

Some Anomalinae of Formosa, with Descriptions of Two New Species (Hymenoptera: Ichneumonidae)

Kanetosi KUSIGEMATI

(Entomological Laboratory)

Received for Publication September 10, 1987

Introduction

The present article is based on material collected by Dr. K. Baba (1986) and Mr. K. Ôhara (1984) in Formosa. In Formosa 24 species of the subfamily Anomalinae belonging to 8 genera have been reported by Cushman (1937), Enderlein (1921), Kusigemati (1983), and Uchida (1928, 1937 and 1958). In the course of the present investigation I have found 7 species in Formosa, of which two are new to science. It seems that Formosa has a comparatively rich fauna of the Anomalinae. The members of this subfamily (except the tribe Anomalini, which is parasitic on larvae of Tenebrionidae and Elateridae) have been known as solitary internal parasites of many Lepidopterous families. Information on the host association of the Formosan species of this subfamily is scanty and so far as I am aware, *Habronyx discoidellus* (Sonan), *Therion rufomaculatum* (Uchida), *Heteropelma amictum* (Fabricius), and *Trichomma cnaphaloclocis* Uchida are the only 4 species, of which the host known.

The holotypes of the new species will be preserved in the collection of the Entomological Institute, Hokkaido University, Sapporo.

Habronyx (Habronyx) discoidellus (Sonan)

Anomalon discoidellus Sonan, Trans. Nat. Hist. Soc. Formosa, 20: 139, 1930.

Barylypa discoidella: Townes, Townes and Gupta, Mem. Amer. Ent. Inst., 1: 313, 1971.

Habronyx discoidellus: Townes, J. Agr. Res. China, 33: 191, 1984.

Habronyx (Habronyx) discoidellus: Gupta, Mem. Amer. Ent. Inst., 41: 629, 1987.

Specimens examined. 3 ♂♂, 13-iv-1984, Alishan-Chushan, Alishan, Chiai, K. Ôhara leg.
Distribution: Formosa.

Hosts: *Rondotia menciiana* Moore (Notodontidae, Lep.) (after Sonan, 1930, in Formosa) and *Homona coffearia* Nietner (Tortricidae, Lep.) (after Sonan, 1944, in Formosa).

This species agrees well with the original description of *discoidellus* (Sonan, 1930), except the following colour variations:—

♂. Top of eye with a subtriangular yellowish spot; posterodorsal corner of pronotum yellow; scape entirely yellowish brown; pedicel light yellowish brown ventrally, dark brown dorsally; apices of metapleurum and propodeum yellowish brown; hind femur blackish dorsally, light ferruginous ventrally, sometimes entirely light ferruginous; hind trochanter dark brown dorsally, yellowish brown ventrally; hind metatarsus fuscous, paler basally.

Aphanistes transstriatus sp. nov. (Figs. 1, 3, 4 & 6)

