 1890


**Diagnostic characters.** Antennae inserted slightly above clypeal margin; antennal formula 11143, clava large and without distinct separation. Head with weak occipital carina. Mesoscutum and scutellum with scattered bristles; scutellum without short hairs, but with two pairs of bristles. Propodeum long and horizontal, nucha distinct; propodeum slightly longer than scutellum, and extending beyond hind coxa; fore wing with basal area bare. Some species possessing distinct tuft of brown hairs on basal vein and base of parastigma.

**Biology.** *Ophelosia* act as egg predators and the primary parasitoids of margarodids (*Icerya*), dactylopiids (*Trionymus*), pseudococcids (*Nipaecoccus*, *Phenacoccus*, *Planococcus*, *Pseudococcus*) and coccinellids. Some species are occasionally hyperparasitoids via encyrtids on pseudococcids or aphids.

There are about 15 species in the world. They are mainly distributed in Pacific, Nearctic and Oriental areas, including Australia, New Zealand, North America, India, Papua New Guinea, Java. This is the first time they have been recorded in China.

**Ophelosia crawfordi** Riley

(figures 6–11)

*Ophelosia crawfordi* Riley, 1890: 248–250. 

*Ophelosia sulcata* Girault, 1925: 1. Synonymized by Berry, 1995: 44. 

*Phelosia crawfordi* Riley; Bouček, 1988: 354. 

*Ophelosia crawfordi* Riley; Berry, 1995: 44–45.

**Material examined.** China: Fujian, Fuzhou, 2 November 1983, 1♀1♂ (Tang Yu-Qing); Fujian Fuzhou, 1964, 3♂ from mealybugs on citrus (Huang Chun-Mei); Fujian, Fuzhou, 23 September 1955, 1♀, from *Pseudococcus* sp. (Liao Ding-Xi); Zhejiang, 1 June 1964), 1♂, from mealybugs on citrus (Liao Ding-Xi).

**Biology.** Reared from *Pseudococcus* sp. and mealybugs on citrus in China. It was reported that *Ophelosia crawfordi* is a predator of margarodid eggs, and has been reared from *Icerya purchasi* on lemon, *Leptospernum*, *Mimosa pigra* and *Cassia* sp., and from *Icerya seychellarum* (Westwood) (Berry, 1995). It has been reared from *Planococcus citri*, *Pseudococcus adonidum*, *Pulvinaria* sp. and as a hyperparasitoid via the encyrtid *Tetracnemoidea sydneyensis*.

**Distribution.** China (Fujian, Zhejiang); India, Australia, New Zealand, Java, USA.

**Moranila** Cameron, 1883


*Moranila* Cameron, 1883: 188. Type-species: *M. testaceipes* Cameron, by monotypy.


Euotonyia Masi, 1917: 197. Type species E. festiva Masi, by monotypy.


**Diagnostic characters.** Antenna inserted near clypeal margin; antenna formula 11143, and clava more or less fused. Vertex not convex, posterior ocellus touching the margin of occiput. Pronotum and mesoscutum with bristles; scutellum with two pairs of bristles, frenal line absent, and scutellum not extending beyond propodeum; dorsellum triangular and with coarse sculpture. Propodeum longer and nucha distinct. Basal area of fore wing bare, outside of speculum with scattered hairs. First gastral tergite about two-thirds the length of gaster.

**Biology.** Mainly parasites of various coccids that sometimes are economically important. They are usually primary parasitoids. The hosts of M. californica include Coccidae (Ceroplastes, Coccus, Parasaissetia, Saissetia), Asterolecaniidae (Asterolecanium) and Pseudococcidae (Antonina). M. californica and M. comperei have been occasionally recorded as secondary parasites, the former via the encyrtid Microterys nietneri, the later via various aphids.

So far, there are about nine species recorded in the world. This genus is distributed throughout the world, including Palearctic, Nearctic, Neotropical, Oriental, Australian and African regions.

**Moranila californica** (Howard) (figures 12–14)

*M. californica* Howard, 1881: 352, 368–369.

