

*Kontyû, Tokyo*, 50 (1): 76-87. March 25, 1982

Species of *Trichomalopsis* CRAWFORD (Hymenoptera,  
Pteromalidae) from Rice Paddy, with  
Descriptions of Two New Species

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**Synopsis** Based upon study of type material of the three known species of *Trichomalopsis* CRAWFORD as well as material newly reared from rice paddy insects, *T. parnarae* (GAHAN) is synonymized with *T. apanteloctena* (CRAWFORD) and *T. shirakii* CRAWFORD is redefined. *Trichomalopsis oryzae* sp. n. and *T. deplanata* sp. n. are described, and a key is given to the four species known from rice paddy. The genus *Eupteromalus* KURDJUMOV is synonymized with *Trichomalopsis*.

While studying parasites associated with rice paddy insects in Japan, we found considerable confusion concerning the names used for the three known species of the pteromalid genus *Trichomalopsis*. In this paper we discuss the results of an examination of newly reared material and all type specimens for this genus, we redefine *T. shirakii* CRAWFORD, synonymize *T. parnarae* (GAHAN) with *T. apanteloctena* (CRAWFORD), and describe two new species, *oryzae* and *deplanata*. We summarize all known host and distribution data and provide a key to aid in identifying *Trichomalopsis* associated with rice paddy. Additionally we place the genus *Eupteromalus* as a synonym of *Trichomalopsis*. Because these wasps are parasites of various rice paddy insects, the results of this research should be important to economic entomologists and biological control specialists studying the rice paddy agroecosystem.

We would like to thank Dr. Z. BOUČEK, Commonwealth Institute of Entomology, London, for his helpful suggestions and for sending us European material for comparison. We are deeply indebted to Mr. J. C. PAIK, Office of Rural Development, Suweon, Korea, and Prof. T. TACHIKAWA, Ehime University, Matsuyama, for the gift of valuable specimens. Thanks are also due to Mr. H. TAKIZAWA, Japan Tabaco & Salt Public Corporation, Hatano, for his information on host species, and to Dr. J. MINAMIKAWA, Nagareyama-shi, for the loan of his papers.

*Trichomalopsis* CRAWFORD

*Trichomalopsis* CRAWFORD, [May] 1913, Proc. U. S. natn. Mus., **45**: 251 (type-species: *Trichomalopsis shirakii* CRAWFORD).

*Eupteromalus* KURDJUMOV, [July] 1913, Russk. Ent. Obozr., **13**: 12 (type-species: *Pteromalus nidulans* THOMSON), **syn. n.**

*Nemicromelus* GIRAULT, 1917, Descr. Hym. Chalcid. Var. Observ., **V**: 4 (type-species: *Merisus subapterus* RILEY).

GRAHAM (1969: 738) pointed out that *Eupteromalus* might be a synonym of *Trichomalopsis* by priority since the latter name was published two months earlier, but because he had not seen the type-species of *Trichomalopsis* he could not be certain. We have examined all the type material of *T. shirakii* and conclude that *Eupteromalus* differs in no respect from *Trichomalopsis*. It is unfortunate that the better known name *Eupteromalus* should be replaced by *Trichomalopsis*, but in following the rules of nomenclature and in the interest of stability we believe the taxonomy of this group is better served by adopting the earlier name.

As currently understood *Trichomalopsis* is composed of nearly three dozen named species largely Holarctic and Oriental in distribution. One Neotropical species is known. GRAHAM (1969) provided the most recent key to European and North American species (as *Eupteromalus*), and we have attempted to place the rice paddy forms in the context of his work. Hosts of this genus are numerous and include the orders Diptera, Lepidoptera, Coleoptera, Hymenoptera, and Araneida. Many species have been taken in marshy habitats (including rotting seaweed) and grassy situations. Some have been shown to parasitize both a primary host (e.g. Lepidoptera, Coleoptera) as well as its parasites (e.g. Tachinidae, Braconidae, Ichneumonidae).

*Trichomalopsis shirakii* CRAWFORD

*Trichomalopsis shirakii* CRAWFORD, 1913, Proc. U.S. natn. Mus., **45**: 252 [partim].

*Trichomalopsis shirakii*: KUWAYAMA, 1932, J. Fac. Agr., Hokkaido Imp. Univ., **33**: 98-102.

*Trichomalopsis shirakii*: KUWAYAMA, 1932, Rep. Hokkaido agr. exp. Stn., **29**: 107-110.

*Trichomalopsis shirakii*: IWATA and TACHIKAWA, 1966, Trans. Shikoku ent. Soc., **9**: 17.

*Trichomalopsis shirakii* was originally described from an unspecified number of specimens reared from the pupae of *Lema flavipes* [= *Oulema oryzae* (KUWAYAMA)] at Taipei, Formosa, in 1911 by T. SHIRAKI. In the USNM type catalog eleven specimens were originally entered (1912) as type material, and that number of specimens now bears type labels in the collection. The type series, however, actually contains two species as follows: the holotype (USNM No. 15111), allotype, and one female paratype belong to *T. shirakii*; seven female and one male paratypes are *T. apanteloctena*. The following redescription is based upon the holotype as well as fresh material.

