

Porizontinae and Diplazontinae Collected by the Hokkaido University Expedition to Nepal Himalaya, 1968 (Hymenoptera: Ichneumonidae)*

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Abstract

Ten species belonging to 6 genera of the subfamily Porizontinae and 1 species belonging to the subfamily Diplazontinae are reported from Nepal. Of them, 7 species are new to science: *Delopia peculiaris*, *Campoletis kumatai*, *Diadegma retusa* (which also occurs in Formosa), *D. nepalensis*, *D. erythropoda*, *Melalophacharops balajensis*, and *Enizemum nepalense*; 3 species are new to Nepal: *Venturia himachala*, *V. inclyta*, and *Cymodusa shiva*.

Key Words: Hymenoptera, Ichneumonidae, Nepalese Porizontinae and Diplazontinae.

Introduction

This paper is a report on Nepalese ichneumonflies of the subfamily Porizontinae and Diplazontinae based on the material collected from Central Nepal by the Hokkaido University Expedition to the Nepal Himalaya, 1968. In Nepal only 14 species of the subfamily Porizontinae belonging to 4 genera have been reported by V. K. GUPTA (1974), V. K. GUPTA and S. MAHESHWARY (1977), and M. L. GUPTA and V. K. GUPTA (1978). So far as I am aware, no species of the subfamily Diplazontinae have been known to occur in Nepal. This paper dealt with 11 species, of which, seven are new to science, and three are new to Nepal. The main part of the collection, including type specimens of the new species described herein, will be preserved in the collection of the Entomological Institute, Hokkaido University, Sapporo.

* Scientific Results of Hokkaido University Expedition to the Himalaya, Entomology.

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Subfamily PORIZONTINAE

1. *Venturia himachala* MAHESHWARY

Venturia himachala MAHESHWARY, Oriental Ins. Monogr. 5: 103, 1977.

Specimen examined. Nepal: 1 ♀, Kuinibisona, No. 1 West, 6-vii-1968, T. KUMATA leg.

This is the first record of this species from Nepal. The present material well agrees with the original description of this species based on material of India, but it differs in having the following characters: —

♀. Hind femur reddish brown, a little darker apicodorsally; 1st tergite entirely black; 2nd tergite black, slightly tinged with dark brown on posteromedian part; 3rd tergite blackish basally, reddish brown apically.

Length: Body 9.4 mm., forewing 5.0 mm.

Distribution: Nepal and India.

2. *Venturia inclyta* (MORLEY)

Cymodusa inclyta MORLEY, In Dutt: Mem. Dept. Agr. India (Ent. Ser.) 8: 19, 1923.

Specimen examined. Nepal: 1 ♀, Balaju, Kathmandu, 9-vii-1968, T. KUMATA leg.

This species is new to Nepal. The present material agrees well with the MAHESHWARY's redescription of this species based on material of India and Sri Lanka, but it differs in having the following characters: —

♀. Front and middle coxae more extensively yellow; apex of hind coxa yellowish brown; hind trochanters entirely yellowish brown; hind tibia entirely light ferrugineous; postpetiole reddish brown at apex.

Length: Body 12.4 mm., forewing 7.4 mm.

Host: *Melasina* sp. (Tineidae, Lep.) (in India, after MORLEY, 1923).

Distribution: Nepal and India.

The two species of *Venturia* treated above may be distinguished from each other by the following key: —

1. Mesopleurum strongly and closely rugoso-punctate; metapleurum and propodeum more or less similar in sculpture; median longitudinal carina of propodeum strong and complete; flagellum with a white band; 1st tergite with an apical reddish marking; hind 1st trochanter light yellowish brown. 2. *inclyta* (MORLEY)
- Mesopleurum distinctly punctate, the punctures well separated; metapleurum and propodeum rugoso-punctate; median longitudinal carina of propodeum rather weak, absent on median part of 2nd lateral area; flagellum without a white band; 1st ter-

gite entirely black; hind 1st trochanter blackish. 1. *himachala* MAHESHWARY

3. *Cymodusa shiva* GUPTA and GUPTA

Cymodusa shiva GUPTA and GUPTA, Oriental Ins. 8: 8, 1974.

Specimens examined. Nepal: 1 ♂, Syang, Palpa, 6-v-1968, T. MATSUMURA leg.; 1 ♂, Kuinibisona, No. 1 West, 6-vii-1968, T. KUMATA leg.

This species is new to Nepal. The present material agree well with the original description of *C. shiva* GUPTA and GUPTA, 1974, but it differs in having the following aspects: —

♂. Ocelli dark reddish brown; front and middle trochanters, apex of hind 1st trochanter and hind 2nd trochanter light yellowish brown; hind 1st trochanter except at apex black; hind femur reddish brown to infusate, darker dorsally or dorsoapically and dorsobasally; 1st and 2nd tergites sometimes entirely black; 5th or 6th to 7th tergites almost entirely dark brown to blackish.

Length: Body 6.4–7.9 mm., forewing 3.8–4.4 mm.

Distribution: Nepal and India.

4. *Delopia peculiaris* sp. nov. (Figs. 1, 7, 8, 11 & 18)

♂. Body covered with dense, rather long, silvery hairs. Face distinctly and very densely punctate, about 1.2 times as wide as high at level of lower margin of antennal socket, with a distinct median protuberance below antennal sockets; clypeus finely mat, with strong and rather dense punctures, the punctures sparser apicocentrally, its apical margin broadly truncate; malar space 5/9 as long as basal width of mandible, polished and very finely punctate on anterior half, mat with dense and coarse punctures on posterior half; mandible stout, 1.5 times as long as its basal width, with a thick lower carina on basal 3/5, the upper tooth 1.3 times as long as lower one; frons flat, densely and strongly punctate, vertex polished, with a few distinct punctures; ocellar area mat, with rather dense punctures; occiput finely and densely punctate; temple wide, 5/7 as long as eye in lateral view, weakly swollen, weakly and densely punctate; occipital carina strong, the lower end joining directly at base of mandible, and the lower part not sinuate; distance between lateral ocelli and eyes 5/9 as long as diameter of an ocellus. Flagellum 56-segmented; 1st flagellar segment 2.0 times as long as wide at apex and 1.5 times as long as the 2nd. Pronotum polished, rather weakly but distinctly and rather sparsely punctate, with a few oblique striae on lower part; epomia long and strong; collar area finely and densely punctate; mesoscutum polished, distinctly and rather densely punctate; scutellum weakly convex, with strong dense punctures, its lateral carina weak, present on basal 2/3; mesopleurum polished, strongly, densely to sparsely punctate, the punctures sparser posteriorly, with striae in front of speculum and just below tegula; speculum polished and bare; prepectus with a strong transverse lamella-like carina; lateral