**Moranila testaceipes** Cameron, 1883: 188–189. Synonymized by Howard, 1896: 165.


**Material examined.** China: Hainan, 22 May 1964, 2♀3♂, from coccids on oak tree (*Quercus ?*) (Liao Ding-Xi); Hainan, 2 April 1964, 10♀3♂, on *Engelhardtia colebrookiana* Lindl, ex. Wall (Liao Ding-Xi); Hainan, 8 May 1964, 9♀3♂, on oak tree (*Quercus ?*) (Liao Ding-Xi); Hainan, Jianfengling, 28 July 1964, 1♀3♂ (Liao Ding-Xi); Hebei, Xinglong, 30 March 1964, 3♀3♂, from *Coccus* sp. (Liao Ding-Xi); Hebei, Xinglong, 31 March 1964, 1♂, from *Rosanococcus* sp. (Liao Ding-Xi);

Figs 33–42. *Cavitas concava* sp. nov. ♀; (33) body in dorsal view; (34) head in front view; (35) head in lateral view of male; (36, 37) antenna; (38) antenna of male; (39) thorax in dorsal view; (40) scutellum and propodeum; (41) apex of fore tibia and tarsi; (42) fore leg. Scale bars = 50 μm.
Yunnan, Jingdong, 4 May 1974, 1♀ (Liao Ding-Xi); Zhejiang, Hangzhou, 3♀♂, from *Eriococcus* sp. (Liao Ding-Xi); Anhui, 26 September 1965, 3♀ (Chen Tai-Lu).

**Biology.** This species is mainly a parasitoid of scale insects, particularly Coccidae, and rarely as a hyperparasitoid through encyrtids. In China, this species was reared from coccids on oak tree and *Rosanococcus* sp. The known hosts are listed as follows: Asterolecaniidae: *Asterolecanium pustulans* (Cockerell); Coccidae: *Ceroplastes ceriferus* (F.), *C. floridensis* (Comstock), *C. rubens* Maskell, *C. rusci* (L.); *Coccus hesperidum* L., *Parasaissetia nigra* Takahashi, *Saissetia coffeae* (Walker), *S. hemisphaerica* (Targioni-Tozzetti), *S. oleae* (Olivier); Pseudococcidae: *Antonina bambusae* (Maskell).

**Distribution.** Cosmopolitan. China (Hainan, Yunnan, Zhejiang, Anhui and Hebei).

**Eunotus** Walker, 1834


*Megapelte* Förster, 1856: 63, 66 [replacement name for *Eunotus* Walker, supposedly preoccupied].


Masi (1931) divided *Eunotus* into two subgenera: *Eunotus* s. str. with five funicular segments in females, and *Eunotellus* Masi with four funicular segments in females. Graham (1969) accepted the classification. Bouček (1972) found it difficult to determine males to species using this character. He divided the genus into three species-groups: *kocoureki*-Group (mandible with three teeth, body with coarser and shallower sculpture), *cretaceus*-Group (antennae with five funicular segments, and the first funicle anelli), *acutus*-Group (antennae with four or two anelli-like and four funicular segments).

**Generic characters.** Antennae inserted above clypeal margin; antennae with four or five funicular segments. Thorax with densely reticulate sculpture; scutellum frenal line usually absent, and scutellum not extending beyond propodeum; propodeum with distinct tooth-like median carina. Fore wing pilose. First gastral tergite covering most of gaster.

**Biology.** Mainly primary parasites, which have been recorded in the following families: Coccidae (*Ceroplastodes*, *Coccus*, *Eriopeltis*, *Eulecanium*, *Mesolecanium*, *Parthenolecanium*, *Pulvinaria*, *Rhodococcus*, *Scythia*); Eriococcidae (*Eriococcus*, *Grennisca*); Pseudococcidae (*Phenacoccus*). *Eunotus cretaceus* Walker was recorded as an egg predator of some coccids (*Eriopeltis*, *Eulecanium*, *Scythia*).

There are 14 species recorded in the world for *Eunotus*. This genus is mainly distributed in Europe and Palearctic region, one Afrotropical species (*E. gossypii* Risbec) was found in Senegal, two species were recorded in North America. This is the first time recorded from China.