*Female*. Body length 1.8-2.8 mm. Green to bluish green: head and thoracic dorsum, except propodeum, with a brassy to bronzy reflections; gaster bluish green.

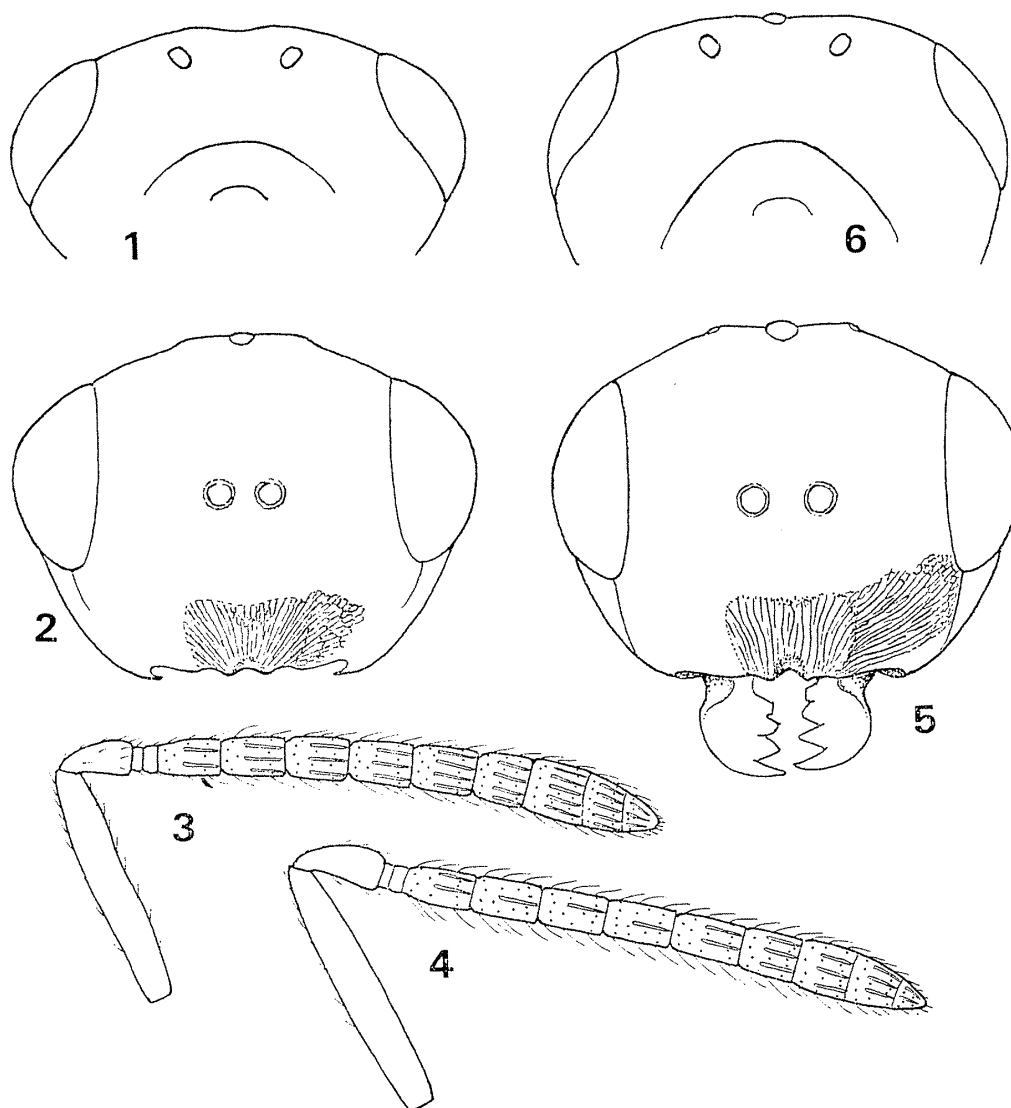
Scape brownish yellow, slightly darker at apex; pedicel and flagellum yellowish brown to dark brown. Legs brownish yellow: coxae concolorous with thorax; tarsi darker at apices. Tegulae pale yellow; wings hyaline; veins pale yellow.