♀. Face about 1.4 times as wide as high at level of lower margin of antennal socket, weakly and rather sparsely punctate, the punctures sparser and weaker laterally, with oblique, weak striae just below antennal socket; clypeus weakly convex, very sparsely punctate, its apex sharply pointed at center; inner margins of eyes rather strongly convergent ventrally; eyes with very short and very sparse hairs; malar space very short, about 1/4 as long as basal width of mandible; mandible stout, moderately strongly tapering towards apex, with large and sparse punctures, the upper tooth stout, 1.6 times as long as the lower one; temple narrow, 1/2 as long as eye in lateral view, slightly swollen, with strong and dense punctures, the punctures a little denser and weaker towards occipital carina; distance between lateral ocelli and eyes about 1.3 times as long as diameter of an ocellus; frons almost flat, reticulate-punctate, with a median longitudinal lamella, rather long and distinct trans-striae besides the median lamella. Flagellum 43-segmented; 1st flagellar segment 5.6 times as long as wide at apex; 2nd flagellar segment about 1/2 as long as the 1st and about 1.2 times as long as the 3rd. Pronotum strongly and densely punctate entirely; mesoscutum subpolished, strongly and densely punctate, the punctures a little weaker anteriorly and posterolaterally, rugulo-punctate on median posterior portion; notauli weak, reaching to behind the center of mesoscutum; scutellum weakly convex, strongly and densely punctate, with a shallow longitudinal sulcus, without lateral carina; mesopleurum strongly and densely punctate as in pronotum, reticulate-rugose just below subtegular ridge; speculum strongly punctate, with a small impunctate area; metapleurum entirely reticulate-rugose; mesosternum finely and densely punctate; prepectal carina ending at lower corner of pronotum; postpectal carina absent medially; lower corner of propleurum strongly bending backward, with distinct transverse striae. Propodeum weakly to moderately reticulate-rugose, with transverse striae on posterior half (Fig. 1); apex of propodeum near basal 3/8 of hind coxa; propodeal spiracle elongate. Wings (Figs. 4 & 6) with nervellus postfurcal by 1/3 of its own length; intercubitus basad of 2nd recurrent vein; portion of cubitus between intercubitus and 2nd recurrent vein about 4/5 as long as intercubitus; 2nd recurrent vein weakly reclivous; nervellus vertical, intercepted at lower 1/3; discoidella weakly curved, reaching nearly to hind margin of wing; brachiella distinct and complete. Leg with hind coxa long, 2.5 times as long as wide in lateral view; hind femur slender, weakly clavate, 8.3 times as long as wide in lateral view; hind tibia 8.5 times as long as wide at apex including hairs; longer spur of hind tibia 1.4 times as long as the shorter one; hind basitarsus 10.9 times as long as wide at apex; front coxa finely and sparsely punctate, unspecialized; front and middle tarsal claws weakly pectinate. Abdomen with 1st tergite about 7.4 times as long as wide at apex; 2nd tergite about 1.3 times as long as the 1st and 2.2 times as long as the 3rd; epipleurum of 2nd tergite narrow and separated by a crease.

Black, with legs and abdomen largely reddish brown. Face, clypeus, mouth parts except for blackish apical teeth of mandible, lower half of temple, small spot at top of eye and lower corner of frons yellow. Scape yellowish brown; pedicel blackish; flagellum yellowish to reddish brown, paler apically, the basal 2/5 of 1st flagellar segment blackish, and the last flagellar segment fuscous. Dorsal side of pronotum, lower corner of pronotum, front and hind margins of mesopleurum, tegula and subtegular ridge yellowish to reddish brown; scutellum black, with a pair of narrow lateral reddish brown markings; metapleurum black on lower 1/2, yellowish brown on dorsal 1/2. Propodeum black; posterior 1/2 of lateral area, apical part of propodeum,

posterolateral side of propodeum and propodeal spiracle yellowish to reddish brown. Legs yellowish to reddish brown; basoventral and inner basal sides of hind coxa, base of hind 1st trochanter and apical 1/5 of hind tibia blackish. Abdomen reddish brown; dorsal side of 2nd tergite except at apex blackish; cercus light yellowish brown. Wings tinged with fuscous; stigma yellowish brown.

Length: Body 18.3 mm, forewing 11.2 mm.

♂. Unknown.

Holotype (♀): Shinanshan near Liukuei, Kaohsiung Hsien, 5-v-1986, K. Baba leg. (Hind tarsus except for right metatarsus lacking).

Host: Unknown.

Distribution: Formosa.

This species is very closely related to the Formosan *A. kankonis* Uchida, 1928 (I have examined the type of *A. kankonis*). It differs from the latter in having the lower corner of the propleurum with distinct trans-striae, less strongly reticulate-rugose metapleurum, apical half of the propodeum with trans-striae, eye with very short and very sparse hairs, scutellum with a pair of lateral yellow markings and reddish brown dorsal side of the pronotum.

