

A Revision of the Tribe Nonnini of Formosa and Japan (Hymenoptera: Ichneumonidae, Porizontinae)

Kanetosi KUSIGEMATI*

Abstract

Formosan and Japanese species of Ichneumonidae of the subfamily Porizontinae belonging to the tribe Nonnini are revised. A total of nine species are dealt with; of them six are new to science. *Chriodes* (*Klutiana*) *pentagonus* Momoi from Formosa is recorded as the first addition to the species, which was original found and described in Japan.

Introduction

The Nonnini constitute a small group of the Ichneumonidae, being represented by only two genera containing nearly 25 described species in the world. The hosts of this tribe remain unknown.

Only one species of this tribe have been described in Formosa (T. Uchida, 1932), and two in Japan (T. Uchida, 1957 and S. Momoi, 1970). In the course of the present investigation six new species will be described which have been found in Formosa and Japan. On this occasion I will give a revision of the Formosan and Japanese *Chriodes*, and keys to the subgenus and species are also given.

The type specimens of the new species are deposited in the collection of the Entomological Laboratory, Kagoshima University, Kagoshima.

Family Ichneumonidae Subfamily Porizontinae Tribe Nonnini

The tribe Nonnini may be distinguished from any other tribe of Porizontinae by the combination of the following characters:—

Body slender; abdomen rather strongly slender and strongly compressed. Head with frons polished, smooth and usually unspecialized, sometimes with a longitudinal

* 榑下町鉦敏, 鹿児島大学農学部農学科害虫学教室

Entomological Laboratory, Faculty of Agriculture, Kagoshima University, 21-24, Korimoto 1-Chome, Kagoshima 890, JAPAN

groove on interantennal area (Figs. 1-3 and 12-15); inner margins of eyes strongly to very strongly convergent ventrad (Figs. 1-3 and 12-15); clypeus separated from face by a distinct groove (Figs. 1-3 and 12-15); maxillary palpus with 4 or 5 segments; labial palpus with 3 segments; mandible with two apical teeth. Postpectal carina complete; sternaulus usually distinct for the whole length of mesopleurum, sometimes present on the basal $1/3-1/2$; epomia present. Propodeum partly to completely areolated (Figs. 7-9 and 16-20). Forewing 2.7-14.5 mm. in length; areolet broadly sessile or pointed above, or absent (Figs. 21-29); nervellus intercepted below the middle (Figs. 30-32) or not intercepted (Figs. 33-37). Glymma present (Figs. 4-6) or absent; lateral margins of 1st tergite below the mid-height of the petiole on the petiolar area (Figs. 4-6); 1st sternite usually completely fused with the tergite in Formosan and Japanese species of *Chriodes* (Figs. 4-6). Ovipositor usually strongly compressed, straight, with a subapical dorsal notch (Figs. 10 and 11), and several times as long as apical depth of abdomen.

This tribe is a small group of the Ichneumonidae, being represented by only two genera in the world. At present only one genus is known to occur in Formosa and Japan. Among the genera occurring in the world, *Nonnus* is confined to the New World tropics and subtropics. *Chriodes* have been found both in the Old World tropics and Japan.

Genus *Chriodes*

This genus is clearly distinguished from any other genera of Porizontinae by the following combination of characters:—

Forewing 3.0-5.3 mm. in length; areolet absent in Formosan and Japanese species (Figs. 21-29); nervellus interstitial or postfurcal by less than $2/5$ of its own length, sometimes antefurcal (Figs. 21-29); brachiella entirely absent or obsolete (Figs. 30-37); discoidiella present (Figs. 30-32) or absent (Figs. 33-37); inner margins of eyes moderately to very strongly convergent ventrad, not indented opposite antennal socket (Figs. 1-3 and 12-15); maxillary palpus with 4 or 5 segments; flagellum with a middle white band in female; notaulus weakly to strongly impressed, reaching to basal $5/7-6/7$; epomia weak but distinct. Legs slender; tarsal claws pectinate or simple. Glymma usually present (Figs. 4-6), sometimes absent. Ovipositor sheath rather long, 1.0-2.0 times as long as 1st tergite.

The genus *Chriodes* is a moderately large group of the subfamily Porizontinae, probably of Old World tropics and Japan. In Japan two species have been described by T. Uchida (1957) and S. Momoi (1970). H. Townes, M. Townes and V. K. Gupta reclassified and catalogued the Indo-Australian species in 1961, enumerating four species in the Indo-Australian region. The author is aware of only one species, *C. (Chriodes) koshunensis* Uchida, 1932, which occurs in Formosa. In the present paper five new species are added to the Ichneumonid fauna of Formosa and one to that of Japan. Most species of this genus occur on the undergrowth of forest in cool and rather moist habitats. The genus is divided into two subgenus which can be separated by the following key:—

Key to the subgenus of *Chriodes*

1. Nervellus intercepted (Figs. 30-32); discoidiella present (Figs. 30-32). Scutellum strongly and entirely carinate laterally. Third abscissa of discoideus usually shorter than 2nd abscissa of discoideus (Figs. 21-23). Subgenus *Chriodes*
 Nervellus not intercepted (Figs. 33-37); discoidiella absent (Figs. 33-37). Scutellum not carinate laterally, when carinate, the clypeus strongly produced apically (Fig. 14), or the interantennal groove long and deep (Fig. 15). Third abscissa of discoideus longer than 2nd abscissa of discoideus, sometimes the 2nd abscissa absent (Figs. 24-29). Subgenus *Klutiana*

Subgenus *Chriodes*

Chriodes Foerster, Verh. Naturh. Ver. Rheinlande 25: 178, 1868. [Type-species: *Chriodes* (!) *oculatus* Ashmead (= *Atrometus minutus* Ashmead)].

Nesomesochorus Ashmead, Proc. U. S. Natl. Mus. 28: 967, 1905. [Type-species: *Nesomesochorus oculatus* Ashmead (= *Atrometus minutus* Ashmead)].

Metanomalon Morley, Revision of the Ichneumonidae... in the British Museum... 2: 50, 58, 1913. [Type-species: *Metanomalon poliendum* Morley].

Prosopstenus Uchida, Jour. Fac. Agr. Hokkaido Imp. Univ. 33: 184, 1932. [Type-species: *Hemiteles* (*Prosopstenus*) *koshunensis* Uchida].

Mavandia Seyrig, Mém. Mus. d'Hist. Nat. Paris (n. s.) 4: 94, 1935. [Type-species: *Mavandia nangukiana* Uchida].

This subgenus is characterized by the following aspects:—

Maxillary palpus with 5 segments in Formosan and Japanese species; clypeus strongly convex, the apical margin broadly truncate (Figs. 1-3). Sternaulus usually reaching to basal 1/3-1/2, sometimes distinct for the whole length of mesopleurum; scutellum strongly and entirely carinate laterally. All tarsal claws pectinate. Nervellus weakly curved, rather strongly reclivous and intercepted below the middle (Figs. 30-32); 3rd abscissa of discoideus usually shorter than 2nd abscissa of discoideus (Figs. 21-23). Glymma distinctly impressed (Figs. 4-6); ovipositor rather strongly compressed (Fig. 11).

This subgenus is widely distributed in the Old World tropics. It contains only a species of the Philippines, a species of Sri Lanka and the three Formosan species described below:—

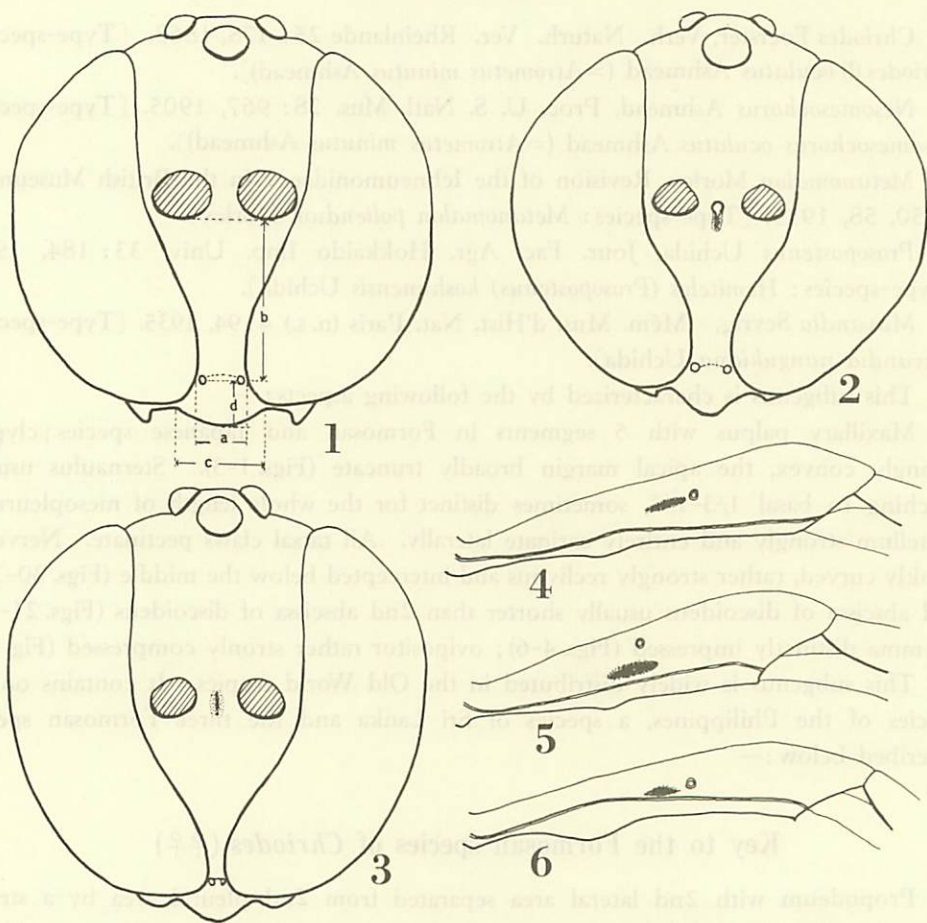
Key to the Formosan species of *Chriodes* (♀♀)

1. Propodeum with 2nd lateral area separated from 2nd pleural area by a strong carina (Fig. 7). Hind femur comparatively stout, 5.3-5.6 times as long as wide in lateral view. Ovipositor sheath comparatively long, 1.6-1.8 times as long as 1st tergite. Clypeus entirely black. 1. *carinatus*, sp. nov.
 Propodeum with 2nd lateral area confluent with 2nd pleural area (Figs. 8 and 9). Hind femur comparatively slender, 6.2-6.5 times as long as wide in lateral view. Ovipositor sheath comparatively short, 1.3-1.5 times as long as 1st tergite. Clypeus

- tinged with yellowish brown. 2.
2. *Nervulus interstitial* (Fig. 22). Pronotum more or less longitudinally striate. First sternite with a strong subbasal median convexity (Fig. 6). Mesopleurum, mesosternum, metapleurum and propodeum almost entirely reddish brown; 1st tergite usually light reddish brown. 2. *hemierythros*, sp. nov.
- *Nervulus postfurcal* (Fig. 23). Propodeum not striate. First sternite with a weak median convexity (Fig. 4). Thorax and propodeum entirely black; 1st tergite usually blackish. 3. *incarinatus*, sp. nov.