part of prepectal carina only medially represented; metapleurum strongly and densely punctate. Propodeum (Fig. 1) almost entirely rugulose, with carinae weak, present on 1st lateral and petiolar areas; 1st lateral area weakly and very closely punctate; median longitudinal sulcus absent; propodeal spiracle large, linear, separated from pleural carina by $5/7$ its own length, the connecting carina very weak; dorsolateral margin not edged; apex of propodeum reaching to basal $1/2$ of hind coxa. Hind coxa polished, weakly and rather sparsely punctate, with a very high basal lamella on dorsal side, the lamella outwardly curved (Fig. 7); hind femur 6.0 times as long as wide in lateral view; longer spur of middle tibia 1.5 times as long as the shorter; hind basitarsus 1.7 times as long as the longer tibial spur; tarsal claws pectinate on about half, with 4 or 5 teeth. Venation of fore and hind wings as in Figs. 11 & 18; metacarpella with 5 hamuli. First tergite 7.0 times as long as wide at apex; suture separating first tergite from sternite present; petiole polished, virtually bare; postpetiole subpolished, 2.8 times as long as its apical width, with very fine, setiferous punctures; 2nd tergite finely mat, with short dense hairs, about $5/7$ as long as the 1st, about 4.5 times as long as wide at apex and 1.6 times as long as the 3rd; spiracle of 1st tergite situated at apical $2/5$; apex of 1st sternite extending to apical $1/6$; glymma absent; thyridium linear, separated from base of 2nd tergite by about 1.8 times of its own length.

Black. Mandible yellowish brown, the apical teeth dark brown; palpi fuscous; tegula blackish, weakly tinged with dirty yellow apically. Front leg (Fig. 8) with coxa black, yellow on ventroapical $3/4$; 1st trochanter yellow, with narrow dorsal stripe on dorsal side; 2nd trochanter yellow ventrally, dark brown dorsally; femur blackish dorsally, yellow ventrally; tibia and tarsus yellowish brown, the apical segments fuscous. Middle leg with coxa black, yellow on apicoventral $2/3$; 1st trochanter blackish, yellow on ventrolateral side; 2nd trochanter dark brown to blackish; femur blackish, the lateral side except at base yellow; tibia yellowish brown, a little darker dorsally; tarsus infusate. Hind leg black. All tibial spurs yellowish brown. Second tergite ferruginous, the basodorsal part dark brown; 3rd tergite entirely ferruginous; 4th tergite ferruginous, dark brown on apicodorsal $1/3$; male clasper dark brown to blackish, weakly tinged with dark reddish brown on apical half. Wings subhyaline; stigma fuscous.

Length: Body 11.7 mm., forewing 6.9 mm.

♀. Unknown.

Holotype: ♂, Nepal: Thare, No. 1 West, 29-v-1968, T. KUMATA leg.

Distribution: Nepal.

This species is readily distinguished from the congeneric Oriental species in having the peculiar high lamella of the hind coxa which is outwardly curved. Furthermore, this species is similar to the Indian *D. gephyra* (GUPTA and GUPTA, 1978), but it is easily distinguished by the weakly and densely punctate temple and mesoscutum, the almost entirely punctate pronotum, and the metacarpella with 6 hamuli.

5. *Campoletis chlorideae* UCHIDA

Campoletis chlorideae UCHIDA, Mushi, 30: 29, 1957.

Specimens examined. Nepal: 2 ♀♀, G. I. Kathmandu, 23–iii–1968, T. MATSUMURA leg.; 4 ♂♂, Kathmandu, 14– & 15–iv–1968, T. KUMATA leg.; 12 ♀♀, Godavari, Nepal Valley, 20–iv–1968, T. KUMATA leg.; 3 ♂♂ & 6 ♀♀, Kathmandu, 22–iv–1968, T. MATSUMURA leg.; 1 ♀, Lete, Palpa, 5–v–1968, T. MATSUMURA leg.; 1 ♀, Larjung, Palpa, 7–v–1968, T. KUMATA leg.

Hosts: *Helicoverpa assulta* (GUENÉE) (Noctuidae, Lep.) (in Japan, after UCHIDA, 1957; in Formosa, after CHIU and CHOU, 1976), *H. armigera* (HÜBNER) (Noctuidae, Lep.) (in India, after GUPTA, 1974, in Formosa, after CHIU and CHOU, 1976), *Spodoptera litula* (FABRICIUS) (Noctuidae, Lep.) (in Formosa, after CHIU and CHOU, 1976; in Japan, after KUSIGEMATI, 1976), *Lithacodia distinguenda* (Staudinger) (Noctuidae, Lep.) (in China, after HE, 1979), *Autographa gamma* (LINNAEUS) (in Japan, after KUSIGEMATI, 1986), *Adisura* sp. (Noctuidae, Lep.) (in India, after GUPTA, 1974); *Phthorinaea operculella* (ZELLER) (Gelechiidae, Lep.) (in Japan, after UCHIDA, 1957), *Bombyx mori* (LINNAEUS) (Bombycidae, Lep.) (in Formosa, after CHIU and CHOU, 1979), and *Cryptophlebia ombrodelta* (LOWER) (Tortricidae, Lep.) (in India, after GUPTA, 1974).

Distribution: Nepal, India, Formosa, China and Japan.

5. *Campoletis kumatai* sp. nov. (Figs. 3, 13 & 20)

♀, Head, thorax, and coxae covered with rather dense, short, silvery hairs. Face about 1.4 times as wide as high at level of lower margin of antennal socket, mat with fine, dense punctures; clypeus rather strongly convex, about 1.8 times as wide as high, mat with fine, rather sparse punctures and with an apicocentral bare area, its apical margin polished, sharp, weakly convex, with a median obtuse tooth; malar space mat, as long as basal width of mandible; mandible long, 1.8–2.0 times as long as its basal width, ocelli and eyes 6/7 as long as diameter of an ocellus; frons strongly mat, slightly convex, with a weak median longitudinal carina; vertex mat; ocellar area mat with fine punctures; occiput mat; temple almost flat, mat, 3/4 – 4/5 as long as eye in lateral view; occipital carina weak, arched on dorsomedian portion, its lower part fading out, so that, its lower end not joining oral carina. Flagellum with 30 or 31 segments; 1st flagellar segment 2.5–2.8 times as long as wide at apex and 2.5–2.8 times as long as the 2nd; 2nd flagellar segment slightly longer than the 3rd. Pronotum subpolished, rugulose to striate transversely, more strongly striate on lower portion; mesoscutum strongly mat with fine dense punctures; scutellum moderately strongly convex, with rather sparse punctures; mesopleurum mat and striate-punctate, densely and finely punctate on lower posterior portion; scutellum polished, very finely striate on lower portion, bare on upper portion; metapleurum densely and weakly punctate with horizontal fine striae. Propodeum (Fig. 3) strongly and completely areolated; basal area 1/2–2/3 as long as