This species may be distinguished from the other members of the genus *Aphanistes* occurring in Formosa, by the following key:—

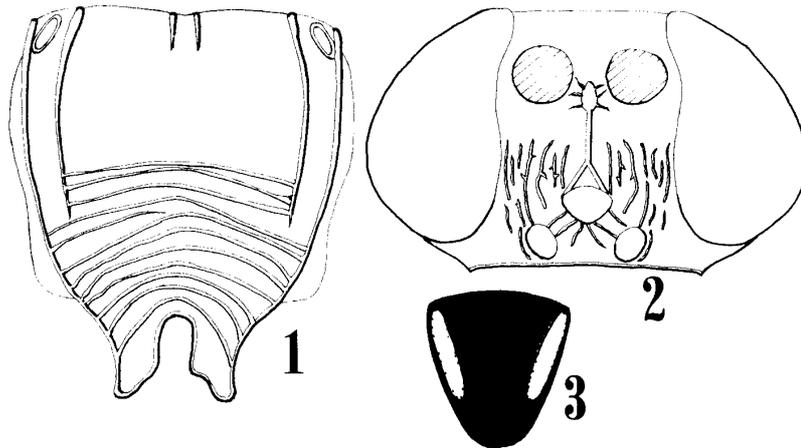
1. Portion of cubitus between intercubitus and 2nd recurrent vein 2/7 as long as intercubitus; discoidiella almost straight. Propodeum without trans-striae on apical portion; propodeal spiracle subcircular. Temple almost entirely black, yellow on lower part; hind coxa black, yellow at apex. *taiwanensis* Kusigemati
- Portion of cubitus between intercubitus and 2nd recurrent vein 5/9–4/5 as long as intercubitus; discoidiella straight or curved. Propodeum with trans-striae on apical portion; propodeal spiracle subcircular or elongate. Temple yellowish brown on lower 1/2, black on dorsal 1/2; hind coxa almost reddish brown, blackish basally. 2
2. Eye without hairs. Lower corner of propleurum without trans-striae; metapleurum coarsely reticulate-rugose. Propodeum with trans-striae on apical 2/5. Pronotum entirely black; scutellum black, without yellow marking; metapleurum black, yellowish at apex. *kankonis* Uchida
- Eye with very short and sparse hairs. Lower corner of propleurum with distinct trans-striae; metapleurum moderately strongly reticulate-rugose. Propodeum with trans-striae on apical 1/2 (Fig. 1). Pronotum black, reddish brown on dorsal side; scutellum black, with a pair of narrow lateral yellow markings (Fig. 3); metapleurum black on lower 1/2, reddish brown on dorsal 1/2. *transstriatus* sp. nov.

Therion rufomaculatum (Uchida)

Exochilum circumflexum var. *rufomaculatum* Uchida, Jour. Fac. Agr. Hokkaido Imp. Univ., 21: 237, 1928.

Therion rufomaculatum: Uchida, Ins. Matsum., 21: 93, 1958.

Specimens examined. 1 ♀, 29-iv-1986, Meishan-Tinchi, 800–2,300 m, Kaohsiung Hsien, K. Baba leg.; 1 ♀, 4-vii-1986, Yushih, 1,900 m, Nantow Hsien, K. Baba leg.; 1 ♀, 8-viii-1986, Nanfonshan near Liukuei, K. Baba leg.; 1 ♂, 4-x-1986, Liyuan, 1,800 m, Taitung Hsien, K.



- Fig. 1. Areolation and striation of propodeum in dorsal view, *Aphanistes transstriatus* sp. nov., ♀.
 Fig. 2. Carination and striation of head in dorsal view, *Heteropelma babai* sp. nov., ♀.
 Fig. 3. Colouration of scutellum, *Aphanistes transstriatus* sp. nov., ♀.

Baba leg.

Host: *Mythimna separata* (Walker) (Noctuidae, Lep.) (after He, 1979 and 1984, in China and Formosa).

Distribution: Formosa and China.

Heteropelma amictum (Fabricius)

Ichneumon amictus Fabricius, Systema Entomologiae, p. 341, 1775.

Anomalon capitatum Desvignes, Catalogue of British Ichneumonidae in the Collection of the British Museum, p. 104, 1856.

Schizoloma bucephalum Brauns, Arch. Ver. Freude Naturg. Mecklenb., 43: 71, 1898.