1. *Chriodes* (*Chriodes*) *carinatus*, sp. nov. (Figs. 3, 5, 7, 11, 21 & 30)

♀. Face (Fig. 3) 4.4–5.1 times as high as wide at level of clypeal foveae, weakly convex, distinctly and rather sparsely punctate; interantennal groove short and shallow



Figs. 1–3. Heads in frontal view: 1, *Chriodes* (*Chriodes*) *incarinatus*, sp. nov., male (a, width of face; b, height of face; c, width of clypeus; d, height of clypeus); 2, *C. (C.) incarinatus*, sp. nov., female; 3, *C. (C.) carinatus*, sp. nov., female.

Figs. 4–6. First abdominal tergites in lateral view, females: 4, *C. (C.) incarinatus*, sp. nov.; 5, *C. (C.) carinatus*, sp. nov.; 6, *C. (C.) hemierythros*, sp. nov.

or absent; clypeus small, 1.9-2.2 times as wide as high, subpolished, with rather dense long hairs; malar space very narrow, almost linear; temple polished, almost flat, about 1/5 as long as eye in lateral view, with rather sparse hairs and more dense than in *incarinatus*; frons polished, rather strongly concave, with a few hairs on dorsolateral corner; vertex weakly convex, weakly mat, with very sparse hairs; distance between lateral ocelli and eyes 0.8-1.0 times as long as diameter of an ocellus; occipital carina strong and complete with lower end joining oral carina far above base of mandible; mandible moderately tapering towards apex, with rather sparse long yellowish-brown hairs, the apical teeth approximately equal in length; maxillary palpus with 5 segments, the 4th and 5th ones indistinctly segmented. Antennae slender, long, filiform, with 28-30 segments; 1st flagellar segment 6.6-6.8 times as long as wide at apex; 2nd flagellar segment 4/5-6/7 as long as 1st flagellar segment and 1.0-1.1 times as long as the 3rd. Pronotum polished and impunctate, with 4-6 longitudinal striae on lower corner; mesoscutum polished to subpolished, weakly mat, or very faintly trans-rugulose anteriorly, smooth and impunctate posteriorly, with sparse hairs becoming denser anteriorly; notaulus strongly impressed with short trans-striae, reaching to about basal 4/5; scutellum rather strongly convex, polished, with very sparse hairs, and strong and complete lateral carinae; mesopleurum strongly and densely punctate, with a wide obliquely striate area just below speculum; speculum weakly convex, polished and impunctate; mesosternum finely and densely punctate; sternaulus short but distinct, reaching to about basal 1/2; metapleurum subpolished, finely and densely punctate, with weak vertical rugae posteriorly. Propodeum (Fig. 7) polished, completely areolated, with sparse hairs; petiolar area and 3rd lateral areas transversely striate, sometimes petiolar area confluent with areola; areola weakly convergent posteriorly, 1.3-1.5 times as long as wide at costula, weakly arched above; posterior margin of median basal area not pointed and straight, the median longitudinal carinae weak, not reaching to anterior margin of propodeum; propodeal spiracle small, elliptic. Wings (Figs. 21 and 30) with areolet absent; nervulus postfurcal by 1/4-1/3 of its own length; portion of cubitus between intercubitus and 2nd recurrent vein 1.0-1.3 times as long as intercubitus; 3rd abscissa of discoideus subvertical, 5/6-8/9 as long as the 2nd; nervellus weakly curved, strongly reconvex, intercepted at its lower 1/9-1/6; discoidiella present, weakly pigmented. Hind femur comparatively stout, 5.3-5.6 times as long as wide in lateral view; basitarsus of hind leg about 2.2 times as long as 2nd segment of hind tarsus and 0.9-1.0 times as long as the 2nd to 5th segments together except claws; all tarsal claws rather strongly pectinate. Abdomen with 1st tergite slender, polished, with short and very sparse hairs and large and sparse punctures on lateral side of postpetiole, 4.3-4.6 times as long as width of postpetiole; glymma strong (Fig. 5); 1st sternite with a subbasal median convexity (Fig. 5); 2nd tergite strongly mat, 1.2-1.5 times as long as 1st tergite and 1.9-2.2 times as long as the 3rd; 3rd tergite weakly mat. Ovipositor strongly compressed, with a subapical dorsal notch (Fig. 11); ovipositor sheath 1.6-1.8 times as long as 1st tergite.

Black. Mandible fuscous, the apical teeth being dark reddish brown; palpi pale-yellow; scape and pedicel pale-yellow, a little darker laterally; basal 3 or 4 segments of flagellum pale-yellow to yellowish brown, darker apically; flagellum except for basal 3 or 4 segments, infusate, the basal 10th to 14th segments white. Tegula dirty yellow-

ish brown. Propleurum more or less weakly tinged with yellowish brown. Front leg with coxa and trochanter pale; femur, tibia and tarsus except for infusate last segment, light yellowish brown. Middle leg with coxa and 1st trochanter pale; 2nd trochanter, femur, tibia and tarsus except for infusate last segment, yellowish brown. Hind leg with coxa light reddish brown to fuscous, paler ventrally, the extreme apex being pale-yellow; 1st trochanter pale-yellow; 2nd trochanter infusate, a little paler ventrally; femur reddish brown; tibia dark reddish brown, with an indistinct pale basal band; tarsus yellowish brown to dark reddish brown, the last segment being infusate. Abdomen black; 1st tergite black, weakly tinged with yellowish brown on basal 1/2; 2nd tergite blackish; extreme apex of 1st and 2nd tergites yellowish brown; 3rd tergite light reddish brown on basal 2/3, blackish on apical 1/3; 4th to 6th tergite blackish, a little paler laterally; 7th tergite dark brown, pale-yellow to yellowish brown dorsally. Ovipositor sheath pale-yellow to infusate, darker apically. Wings subhyaline.

Length: Body 8.2-10.3 mm., forewing 4.6-5.3 mm.

♂. Unknown.

Holotype (♀): Lienhuachih, 500-550 m, Nantou Hsien, 28-iv-1981, H. Takemoto leg. Paratypes: 4♀♀, Lienhuachih, 500-550 m, 28-iv-1981, K. Ôhara leg.

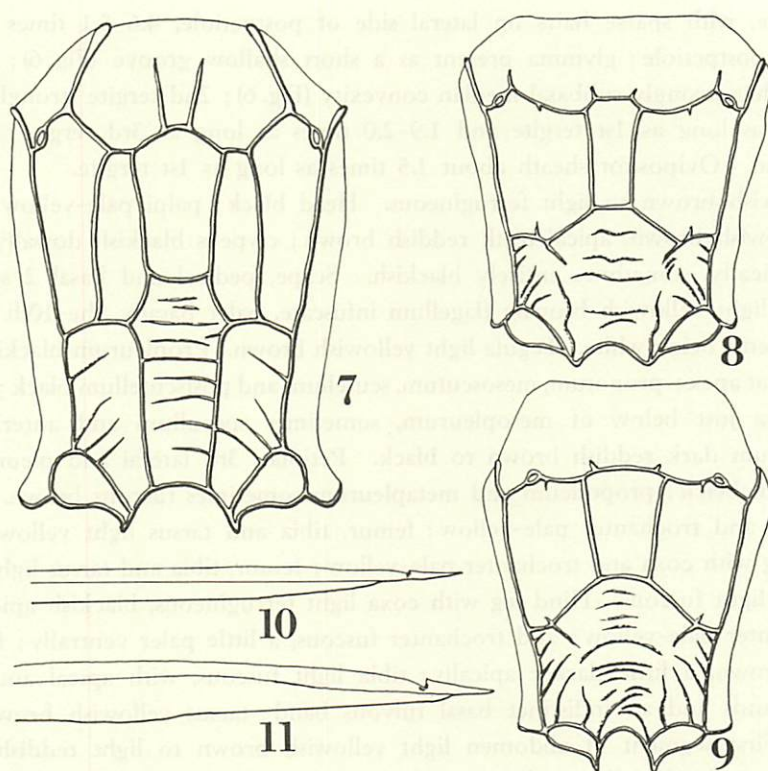
Host: Unknown.

Distribution: Formosa.

This species is readily distinguished from any other consubgeneric Formosan species by the completely areolated propodeum, the comparatively long ovipositor, the stout hind femur and the mesopleurum with a strongly and widely striate area just below the speculum.

2. *Chriodes (Chriodes) hemierythros*, sp. nov. (Figs. 6, 9, 22 & 31)

♀. Face 3.3-3.8 times as high as wide at level of clypeal foveae, weakly convex, finely and densely punctate; interantennal groove long, rather deep; clypeus small, 1.6-1.9 times as wide as high, subpolished, with rather sparse long hairs; malar space very narrow, about 1/10 as long as basal width of mandible; temple almost flat, polished, narrow, 2/9-2/7 as long as eye in lateral view, with sparse hairs; vertex subpolished, with sparse hairs; occipital carina strong and complete, the lower end joining oral carina near base of mandible; frons weakly concave, polished, with sparse hairs along frontal margin; eyes with short and sparse hairs; distance between lateral ocelli and eyes 5/6-8/9 as long as diameter of an ocellus; mandible weakly tapering towards apex, with rather sparse hairs, the apical teeth equal in length. Antennae slender, long, filiform, with 27 or 28 segments; 1st flagellar segment 7.0-7.4 times as long as wide at apex; 2nd flagellar segment 2/3-7/9 as long as 1st flagellar segment and 1.0-1.2 times as long as the 3rd. Pronotum polished, longitudinally striate medially, impunctate ventrally and dorsally, sometimes entirely impunctate; mesopleurum weakly mat, with sparse weak punctures and a wide obliquely striate area just below speculum; speculum polished, weakly swollen, impunctate; sternaulus distinct, reaching to the posterior margin of mesopleurum; mesosternum weakly mat; mesoscutum polished, very finely, transversely rugulose on median lobe, very finely rugulose or very weakly mat on lateral lobes; notaulus strongly impressed with short trans-striae, reaching to basal 4/5-



Figs. 7-9. Propodea in dorsal view, females; 7, *Chriodes* (*Chriodes*) *carinatus*, sp. nov.; 8, *C. (C.) incarinatus*, sp. nov.; 9, *C. (C.) hemierythros*, sp. nov.

Figs. 10 and 11. Apical parts of ovipositor: 10, *Chriodes* (*Klutiana*) *brevistriatus*, sp. nov.; 11. *C. (C.) carinatus*, sp. nov.