wide at base, its hind margin widely truncate; areola small, bare to finely and sparsely rugulose, 1.0–1.2 times as long as wide at costula, with costula emitting from basal $4/9$ – $4/7$ of areola; 1st lateral area rugulo-punctate obliquely; 2nd pleural area weakly mat with vertical striae; petiolar and 3rd lateral areas more or less rugose; propodeal spiracle small and circular. Hind coxa mat; hind femur 5.1–5.3 times as long as wide in lateral view; longer spur of hind tibia 1.2–1.4 times as long as hind basitarsus; tarsal calws weakly pectinate at base. Wings (Figs. 13 & 20) with nervulus postfurcal by $1/4$ – $2/7$ of its own length; areolet with a short petiole, receiving 2nd recurrent vein a little in front of the middle; nervellus subvertical, intercepted at lower $2/7$ – $3/8$; discoidiella almost unpigmented. Abdomen with 1st tergite mat, with a polished and bare apical band, about 2.5 times as long as wide at apex, with distinct glymma; postpetiole stout, about $4/5$ as long as its apical width; 2nd tergite weakly mat with very fine, rather sparse punctures, about $4/5$ as long as wide at apex and 1.0–1.2 times as long as the 3rd; ovipositor sheath $4/7$ – $2/3$ as long as hind tibia.

Black. Mandible blackish, apical part dark brown to yellowish brown, its apical teeth dark brown to black; palpi fuscous; tegula yellowish brown, a little darker basally; antennae black. Legs with coxae and 1st trochanters black; 2nd trochanter dark reddish brown to black, paler apically; femora and tibiae dull ferrugineous, the front and middle ones a little paler; tarsi fuscous to infusate, the hind one darker; front and middle tibial spurs yellowish brown; hind tibial spur reddish brown. Ovipositor sheath infusate. Wings subhyaline; stigma fuscous, paler posteriorly.

Length: Body 5.5–6.2 mm., forewing 4.4–4.9 mm.

♂. Unknown.

Holotype: ♀, Nepal: Khurumsang, No. 1 West, 8–v–1968, T. KUMATA leg. Paratypes. Nepal: 1 ♀, Larjung, Palpa, 7–v–1968, T. KUMATA leg.; 1 ♀, Godavari, Nepal Valley, 7–vi–1968, T. KUMATA leg.

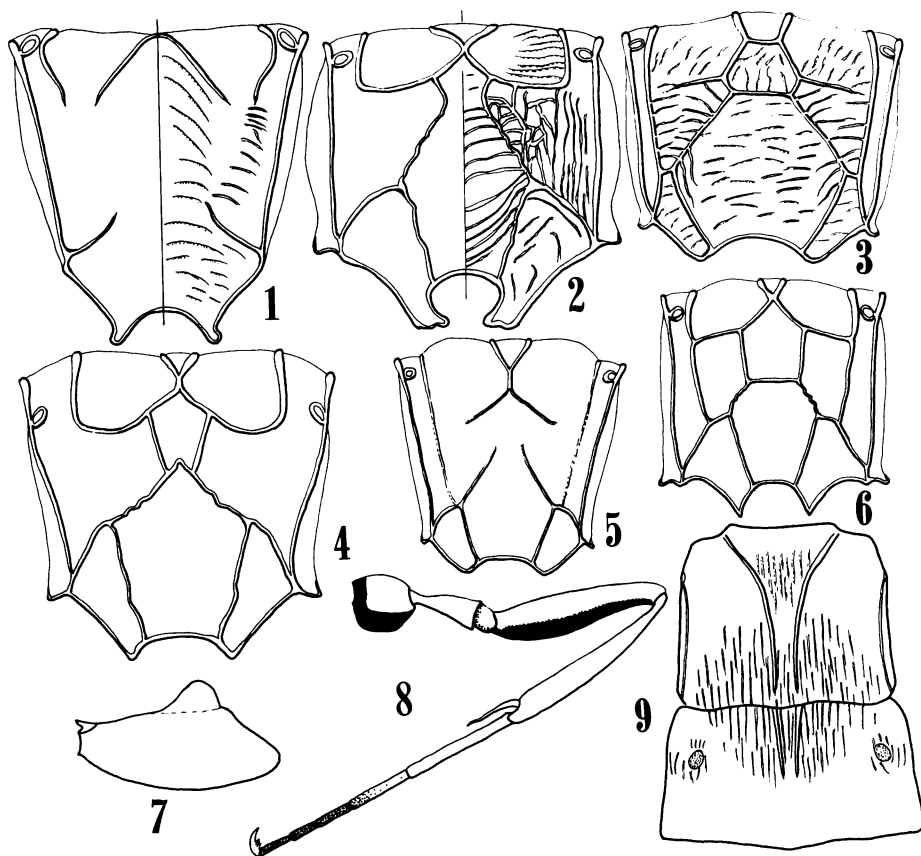
Distribution: Nepal.

This species is similar to the Palearctic and Oriental *C. chlorideae* UCHIDA, but it differs from the latter by the entirely dull ferrugineous hind tibia without subbasal and apical infusate bands, the transversely striate 2nd lateral area of the propodeum, the entirely black abdomen, etc. as stated in the key.

This species is named in honour of Dr. T. KUMATA who collected the type specimen.

The two species of *Campoletis* treated above may to distinguishable from each other by the following key:—

1. Propodeum with areola 1.3–1.5 times as long as wide at costula, with costula emitting from basal $2/7$ – $2/5$ of areola; 2nd lateral area unstriate. Hind tibia light yellowish brown, with apical and subbasal infusate bands; mandible except for apical teeth and tegula yellow; abdominal tergite bicoloured, blackish basally, ferrugineous api-



Figs. 1-6. Areolation and striation of propodea: 1, *Delopia peculiaris* sp. nov., ♂; 2, *Melalophacharops balajensis* sp. nov., ♀; 3, *Campoletis kumatai* sp. nov., ♀; 4, *Diadegma erythropoda* sp. nov., ♂; 5, *D. retusa* sp. nov., ♀; 6, *D. nepalensis* sp. nov., ♂.

Fig. 7. Hind coxa in lateral view: *Delopia peculiaris* sp. nov., ♂.

Fig. 8. Colouration of front leg in inner lateral view: *Delopia peculiaris* sp. nov., ♀.

Fig. 9. Carination and striation of 1st and 2nd tergites in dorsal view: *Enizemum nepalense* sp. nov., ♀.

cally. 5. *chlorideae* UCHIDA

- Propodeum with areola 1.0 – 1.2 times as long as wide at costula, with costula emitting from basal $4/9 - 4/7$ of areola; 2nd lateral area more or less transversely striate. Hind tibia entirely ferrugineous, without infusate bands; mandible except for apical teeth and tegula infusate; abdominal tergite entirely black. 6. *kumatai* sp. nov.