Schizoloma fulvicorne Cameron, Mem. & Proc. Manchester Lit. Phil. Soc., 43 (3): 104, 1899.

Anomalon tinctipenne Cameron, Mem. & Proc. Manchester Lit. Phil. Soc., 43 (3): 112, 1899.

Exochilum acheron Morley, Revision of the Ichneumonidae in the British Museum, 2: 79, 1913.

Exochilum acheron var. *scutellatum* Morley, Fauna of British India, Hym., 3: 412, 1913.

Schizoloma crassicalx Enderlein, Stettiner Ent. Ztg., 82: 11, 1921.

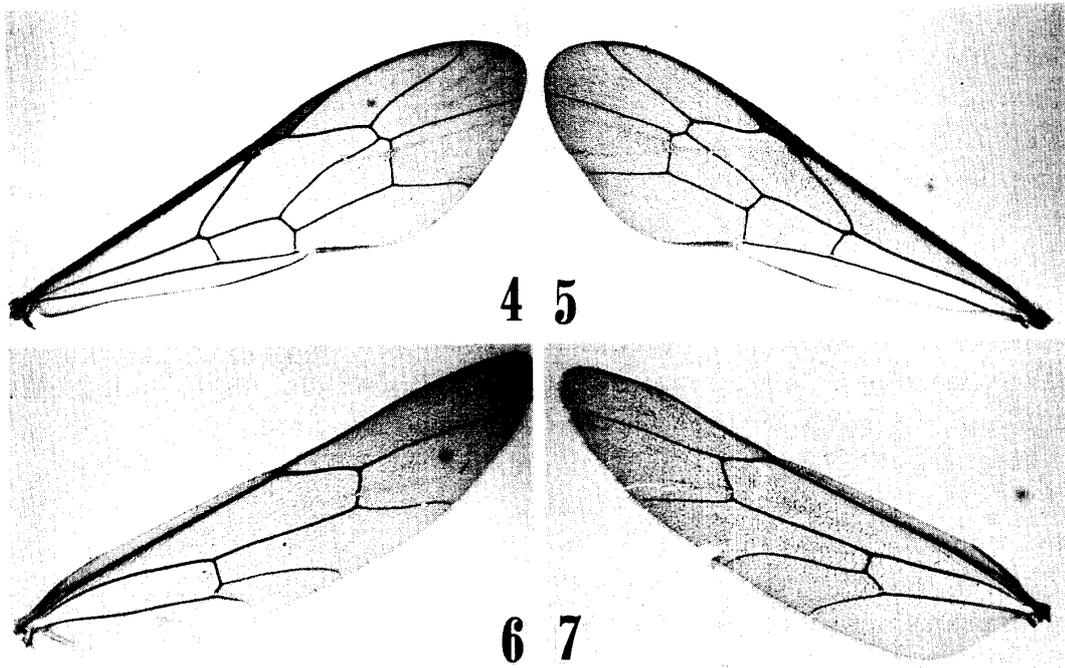
Heteropelma amictum: Townes, Mem. Amer. Ent. Inst., 17: 157, 1971.

Heteropelma perlongum: Kusigemati, Mem. Kagoshima Univ. Res. Center S. Pac., 4: 104, 1983. Misdet. of *perlongum* Cushman.

Specimens examined. 1 ♂, Mt. Lalashan, 1,300–1,500 m, Taoyuan Hsien, 17–iv–1981, K. Ôhara leg.; 2 ♂♂, Hsitsu-Chihtuan, 1,000–1,200 m, Taoyuan Hsien, 18–iv–1981, K. Ôhara leg.; 1 ♂, 5–v–1986, Shinanshan near Liukuei, Kaohsiung Hsien, K. Baba leg.

Distribution: Formosa, China, Philippines, Indonesia, Burma, Nepal, India, Japan and Eurasia.

Hosts: *Dendrolimus allolineatus* Matsumura and *Callitaera pudibunda* Linnaeus (Lasiocampidae, Lep.) (after Uchida, 1928, in Japan).