6/7; metapleurum weakly swollen, finely and densely punctate anteriorly, weakly to strongly rugulose vertically on posterior part, the rugulae becoming stronger posteriorly. Propodeum (Fig. 9) polished, impunctate, incompletely areolated, with scattered hairs; median longitudinal carina present as short stubs on median basal area, so that the median basal area incompletely confluent with 1st lateral areas; areola distinct, rather strongly convergent posteriorly, 1.3-1.6 times as long as wide at costula, straight to weakly arched above; 2nd lateral area confluent with 2nd pleural area; 3rd lateral area confluent with petiolar and 3rd pleural areas, strongly and transversely striate; propodeal spiracle small, elliptic. Wings (Figs. 22 and 31) with areolet absent; nervulus interstitial or postfurcal by about 1/6 of its own length; portion of cubitus between intercubitus and 2nd recurrent vein about 1.1 times as long as intercubitus; 3rd abscissa of discoideus vertical to weakly inclivous, 5/7-8/9 as long as the 2nd, sometimes a little longer than the 2nd; nervellus almost straight, strongly reclivous, intercepted at lower 2/9-2/7; discoidiella short but distinct. Hind femur slender, 6.2-6.5 times as long as wide in lateral view; basitarsus of hind leg 2.2-2.4 times as long as the 2nd tarsal segment and about as long as the 2nd and following segments together except claws; all tarsal claws very weakly pectinate. Abdomen with 1st tergite slender, polished,

impunctate, with sparse hairs on lateral side of postpetiole, 4.6–5.1 times as long as width of postpetiole; glymma present as a short shallow groove (Fig. 6); 1st sternite with a rather strongly subbasal median convexity (Fig. 6); 2nd tergite strongly mat, 1.1–1.2 times as long as 1st tergite and 1.9–2.0 times as long as 3rd tergite; 3rd tergite weakly mat. Ovipositor sheath about 1.5 times as long as 1st tergite.

Yellowish brown to light ferrugineous. Head black; palpi pale-yellow; mandible light yellowish brown, apical teeth reddish brown; clypeus blackish dorsally, yellowish brown apically, sometimes entirely blackish. Scape, pedicel and basal 2 segments of flagellum light yellowish brown; flagellum infusate, paler basally, the 10th to 13th or 14th segments being white. Tegula light yellowish brown. Propleurum blackish, yellowish brown at apex; pronotum, mesoscutum, scutellum and postscutellum black; prepectus, striate area just below of mesopleurum, sometimes speculum and anterior 2/3 of mesopleurum dark reddish brown to black. Petiolar, 3rd lateral and pleural areas of propodeum black; propodeum and metapleurum sometimes fuscous brown. Front leg with coxa and trochanter pale-yellow; femur, tibia and tarsus light yellowish brown. Middle leg with coxa and trochanter pale-yellow; femur, tibia and tarsus light yellowish brown to light fuscous. Hind leg with coxa light ferrugineous, blackish apicodorsally; 1st trochanter pale-yellow; 2nd trochanter fuscous, a little paler ventrally; femur dark reddish brown, a little darker apically; tibia light fuscous, with apical and subapical fuscous bands and an indistinct basal fulvous band; tarsus yellowish brown to dark brown. First segment of abdomen light yellowish brown to light reddish brown, a little darker apicodorsally; 2nd tergite blackish; 3rd tergite blackish, dark brown laterally; 4th tergite yellowish brown, darker posteriorly; 5th and 6th tergites blackish; 7th and following tergites yellowish brown; extreme apex of 1st and 2nd tergites tinged with yellowish brown; posterior half of 1st tergite sometimes blackish; basal half of 2nd tergite sometimes tinged with yellowish brown. Ovipositor sheath infusate. Wings subhyaline.

Length: Body 6.3–7.9 mm., forewing 3.9–4.3 mm.

♂. Unknown.

Holotype (♀): Jihyetan, 750 m, Nantou Hsien, 27-iv-1981, H. Takemoto leg.

Paratypes: 1♀, Nanshanchi, 650–700 m, Nantou Hsien, 23-iv-1981, H. Takemoto leg.;

1♀, Lienhuachih, 500–550 m, Nantou Hsien, 28-iv-1981, K. Ôhara leg.

Host: Unknown.

Distribution: Formosa.

This species is very closely related to the following species, *C. (C.) incarinatus*, sp. nov., but it can be easily distinguished from the latter by the interstitial nervulus, the striate pronotum and the colouration of thorax, propodeum and abdomen. Furthermore, this species seems to be close to *C. (C.) poliendus* (Morley, 1913), from Sri Lanka. In this species, however, the areola is 1.3–1.6 times as long as wide at costula and weakly convergent posteriorly, the petiolar area of the propodeum is blackish and the hind leg is entirely reddish brown, while in *poliendus* it is said that the areola is subparallel-sided and also twice as long as broad, the entire metathorax, mesopleurae and sternum, ... pale testaceous and the hind legs infusate, with rufescent marking.

3. *Chriodes (Chriodes) incarinatus*, sp. nov. (Figs. 1, 2, 4, 8, 23 & 32)

♀. Face 3.1-3.6 times as high as wide at level of clypeal foveae, weakly convex, finely and rather densely punctate (Fig. 2); interantennal groove short, shallow, the dorsal part ending as a small pit; clypeus small, 1.5-1.7 times as wide as high, subpolished, with sparse punctures (Fig. 2); malar space very narrow, linear (Fig. 2); temple almost flat, polished, narrow, $1/5-1/4$ as long as eye in lateral view, with sparse hairs, the hairs becoming denser ventrally; occipital carina distinct and complete, the lower end joining oral carina far above base of mandible; distance between lateral ocelli and eyes $5/6-6/7$ as long as diameter of an ocellus; frons polished, smooth, weakly concave, with a few hairs along frontal margins; vertex polished, smooth with very sparse hairs; mandible weakly tapering towards apex, with sparse long hairs, the apical teeth approximately equal in length. Antennae slender, long, filiform, with 27 or 28 segments; 1st flagellar segment 7.1-7.3 times as long as wide at apex; 2nd flagellar segment $7/9-6/7$ as long as 1st flagellar segment and about 1.1 times as long as the 3rd one. Pronotum polished, finely rugulose, without punctures; mesoscutum polished, almost entirely bare, but anterior $1/3$ of median lobe mat, with sparse short hairs; notaulus distinctly impressed with short trans-striae, reaching to about basal $5/6$; scutellum moderately strongly convex, with very sparse hairs, and strong and complete lateral carinae; mesopleurum distinctly and rather densely punctate; speculum weakly swollen, polished and smooth; mesosternum mat to weakly punctate; metapleurum weakly convex, distinctly and densely punctate. Propodeum (Fig. 8) polished and impunctate; median basal area distinctly areolated, sometimes incompletely confluent with 1st lateral areas, with very sparse hairs, the posterior margin wide, not pointed, straight; 2nd lateral area completely confluent with 2nd pleural area, smooth and without hairs; petiolar area confluent with 3rd lateral area, with strong, transverse or oblique striae; areola narrow, weakly convergent posteriorly, 1.9-2.3 times as long as wide at costula; anterior margin of areola straight to weakly arched; 2nd pleural area with sparse hairs. Wings (Figs. 23 and 32) with areolet absent; portion of cubitus between intercubitus and 2nd recurrent vein 1.0-1.2 times as long as intercubitus; nervulus postfurcal by $1/4-1/3$ of its own length; 3rd abscissa of discoideus vertical to weakly reclivous, $2/3-5/6$ as long as the 2nd, sometimes a little longer than the 2nd; nervellus almost straight, strongly reclivous, intercepted at lower $2/9-2/7$; discoidiella almost straight, reaching nearly to hind edge of hind wing. Hind femur slender, 6.2-6.5 times as long as wide in lateral view; basitarsus of hind leg 2.1-2.4 times as long as 2nd segment of hind tarsus and about $8/9$ as long as the 2nd and following segments together except claws; all tarsal claws more weakly pectinate than in *carinatus*. Abdomen with 1st tergite slender, polished, impunctate, 4.9-5.2 times as long as width of postpetiole; glymma distinct (Fig. 4); 2nd tergite strongly mat, 1.1-1.2 times as long as 1st tergite and 2.0-2.1 times as long as the 3rd one; 3rd tergite weakly mat; 1st sternite with a weak subbasal median convexity (Fig. 4). Ovipositor sheath 1.3-1.5 times as long as 1st tergite.

Black. Mandible yellowish brown, the apical teeth being reddish brown; clypeus blackish basally, yellowish brown apically; palpi pale-yellow; scape pale-yellow, fuscous brown basodorsally; pedicel pale-yellow, with a sublateral fuscous stripe; basal 3 or 4 segments of flagellum pale-yellow ventrally; flagellum except for basal 3 or 4 segments

infusate, the basal 10th to 13th or 14th segments white. Tegula dirty yellowish brown. Front leg with coxa and trochanter pale-yellow; femur, tibia and tarsus except for last segment, yellowish brown; last segment of tarsus and tarsal claws infusate. Middle leg with coxa and trochanter pale-yellowish brown to dark brown; last tarsal segment and tarsal claws infusate. Hind leg yellowish to dark brown, paler basoventrally, the apex being light yellowish brown; 1st trochanter pale-yellow, a little darker dorsally; 2nd trochanter fuscous on inner and outer sides, yellowish brown on dorsal and ventral sides; femur dark reddish brown; tibia dark reddish brown, with a indistinct yellowish brown basal band; tarsus except for infusate last segment, yellowish brown to dark brown, the both ends of each segment paler. Abdomen with 1st tergite tinged with yellowish brown on basal 1/2, blackish on apical 1/2; 2nd tergite light reddish brown on about basal 1/2, blackish on about apical 1/2, sometimes almost entirely blackish; 3rd tergite blackish, light reddish brown to yellowish brown basolaterally; extreme apex of 1st to 3rd tergites tinged with yellowish brown; 4th and 5th tergites black; 7th tergite dark brown to black, the apex being pale-yellow to light yellowish brown; ovipositor sheath infusate, a little darker apically. Wings hyaline.

Length: Body 6.5-7.5 mm., forewing 4.2-4.5 mm.