**Key to the species**

1 Antenna short and clubbed, one anellus from five funicular segments (figure 44); head in dorsal view much thicker, occiput low-pitched in the middle; first tergite about two-thirds the length of gaster . . . . . . . . . . . *E. applanatus* sp. nov.
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2 Flagellum clubbed, and with four funicular segments (figure 26); thorax with dense reticulation; scutellum about 1.13–1.3 times as broad as long; fore wing with short hair; marginal vein 1.34–1.63 times as long as stigmal vein; first tergite smooth

- Antenna with one anellus and four funicular segments

E. parvulus Masi

- Antenna with five funicular segments

3 First tergite mainly longitudinally reticulate (figure 23), smooth only near the edges; scutellum slightly convex, as long as broad; each funicular segment with sensilla (figure 22), clava about three times as long as broad; marginal vein about twice as long as postmarginal vein, the latter shorter than the stigmal. Body black

- First tergite smooth all over

E. cretaceus Walker

4 First funicular segment distinctly shorter than the second (figures 16, 20), the latter as long as the third; scutellum at least slightly longer than broad

- First funicular segment as long as the second, both segments distinctly shorter than the third (figure 25); clava slightly swollen; scutellum shorter than broad; thorax dull and with coarse punctation

E. acutus Kurdjumov

5 Marginal vein about twice as long as the stigmal; antenna relatively shorter, each flagellum segment broader than previous one; clava distinctly swollen and asymmetric, about 1.5 as long as broad; POL: OOL as 4:1

E. obscurus Masi

- Marginal vein at most 1.5 times as long as the stigmal

6 Marginal vein about 1.5 times as long as the stigmal (figure 19); POL: OOL as 4: 1

E. strenus sp. nov.

- Marginal vein as long as the stigmal (figure 21); POL: OOL as 3: 1

E. aequalivena sp. nov.

Eunotus strenus sp. nov.

(figures 15–19)

Female. Body length 2 mm. Head and thorax black green, gaster brown; antennae brown, excepting scape and pedicellus yellowish brown; legs brown or yellowish except coxa concolorous with thorax.

Head (figures 15, 17) in front view, clypeal margin emarginate, gena strongly exceeding mouth. Antennal insertion above clypeal margin; antenna (figure 16) with scape not reaching the median ocellus; pedicellus about twice as long as broad, three times as long as first funicular segment; first funicular segment at most half as long as the second; the second to the fifth slightly transverse; clava about 1.8 times as long as broad; flagellum plus pedicellus shorter than head width. Relative measurements: head width 50, height 39, length 23, eyes space 27, eyes height 19, malar space 17, scape 18, POL: OOL as 17: 4.

Thorax (figure 18) convex. Pronotum narrower than mesoscutum, collar not margined. Notauli deep and complete. Scutellum without fenal line. Propodeum with slightly tooth-like median carina, nucha distinct. Fore wing (figure 19) densely hairy, without speculum. Gaster (figure 18) sessile, ovate, first gastric turgor about three-quarters length of gaster. Relative measurements: pronotum length 6, mesoscutum length 22, scutellum 29 long, 27 wide, marginal vein 12, postmarginal 9, stigmal vein 8; gaster width 47, length 65.

Male. Body smaller than female; antenna yellow excepting clava brown.

E. strenus together with E. aequalivena sp. nov. are close to E. obscurus Masi.
The differences from the latter are given in the key. **Holotype** female, China, Beijing, 17 May 1955 (Liao Ding-Xi).

**Paratype**, 9♀3♂, same as holotype; China: Beijing, 7 May, 4♀5♂ (Zhang Dai-Xiang); Beijing, Haidian, 17 May 1955, 11♀3♂ (Liao Ding-Xi); Xinjiang, Hami, 28 April 1980, ex. coccids on almond, 1♀.

**Biology.** The specimen from Xinjiang was reared from coccids on almond.

**Distribution.** China (Beijing, Xinjiang).

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**Eunotus aequalivena** sp. nov.  
(figures 20, 21)

*Female.* Body length 2.1 mm. Body black; antenna brown, excepting scape and pedicellus deep yellow; coxae, legs, tibiae reddish brown.