Head 1.14 to 1.2 times as broad as thorax, in dorsal view 2.0 to 2.1 times as broad as long; temples one-quarter as long as eyes or slightly more, roundly converging. POL 1.2 to 1.3 times OOL. Occipital carina rather strong, in postero-dorsal view evenly curved (Fig. 1). Head (Fig. 2) in front view 1.25 to 1.3 times as broad as high. Eyes separated by 1.3 to 1.4 times their height. Malar space 0.53 to 0.56 times height of eye. Lower margin of clypeus weakly emarginate medially (Fig. 2). Left mandible with three teeth, right mandible with four. Clypeus strigose; head otherwise moderately reticulate. Antennae (Fig. 3) inserted distinctly above level of ventral edge of eyes; scape 0.93 to 1.0 times as long as height of eye, reaching level of vertex; combined length of pedicel and flagellum 0.91 to 0.98 times breadth of head; pedicel twice as long as broad, nearly as long as anelli plus first funicle segment; flagellum rather slender, only weakly clavate distally; first funicle segment a little longer than broad, second equal to first in length and breadth; sixth slightly shorter than first, subquadrate to transverse; club about 2.2 times as long as broad.

Thorax 1.5 to 1.6 times as long as broad. Pronotal collar weakly and irregularly margined or immargined, with a narrow, smooth strip along its hind margin. Mesoscutum twice as broad as long, moderately reticulate. Scutellum as long as mesoscutum, slightly transverse, reticulate as in mesoscutum; frenal furrow indistinct. Dorsellum linear, smooth; area between hind margin of scutellum and dorsellum broad, with several longitudinal carinae. Propodeum a little shorter than scutellum (10:12), median area including nucha reticulate as scutellum; median carina usually present though sometimes irregular; plicae strong, extending to hind edge of nucha; nucha a little shorter than half length of propodeum, strongly convex, well-defined in front; a deep fovea present just behind spiracle, its hind margin raised to form a sharp transverse ridge; area behind the ridge densely reticulate; callus moderately hairy. Forewing 2.4 to 2.5 times as long as broad; basal cell and basal vein bare; marginal vein 1.4 to 1.7 times as long as stigmal vein, slightly longer than, or as long as postmarginal.

Gaster ovate, usually a little longer than thorax, 1.6 to 1.8 times as long as broad, acute apically; first tergite occupying one-third length of gaster; first to third tergites smooth, fourth tergite sometimes alutaceous basally; last tergite a little broader than long.

*Male.* Differs from female as follows: Body length 1.5–1.9 mm. Antennae inserted higher, their toruli often nearer to anterior margin of median ocellus than to lower margin of clypeus; scape reaching above level of vertex; pedicel nearly twice as long as broad; combined length of pedicel and flagellum 1.05 to 1.1 times as long as breadth of head; flagellum slender (Fig. 4); first funicle segment about 1.6 times as long as broad; sixth a little longer than broad; club about 2.7 times



Figs. 1-6. — 1, *Trichomalopsis shirakii* CRAWFORD, ♀, head in postero-dorsal view; 2, same, ♀, head in front view; 3, same, ♀, antenna; 4, same, ♂, antenna; 5, *T. apanteloctena* (CRAWFORD), ♀, head in front view; 6, same, ♀, head in postero-dorsal view.

as long as broad; in smaller specimens first funicle segment occasionally shorter than second and a little longer than broad. Gaster subcircular; first tergite occupying half length of gaster or more.

This species is very close to, or might be conspecific with *T. tigasis* (WALKER) (comb. n.). We sent some specimens of *shirakii* to Dr. BOUČEK, who kindly compared them with the lectotype (a male) and other specimens of *tigasis*. He informed us that *shirakii* is possibly distinct from *tigasis* though the limits of variation of the latter are still uncertain (e.g. the lectotype has the pronotal collar distinctly margined), and he kindly sent us on loan two females and one male deter-

mined as *tigasis* by GRAHAM. Judging from the three specimens and the redescription of *tigasis* given by GRAHAM (1969), typical specimens of *shirakii* differ from *tigasis* in having the flagellum more slender and the first funicle segment not (in male) or very slightly (in female) broader than pedicel in lateral view and usually distinctly longer than broad (in *tigasis* first funicle segment a little broader than pedicel, varying from slightly longer than broad to subquadrate); in addition the disc of the male forewing is more densely hairy, and the body is usually bluish green with legs except coxae brownish yellow (in *tigasis* the body is dark green with legs often darker). However, in some smaller male specimens of *shirakii* the antennae have the first funicle segment a little shorter than the second and the flagellum less slender, so that they are difficult to separate from *tigasis*.

*Additional material.* Japan — Hokkaido: Bibai, 1 ♀, 19. viii. 1971, 3 ♀, 14–30. ix. 1971, 1 ♀, 22. viii. 1976 (K. KAMIJO); Iwamizawa, 5 ♀ 15 ♂, 22. vii–22. viii. 1978 (K. MAKIHARA); Sapporo, 1 ♀, 7. ix. 1957 (H. KIMURA); Sapporo, 6 ♀, 1–11. viii. 1964 (K. KUSIGEMATI); Sapporo, 2 ♀ 1 ♂, 3. vii. 1967 (T. KUMATA). Honshu: Sendai, 2 ♀ 3 ♂, 27. vi. 1973 (K. OKAZAKI); Sôma-shi, Fukushima-ken, 5 ♀ 1 ♂, 1977 (M. SAITO); Wajima-mura, Niigata-ken, 1 ♂, 28. vi. 1974 (A. KOJIMA). Kyushu: Aburatsu, Miyazaki-ken, 1 ♀, 19. xi. 1971 (K. YANO). Korea — Suweon, 1 ♂, 21. vi. 1974, 1 ♂, 11. vii. 1974, 1 ♀, 15. viii. 1974, 1 ♂, 16. ix. 1974, 1 ♀, 10. x. 1974. China — Tungyang, Chekiang, 1 ♀, 24. vi. 1963.