♂. Agrees with the above-mentioned description of the female, except in following aspects:—

Face wide, 3.3-3.5 times as high as wide at level of clypeal foveae (Fig. 1); inter-antennal groove long and deep; clypeus rather wide, 1.9-2.1 times as wide as high, with large and scattered punctures (Fig. 1); temple 4/9 as long as eye in lateral view; lower apical tooth of mandible a little longer than the upper one. Antennae with 33 segments; 1st flagellar segment 6.5-6.7 times as long as wide at apex; 2nd flagellar segment 4/5-7/8 as long as 1st flagellar segment. Mesoscutum subpolished, weakly and rather densely punctate on anterior 1/2, impunctate on posterior 1/2; lateral carina of scutellum very weak, present on about basal 1/3; mesopleum with weak, regularly spaced punctures, the punctures a little sparser anterodorsally; mesosternum with weak and regularly spaced punctures; sternaulus strongly impressed, reaching to the posterior margin of mesopleurum; metapleurum with a few vertical rugae. Propodeum with areola incompletely confluent with 2nd lateral area. Nervulus interstitial; nervellus slightly curved, intercepted at lower 1/3. Hind femur comparatively stout, about 5.5 times as long as wide in lateral view; all tarsal claws larger and more strongly pectinate than in female. First tergite 5.4-5.7 times as long as width of postpetiole; glymma present as a shallow longitudinal groove. Antennae without a median white band. Legs a little paler than in female, hind coxa and tarsus light yellowish brown; 2nd tergite entirely blackish; 3rd tergite entirely yellowish brown; 4th tergite more widely yellowish brown; 5th and following tergites black.

Holotype (♀): Lienhuachih, 500-550 m, Nantou Hsien, 28-iv-1981, K. Ôhara, leg. Paratypes: 2♂♂ and 2♀♀, data same as the holotype; 1♀, Lienhuachih, 500-550 m, Nantou Hsien, 28-iv-1981, H. Takemoto leg.

Host: Unknown.

Distribution: Formosa.

This species is closely related to the preceding species, *C. (C.) hemierythros*, sp. nov.,

in that its 2nd lateral area of propodeum is confluent with 2nd pleural area, the comparatively slender hind femur, the comparatively short ovipositor and dark yellowish brown clypeus, but it can be readily distinguished by the postfurcal nervellus, the pronotum without striae, and the colouration of thorax, etc. as mentioned in the key.

The following species described from Formosa seems to be referable to the subgenus *Chriodes*. However, I have no knowledge of this species except from the original description. It is excluded from the present key.

4. *Chriodes (Chriodes) koshunensis* (Uchida)

Hemiteles (Prosopostenus) koshunensis Uchida, Jour. Fac. Agr. Hokkaido Imp. Univ. 33: 184, 1932. Type (♂): preserved in the Friedrichshagen Museum.

Chriodes (Chriodes) koshunensis: Townes, Townes and Gupta, Mem. Amer. Ent. Inst. 1: 219, 1961.

The original description reads as follows: —

"♂ Kopf glatt, stark glanzend, nach hinten verengt; Leiste des Hinterkopfes nicht gebrochen; Ocellen klein; Stirn und Fühlergruben eingedrückt; Gesicht nach unten deutlich verschmälert; Clypeus klein, vorn zugerundet. Antennen schlank, fast von Körperlänge. Mesonotum glatt, mit tiefen Parapsiden; Schildchen seitlich bis zur Mitte gerandet; Mesopleuren zerstreut punktiert; Propodeum lang, mit 2 Querleisten; Area superomedia und Area basalis undeutlich. Hinterleib gegen das Ende zu schwach zusammengedrückt. Beine schlank und lang, die Hintertrochantern so lang wie der Metatarsus. Flügel hyalin; Stigma schmal; Areola aussen offen; Nervulus interstitial; Nervellus unter der Mitte gebrochen.

"Schwarz und glanzend. Fühler an der Basis und der Schaft gelbbraun. Mesothorax unten und Propodeum rotlichbraun. Beine gelbrot, die vordersten mehr gelb. Hinterleib gelbbraun mit schwarzem Ende. Körperlänge: 6 mm.

"Fundort: Koshun (3♂, am 22. IV. 1912)"

Distribution: Formosa.

Subgenus *Klutiana*

Klutiana Betrem, Tijdschr. v. Ent. 75: 89, 1933. [Type-species: *Klutiana compersa* Betrem].

Mavandiella Seyrig, Mem. Mus. d'Hist. Nat. Paris (n. s.) 4: 9, 1935. [Type-species: *Mavandiella hemitelina* Seyrig].

This subgenus is characterized by the following aspects: —

Maxillary palpus with 4 or 5 segments; clypeus weakly to strongly convex, the apical margin usually broadly truncate (Figs. 12, 13 and 15), sometimes produced (Fig. 14). Sternaulus usually present for the whole length of mesopleurum, sometimes present on basal 1/3. Scutellum not carinate laterally, sometimes carinate at extreme base, or strongly and entirely carinate. All tarsal claws usually simple, sometimes weakly pectinate. Nervellus straight to weakly curved, weakly to strongly reclivous, not intercepted (Figs. 33-37); 3rd abscissa of discoideus longer than the 2nd which is sometimes very short, or absent (Figs. 24-29); discoidiella absent (Figs. 33-37). Glymma usually absent, or weakly impressed; ovipositor compressed to subcylindrical (Fig. 10).

This subgenus is widely distributed in the Old World tropics and Japan, being

represented by the three species: *Chriodes* (*Klutiana*) *jezoensis* Uchida, 1957, C. (K.) *pentagonus* Momoi, 1970, of Japan and C. (K.) *compressus* Betrem, 1933, of Java. In the course of the present investigation I have found three species in Formosa and three in Japan, of which three are new to science and one is new to Formosa. The Formosan and Japanese species can be distinguished by the following key: —

Key to the Formosan and Japanese species of *Klutiana*

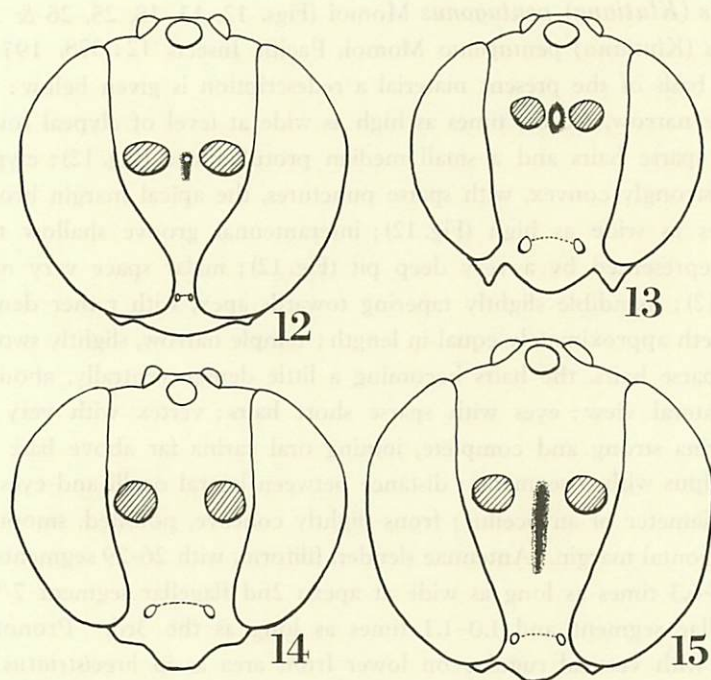
- (Female of *takemotoi*, and males of *rubens*, *jezoensis* and *brevistriatus* are unknown.)
1. Female..... 2
 - Male..... 5
 2. Scutellum strongly and entirely carinate laterally. Nervellus weakly reclivous (Fig. 33). Clypeus weakly convex, the apical margin strongly produced (Fig. 14). Thorax and 1st tergite light reddish brown. Formosa..... 3. *rubens*, sp. nov.
 - Scutellum not carinate laterally, sometimes weakly carinate at extreme base. Nervellus strongly reclivous (Figs. 34-37). Clypeus strongly convex, the apical margin broadly truncate, not produced (Figs. 12, 13 and 15). Thorax and 1st tergite black..... 3
 3. Sternaulus short and strong, extending basal 1/3. Maxillary palpus with 4 segments. Ovipositor sheath long, 2.0 times as long as 1st tergite. Flagellum weakly clavate, the 8th-11th segments white. Japan..... 4. *brevistriatus*, sp. nov.
 - Sternaulus distinct, reaching to the posterior margin of mesopleurum. Maxillary palpus with 5 segments. Ovipositor sheath short, 1.5-1.7 times as long as 1st tergite. Flagellum filiform, the 9th or 10th-13th segments white..... 4
 4. Propodeum (Fig. 18) with 2nd pleural area separated from 2nd lateral area by a strong carina, more or less trans-striate. Mesopleurum weakly to strongly punctate on lower half, the punctures denser anteriorly, with an oblique groove just below speculum, the groove vertically striate throughout; metapleurum vertically rugulose. Formosa and Japan..... 1. *pentagonus* Momoi
 - Propodeum (Fig. 16) with 2nd pleural area confluent with 2nd lateral area, not rugulose. Mesopleurum finely punctate or mat on lower half, with a oblique groove just below speculum, the groove vertically striate on anterior half, bare on posterior half; metapleurum entirely mat. Japan. 2. *jezoensis* Uchida
 5. Propodeum (Fig. 17) with 2nd pleural area confluent with 2nd lateral area, weakly rugulose; areola incompletely confluent with 2nd lateral area. Interantennal groove long and deep. Third abscissa of discoideus about 1.1 times as long as the 2nd (Fig. 29). Second tergite mat, with dense hairs. Tarsal claws pectinate. Formosa. 5. *takemotoi*, sp. nov.
 - Propodeum completely areolated (Fig. 18); 2nd pleural area weakly rugulose. Interantennal groove usually short and shallow, sometimes strongly deepened as a pit. Third abscissa of discoideus 3.4-11.0 times as long as the 2nd which is sometimes absent (Figs. 25 and 26). Second tergite polished, with very sparse hairs. Tarsal claws simple. Formosa and Japan..... 1. *pentagonus* Momoi

1. *Chriodes (Klutiana) pentagonus* Momoi (Figs. 12, 13, 18, 25, 26 & 35)

Chriodes (Klutiana) pentagonus Momoi, Pacific Insects 12: 378, 1970.