Head in front view, clypeal margin emarginate, gena strongly exceeding mouth. Antennal insertion above clypeal margin; antenna (figure 20) with scape not reaching the median ocellus; pedicellus about twice as long as broad, and longer than first funicular segment; first funicular segment much shorter than the second; the second quadrate, the fifth transverse; clava about 1.8 times as long as broad; flagellum plus pedicellus shorter than head width. Relative measurements: head width 52, height 37, length 21, eyes height 18, scape 18, POL: OOL as 16: 5.

Thorax convex; pronotum narrower than mesoscutum, collar not margined; notauii deep and complete; scutellum without frenal line; propodeum with slightly tooth-like median carina, nucha distinct. Fore wing (figure 21) densely hairy, without speculum. Gaster sessile, ovate, first gastral tergite about three-fifths length of gaster. Relative measurements: pronotum length 5, mesoscutum length 23, scutellum 31 long and 29 wide, fore wing length 110, width 48, marginal vein 10, postmarginal 11, stigmal vein 10; gaster width 55, length 71.

*Male.* Unknown.

*E. aequalivena* is very similar to *E. strenus* except for the marginal vein as long as the stigmal (figure 21); POL: OOL as 3: 1. *E. strenus* with marginal vein about 1.5 times as long as the stigmal (figure 19); POL: OOL as 4: 1.

**Holotype** female, China, Xinjiang, Korla, from coccids, July 1956 (Zhang Xui-Zu).

**Paratype**, 1♀, same as holotype.

**Biology.** Reared from coccids.

**Distribution.** China (Xianjiang).

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**Eunotus cretaceus** Walker  
(figures 22, 23)

*Eunotus cretaceus* Walker, 1834: 298.


*Eunotus cretaceus* Walker; Masi, 1931: 426–428.


Material examined: China: Gansu, Gulang, August 1980, 3♀1♂ (Guo Yu-Ling); Nei Mongol, 2 September 1981, 1♀ (Liao Ding-Xi).

**Biology.** According to Bouček (1972), this species develops as predator on the eggs of the following coccids on grasses: *Eriopeltis festucae* (Fonscolombe), (Masi,
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**Distribution.** Europe and Palearctic region, including China (Gansu, Nei Mongol), Austria, France, Georgia, Germany, Hungary, Italy, Moldova, Russia, Ukraine, Sweden and UK.

**Eunotus obscuras** Masi


**Material examined.** China, Yunnan, Binchuan, 18 May 1974, 4♀, from *Rosanococcus* sp. on *Cedrela toona* Roxb. (Liao Ding-Xi).

**Biology.** The parasite attacks *Rosanococcus* sp. on *Cedrela toona* Roxb. in China. According to Bouček (1972), it attacks coccids on various bushes and trees, mainly *Pulvinaria vitis* (L.) (Masi, 1931). Another record is *Parthenolecanium persicae* (F.) on *Robinia pseudacacia* L.

**Distribution.** China (Yunnan); Denmark, Germany, France, Spain, Italy, Czechoslovakia, Moldavian.

**Eunotus applanatus** sp. nov.

(figures 24, 43–50)

**Female.** Body length 2.0–2.2 mm. Body black; antenna black; legs cocolorous with body except tarsi yellow.

Head (figure 43) in front view, clypeal margin emarginate, genae strongly exceeding mouth. Antennal insertion above clypeal margin; antenna (figures 44–46) with a very small anellus; scape not reaching the median ocellus; pedicellus about twice as long as broad, and longer than first funicular segment; first funicular segment slightly shorter than the second, and without sensilla; the second to the fifth quadrate or sub-subquadrate, and with a row of large sensilla; clava very swollen, about 1.8 times as long as broad; flagellum plus pedicellus shorter than head width. Relative measurements: head width 40, height 29, length 20, eyes height 16, scape 16, flagellum plus pedicellus 30, POL: OOL as 12.5: 2.5.

Thorax flat, reticulate and with hairs (figure 47); pronotum narrower than mesoscutum, collar not margined; notauli deep and complete; scutellum without frenal line; propodeum (figure 48) with slightly tooth-like median carina, plica complete, nucha distinct. Fore wing densely hairy. Gaster sessile, ovate, first gastral tergite near four-fifth the length of the gaster. Relative measurements: pronotum 5 long and 32 wide, mesoscutum 17 long and 35 wide, scutellum 20 long and 20 wide, fore wing 88 long and 40 wide, marginal vein 15, postmarginal 7.5, stigmal vein 5; gaster width 43, length 50.