Figs. 4 & 5 (forewings) & 6 & 7 (hind wings): 4 & 6, *Aphanistes transstriatus* sp. nov., ♀; 5 & 7, *Heteropelma babai* sp. nov., ♀.

***Heteropelma babai* sp. nov. (Figs. 2, 5 & 7)**

♀. Face about 1.1 times as wide as high at level of lower margin of antennal socket, weakly and roughly rugose with large sparse punctures; clypeus weakly convex, with large, very sparse punctures, its apical margin thin, weakly reflexed, convex; inner margins of eyes rather strongly convergent ventrally; malar space short, $1/3$ as long as basal width of mandible; mandible strongly tapering towards apex, the lower tooth $1/4$ as long as the upper one; temple rather strongly converging behind the eyes, flat, strongly and densely punctate, about $4/9$ as long as eye in lateral view; frons (Fig. 2) coarsely rugose, weakly concave medially, with a weak longitudinal carinae, the carina connected with high interantennal lamella; lower corner of frons weakly raised and yellow (Fig. 2); distance between lateral ocelli and eyes 1.3 times as long as diameter of an ocellus; vertex rugoso-punctate. Flagellum with 53 segments; 1st flagellar segment 5.2 times as long as wide at apex; 2nd flagellar segment $4/9$ as long as the 1st and about 1.2 times as long as the 3rd. Pronotum coarsely rugose, with a strongly punctate area on posterodorsal portion, and with a rather long, acute tooth on lower front corner; epomia strong, reaching near dorsal margin of pronotum; mesoscutum very strongly and densely punctate, reticulate-rugose on posteromedian portion; notauli distinctly impressed, reaching to posterior $1/5$; scutellum weakly convex, coarsely rugoso-punctate, with a wide and shallow longitudinal sulcus; mesopleurum densely and strongly punctate medially, weakly and rather sparsely punctate ventrally, with a coarsely rugose area just below subtegular ridge, and with a row of short trans-striae along posterior margin of mesopleurum; speculum polished, with fine, rather sparse punctures; postpectal carina strong and complete; mesosternum weakly and rather sparsely punctate as in ventral portion of mesopleurum; prepectal carina strong, reaching to lower $1/2$ of front margin of mesopleurum; metapleurum coarsely and strongly reticulate-rugose. Propodeum reticulate-rugose as in meta-

pleurum; propodeal spiracle large, subcircular; pleural carina absent; apex of propodeum near basal 5/8 of hind coxa. Wings (Figs. 5 & 7) with nervulus postfurcal by about 1/3 of its own length; intercubitus basad of 2nd recurrent vein; portion of cubitus between intercubitus and 2nd recurrent vein about as long as intercubitus; nervellus vertical on upper part, strongly reclivous on lower part, intercepted at upper 2/3; discoidiella and brachiella distinct, reaching to the hind margin of wing. Leg with hind coxa polished, with sparse, fine punctures, the punctures a little denser laterally and ventrally, about 2.6 times as long as wide in lateral view; hind femur slender, weakly clavate, 8.2 times as long as wide in lateral view; hind tibia slender, 11.4 times as long as wide at apex including hairs; longer spur of hind tibia about 1.5 times as long as the shorter one; hind basitarsus slender, 11.4 times as long as wide at apex, 3.8 times as long as the 2nd and 1.7 times as long as the 2nd to 5th segments together except claw; tarsal claws not pectinate; front and middle tarsal claws strongly curved; hind tarsal claws with a sharp bend of about 97° at middle and with a lobe at base with long hairs. Abdomen with 1st tergite 9.0 times as long as wide at apex; 2nd tergite 1.1 times as long as the 1st and 1.9 times as long as the 3rd.