On the basis of the present material a redescription is given below: —

♀. Face narrow, 6.0-6.4 times as high as wide at level of clypeal foveae, polished, with rather sparse hairs and a small median protuberance (Fig. 12); clypeus polished, moderately strongly convex, with sparse punctures, the apical margin broadly truncate, 2.8-3.2 times as wide as high (Fig. 12); interantennal groove shallow to very deep, sometimes represented by a very deep pit (Fig. 12); malar space very narrow, almost linear (Fig. 12); mandible slightly tapering towards apex, with rather dense long hairs, the apical teeth approximately equal in length; temple narrow, slightly swollen, polished, with very sparse hairs, the hairs becoming a little denser ventrally, about 1/4 as long as eye in lateral view; eyes with sparse short hairs; vertex with very sparse hairs; occipital carina strong and complete, joining oral carina far above base of mandible; maxillary palpus with 5 segments; distance between lateral ocelli and eyes 1.0-1.1 times as long as diameter of an ocellus; frons slightly concave, polished, smooth, with a few hairs along frontal margin. Antennae slender, filiform, with 26-29 segments; 1st flagellar segment 5.6-6.3 times as long as wide at apex; 2nd flagellar segment 7/9-6/7 as long as 1st flagellar segment and 1.0-1.1 times as long as the 3rd. Pronotum polished, impunctate, with vertical rugulae on lower front area as in *brevistriatus*; mesoscutum polished, impunctate, with very sparse short hairs; notaulus strongly impressed with weak and short trans-striae, reaching basal 4/5-6/7; scutellum moderately strongly convex, with very sparse, short hairs, without lateral carina; mesopleurum sparsely to densely punctate on lower 1/3, the punctures becoming denser anteriorly, with an obliquely striate groove just below speculum; speculum weakly convex, polished and smooth; prepectal carina strong, reaching to anterior ridge of mesopleurum; sternaulus strong, reaching to posterior margin of mesopleurum; mesosternum finely and densely punctate; metapleurum vertically rugulose. Propodeum (Fig. 18) polished, completely areolated, with very sparse hairs; 2nd pleural area, sometimes 2nd lateral area transversely striate; areola weakly convergent posteriorly, 1.3-1.6 times as long as wide at costula, usually pointed above, sometimes strongly arched above, more or less trans-striate, rarely smooth; petiolar and 3rd lateral areas transversely or obliquely rugose; median basal area usually pointed on hind margin, the median longitudinal carina not always reaching to anterior margin of the propodeum. Wings (Figs. 25, 26 and 35) with areolet absent; nervulus usually interstitial, sometimes postfurcal by 1/4 of its own length; portion of cubitus between intercubitus and 2nd recurrent vein 0.9-1.2 times as long as intercubitus; 3rd abscissa of discoideus vertical, 3.7-11.5 times as long as the 2nd which is sometimes very short or absent, so that 2nd discoidal cell pointed basally; nervellus straight, strongly reclivous, not intercepted; discoidella and brachiella absent; mediella rather strongly curved near nervellus. Hind femur 5.7-6.1 times as long as wide in lateral view; basitarsus of hind leg 2.0-2.2 times as long as 2nd hind tarsal segment and 4/5-7/8 as long as the 2nd and following segments together except claws; all tarsal claws simple. Abdomen with 1st tergite slender, polished, impunctate, with sparse hairs on lateral side of postpetiole, 4.3-4.6 times as long as wide of postpetiole; 2nd tergite polished, faintly and longitudinally striate, with sparse hairs laterally, about



Figs.12-15. Heads in frontal view: 12, *Chriodes (Klutiana) pentagonus* Momoi, female; 13, *C. (K.) pentagonus* Momoi, male; 14, *C. (K.) rubens*, sp. nov., female; 15, *C. (K.) takemotoi*, sp. nov., male.

1.1 times as long as 1st tergite and 1.9-2.1 times as long as the 3rd one; glymma absent, sometimes represented by a narrow and inconspicuous vestige; 3rd and following tergites subpolished, with dense hairs. Ovipositor compressed; ovipositor sheath 1.5-1.7 times as long as 1st tergite.

Black. Palpi pale-yellow; mandible yellowish brown, dark brown to black basally, the apical teeth dark reddish brown; scape, pedicel and basal 3 segments of flagellum light yellowish brown; flagellum dark brown to blackish, paler basally, the 9th or 10th to 13th segments white, sometimes the apical 1/2 of the 13th segment infuscate. Tegula dirty yellowish brown, darker basally. Front and middle legs with coxae and trochanters pale to pale-yellow; femora, tibiae and tarsi light yellowish brown; last segments of tarsi infuscate. Hind leg with coxa dark brown to black, paler apically; 1st trochanter pale; 2nd trochanter, femur, tibia and tarsus dark reddish brown to infuscate. Abdomen black; 3rd tergite light yellowish brown, darker posteriorly, sometimes almost entirely light yellowish brown; 7th and following tergites white to light fulvous; ovipositor sheath infuscate. Wings subhyaline.

♂. Agrees with the female except for the following aspects: —

Face (Fig. 13) wide, 1.1-1.2 times as high as wide at level of clypeal foveae, very finely and rather sparsely punctate; clypeus (Fig. 13) wide, 2.5-2.9 times as wide as high, with sparse large punctures; malar space (Fig. 13) wide, 1/3-3/8 as long as basal width of mandible; distance between lateral ocelli and eyes 1.1-1.3 times as long as

diameter of an ocellus; temple wide, weakly swollen, $4/9$ - $5/9$ as long as eye in lateral view; interantennal groove rather deep. Antennae more slender, with 29-32 segments; 1st flagellar segment 6.2-6.9 times as long as wide at apex; flagellum without median white band. Oblique groove of mesopleurum sometimes not striate on posterior $1/2$.

Length: Body 4.4-5.2 mm., forewing 2.7-3.5 mm.

Specimens examined. Formosa: 1♂, Jihyetan, 750 m, Nantou Hsien (27-iv-1981, H. Takemoto). Japan: 5♀♀, Haguro-san, Yamagata-ken, Honshu (1-ix-1966, K. Kusigemati); 12♀♀, Haguro-san, Yamagata-ken (3-ix-1966, K. Kusigemati); 1♀, Hiei-zan, Kyoto-fu, Honshu (9-ix-1973, H. Takada); 11♀♀, Shimota, Kagoshima-shi, Kagoshima-ken, Kyushu (15-vi-1969, K. Kusigemati); 1♀, Shimota, Kagoshima-ken (9-xi-1969, K. Kusigemati); 1♂ & 53♀♀, Takakuma-yama, Kagoshima-ken (27-30-viii-1970, K. Kusigemati); 6♀♀, Jusantsukabaru, Kagoshima-ken (29-vi-1974, K. Kusigemati); 1♀, Toso, Kagoshima-shi, Kyushu (2-ix-1970, K. Kusigemati); 1♂ & 1♀, Toso, Kagoshima-shi (26-viii-1971, K. Kusigemati); 1♀, Ambo, Yaku-shima, Kyushu (31-v-1969, K. Kusigemati); 1♂ & 2♀♀, Ambo, Yaku-shima (7-vi-1969, K. Kusigemati); 1♂, Ambo, Yaku-shima (18-x-1971, K. Kusigemati); 1♂, Kosugidani, Yaku-shima (1-vi-1969, K. Kusigemati); 1♂, Miyanoura, Yaku-shima (15-x-1971, K. Kusigemati); 1♂ & 1♀, Miyanoura, Yaku-shima (15-xi-1971, K. Kusigemati); 1♂, Miyanoura, Yaku-shima (15-xi-1974, K. Hashimoto); 1♂, Miyanoura, Yaku-shima (4-vi-1975, K. Kusigemati); 1♂, Koseta, Yaku-shima (23-ix-1972, K. Kusigemati); 1♂, Shiratani, Yaku-shima (17-vi-1980, K. Kusigemati); 2♂♂, Amami-ôshima, Ryukyu Is. (25-iv- & 2-v-1959, K. Kamijo); 2♂♂ & 1♀, Amami-ôshima (8-10-v-1966, K. Kusigemati); 3♂♂, Yuwan-dake, Amami-ôshima (30-vi-1977, H. Takizawa); 1♂, Hedo, Okinawa-jima, Ryukyu Is. (5-iv-1979, K. Kusigemati); 1♂, Yona, Okinawa-jima (6-iv-1979, K. Kusigemati); 2♂♂, Okuma, Okinawa-jima (6-iv-1979, Y. Shôno); 2♂♂, Benoki, Okinawa-jima (7-iv-1979, K. Kusigemati); 1♂ & 1♀, Izumi, Okinawa-jima (29-vi-1982, K. Kusigemati); 2♂♂ & 3♀♀, Banna-dake, Ishigaki-jima, Ryukyu Is. (3-vii-1982, K. Kusigemati); 1♂, Iriomote-jima (30-iii-1971, N. Sakane); 1♂, Uehara, Iriomote-jima (5-vii-1982, K. Kusigemati); 5♂♂ & 1♀, Yonakuni-jima, Ryukyu Is. (5-iv-1971, N. Sakane).

Host: Unknown.

Distribution: Formosa and Japan (Honshu, Kyushu and Ryukyu Is.).

This species is new to Formosa. The present specimen agrees well enough with the original description and above redescription of *pentagonus*, but differs in having the following aspects: —

♂. Flagellum with 1st segment more slender, 7.6 times as long as wide at apex; 2nd flagellar segment $3/4$ as long as 1st flagellar one; nervulus interstitial; hind leg paler, in colouration similar to the northern form of Japan.

The hind leg of this species is variable in colouration. In general, specimens from northern localities (Honshu and Kyushu) are paler, with the coxa blackish basally, yellowish brown to pale-yellow apically, the trochanter, femur, tibia and tarsus yellowish brown to dark brown, while specimens from southern localities (Yaku-shima to Yonakuni-jima) are darker, with the coxa, 2nd trochanter, femur, tibia and tarsus infuscate to black, sometimes the 3rd tergite largely blackish. Furthermore, in some specimens from Yaku-shima, Amami-ôshima, Okinawa-jima and Ishigaki-jima, and all specimens

from Iriomote-jima and Yonakuni-jima the interantennal groove is a deep circular hole, especially in male, lateral margins of 1st tergite a little below the mid-height of the petiole on the petiolar part.

This species occurs from the northern part of Japan to the Ryukyu Archipelago and mountains of Formosa. Adults occur from early spring through the late fall, but are most common in June to September.

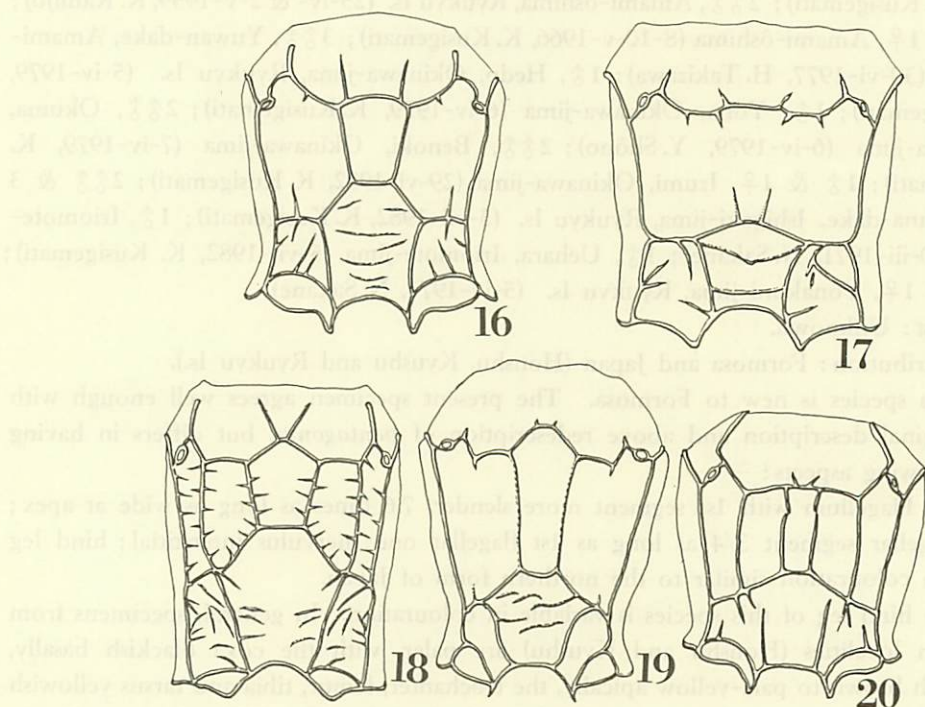
2. *Chriodes* (*Klutiana*) *jezoensis* Uchida (Figs. 16, 27 & 34)

Chriodes (*Mavandiella*) *jezoensis* Uchida, Ins. Mats. 21: 41, 1957.