**Male.** Unknown.

**Eunotus applanatus** differs from all described species by having one anellus and five funicular segments (figure 44).

**Holotype** female, China, Beijing, Tiantan Park, April 1997 (Zhu Chao-Dong). **Paratype**, 9♂, same as holotype.

**Biology.** Host unknown.

**Distribution.** China (Beijing).
Figs 43-50. *Eunotus aplanatus* sp. nov. ♂; (43) head in front view; (44) antenna; (45) eighth and eleventh antennal subsegments; (46) third and fifth antennal subsegments; (47) part of pronotum and mesoscutum; (48) propodeum; (49) fore leg; (50) fore tibia. Scale bars = 50 μm.
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_Eunotus acutus_ Kurdjumov (figure 25)

_Eunotus acutus_ Kurdjumov; Masi, 1931: 430–431.
_Eunotus (Eunotus) acutus_ Kurdjumov; Graham, 1969: 73–74.

**Material examined.** China, Beijing, 22 June 1955, 8♀ (Zhang Dai-Xiang); Shandong, Pingyi, 9 October 1958, 2♀ (Liao Ding-Xi).

**Biology.** The recorded hosts are listed as following coccids: _Eriococcus agropyri, E. Greeni_ and _Greenisca placida_.

**Distribution.** Palearctic region, including China (Beijing, Shandong), Czechoslovakia, Poland, Russia, Ukraine.

_Eunotus parvulus_ Masi (figure 26)

_Eunotus (Eunotellus) aquisgranensis_ Masi, 1931: 437.
_Eunotus (Eunotellus) parvulus_ Masi; Graham, 1969: 74.
_Eunotus parvulus_ Masi; Bouček, 1972: 287.

**Material examined.** China, Hebei, Xinglong, 2 July 1963, 2♀, ex. aphids on willow (Liao Ding-Xi).

**Biology.** Reared from aphids on willow in China.

**Distribution.** Palearctic region, including China (Hebei); Austria, Czechoslovakia, Sweden, Germany (West), UK.

_Cephaleta_ Motschulsky, 1859

_Eurycephalus_ Ashmead, 1903: 61. Type-species: _E. alcocki_ Ashmead; by monotypy [pre-occupied by _Eurycephalus_ Gastelnu, 1832 (Coleoptera)]. Synonymized by Bouček, Subba Rao and Farooqi, 1979: 439.

**Generic characters.** Gena strongly shiny between hairs, posteriorly delimited by a distinct carina; antennal insertion above clypeal margin; antennae with 10 segments (male antennae with nine segments, every funicular segment longer than broad). Thorax shiny between hairs; scutellum frenal line usually absent, hind area with large and shallow punctures; scutellum moderately produced over propodeum; propodeum with distinct median carina, plicae absent. Fore wing pilose. First gastric tergite largest.

**Biology.** Hosts have been reported in the following coccid families: Asterolecaniidae (_Asterolecanium, Cercococcus_), Coccidae (_Ceroplastes, Ceroplastodes, Parasaissetia, Pulvinaria, Saissetia_); and Pseudococcidae (_Ferrisia_).

There are four species recorded in the world. This genus is mainly distributed in
the Australian-Pacific region and Oriental region. One species was found in Neotropical region.

**Key to the species**

1. Female antenna stout, clava distinctly clavate; pedicellus longer than first funicular segment; the first and the second funicular segments quadrate or subquadrate. Male: antenna with long funicular segments, first one curved and longer than scape.

   - C. brunniventris Motschulsky

   - Female: antenna slender, clava not strongly clavate; pedicellus shorter than first segment; the first and second funicular segments longer than broad. Male: antenna with long funicular segments, first one slightly curved and shorter than scape.

   - C. australiensis (How.)

**Cephaleta australiensis** (Howard)

(figures 27, 28)


**Material examined.** China, Sichuan, Guanxian, 1 August 1963, 3♀ (Liu Tian-Zhen); 13 August 1963, 4♀2♂, ex. *Coccus* sp. (Mao Jin-Long).