7. *Diadegma retusa* sp. nov. (Figs. 5, 15 & 22)

♀. Body subpolished, mat without distinct punctures, covered with short and rather dense silvery hairs. Face 1.3 times as wide as high at level of lower margin of antennal socket; inner margins of eyes parallel-sided; clypeus moderately strongly convex, 2.0 times as wide as high, its apical margin roundly convex, polished, slightly reflexed; malar space $8/9$ as long as basal width of mandible; mandible moderately taper-

ing towards apex, 1.5 times as long as its basal width, with a rather high lamella on about lower basal 1/2, its upper tooth a little longer than the lower one; temple weakly swollen, about 2/3 as long as eye in lateral view; frons almost flat; occipital carina complete, its lower end joining oral carina; distance between lateral ocelli and eyes 1.2 times as long as diameter of an ocellus. Flagellum 33-segmented; 1st flagellar segment 4.5 times as long as wide at apex and 1.3 times as long as the 2nd; 2nd flagellar segment 1.1 times as long as the 3rd; basal two or three segments weakly compressed. Pronotum mat, with fine oblique striae on ventral and anterior part; scutellum weakly convex, with sparse hairs; mesopleurum almost entirely mat; speculum subpolished, very finely mat; metapleurum strongly mat. Propodeum (Fig. 5) mat as in metapleurum, weakly and incompletely carinate; median and lateral longitudinal carinae obsolete or absent on 2nd lateral area; basal area indistinct, with a long petiole; costula weak, absent on lateral 1/2; propodeal spiracle small, and circular. Hind femur 5.8 times as long as wide in lateral view; longer spur of middle and hind tibiae 2.1 and 1.4 times as long as the shorter ones, respectively; tarsal claws moderately strongly pectinate at base, with 3 or 4 teeth. Wings (Figs. 15 & 22) with nervulus postfurcal by 1/4 of its own length; areola with a short stalk above, receiving 2nd recurrent vein a little distad of the middle; nevellus weakly reclivous, not intercepted; discoidiella absent. Abdomen with 1st tergite mat, polished and virtually bare on basal 1/3, about 1.3 times as long as wide at apex; post-petiole 3.5 times as long as its apical width, sparsely haired, with a median bare area; 2nd tergite weakly mat, about 1.5 times as long as wide at apex and 1.4 times as long as the 3rd, with thyridium large, separated from base of 2nd tergite by about 2/5 of its own diameter; ovipositor sheath short, 2/7 as long as hind tibia.

Black. Mandible except for reddish brown apical teeth and palpi except for fuscous 5th segment of maxillary palpus, light yellowish brown; tegula stramineous; antennae black. Front leg with coxa black, yellowish brown at extreme apex; trochanter light yellowish brown, darker basally; femur dark reddish brown, dark brown on ventral side; tibia and tarsus except for last two segments dark reddish brown; last two tarsal segments infusate. Middle leg with coxa and femur black; 1st trochanter black basally, pale yellow apically; tibia yellowish brown to fuscous, yellowish brown on basoventral 2/3; tarsus fuscous, yellowish brown on ventral side of metatarsus. Hind leg with coxa, trochanters and femur black; tibia infusate on about basal 2/9 and about apical 1/3, yellowish brown on about median 4/9; tarsus infusate. Middle and hind tibial spurs pale yellow basally, fuscous apically; ovipositor sheath blackish on apical 1/2, dirty yellowish brown on basal 1/2. Wings hyaline; stigma fuscous.

Length: Body 5.7 mm., forewing 5.3 mm.

♂. Differs from female as follow: -

Face 1.4 times as wide as high at level of lower margin of antennal socket; clypeus a little more strongly convex than in female; mandible 1.3 times as long as its basal width; basal segments of flagellum not compressed; 1st flagellar segment 3.0 times as long as wide at apex and 1.1 times as long as the 2nd; 2nd flagellar segment 1.2 times as long as

the 3rd. Propodeum with basal area very small, with a long petiole; petiolar area rugulose; pleural longitudinal carinae stronger than in female. Hind femur 5.2 times as long as wide in lateral view; longer spur of middle tibia 1.8 times as long as the shorter one. First tergite more densely haired than in female; 2nd tergite more densely haired than in female, 1.6 times as long as wide at apex and 1.4 times as long as the 3rd. Tegula a little darker and front femur a little paler than in female, respectively.

Length: Body 5.0 mm., forewing 4.5 mm.

Holotype: ♀, Formosa: Alishan-Chushan, Alishan, Chiai, 13-iv-1984, K. ÔHARA leg. Paratype. Nepal: 1 ♂, Gorapani, No. 4 West, 11-v-1968, T. MATSUMURA leg.

Distribution: Nepal and Formosa.

This species is similar to the following species, *D. nepalensis* sp. nov., but it easily differs from the latter by the mat face, clypeus and frons, the incompletely areolated propodeum, the circular propodeal spiracle, and the black middle and hind femora and abdominal tergites.

8. *Diadegma nepalensis* sp. nov. (Figs. 6 & 16)

♀. Body covered with rather long, dense, silvery hairs. Face strongly and densely punctate, 1.2 times as wide as high at level of lower margin of antennal socket; inner margins of eyes parallel-sided; clypeus weakly convex, strongly and densely punctate as in face, 1.6 times as wide as high, its apical margin roundly convex, polished, blunt; malar space $1/2$ as long as basal width of mandible; mandible short and stout, weakly tapering towards apex, 1.3 times as long as its basal width, with a rather high lamella on about lower basal half, its upper tooth slightly longer than the lower one; frons almost flat, rugose; vertex mat; ocellar area mat with few weak punctures; temple flat, very finely and densely punctate, finely mat, with rather dense hairs; occipital carina strong and complete, its lower end joining oral carina. Flagellum with 35 segments; 1st flagellar segment 4.4 times as long as wide at apex and 1.3 times as long as the 2nd; 2nd flagellar segment 1.2 times as long as the 3rd. Pronotum shortly trans-striate medially, densely and distinctly punctate posteriorly; mesoscutum strongly mat with distinct and dense punctures; scutellum moderately strongly convex, distinctly and densely punctate; mesopleurum distinctly and rather densely punctate, with a weakly striate area in front of speculum; speculum polished, bare; metapleurum rather weakly and densely punctate. Propodeum (Fig. 6) strongly and completely areolated; basal area very small, with a short petiole at base; areola impunctate, with moderately dense hairs, 1.7 times as long as wide at costula, with costula emitting from basal $1/3$ of areola; 1st lateral area finely and densely punctate; 2nd lateral area rugulose; 2nd pleural area finely and rugulose-punctate obliquely, 3rd lateral area longitudinally rugoso-punctate; petiolar area rather weakly rugoso-striate transversely; propodeal spiracle small, and elliptic. Hind coxa finely mat; hind femur 5.4 times as long as wide in lateral view; longer spurs of