*Distribution.* Japan (Hokkaido, Honshu, Kyushu), Korea, China, Formosa.

*Biology.* *T. shirakii* has hitherto been recorded as an ectoparasite in cocoons of *Oulema oryzae* (KUWAYAMA). We have also seen specimens from *Agromyza oryzae* MUNAKATA, *Hydrellia griseola* FALLÉN, syrphid puparia on rice plant, and *Elachista* sp. on *Sasa* sp.

#### *Trichomalopsis apanteloctena* (CRAWFORD), comb. n.

*Trichomalus apanteloctenus* CRAWFORD, 1911, Proc. U.S. natn. Mus., 39: 618.

*Trichomalopsis shirakii* CRAWFORD, 1913, *Ibid.*, 45: 252 [partim].

*Eupteromalus parnarae* GAHAN, 1919, *Ibid.*, 56: 522, syn. n.

*Eupteromalus parnarae*: SONAN, 1943, Trans. nat. Hist. Soc. Taiwan, 33: 227.

*Eupteromalus parnarae*: YASUMATSU & FUKUSHIMA, 1945, Mushi, 16: 18.

*Eupteromalus parnarae*: MIYATAKE, 1952, Sci. Rep. Matsuyama agr. Coll., 8: 34.

*Eupteromalus parnarae*: MINAMIKAWA, 1954, Ôyô-Kontyu, 9: 148.

*Eupteromalus apanteloctenus*: MINAMIKAWA, 1954, *Ibid.*, 9: 148–149.

*Eupteromalus parnarae*: IWATA & TACHIKAWA, 1966, Trans. Shikoku ent. Soc., 9: 16.

*Eupteromalus parnarae*: TACHIKAWA, 1977, *Ibid.*, 13: 133.

*Eupteromalus parnarae*: BOUČEK, SUBBA RAO, & FAROOQI, 1978, Oriental Ins., 12: 443.

*Trichomalus apanteloctenus* was described from five females and one male reared from cocoons of *Apanteles* sp. [probably *A. ruficrus* HALIDAY] on *Naranga diffusa* [= *N. aenescens* MOORE] at Konosu, Saitama-ken, Japan, by T. FUKAI. Actually the material represents three female and three male specimens. We accept CRAWFORD's use of the term "type" and "paratopotypes" as selection of a

holotype (USNM No. 13457).

*Eupteromalus parnarae* was described from ten females reared from *Parnara* [= *Peropidas*] *mathias* (F.) on paddy on 7. xii. 1914 at Karvetnagar, South India. We designate one female as lectotype (USNM No. 22288).

This species is characterized as follows: Lower margin of clypeus rather deeply incised medially (Fig. 5); striation of clypeus extending to lower margin of eyes and to malar sulcus; both mandibles with four teeth; head thick, in dorsal view 1.85 to 1.95 times as broad as long; temples 0.4 to 0.5 times as long as eyes; occipital carina sharp, in postero-dorsal view strongly curved medially (Fig. 6). Antennal toruli separated by their diameter. Antennae (see Figs. in TACHIKAWA, 1977) with combined length of pedicel and flagellum, in female 0.8 to 0.93 times, and in male 0.95 to 1.05 times, breadth of head; first funicle segment subquadrate in female, and slightly longer than broad in male. Pronotal collar indistinctly margined. Scutellum with frenal furrow usually distinct. Forewing with marginal vein 1.55 to 2.1 times as long as stigmal vein. Gaster 1.7 to 2.0 times as long as broad.

In GRAHAM's key (1969) to *Eupteromalus*, *T. apanteloctena* keys to *T. submarginata* (THOMSON) (comb. n.) or near *T. germanica* (GRAHAM) (comb. n.) depending upon the comparative lengths of stigmal and marginal veins. The three species share the following characters: head (dorsal view) twice or less as broad as long, temples one-third to one-half as long as eye, and scape shorter than height of eye and barely (or not) reaching level of median ocellus. *T. apanteloctena* differs from *submarginata* and *germanica* in having the clypeus incised medially (Fig. 5; other species barely emarginate as in Fig. 2). In addition *apanteloctena* differs as follows: from *submarginata* by having the scrobes barely depressed (deeply excavated in *submarginata*) and the gaster nearly twice as long as broad (less than 1.7 in *submarginata*), and from *germanica* by having four teeth on the left mandible (three in *germanica*).