Black, with legs and abdomen largely reddish brown. Face, clypeus, malar space, labrum, mouth parts except for blackish apical teeth of mandible, and lower lateral corner of frons yellow; apical margin of clypeus tinged with dark brown; yellow marking at top of eye small, elongate; temple with a very narrow, median yellow marking along eye margin. Scape dark reddish brown; pedicel fuscous; flagellum yellowish brown, darker basally, paler apically. Lower corner of propleurum, lower front tooth of pronotum and posterodorsal corner of pronotum tinged with yellowish brown. Tegula yellowish brown. Apices of metapleurum and propodeum tinged with yellowish brown; front and middle legs yellowish brown, the coxae yellow. Hind leg with coxa, trochanter, femur reddish brown; tibia reddish brown, blackish on apical 1/3; 1st to 4th tarsal segments light yellowish brown; 5th tarsal segment and tarsal claw infusate. Abdomen reddish brown, blackish on dorsal side of 2nd tergite; cercus yellowish brown basally, fuscous apically; ovipositor sheath yellowish brown, darker basally. Wings tinged with fuscous; stigma yellowish brown, fuscous along anterior margin.

Length: Body 21.5 mm, forewing 9.3 mm.

♂. Unknown.

Holotype (♀): Taona near Maolin, Kaohsiung Hsien, 30-v-1986, K. Baba leg.

Host: Unknown.

Distribution: Formosa.

This species is closely allied to the Formosan *H. fulvitarse* Cameron, 1899. It differs from the latter in having the strongly and coarsely punctate mesoscutum, comparatively short hind coxa, hind metatarsus which is 3.8 times as long as the 2nd, and clouded wings. Furthermore, this species is very similar to the Japanese and Formosan *H. flaviscutellum* Uchida, 1928, but it is easily distinguished from the latter by the coarsely punctate mesopleurum, the frons with a complete median longitudinal carina, the yellow frontal orbit which is interrupted near the yellow spot at top of eye in female, and the black scutellum.

This species is named in honour of Dr. K. Baba who collected the type specimen.

Trichomma cnaphalocrocis Uchida

Trichomma cnaphalocrocis Uchida, Jour. Fac. Agr. Hokkaido Imp. Univ. 21: 239, 1928.
Specimen examined. 1 ♂, Tasitiehku near Liukuei, Kaohsiung Hsien, K. Baba leg.

Distribution: Formosa, China and Japan.

Hosts: *Cnaphalocrocis medinalis* Guenée (Pylaridae, Lep.) (after Uchida, 1928, in Formosa) and *Ostrinia nubilalis* (Hübner) (Pylaridae, Let.) (after Clark, 1934, in Formosa).

Agrypon kikuchii (Uchida)

Gongropelma kikuchii Uchida, Jour. Fac. Agr. Hokkaido Imp. Univ., 21: 258, 1928.

Agrypon (Paragrypon) kikuchii: Uchida, Ins. Matsum., 15: 160, 1941.

Phaenolabrorychus kikuchii: Townes, Proc. Ent. Soc. Washington, 59: 115, 1957.

Labrorychus kikuchii: Townes, Townes & Gupta, Mem. Amer. Ent. Inst., 1: 317, 1961.

Agrypon kikuchii: Gauld, Bull. Brit. Mus. Nat. Hist. (Ent.), 33: 66, 1976.

Specimen examined. 1 ♀, 4–vii–1986, Yushih, 1,900 m, Nantow Hsien, K. Baba leg.

Distribution: Formosa.

Host: Unknown.

This species agrees well with the original description of *kikuchii* (Uchida), except the face coarsely and obliquely rugose on the median dorsal portion, the frontal orbit yellow, the yellow marking connected with the yellow marking at top of eye, the temple yellow, blackish on the dorsal 1/9, the lower half of the occiput yellow, and the dorsal sides of 6th to 8th tergites blackish.

Summary

Seven species belonging to 5 genera of the subfamily Anomalinae are reported from Formosa. Of them, 2 species are new to science: *Aphanistes transstriatus* and *Heteropelma babai*. A key is provided to distinguish the three Formosan species of *Aphanistes*.

Acknowledgements

I wish to express my hearty thanks to Dr. K. Baba (Kurokawa, Niigata Pref.) and Mr. K. Ôhara (Tokushima Prefectural Museum, Tokushima) for their kindness in giving me the opportunity to study invaluable specimens. Grateful acknowledgement is made to Prof. A. Nagatomi (Kagoshima University, Kagoshima) for his kindness in reading through the manuscript.

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