middle and hind tibiae 2.1 and 1.4 times as long as the shorter ones, respectively; tarsal claws moderately strongly pectinate, with 3 or 4 teeth. Venation of fore wing as in Fig. 16; nervulus postfurcal by $2/7$ of its own length; areolet very small, with a long petiole above; 2nd recurrent vein distad of 2nd intercubitus; nervellus vertical, not intercepted; discoidiella absent. Abdomen with 1st tergite slender, 3.9 times as long as wide at apex; petiole virtually bare; postpetiole stout, mat, rather sparsely haired laterally, bare medially, 1.2 times as long as its apical width; 2nd tergite finely mat, covered with dense short hairs, about 1.2 times as long as wide at apex and about 1.2 times as long as the 3rd; ovipositor sheath very short, about 3.8 times as long as hind tibia.

Black. Scape and pedicel pale yellow, with a narrow dorsolateral stripe; flagellum blackish, slightly paler apically; mouth parts except for reddish brown apical teeth, and tegula pale yellow. Front and middle legs with coxae except for basal $2/3$ of the middle one, trochanters pale yellow; femora, tibiae, and tarsi except for last two segments, yellowish brown; last two tarsal segments fuscous. Hind leg with coxa black, yellowish brown at extreme apex; trochanters light yellowish brown; femur and tibia light ferruginous; tarsus reddish brown to fuscous, paler basally. All tibial spurs yellowish brown. First tergite black, reddish brown on about apical half; 2nd tergite blackish, reddish brown laterally and on apical $2/5$; 4th and subsequent tergites ferruginous; ovipositor sheath infuscate. Wings hyaline; stigma fuscous.

Length: Body 7.1 mm., forewing 5.3 mm.

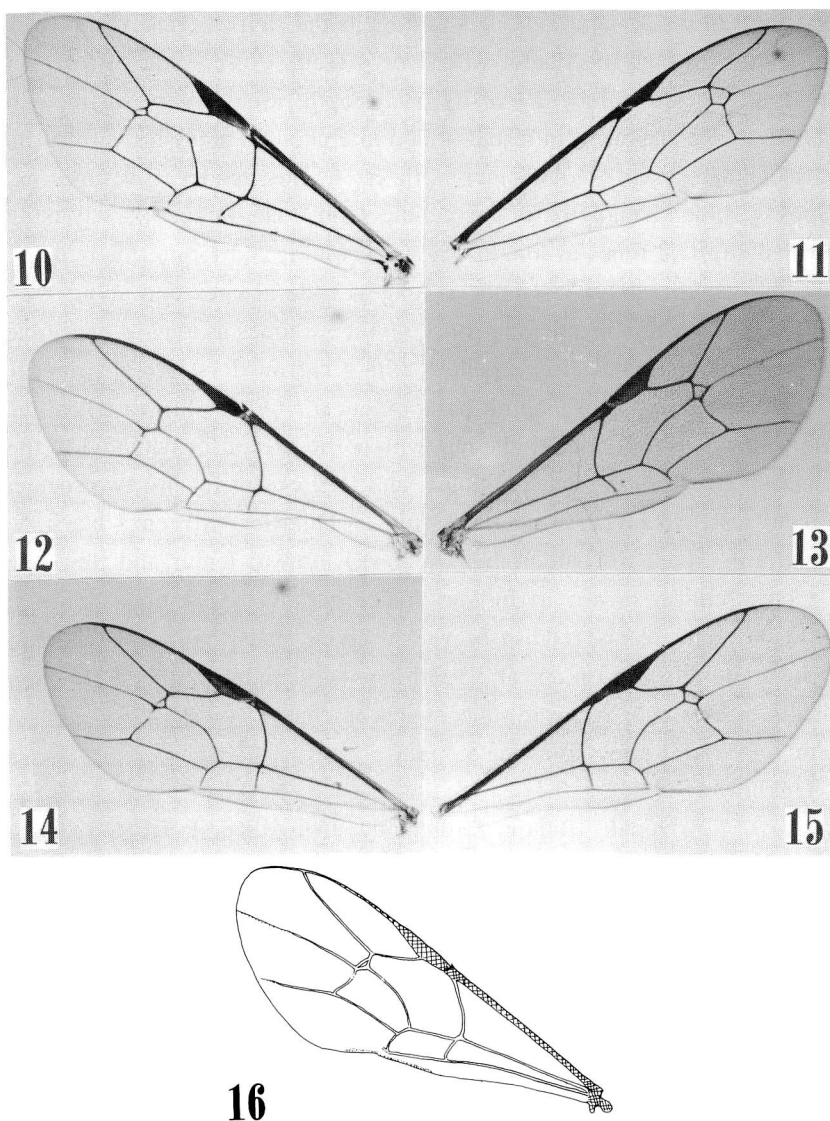
♂. Unknown.

Holotype: ♀, Nepal: Balaju, Kathmandu, 16-iv-1968, T. KUMATA leg.

This species resembles the following *D. erythropoda* sp. nov., but it is clearly distinguished from the latter by the very small areolet with a long petiole above, the strongly punctate face and clypeus, the strong and complete lateral longitudinal carinae of the propodeum, the elliptic propodeal spiracle, the black front and middle coxae, and the ferruginous abdominal tergites.

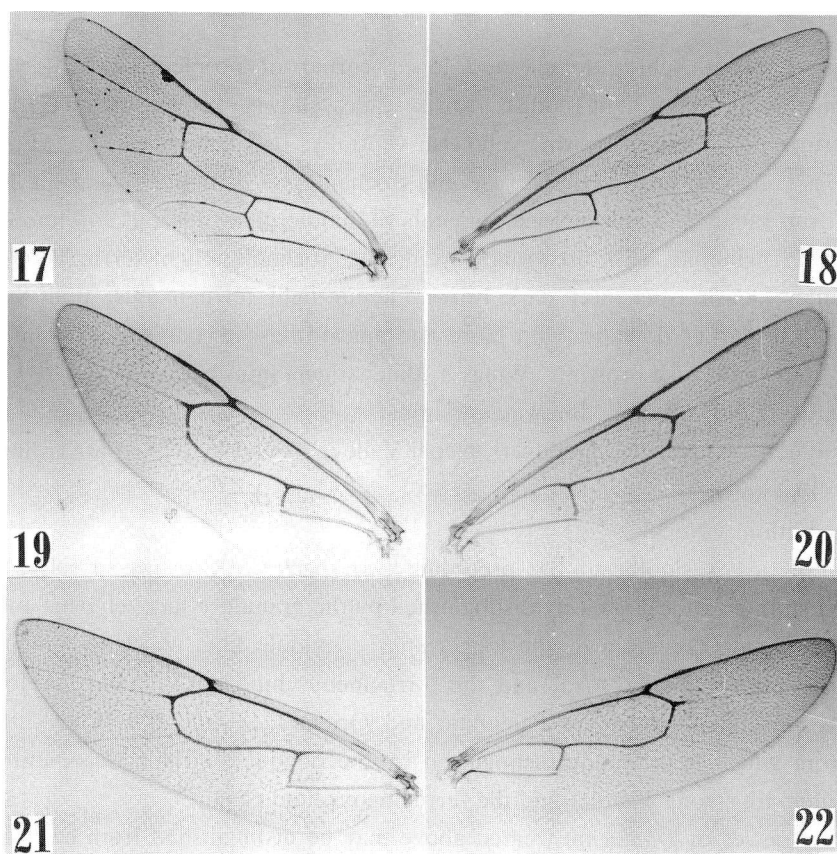
9. *Diadegma erythropoda* sp. nov. (Figs. 4, 14 & 21)