*Additional material.* Many specimens from the following localities in Japan: Hokkaido: Bibai, Iwamizawa, Sapporo, Eniwa. Honshu: Morioka, Sendai, Niigata-ken, Ishikawa-ken, Ibaraki-ken, Tokyo, Kanagawa-ken. Shikoku: Kagawa-ken. Kyushu: Kagoshima. Also seen some specimens from Korea, China, the Philippines, and Eastern and Western Malaysia.

*Distribution.* Japan, Korea, China, Formosa, Philippines, Eastern and Western Malaysia, Bangladesh, India.

*Biology.* This species has hitherto been reared from *Peropidas mathias* (F.), *Cnaphalocrocis medinalis* (GUENÉE), *Apanteles baoris* WILKINSON on *Parnara guttata* BREMER et GREY, *A. chilonis* MUNAKATA on *Chilo suppressalis* WALKER, *A. ruficrus* HALIDAY on *Naranga aenescens* MOORE, *A. glomeratus* (L.) on *Pieris rapae* (L.), and *Meteorus* sp. on *Sesamia inferens* WALKER. We have also seen specimens reared from the following hosts: *Oulema oryzae* (KUWAYAMA), *Agromyza oryzae* MUNAKATA, *Hydrellia griseola* FALLÉN, *Apanteles kariyai* WATANABE on *Leucania separata* WALKER, *A. parnarae* WATANABE on *P. guttata*, *A. plutellae* KURDJUMOV

on *Plutella xylostella* (L.), and *Apanteles* sp. on *Grapholitha molesta* BUSCK.

*Trichomalopsis oryzae* sp. n.

*Female.* Body length 1.3–2.1 mm. Blackish to blue-black: thoracic dorsum, especially scutellum, usually with a bronzy tinge. Scape yellowish brown, infusate apically; pedicel and flagellum dark brown. Legs yellowish brown: coxae concolorous with thorax, sometimes fore and mid coxae mainly, and hind one apically yellowish brown; tarsi darker apically. Tegulae pale yellow, darker apically; wings hyaline; venation pale yellow.

Head 1.2 to 1.25 times as broad as thorax, in dorsal view 2.05 to 2.15 times as broad as long; temples one-quarter as long as eyes; POL 1.3 to 1.4 times OOL. Occipital carina weak, in postero-dorsal view evenly curved. Head in front view 1.2 to 1.3 times as broad as high; eyes separated by 1.25 times their height; malar space 0.45 times as long as height of eye. Anterior margin of clypeus very slightly emarginate medially. Both mandibles with four teeth. Clypeus striate, smooth anteriorly; head otherwise moderately reticulate. Antennal toruli separated by half their diameter, situated distinctly above level of lower edge of eyes; scape 0.83 to 0.92 times height of eyes, reaching level of vertex; combined length of pedicel and flagellum 0.9 times as long as breadth of head; pedicel nearly twice as long as broad; second anellus much longer than first; first funicle segment distinctly shorter and very slightly broader than pedicel, usually about 1.3 times as long as broad, sometimes subquadrate (Fig. 7); second segment equal to first in length and breadth; sixth quadrate to slightly transverse; club twice as long as broad; third segment with area of micropilosity rather large. Sensilla disposed in one row on each segment.

Thorax 1.45 to 1.56 times as long as broad. Pronotal collar weakly but sharply margined except at sides, with broad, smooth strip. Mesoscutum twice as broad as long, moderately reticulate. Scutellum convex, slightly longer than mesoscutum, slightly broader than long, reticulate as in mesoscutum; frenal furrow vague. Metanotum with area between hind margin of scutellum and dorsellum rather narrow, with several longitudinal carinulae. Propodeum slightly longer than two-thirds length of scutellum; panels of median area reticulate as in scutellum, median carina weak, plicae strong throughout; nucha occupying two-fifths length of propodeum, strongly convex, deeply reticulate (Fig. 8); spiracular sulcus shallow and densely reticulate, without any transverse ridges; callus moderately hairy. Forewing 2.3 to 2.4 times as long as broad; basal cell and basal vein bare; speculum open below; marginal vein as long as postmarginal, 1.5 to 1.65 times as long as stigmal vein.

Gastral petiole (Fig. 8) nearly as long as nucha, weakly sculptured. Gaster shorter than thorax, 1.25 to 1.55 times as long as broad; first tergite occupying more than one-third length of gaster; first to fourth tergites smooth, without hairs dorsally.