Chriodes (*Klutiana*) *jezoensis*: Townes, Momoi and Townes, Mem. Amer. Ent. Inst. 5: 270, 1965.

On the basis of the present material a redescription is given below: —

♀. Face narrow, 4.5-5.0 times as high as wide at level of clypeal foveae, almost flat, polished, with rather sparse short hairs and an indistinct small median protuberance; clypeus polished, rather strongly convex, sparsely punctate, the apical margin broadly truncate, 2.2-2.4 times as wide as high; interantennal groove very shallow; malar space narrow, almost linear; mandible slightly tapering towards apex, with rather sparse long hairs, the lower tooth a little shorter than the upper one; temple polished, narrow, slightly swollen, about 1/4 as long as eye in lateral view, very sparsely haired, the hairs becoming sparser dorsally; eyes with sparse short hairs; occipital carina strong



Figs. 16-20. Propodea in dorsal view: 16, *Chriodes* (*Klutiana*) *jezoensis* Uchida, female; 17, *C. (K.) takemotoi*, sp. nov., male; 18, *C. (K.) pentagonus* Momoi, female; 19, *C. (K.) brevistriatus*, sp. nov., female; 20, *C. (K.) rubens*, sp. nov., female.

and complete, the lower end joining oral carina near base of mandible; frons polished, smooth, weakly concave medially, slightly convex dorsally, with a few hairs along frontal margin; vertex with very sparse hairs; maxillary palpus with 5 segments; antennae slender, filiform, with 29 or 30 segments; 1st flagellar segment 6.9-7.2 times as long as wide at apex; 2nd flagellar segment $7/9-4/5$ as long as 2nd flagellar segment and 1.1-1.2 times as long as the 3rd one. Pronotum polished, impunctate, vertically rugulose on anterior $1/3$; mesoscutum polished, impunctate; median lobe of mesoscutum with very sparse hairs on anterior half, bare on posterior half; lateral lobes of mesoscutum with very sparse hairs laterally and posteriorly, bare medially; notaulus weak but distinct, reaching to basal $5/7$; scutellum weakly swollen, with short and scattered hairs, the lateral carina absent; mesopleurum weakly to strongly mat on lower $1/2$, with a long groove just below speculum, the groove vertically striate on anterior half, smooth on posterior half, with a wide striate area just below subtegular ridge; sternaulus shallowly impressed, reaching to the posterior margin of mesopleurum; prepectal carina strong, reaching to anterior ridge of mesopleurum; mesosternum weakly mat; metapleurum weakly to strongly mat, the mat becoming stronger posteriorly. Propodeum (Fig. 16) polished, almost entirely smooth, with very sparse hairs; 2nd pleural area incompletely confluent with 2nd lateral area; areola weakly convergent posteriorly, 1.3-1.6 times as long as wide at costula, almost straight or slightly arched above; median basal area wide and not pointed on posterior margin, the median longitudinal carina not reaching to anterior margin of propodeum; petiolar area obliquely striate. Wings (Figs. 27 and 34) with areolet absent; nervulus usually interstitial, rarely antefurcal; portion of cubitus between intercubitus and 2nd recurrent vein 1.0-1.3 times as long as intercubitus; 3rd abscissa of discoideus vertical, 2.7-4.6 times as long as the 2nd; nervellus weakly curved, rather strongly reclivous; mediella rather strongly curved near nervellus; discoidiella absent. Legs with hind femur 5.7-5.9 times as long as wide in lateral view; basitarsus of hind leg 2.2-2.4 times as long as 2nd hind tarsal segment and $5/6-8/9$ as long as the 2nd and following segments together except claws; all tarsal claws simple. Abdomen with 1st tergite slender, polished, smooth, with sparse hairs on lateral side of postpetiole, 4.4-4.5 times as long as width of postpetiole; glymma absent; 2nd tergite subpolished, very finely and longitudinally striate, with sparse hairs along lateral margin, 1.1-1.2 times as long as 1st tergite and 1.8-2.1 times as long as the 3rd one; 3rd and following tergites subpolished, with short dense hairs. Ovipositor moderately compressed; ovipositor sheath 1.5-1.7 times as long as 1st tergite.

Black. Mouth parts pale-yellow to yellowish brown, the mandibular teeth reddish brown; scape, pedicel and basal 2 segments of flagellum yellowish brown; flagellum except for basal 2 segments yellowish brown to blackish, paler basally, the 10th to 13th or 14th segments being white, sometimes apical $1/2$ of 13th segment infusate. Tegula yellowish brown, a little darker basally. Front and middle legs with coxae and trochanters pale-yellow to yellowish brown; femora, tibiae and tarsi light yellowish brown, the last segments of tarsi infusate. Hind leg with coxa blackish basally, yellowish brown apically; 1st trochanter pale; 2nd trochanter dark brown to black, a little paler ventrally; femur dark reddish brown, darker apically; tibia dark reddish brown,

infusate apically and subbasally, with an indistinct yellowish brown basal band; tarsus infusate. Abdomen black; extreme apex of 1st and 2nd tergites weakly tinged with yellowish brown; 3rd tergite yellowish brown, darker posteriorly; 7th and following tergites white to light fulvous; ovipositor sheath blackish. Wings subhyaline.

Length: Body 4.7-5.9 mm., forewing 3.4-3.7 mm.

♂. Unknown.

Specimens examined: 1♀, Sapporo, Hokkaido, 2-ix-1965, K. Kusigemati leg.; 4♀♀, 19-viii- & 15-ix-1977, 1♀, 14-viii-1968, Shimamatsu, Hokkaido, K. Kusigemati leg.; 1♀, 1-ix-1966, Haguro-san, Yamagata-ken, Honshu, K. Kusigemati leg.

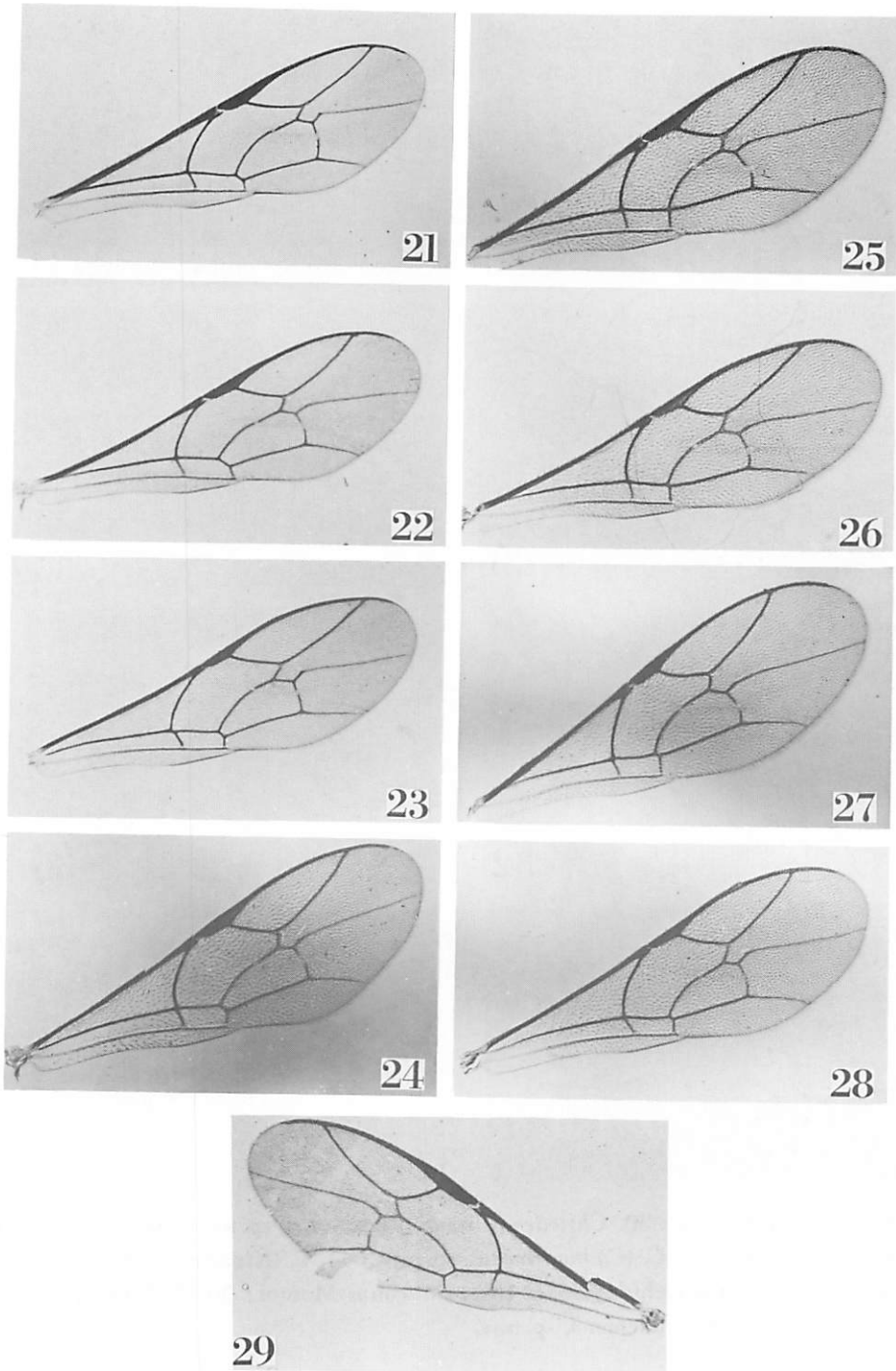
Host: Unknown.

Distribution: Japan (Hokkaido and Honshu).