♂. Head, thorax and coxae covered with dense, rather short, silvery hairs. Face finely and densely granulose, about 1.3 times as wide as high at level of lower margin of antennal socket; clypeus 1.8 times as wide as high, moderately strongly convex, strongly mat with very fine, rather dense punctures, its apical margin roundly convex, polished, blunt; inner margins of eyes slightly convergent ventrally; malar space $4/5$ as long as basal width of mandible; mandible short and stout, weakly tapering towards apex, vertex and ocellar area mat; temple almost flat, $5/9$ as long as eye in lateral view, finely and densely punctate; distance between lateral ocelli and eyes $4/5$ as long as diameter of an ocellus; occipital carina distinct and complete, the lower end joining oral carina near base of mandible. Flagellum 37-segmented; 1st flagellar segment 4.5 times as long as wide at apex and 1.3 times as long as the 2nd; 2nd flagellar segment about 1.1



Figs. 10-16. Forewings : 10, *Enizemum nepalense* sp. nov., ♀; 11, *Delopia peculiaris* sp. nov., ♂; 12, *Melalophacharops balajensis* sp. nov., ♂; 13, *Campoletis Kumatai* sp. nov., ♀; 14, *Diadegma erythropoda* sp. nov., ♂; 15, *D. retusa* sp. nov., ♀; 16, *D. nepalensis* sp. nov., ♂.

times as long as the 3rd. Pronotum weakly, transversely or obliquely striate almost entirely, strongly mat on dorsal portion; mesoscutum strongly mat, rugulose on posterior part of median lobe; notaulus replaced rugulae; scutellum moderately strongly convex, mat, with very fine, sparse punctures, finely and longitudinally rugose on posterior part; mesopleurum obliquely striate, mat with weak and dense punctures on posterior part, weakly and longitudinally rugulose on posteromedian portion; speculum polished, bare; metapleurum rather strongly, densely granulate, with weak oblique rugae. Propodeum (Fig. 4) rather weakly areolated, more or less granulate; areola about 1.3 times as long



Figs. 17–22. Hind wings : 17, *Enizemum nepalense* sp. nov., ♀; 18, *Delopia peculiaris* sp. nov., ♂; 19, *Melalophacharops balajensis* sp. nov., ♂; 20, *Campoletis Kumatai* sp. nov., ♀; 21, *Diadegma, erythropoda* sp. nov., ♂; 22, *D. retusa* sp. nov. ♀.

as wide at costula, with costula emitting from basal 1/4 of areola, its posterior margin strongly emarginated; 2nd lateral area confluent with 2nd lateral area, with a few weak striae; petiolar area rugose, incompletely confluent with 3rd lateral area; 3rd lateral area obliquely rugose; petiolar area rather strongly reticulate–rugose; propodeal spiracle small, subcircular. Hind coxa subpolished, slightly mat; hind femur 5.7 times as long as wide in lateral view; longer spurs of middle and hind tibiae about 3.0 and 1.5 times as long as the shorter ones, respectively; tarsal claws rather strongly and fully pectinate, with 5 teeth. Venations of fore and hind wings as in Figs. 14 & 21; nervulus postfurcal by 1/5 of its own length; areolet moderate–sized, stalked above, receiving 2nd recurrent vein at posterior corner; nervellus rather strongly reclivous, not intercepted; discoidiella absent. Abdomen with 1st tergite slender, 4.2 times as long as wide at apex; petiole polished, virtually bare; postpetiole mat, sparsely haired laterally, bare medially, about 1.5 times as long as its apical width; glymma deeply impressed; 2nd tergite weakly mat, covered with short, rather dense hairs, 1.9 times as long as wide at apex and 1.5 times as long as the 3rd, with thyridium linear, separated from base of 2nd tergite by its own

length.

Black. Mouth parts, tegula and lower corner of propleurum light yellowish brown; mandibular teeth light reddish brown; scape yellowish brown, with a dark brown lateral stripe; pedicel dark brown, yellowish ventrally; flagellum blackish. Front and middle legs yellowish brown, the coxae and trochanters a little paler, and the last segment of front tarsus and apical three segments of middle tarsus fuscous. Hind leg with coxa light ferrugineous, dark brown apicoventrally; trochanters light ferrugineous, basolateral side of each trochanter dark brown; femur light ferrugineous; tibia yellowish brown, a little darker dorsally, with basal and apical infusate bands; tarsus infusate. All tibial spurs yellowish brown. Wings hyaline; stigma infusate.

Length: Body 7.5 mm., forewing 5.6 mm.

Holotype: ♂, Nepal: Godavari, Nepal Valley, 20–iv–1968, T. KUMATA leg.

♀. Unknown.

Distribution: Nepal.

This species is similar to the preceding two species, *D. retusa* sp. nov. and *D. nepalensis* sp. nov., but it is easily distinguished by the granulose face, clypeus and frons, the fully pectinate tarsal claws, the longer spur of middle tibia which is comparatively longer, the yellow middle coxa, and the ferrugineous hind coxa. Furthermore, this species is closely allied to the Palearctic and Oriental *D. apostata* (GRAVENHORST, 1829), from which it is readily distinguished by the obliquely striate mesopleurum, the propodeum with strong costula, and the ferrugineous hind coxa.