**Biology.** The parasite attacks *Coccus* sp. in China. Other host records are *Cerococcus* sp., *Coccus hesperidum*, *Coccus viridis*, eriococcid and *Ferrisia virgata*; some are coccids on *Hibiscus rosasinensis*, *Alternantia philloxeroides* and cotton.

**Distribution.** Australian-Pacific and Oriental species, distributed in China (Sichuan); Pakistan, India, Indonesia, Sri Lanka, Bangladesh and Australia.

**Cephaleta brunniventris** Motschulsky

(figures 29, 30)

*Cephaleta purpureiventris* Motschulsky, 1859: 173.
*Eurycrantan saissetiae* Ashmead, 1905: 405.

**Material examined.** China: Hainan, 17 May 1964, 10♀8♂ (Chen Tai-Lu); 23/24 May 1964, 4♀1♂, ex. *Saissetia* sp. (Liao Ding-Xi); 19 May 1964, 9♀3♂, ex. *Ceroplastes rubens* Maskell (Liao Ding-Xi); Hainan, Zhanxian, 5 November 1980, 7♀ (Liao Ding-Xi); 10 August 1979, 1♀, ex. *Saissetia* sp. (Luo Yong-Ming); 23 May 1964, 1♀, 19 May 1964, 2♀ (Liao Ding-Xi); Guandong, Gurangzhou, 26/27 May 1964, 3♀, ex. *Pseudococcus* sp. (Liao Ding-Xi); 22 June 1963, 2♀4♂ (Liao Ding-Xi); 30 March 1957, 2♀ (Liao Ding-Xi); Fujian, Shaxian, 1980, 3♀ (Huang Jian); Fujian, Sanming, October 1994, 1♀5♂, ex. *Ceroplastes* sp. (Liang Wei-Guang); Hebei,
Xinglong, 1 April 1964, 1♀, ex. *Coccus* sp. (Liao Ding-Xi); Nei Mongol, Hailar, 17 May 1964, 1♀, ex. *Coccus* sp. (Liao Ding-Xi).

**Biology.** Host records found in China are as follows: *Saissetia* sp., *Ceroplastes rubens* Maskell, *Coccus* sp., *Pseudococcus* sp. Hosts from other countries: *Asterolecanium* sp., *Cerococcus hibisci* (Green), *Ceroplastes pseudoceriferus* (Green), *Ceroplastodes chiton* (Green), *Saissetia coffeae* (Walker), *Pulvinaria psidii* Maskell.

**Distribution.** Oriental species, has been recorded from China (Guangdong, Hainan, Fujian and Hebei, Nei Mongol, Taiwan); India, Sri Lanka, Philippines.

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**Scutellista** Motschulsky, 1859


**Generic characters.** Face with densely piliferous punctures except clypus shiny; antennal insertion above clypeal margin; clypeal margin truncate; thorax with dense microsculpture; scutellum enlarged and expanded as a flat roof over at least a part of gaster; metapleuron shiny between transverse carinae; fore wing mostly with brown setose; first gastric tergite largest.

This genus is closest to *Cephaleta* Motschulsky. The differences are the more expanded scutellum and dense microsculpture on the thorax.

**Biology.** Hosts have been reported in the following coccid families: *Asterolecaniidae* (*Asterolecanium, Cerococcus*), *Coccidae* (*Ceroplastes, Ceroplastodes Parasaissetia, Pulvinaria, Saissetia*) and *Pseudococcidae* (*Ferrisia*).

There are eight species recorded in the world. This genus is distributed in every region except Neotropical region.

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**Scutellista caerulea** (Fonscolombe)

(figures 31, 32)


*Scutellista caerulea* (Fonscolombe); Bouček, 1988: 351.


**Biology.** The parasite attacks *Ceroplastes floridensis* Comstock, *Ceroplastes ruscii* (L.), *Parasaissetia nigras*, *Saissetia hemisphaerica* (Targioni), *Saissetia oleae* (Bernard) and *Saissetia coffeae* (Walker) (data from Noyes, 1988).
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