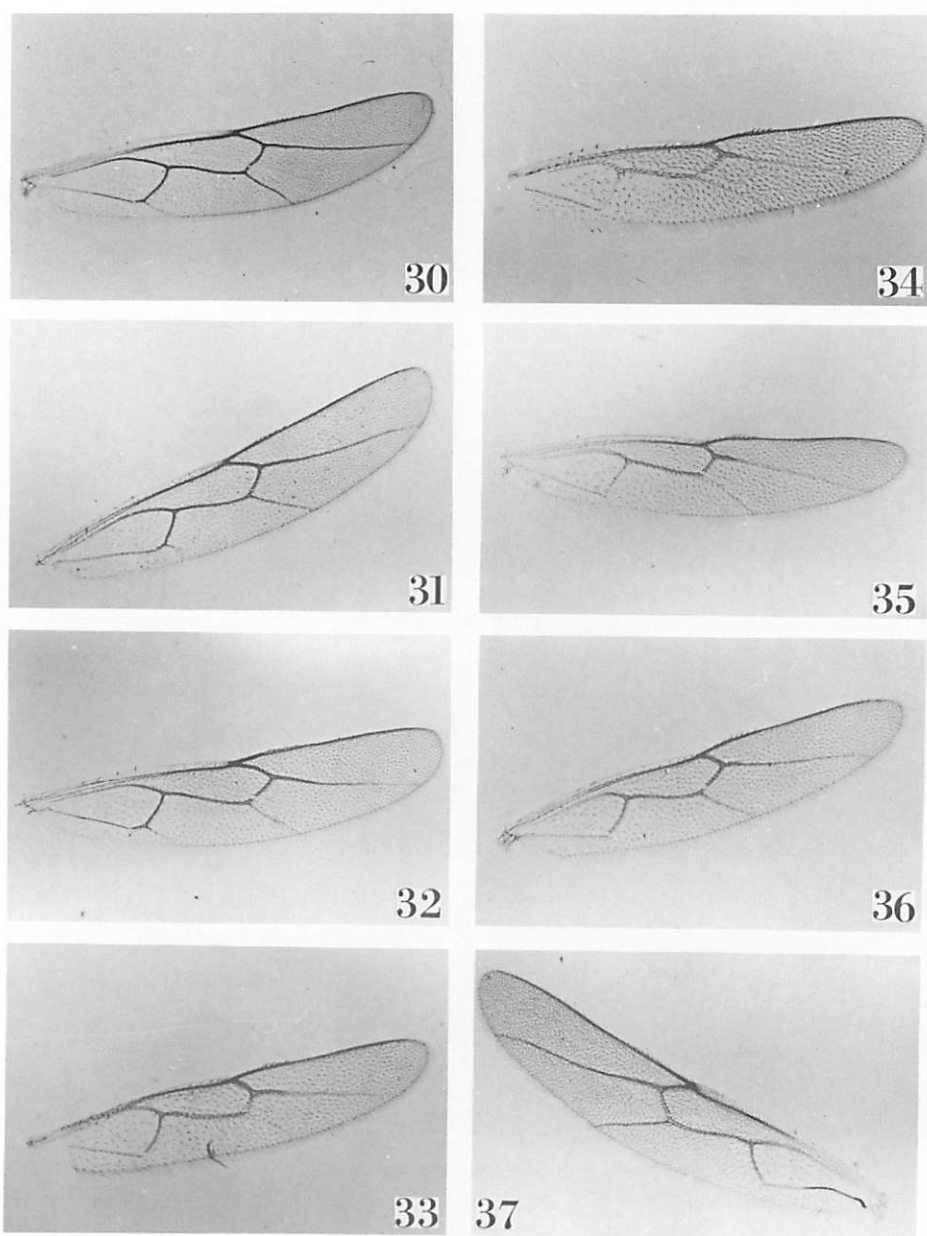
This species is found in northern Japan. Adults occur in late summer to fall.

3. *Chriodes (Klutiana) rubens*, sp. nov. (Figs. 14, 20, 24 & 33)

♀. Face wide, about 1.3 times as high as wide at level of clypeal foveae, weakly convex, weakly mat, with rather sparse short hairs (Fig. 14); clypeus polished, very finely trans-rugulose, about 1.6 times as wide as high, without hairs and punctures, the apical margin thin, rather strongly produced (Fig. 14); malar space wide, 5/9 as long as basal width of mandible (Fig. 14); mandible strongly tapering towards apex, with a few hairs, the lower tooth being clearly longer than the upper one; temple narrow, 1/4 as long as eye in lateral view, weakly swollen, polished, impunctate and with a few hairs; occipital carina weak and complete, the lower end joining oral carina near base of mandible; frons slightly convex, very finely mat, with a few hairs along frontal margin; inter-antennal groove obsolete; distance between lateral ocelli and eyes 4/5 as long as diameter of an ocellus. Antennae slender, filiform, with 30 segments; 1st flagellar segment 7.6 times as long as wide at apex; 2nd flagellar segment 5/7 as long as 1st flagellar segment and about as long as the 3rd one. Propodeum polished, impunctate, with short longitudinal striae along hind margin; mesoscutum subpolished, almost entirely transversely rugulose, the posterior part being longitudinally and very finely rugulose; notaulus strongly impressed, reaching to basal 5/7; scutellum rather strongly convex, with a few short hairs and strong lateral carinae; mesopleurum weakly and sparsely punctate, the punctures becoming weaker and sparser posteriorly, with a wide striate area just below of speculum; speculum weakly convex, polished and impunctate; sternaulus distinct, reaching to posterior margin of mesopleurum and weakly curved; mesosternum mat; metapleurum weakly convex, finely and rather sparsely punctate. Propodeum (Fig. 20) polished, impunctate, with very sparse hairs; median basal area incompletely fused with 1st lateral area; areola very narrow, almost parallel-sided, 2.6 times as long as wide at costula, straight above; propodeal spiracle small and elliptic. Wings (Figs. 24 and 33) with nervulus interstitial; portion of cubitus between intercubitus and 2nd recurrent vein 1.1 times as long as intercubitus; 3rd abscissa of discoideus vertical, about 1.3 times as long as the 2nd; nervellus weakly curved, weakly reclivous, not intercepted; discoidiella absent. Abdomen with 1st tergite stout, 4.7 times as long as width of postpetiole, polished and impunctate; postpetiole with a few hairs laterally; 2nd tergite weakly mat, about 1.2 times as long as 1st tergite and 2.1 times as long as the 3rd one; glymma



Figs. 21-29. Forewings: 21, *Chriodes* (*Chriodes*) *carinatus*, sp. nov.; 22, *C. (C.) hemierythros*, sp. nov.; 23, *C. (C.) incarinatus*, sp. nov.; 24, *C. (Klutiana)* *rubens*, sp. nov.; 25 and 26, *C. (K.) pentagonus* Momoi; 27, *C. (K.) jezoensis* Uchida; 28, *C. (K.) brevistriatus*, sp. nov.; 29, *C. (K.) takemotoi*, sp. nov.



Figs. 30-37. Hind wings: 30, *Chriodes (Chriodes) carinatus*, sp. nov.; 31, *C. (C.) hemierythros*, sp. nov.; 32, *C. (C.) incarinatus*, sp. nov.; 33, *C. (Klutiana) rubens*, sp. nov.; 34, *C. (K.) jezoensis* Uchida; 35, *C. (K.) pentagonus* Momoi; 36, *C. (K.) brevistriatus*, sp. nov.; 37, *C. (K.) takemotoi*, sp. nov.

deeply impressed. Hind femur slender, 6.6 times as long as wide in lateral view; basitarsus of hind leg 1.9 times as long as 2nd segment of hind tarsus and $7/9$ as long as the 2nd to 5th segments together except claws; all tarsal claws simple. Ovipositor short, compressed; ovipositor sheath about 1.0 times as long as 1st tergite.

Light reddish brown. Head black; palpi pale; mandible light yellowish brown, the apical teeth reddish brown; clypeus weakly tinged with yellowish brown; scape and pedicel pale-yellow, a little darker dorsally; flagellum except for basal 3 segments infusate, paler basally; basal 3 segments of flagellum pale-yellow to dark brown, paler basally; 9th to 12th flagellar segments white. Thorax light reddish brown. Front and middle legs pale-yellow to light yellowish brown; last segments of tarsi dark brown. Hind leg with coxa yellowish brown, a little darker dorsoapically; 1st trochanter yellowish brown; 2nd trochanter yellowish brown dorsally and ventrally, dark brown laterally; femur light reddish brown, a little darker apically; tibia and tarsus dark brown. First tergite light reddish brown; 2nd tergite yellowish brown on basal $2/3$, blackish on apical $1/3$, with a narrow apical yellowish brown band; 3rd tergite yellowish brown, a little darker dorsally; 4th to 6th tergites blackish, weakly tinged with yellowish brown on lateral side; 7th tergite dark brown; apical part of 7th and 8th tergites light yellowish brown. Ovipositor sheath infusate. Wings hyaline.

Length: Body 5.0 mm., forewing 3.5 mm.

Holotype (♀): Jihyetan, 750 m, Nantou Hsien, 27-iv-1981, H. Takemoto leg.

Host: Unknown.

Distribution: Formosa.

This species is readily distinguished from any other consubgeneric Formosan and Japanese species by the wide malar space and face, the weakly reclivous nervellus, the strongly produced clypeus, the strongly and entirely carinate scutellum laterally, the very narrow and almost parallel-sided areola and the ferrugineous thorax, propodeum and 1st tergite.

4. *Chriodes (Klutiana) brevistriatus*, sp. nov. (Figs. 10, 19, 28 & 36)