Three species of *Diadegma* treated above may be distinguished from each other by the following key: —

1. Face and clypeus strongly and densely punctate. Forewing with areolet very small; 2nd intercubitus basad of 2nd recurrent vein. Hind tibia entirely light ferrugineous. First tergite black, with a reddish brown apical band; 2nd tergite blackish basally, ferrugineous laterally and apically; 3rd and subsequent tergites ferrugineous. 8. *nepalensis* sp. nov.
- Face and clypeus strongly mat or granulose. Forewing with areolet moderate-sized, with emitting 2nd recurrent vein a little distad of the middle. Hind tibia with infusate basal and apical bands. Abdomen entirely black. 2
2. Face, clypeus and propodeum strongly mat. Second lateral area of propodeum confluent with areola and 2nd pleural area. Mesopleurum strongly mat, without punctures and striae. Scape and pedicel black; coxae and middle and hind femora black. 7. *retusa* sp. nov.
- Face and clypeus granulose; propodeum more or less granulose, the petiolar and 3rd lateral area rugose; areola distinct and complete; 2nd lateral area confluent with 2nd pleural area. Scape and pedicel yellowish brown, dark brown partly; coxae and femora yellowish brown to ferrugineous. 9. *erythropoda* sp. nov.

10. *Melalophacharops balajensis* sp. nov. (Figs. 2, 12 & 19)

♂. Head, thorax, and coxae covered with rather dense, silvery hairs. Face 1.5 times as wide as high at level of lower margin of antennal socket, strongly granulose, the granules smaller and sparser laterally; inner margins of eyes parallel-sided; eye margin rather strongly indented next to antennal socket; clypeus almost flat, strongly granulose as in face, its apical margin thin, weakly reflexed; mandible short, with narrow lamella along lower margin, the upper tooth a little longer than the lower one; malar space about 1/2 as long as basal width of mandible; frons slightly convex, trans-rugose; vertex and ocellar area mat; distance between lateral ocelli and eyes 1/2 as long as diameter of an ocellus; occiput very narrow, weakly and sparsely granulose, with a bare area on median portion; temple very narrow, slightly swollen, rather densely and weakly granulose, about 1.3 times as long as wide in lateral view; occipital carina strong and complete, its lower end joining oral carina at equal distant from base by basal width of mandible. Flagellum with 28 + α (apical segments lacking); 1st flagellar segment 3.7 times as long as wide at apex and 1.3 times as long as the 2nd; 2nd flagellar segment 1.1 times as long as the 3rd. Pronotum trans-striate on about lower half, mat on about upper half; mesoscutum strongly mat, with trans-rugulae on basal part of notaulus and subapical central portion; scutellum rather strongly convex, weakly reticulate-rugose, with weak lateral carina on about basal 1/3; mesopleurum polished, finely and rather densely punctate, weakly and obliquely striate in front of speculum; speculum polished, bare; metapleurum finely and densely punctate. Propodeum (Fig. 2) short, weakly and incompletely areolated; 1st lateral area finely trans-striate; areola small, with a few trans-striae, confluent with petiolar area; combined 2nd lateral and 2nd pleural area longitudinally striate; petiolar area obliquely striate; 3rd lateral area roughly striate; propodeal spiracle long oval. Wings (Figs. 12 & 19) with nervulus postfurcal by 3/8 of its own length; areolet absent; portion of cubitus between intercubitus and 2nd recurrent vein 5/7 as long as intercubitus; nervellus vertical, not intercepted; discoidiella absent. Hind femur cylindrical, sparsely granulose, 5.6 times as long as wide in lateral view; longer middle and hind tibial spurs 2.3 and 1.7 times as long as the shorter ones, respectively; hind basitarsus 1.8 times as long as the 2nd; 1st to 4th tarsal segments with a midventral row of closely spaced hairs, the row of hairs appearing like a sharp carina; tarsal claws closely pectinate. Abdomen with 1st tergite rather stout, very sparsely haired, 3.4 times as long as wide at apex; postpetiole a little longer than its apical width; glymma replaced by weak longitudinal striae; 2nd tergite 1.2 times as long as wide at apex and 1.1 times as long as the 3rd.

Black with ferrugineous legs and abdomen. Scape and pedicel light yellowish brown, with a dorsolateral dark brown stripe; flagellum infusate; mouth parts except reddish brown mandibular teeth, and tegula light yellowish brown. Front leg with coxa dark brown to blackish, yellowish brown at apex; trochanters yellow; femur and tibia

light yellowish brown. Middle leg with coxa blackish brown at extreme apex; trochanter yellow; femur and tibia light ferrugineous, the last segment of tarsus fuscous. Hind leg with coxa black, reddish brown at extreme apex; trochanter yellowish brown to reddish brown, paler apically; femur and tibia ferrugineous, dark reddish brown on apical portion; tarsus infusate; tibial spur dark reddish brown. Front and middle tibial spurs light yellowish brown. First tergite blackish on basal 1/2, ferrugineous on apical 1/2; 2nd tergite ferrugineous, with an apical blackish band, 3rd tergite ferrugineous, dark brown on basodorsal 2/3; 4th to 6th tergites ferrugineous; 7th and 8th tergites and clasper dark reddish brown. Wings weakly tinged with fuscous; stigma fuscous.

Length: Body 7.0 mm., forewing 5.8 mm.

♀. Unknown.

Holotype: ♀, Nepal: Balaju, Kathmandu, 16–iv–1968, T. KUMATA leg.

Distribution: Nepal.

This species is closely related to the Oriental *M. papilionis* (ASHMEAD, 1905), but it is clearly distinguished by the weakly striate propodeum, the glymma which is replaced by short and longitudinal striae, the ferrugineous middle and hind femora, and the widely ferrugineous 1st tergite.

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11. *Enizemum nepalense* sp. nov. (Figs. 9, 10 & 17)

♀. Face about 2.0 times as wide as high at level of lower margin of antennal socket, mat with shallow, rather sparse punctures, with a dull median prominence; inner margins of eyes slightly divergent ventrally; malar space mat, 2/3 as long as basal width of mandible; apical margin of upper tooth weakly concave; clypeus weakly convex medially, 2.0 times as wide as high, mat with long sparse hairs, its apical lobes well developed with a deep median notch; frons widely and shallowly concave, mat laterally, shagreen medially, with shallow sparse punctures; vertex weakly mat with fine sparse punctures; distance between lateral ocelli and eyes as long as diameter of an ocellus; temple polished, weakly swollen, finely and rather densely punctate, 4/9 as long as eye in lateral view; occiput weakly concave medially, densely and strongly punctate; occipital carina weak but complete, weakly arched medially. Flagellum 21-segmented, with a few erect short hairs; 1st flagellar segment 4.6 times as long as wide at apex and 1.3 times as long as the 2nd. Pronotum distinctly and densely punctate almost entirely, obliquely and weakly rugulose ventromedially; notaulus absent; mesoscutum finely and densely punctate; scutellum weakly convex, with distinct, rather dense punctures; mesopleurum strongly and densely punctate, the punctures weaker and denser dorsally and posteriorly; speculum strongly and sparsely punctate, with an impunctate area on posterior part; metapleurum strongly and densely punctate; sternaulus widely and shallowly impressed,