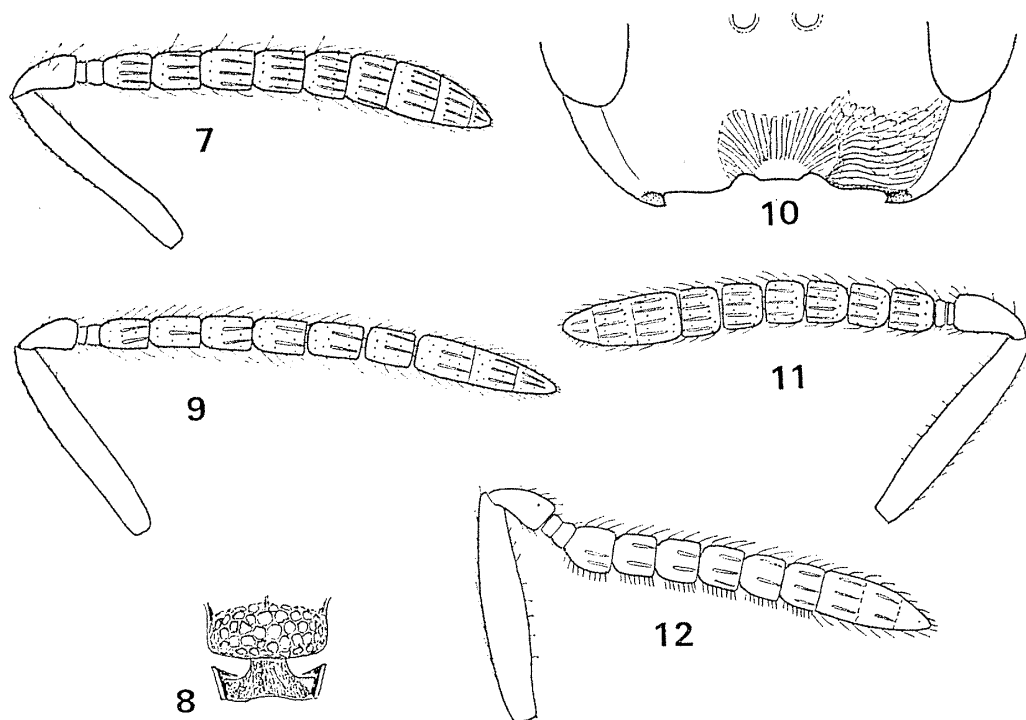
*Male.* Differs from female as follows: Body length 1.0–1.8 mm. Fore and mid coxae yellowish brown, with outer surfaces infusate with metallic reflections; hind coxae concolorous with thorax, with apices brown. Malar space 0.46 to 0.52 times as long as height of eye. Antennal toruli equidistant from lower margin of clypeus and anterior margin of median ocellus; scape reaching above level of vertex; combined length of pedicel and flagellum 1.05 to 1.15 times as long as breadth of head; flagellum slender (Fig. 9), hardly broader than pedicel in lateral view; each funicle segment distinctly longer than broad; club nearly three times as long as broad. Gaster subcircular.

This species appears to be near to *T. caricicola* (GRAHAM) (comb. n.) and *T. maurus* (GRAHAM) (comb. n.) in the sharply margined pronotal collar and both the mandibles with four teeth. It differs from the description of *caricicola* in having the body blackish (green with blue reflections in *caricicola*), combined length of pedicel and flagellum in female 0.9 times as long as breadth of head (equal to breadth of head in *caricicola*), and sixth funicle segment in male a little longer than broad (quadrate in *caricicola*). From female *maurus, oryzae* differs in having the flagellum slender, with first funicle segment as long as second, longer than broad (in *maurus* the segment is shorter than the second and transverse), and eyes separated by 1.25 times their height (in *maurus* 1.3 to 1.4 times). From both *caricicola* and *maurus*, female *oryzae* appears to differ in having the gastral petiole nearly as long as the nucha and sculptured (Fig. 8). No mention is made of the petiole by GRAHAM (1969) which we take as an indication that the petiole is normal for the genus, i.e. strongly transverse and unsculptured.

Holotype (♀), Bibai, Hokkaido, vii. 1975, ex *Apanteles glomeratus* (L.), (K. KAMIJO). Paratypes. Japan — Hokkaido: 3 ♀ 3 ♂, with same data as holotype; Bibai, 4 ♀, 30. v. 1963, 1 ♀, 16. ix. 1971, 1 ♀, 22. viii. 1976 (K. KAMIJO); Iwamizawa, 9 ♀ 4 ♂, 5. viii. 1978 (K. MAKIHARA); Sapporo, 1 ♀ 1 ♂, 1959 (T. NAMBU). Honshu: Morioka, 1 ♀, 18. viii. 1964 (Y. MAETA); Morioka, 1 ♀, x. 1964, 1 ♂, 8. ix. 1965, 1 ♀, 3. ix. 1966 (T. OKU); Sendai, 1 ♂, 25. vi. 1973 (K. OKAZAKI); Kogota, Miyagi-ken, 2 ♀ 3 ♂, 5. vii. 1973 (K. OKAZAKI); Sôma, Fukushima-ken, 1 ♀ 1 ♂, 14. vii. 1973 (K. OKAZAKI); Kôriyama, Fukushima-ken, 5 ♀ 2 ♂, 1977 (M. SAITO); Nishiyama-cho, Niigata-ken, 1 ♀ 1 ♂, 28. vi. 1974 (A. KOJIMA); Nagaoka, Niigata-ken, 4 ♀ 4 ♂, vii. 1980 (A. KOJIMA); Ichihara, Chiba-ken, 1 ♂, i. 1975, 2 ♀, 23. vi. and 17. vii. 1975 (A. FUJIE); Tsu, Mie-ken, 1 ♀ 1 ♂, 14. ix. 1962 (S. YAMASHITA); Kyoto, 2 ♀, 1–3. vii. 1970 (N. UEDA). Kyushu: Kagoshima, 2 ♀, 15. vi. and 15. ix. 1963 (K. KUSIGEMATI). Korea — Suweon, 1 ♀, 12. vi. 1974, 1 ♀, 4. viii. 1974, 1 ♀, 22. viii. 1974, 1 ♀, 12. ix. 1974, 1 ♀ 1 ♂, 25. x. 1974; Milyang, 2 ♀, 5. vi. and 7. x. 1974; Gyehwado, 1 ♀, 7. ix. 1976. The holotype and most paratypes will be deposited in the Entomological Institute, Hokkaido University, and some paratypes in the U.S. National Museum.