♀. Face 4.3-4.6 times as high as wide at level of clypeal foveae, weakly convex, weakly mat, with an indistinct, small median protuberance; clypeus small, 2.1-2.2 times as wide as high, weakly mat, with long sparse hairs, the apical margin broadly truncate, slightly concave medially; interantennal groove very shallow and short; malar space very narrow, almost linear; temple polished, slightly swollen, narrow, about $2/7$ as long as eye in lateral view, with scattered hairs, the hairs becoming denser ventrally and dorsally; occipital carina strong and complete, the lower end joining near base of mandible; eyes with short sparse hairs; maxillary palpus with 4 segments; frons polished, weakly concave ventrally, slightly convex dorsally, with sparse hairs along frontal margin; distance between lateral ocelli and eyes about 1.1 times as long as diameter of an ocellus; mandible weakly tapering towards apex, with rather long sparse hairs, the apical teeth approximately equal in length. Antennae slender, weakly clavate, with 27 or 28 segments; 1st flagellar segment 6.4-6.5 times as long as wide at apex; 2nd flagellar segment $5/7$ - $4/5$ as long as 1st flagellar segment and about 1.1 times as long as the 3rd one. Pronotum polished, impunctate; mesopleurum polished, smooth, with

very scattered hairs; notaulus strongly impressed, reaching to basal $4/5$ - $5/6$; mesopleurum polished, very finely and rather sparsely punctate on lower $1/2$, with an oblique groove just below speculum, the groove vertically striate throughout, and with a wide impunctate area behind prepectal carina; speculum weakly swollen, polished, smooth; sternaulus strong, extending to about basal $1/3$; prepectal carina strong, reaching to anterior margin of mesopleurum; mesosternum weakly mat; scutellum moderately strongly convex, polished, with very sparse and short hairs, without lateral carinae; metapleurum weakly convex, slightly mat, subpolished. Propodeum (Fig. 19) polished, very sparsely haired, weakly areolated; 2nd pleural area incompletely confluent with 2nd lateral area, polished, impunctate, without rugae; areola weakly convergent posteriorly, smooth, pentagonal, pointed above, about 1.8 times as long as wide at costula; petiolar area weakly and transversely striate; 3rd lateral area distinct, smooth; median basal area small, incompletely fused with 1st lateral areas. Wings (Figs. 28 and 36) with areolet absent; nervulus postfurcal by $1/4$ - $2/7$ of its own length; portion of cubitus between intercubitus and 2nd recurrent vein $5/8$ - $6/7$ as long as intercubitus; 3rd abscissa of discoideus vertical to weakly reclivous, 2.3-3.0 times as long as the 2nd; nervellus almost straight, rather strongly reclivous, not intercepted; mediella rather strongly curved at near nervellus; discoidiella and brachiella absent. Hind femur slender, 5.5-5.8 times as long as wide in lateral view; basitarsus of hind leg 2.1-2.3 times as long as 2nd hind tarsal segment and $5/6$ as long as the 2nd and following segments together except claws; front and middle tarsal claws weakly pectinate; hind tarsal claws strongly pectinate. Abdomen with 1st tergite slender, polished, smooth, with sparse hairs along lateral margin of postpetiole, 4.7-5.3 times as long as width of postpetiole; glymma small but distinct; 2nd tergite strongly mat, 1.0-1.1 times as long as 1st tergite and 2.1-2.2 times as long as the 3rd one; 3rd and following tergites subpolished, with short dense hairs. Ovipositor long, subcylindrical (Fig. 10); ovipositor sheath long, about 2.0 times as long as 1st tergite.

Black. Mouth parts light yellowish brown, the apical teeth and 1st segment of maxillary palpus dark brown; scape, pedicel and basal 2 segments of flagellum light yellowish brown; flagellum except for basal 2 segments blackish, paler basally, the 8th to 11th segments being white. Tegula dirty yellowish brown. Front and middle legs with coxae and trochanters pale-yellow; femora, tibiae and tarsi light yellowish brown, the last segments of tarsi dark brown, the apex of femora and tibiae, base of tibiae, apex of 1st to 4th tarsal segments and last segments a little darker. Hind leg with coxa and trochanter light yellowish brown; 2nd trochanter dark brown, paler ventrally; femur light reddish brown, dark brown at apex; tibia yellowish brown, dark brown at both ends; tarsus yellowish brown, apex of 1st to 4th segments and last one dark brown. Abdomen black; 2nd tergite blackish, slightly tinged with yellowish brown laterally; 3rd tergite yellowish brown, infusate posteriorly; 4th tergite sometimes weakly tinged with yellowish brown basally; extreme apex of 1st and 2nd tergites usually tinged with yellowish brown; 7th tergite blackish on basal $1/2$, white on apical $1/2$; ovipositor sheath infusate. Wings subhyaline.

Length: Body 5.0-5.2 mm., forewing 3.0-3.3 mm.

♂. Unknown.

Holotype (♀): Takakuma-yama, Kagoshima-ken, Kyushu, 30-viii-1970, K. Kusigemati leg. Paratype: 1♀, Haguro-san, Yamagata-ken, Honshu, 1-ix-1966, K. Kusigemati leg.

This species is extremely closely allied to the preceding species, *C. (K.) jezoensis* Uchida. It differs from the latter in having a short sternaulus, a long ovipositor, a maxillary palpus with 4 segments and a pectinate tarsal claws.

5. *Chriodes (Klutiana) takemotoi*, sp. nov. (Fig. 15, 17, 29 & 37)

♂. Face 2.0 times as high as wide at level of clypeal foveae, weakly convex, finely and densely punctate, without a median protuberance (Fig. 15); clypeus small, strongly convex, about 1.5 times as wide as high, subpolished, with rather sparse long hairs, the apical margin broadly convex (Fig. 15); malar space narrow, about 1/8 as long as basal width of mandible (Fig. 15); interantennal groove rather deep and long (Fig. 15); temple comparatively wide, about 2/5 as long as eye in lateral view, slightly swollen, polished, almost bare on dorsal 1/2, sparsely haired on ventral 1/2; vertex polished, with a few short hairs; frons polished, slightly convex, with very sparse hairs; occipital carina strong and complete, the lower end joining oral carina near base of mandible; eye with short and scattered hairs; distance between lateral ocelli and eyes about 1.2 times as long as diameter of an ocellus; mandible moderately strongly tapering towards apex, with rather dense hairs, the lower apical tooth clearly longer than the upper one. Antennae slender, long, filiform, with 29 segments; 1st flagellar segment 8.3 times as long as wide at apex; 2nd flagellar segment 5/7 as long as 1st flagellar segment and about 1.1 times as long as the 3rd one. Pronotum polished, impunctate and smooth, with short trans-striae along hind margin; mesoscutum polished; median lobe of mesoscutum weakly mat, with rather dense hairs on anterior half, bare on posterior half; lateral lobes of mesoscutum bare, with a sparse hair band along lateral margin; notaulus strongly impressed with weak trans-striae, reaching to basal 4/5; scutellum polished, moderately convex, with very sparse hairs, and lateral carinae at extreme base; mesopleurum polished, finely and rather sparsely punctate, the punctures becoming sparser anterodorsally, with a shallow groove just below of speculum with short, vertical striae; speculum weakly swollen; metapleurum weakly convex, finely and rather sparsely punctate, with a few rugae posteriorly. Propodeum (Fig. 17) polished, almost entirely impunctate; median basal area confluent with 1st lateral area, with a few hairs; 2nd pleural area completely confluent with 2nd lateral area, with sparse hairs along lateral margin; 3rd lateral area with a few rugae; petiolar area trans-striate; areola incompletely fused with 2nd lateral area, bare, almost straight above, 1.8 times as long as wide at costula; propodeal spiracle small, elliptic. Wings (Figs. 29 and 37) with areolet absent; nervulus postfurcal by about 1/5 of its own length; portion of cubitus between intercubitus and 2nd recurrent vein about 1.0 times as long as intercubitus; 3rd abscissa of discoideus weakly inclivous, 1.1 times as long as the 2nd; nervellus slightly curved, weakly reclivous, not intercepted; discoidiella and brachiella absent. Legs slender; hind femur 5.6 times as long as wide in lateral view; basitarsus of hind leg 2.0 times as long as 2nd hind tarsal segment and 4/5 as long as the 2nd to 5th segments together except claws; all tarsal claws weakly pectinate. Abdomen with 1st tergite slender, polished,

impunctate, with a row of hair along lateral margin of postpetiole, about 5.4 times as long as width of postpetiole; glymma distinct; 2nd tergite weakly mat, with rather dense and short hairs, about 1.2 times as long as 1st tergite and 1.9 times as long as 3rd tergite; 3rd and following tergites with short dense hairs.

Black. Mandible yellowish brown, the apical teeth reddish brown; palpi pale-yellow; clypeus slightly tinged with yellowish brown; scape and pedicel yellowish brown to dark brown; flagellum infusate, paler basally. Tegula yellowish brown, darker basally. Front and middle legs pale-yellow to light yellowish brown; last segments of tarsi infusate. Hind leg with coxa light reddish brown, dark brown dorsally; trochanter light yellowish brown to dark brown, paler ventrally; femur light reddish brown, darker apically; tibia dark yellowish brown, darker apically, with a basal yellowish brown band and a subbasal infusate band; tarsus yellowish brown to dark brown, darker apically. First tergite dark brown to black; 1st sternite yellowish brown; 2nd tergite blackish; 3rd tergite blackish dorsally, yellowish brown laterally; 4th tergite blackish dorsally and apically, yellowish brown laterally; 5th to 7th tergites black. Wings hyaline.

Length: Body ca. 6.4 mm., forewing 4.6 mm.

♀. Unknown.

Holotype (♂): Mt. Lalashan, 1300-1500 m, Taoyuan Hsien, 17-iv-1981, H. Takemoto leg.

Distribution: Formosa.

This species is closely allied to the preceding species, *C. (K.) pentagonus* Momoi, 1970, in having a strongly reclivous nervellus, 2nd pleural area without rugae, comparatively stout hind femur and black body. The present species is distinct from the latter in having the narrow face, deep interantennal groove, postfurcal nervulus, etc. as in the key stated above. Furthermore, this species is similar to the Japanese species, *C. (K.) jezoensis* Uchida, 1957, but it can be distinguished by the postfurcal nervulus, the mat 2nd tergite with dense hairs.

It is my real pleasure that this species is named in honour of Mr. H. Takemoto who collected the type-specimen.

Acknowledgements

I wish to express my sincere thanks to Messrs. K. Ôhara and H. Takemoto of Kyushu University for their kindness in offering valuable material and generous help in many ways. Grateful acknowledgement is made to Prof. A. Nagatomi of Kagoshima University for his constant encouragement and assistance.

References

- 1) Cushman, R. A.: H. Sauter's Formosan collection: Ichneumonidae. Arb. über

- Morph. u. Taxonom. Ent. 4: 283-311 (1937).
- 2) Momoi, S.: Ichneumonidae (Hymenoptera) of the Ryukyu Archipelago. Pacific Insects 12: 327-399 (1970).
 - 3) Morley, Cl.: The Fauna of British India, including Ceylon and Burma. Hymenoptera 3. Ichneumonidae, 532 pp. (1913).
 - 4) Townes, H.: A revision of the generic names proposed for Old World ichneumonids, the type of whose genotypes are in Japan, Formosa, or North America (Hymenoptera, Ichneumonidae). Proc. Ent. Soc. Washington 59: 100-120 (1957).
 - 5) Townes, H., M. Townes and V.K. Gupta: A catalogue and reclassification of the Indo-Australian Ichneumonidae. Mem. Amer. Ent. Inst. 1, 522 pp. (1961).
 - 6) Townes, H., S. Momoi and M. Townes: A catalogue and reclassification of Eastern Palearctic Ichneumonidae. Mem. Amer. Ent. Inst. 5, 661 pp. (1965).
 - 7) Townes, H. and M. Townes: A catalogue and reclassification of the Neotropic Ichneumonidae. Mem. Amer. Ent. Inst. 8, 367 pp. (1966).
 - 8) Townes H.: The genera of Ichneumonidae, part 4. Mem. Amer. Ent. Inst. 17, 372 pp. (1971).
 - 9) Uchida, T.: H. Sauter's Formosa-Ausbeute, Ichneumonidae (Hym.). Jour. Fac. Agr. Hokkaido Imp. Univ. 33: 133-222 (1932).