*Additional material.* China — Tungan, Hunan, 1 ♀, v. 1955. Formosa — Niigarta, 1 ♀ 1 ♂, 18. vii. 1921 (T. SHIRAKI); Taipei, 4 ♀, 20. vii. 1922 (T. SHIRAKI).





Figs. 7-12. — 7, *Trichomalopsis oryzae* sp. n., ♀, antenna; 8, same, ♀, propodeal nucha and gastral petiole; 9, same, ♂, antenna; 10, *T. deplanata* sp. n., ♀, lower part of head, front view; 11, same, ♀, antenna; 12, same, ♂, antenna.

*Distribution.* Japan (Hokkaido, Honshu, Kyushu), Korea, China, Formosa.

*Biology.* This species has been reared from *Oulema oryzae* (KUWAYAMA), *Bucclatrix pyrivorella* KUROKO, *Agromyza oryzae* MUNAKATA, *Hydrellia griseola* FALLÉN, and *Allognosta sapporensis* MATSUMURA; also reared as a secondary parasite from cocoons of *Apanteles ruficrus* HALIDAY on *Naranga aenescens*, *A. glomeratus* (L.), and *Microplitis medianus* RUTHE.

*Trichomalopsis deplanata* sp. n.

*Female.* Body length 1.5–2.4 mm. Bluish green. Scape and pedicel yellowish brown, flagellum brown. Legs brownish yellow: coxae concolorous with thorax; tips of tarsi darker. Tegulae brownish yellow. Wings subhyaline; veins pale brownish yellow.

Head about 1.2 times as broad as thorax, in dorsal view 1.9 to 2.0 times as broad as long; POL 1.1 to 1.2 times OOL; temples 0.4 to 0.5 times as long as eyes, roundly and rather strongly converging behind eyes. Head in front view usually transverse, 1.3 times as broad as high, occasionally 1.2 times as broad as high; eyes separated by 1.4 to 1.5 times their height; malar space 0.45 to 0.55 times height of eye; lower margins of face on either side of clypeus curved and projecting below level of lower margin of clypeus (Fig. 10); clypeus with lower margin weakly emargi-

nate. Both mandibles with four teeth. Clypeus radiately strigose, the striae extending almost to lower margin of eyes and to malar sulcus; head otherwise moderately reticulate. Antennal toruli situated distinctly above level of lower edge of eyes; scape much shorter than height of eye, almost reaching lower edge of median ocellus; pedicel nearly twice as long as broad; combined length of pedicel and flagellum about 0.8 times breadth of head; flagellum stout (Fig. 11), hardly clavate in larger specimens, weakly so in smaller specimens; first funicle segment much shorter than pedicel, subquadrate or distinctly transverse especially in smaller specimens; second segment weakly to strongly transverse; sixth usually a little shorter than first, distinctly transverse; club almost as long as three preceding segments combined. Sensilla disposed in one row on each segment.

Thorax squat, usually 1.4 to 1.5 times, sometimes nearly 1.6 times, as long as broad, depressed, in lateral view thoracic dorsum including propodeum evenly and only weakly curved. Pronotal collar not margined anteriorly, with smooth strip posteriorly. Mesoscutum 2.0 to 2.35 times as broad as long, moderately reticulate. Scutellum flattened, distinctly broader than long, reticulate much as mesoscutum; frenal furrow rather distinct. Propodeum relatively long, about 0.8 times as long as scutellum; median panels deeply reticulate, with median carina not so strong, sometimes sinuate; nucha occupying nearly one-third length of propodeum, coarsely reticulate; plicae sharp throughout; spiracular sulcus distinct, with a transverse ridge at middle; callus moderately hairy. Upper mesepimeron feebly sculptured. Forewing 2.3 to 2.4 times as long as broad; basal cell and basal vein bare; marginal vein 1.45 to 1.85 times as long as stigmal vein, a little longer than postmarginal.

Petiole strongly transverse, almost smooth. Gaster ovate, about as long as thorax, usually 1.3 to 1.4 times as long as broad, pointed apically; first tergite occupying one-third length of gaster or more.

*Male.* Differs from female as follows: Body length 1.2–2.0 mm. Antennae brownish yellow throughout. Fore and mid coxae occasionally mainly yellowish brown. POL 1.3 to 1.4 times OOL; eyes separated by 1.5 to 1.6 times their height. Scape slightly shorter than height of eye, fully reaching median ocellus; combined length of pedicel and flagellum 0.85 to 0.94 times breadth of head; funicle stouter than pedicel, cylindrical, ventrally covered with dense, erect hairs (Fig. 12); first funicle segment quadrate to distinctly transverse, in profile asymmetrical especially in larger specimens; following funicle segments quadrate to slightly transverse. Sensilla sparse. Thorax slightly more than 1.5 times as long as broad. Marginal vein 1.6 to 1.7 times as long as stigmal vein. Gaster much shorter than, and as broad as, thorax, almost rounded.

This species closely resembles *T. genalis* GRAHAM (comb. n.) especially in the shape of the lower face and clypeus. Dr. BOUČEK kindly sent us a pair of specimens from Austria. The new species differs from *genalis* in having the thorax more flattened, in lateral view its dorsum weakly and evenly curved, propodeum longer,

about 0.8 times as long as scutellum (in *genalis* about three-quarters as long as scutellum), in female POL 1.1 to 1.2 times OOL (in *genalis* 1.25 to 1.3), and male funicle stouter, covered with dense, erect hairs ventrally (Fig. 12).

Holotype (♀), Kôriyama, Fukushima-ken, Japan, 1977, ex *Oulema oryzae*, (M. SAITO). Paratypes. Japan — Hokkaido: Bibai, 4 ♀, vii. 1975 (K. KAMIJO). Honshu: Morioka, Iwate-ken, 9 ♂, 10. xii. 1963 (Y. MAETA); 2 ♀, with same data as holotype. Kyushu: Kagoshima, 1 ♀ 1 ♂, 14. v. 1963 (K. KUSIGEMATI). Korea — Suweon, 11 ♀, 20. vii. —2. viii. 1978 (J. C. PAIK). China — Foochow, 3 ♀ 1 ♂, xii. 1928 (KELLOGG); Lou Chow, Kwangsi, 2 ♂, 12. ix. 1934 (T. H. LIU). India — Tribeni, West Bengal, 1 ♀, 1. vii. 1963. The holotype and most paratypes from Japan and Korea will be deposited in the Entomological Institute, Hokkaido University, Sapporo, and the other paratypes in the U. S. National Museum.

*Distribution.* Japan (Hokkaido, Honshu, Kyushu), Korea, China, India.

*Biology.* This species appears to be a primary or secondary parasite of various hosts. In Japan it has been reared from *Oulema oryzae* (KUWAYAMA), puparia of *Agromyza yanonis* MATSUMURA on wheat, tachinid puparia on a noctuid, and cocoons of *Apanteles glomeratus* (L.). The Korean specimens have been reared from tachinid puparia on *Ostrinia furnacalis* GUENÉE; the Chinese specimens from larvae of *Parnara* sp. on paddy and parasite cocoons on a rice borer; and the Indian specimen from a tachinid puparium on paddy.

The above four species are usually common in paddy field in Japan and have a similar host range. These species have been confused by agricultural entomologists, because they are often reared together from the same batch of a host. A key is provided to facilitate the separation of the four species.

### Key to *Trichomalopsis* Species of Rice Paddy

(Females and males)

1. Head in dorsal view thick, less than twice as broad as long; temples nearly half as long as eyes; striae on clypeus extending almost to lower margin of eyes and to malar sulcus (Figs. 5, 10) ..... 2
- Head in dorsal view less thick, 2.0 to 2.15 times as broad as long; temples about one-quarter as long as eyes; striae on clypeus almost restricted to clypeal region (Fig. 2) ..... 3
2. Lower margin of clypeus incised medially (Fig. 5); lower margins of face on either side of clypeus normal, not projecting below level of lower margin of clypeus; occipital carina strongly curved medially (Fig. 6); thoracic dorsum moderately curved ..... *apanteloctena* (CRAWFORD)
- Lower margin of clypeus only weakly emarginate (Fig. 10); lower margins of face on either side of clypeus curved and projecting below level of lower margin of clypeus; occipital carina evenly curved medially (as Fig. 1); thoracic dorsum weakly and evenly curved ..... *deplanata* sp. n.

3. Body green to bluish green; pronotal collar weakly, irregularly margined or immargined; malar space slightly longer than half height of eye; left mandible with three teeth, right mandible with four.....*shirakii* CRAWFORD
- Body blackish to blue-black; pronotal collar weakly but sharply margined except at sides; malar space slightly shorter than half height of eye; both mandibles with four teeth.....*oryzae* sp. n.

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