but the distinct groove absent. Propodeum punctate basally, rugulose apically; median longitudinal carinae present on basal 1/2, the other carinae absent; pleural area obliquely rugulose; petiolar area with 4 longitudinal, strong striae; propodeal spiracle oval. Venation of fore and hind wings as in Figs. 10 & 17; areolet rectangular, petiolate above; 2nd intercubitus distinct; costella with 4 hamuli. Legs rather slenger; hind coxa finely and densely punctate; hind femur about 4.8 times as long as wide in lateral view; hind tibia apically and hind basitarsus moderately strongly compressed, the former with about 25 short spines on outer dorsal side; longer spur of hind tibia 5/9 as long as hind basitarsus. Abdomen with 1st tergite strongly and densely punctate, striate-punctate posteriorly, weakly and longitudinally striate on basomedian part, 4/5 as long as wide at apex and about 1.2 times as long as the 2nd, with distinct median longitudinal carinae almost entirely (Fig. 9); 2nd tergite 5/9 as long as wide at apex and about as long as the 3rd, strongly and longitudinally striate-punctate, sparsely punctate on apical part, with weak but distinct median longitudinal carinae on about 1/2 (Fig. 9); 3rd tergite 1/2 as long as wide at apex, striate-punctate basally, sparsely punctate apically, the carina between spiracle and base of 3rd tergite weakly raised with fine longitudinal striae; 4th tergite 4/9 as long as wide at apex, weakly mat, densely to sparsely punctate, the punctures much sparser apically; apical margins of 3rd to 7th tergites truncate; epipleura of 3rd and 4th tergites separated by a crease; 5th and subsequent tergites shagreen; spiracle of each abdominal tergite present on tergite; ovipositor sheath polished and bare basodorsally, shagreen medially, strongly granulose with hairs on apical 1/4.

Black. Clypeus yellowish brown, dark brown on basolateral portion and lateral portion and apical margin; mandible yellowish brown, reddish brown to dark brown at both ends; palpi yellowish brown to fuscous, basal two segments of maxillary palpus and 1st segment of labial palpus dark brown; scape and pedicel blackish; flagellum reddish brown to fuscous, darker apically; apical margins of scutellum and postscutellum tinged with whitish yellow. Narrow dorsal margin of eye whitish. Tegula fuscous, a little paler apically. Front coxa blackish, yellowish brown at extreme apex; middle coxa reddish brown ventrally, dark brown dorsally; front and middle trochanters, femora, tarsi and tibial spurs light ferrugineous. Hind leg with coxa, trochanter and femur light ferrugineous, the trochanter a little paler; tibia black, pale yellow on basal 1/6; tibial spur infusate; tarsus black. Ovipositor sheath weakly tinged with reddish brown, a little darker apically. Wings subhyaline, weakly tinged with fuscous; stigma fuscous, a little paler posteriorly.

Length: Body 7.3 mm, forewing 6.7 mm.

♂. Punctuation and striation of body a little weaker than in female. Clypeus about 2.3 times as wide as high; malar space 3/4 as long as basal width of mandible; temple 3/5 as long as wide in lateral view; 1st flagellar segment 4.8 times as long as wide at apex and 1.2 times as long as the 2nd; 7th to 14th flagellar segment with a tyloid each; wing with a small areolet. First abdominal tergite 1.1 times as long as wide at apex and 1.3 times as long as the 2nd, with median longitudinal carinae on basal 3/4; 2nd tergite 5/8

as long as wide at apex, with median longitudinal carinae on basal 1/3; 3rd tergite 5/9 as long as wide at apex; 4th tergite 4/9 as long as wide at apex.

Black. Face, clypeus, mouth parts except for reddish brown apical teeth, malar space, and lower part of temple, yellow; tegula, subtegular ridge, anterolateral marking of mesoscutum, posterodorsal corner of pronotum, prepectus, posterior margin of mesopleurum, ventral side of scape and pedicel, propleurum, and posterior margin of scutellum pale yellow; front and middle legs with coxae and trochanters pale yellow; femora, tibial spurs, and tarsi light yellowish brown. Hind leg with coxa and femur light ferrugineous; trochanter light yellowish brown; tibia infusate, yellowish brown on about basal 1/3; tibial spurs yellowish brown, darker basally; tarsus black.

Length: Body 7.3 mm., forewing 5.9 mm.

Holotype: ♀, Nepal: Larjung, Palpa, 7-v-1968, T. KUMATA leg. Paratype. 1 ♂, Tukucha, Palpa, 7-v-1968, T. MATSUMURA leg.

Distribution: Nepal.

This species is very closely related to the Palearctic and Oriental *E. ornatum* (GRAVENHORST, 1829), but it may be distinguishable from the latter by the propodeum which is densely punctate basally and rugulose apically, the black front coxa in the female and the yellow tegular ridge in the male.

Acknowledgements

I wish to express my hearty thanks to Dr. T. KUMATA (Hokkaido University, Sapporo) and Dr. T. MATSUMURA (Livestock Insect Laboratory, National Grassland Research Institute, Nishinasuno, Tochigi) for collecting ichneumonids during their own tasks as a member of the expedition and giving me the opportunity to examine them. I am also very grateful to Mr. K. ÔHARA (Tokushima Prefectural Museum, Tokushima) for his kindness in offering valuable Formosan material.

References

- GUPTA, M. L. and GUPTA, V. K. 1978. Ichneumonologia Orientalis, part V, The genus *Dusona* of the Indian subregion (Hymenoptera: Ichneumonidae: Porizontinae). Oriental Ins. Monogr., 8: 1-266.
- GUPTA, V. K. 1974. Studies on certain Porizontine ichneumonids reared from economic hosts (Parasitic Hymenoptera). Oriental Ins., 8: 99-116.
- 1987. The Ichneumonidae of the Indo-Australian area (Hymenoptera). Mem. Amer. Ent. Inst., 41: 1-1210.
- and GUPTA, M. L. 1974. The Oriental species of *Cymodusa* Holmgren

- (Hymenoptera: Ichneumonidae). *Oriental Ins.*, 10: 459–496.
- and MAHESHWARY, S. 1977. *Ichneumonologia Orientalis*, part IV. The tribe Porizontini (= Campoplegini) (Hymenoptera: Ichneumonidae). *Oriental Ins. Monogr.*, 5: 1–267.
- KUSIGEMATI, K. 1976. New host records of Ichneumonidae from Japan, *Mem. Fac. Agr. Kagoshima Univ.*, 12: 125–127.
- 1986. New host records of Ichneumonidae (Hymenoptera) from Japan (V). *Kontyû*, 54: 25–28.
- MOMOI, S. 1970. Ichneumonidae (Hymenoptera) of the Ryukyu Archipelago. *Pacific Ins.*, 12: 327–399.
- MORLEY, C. 1913. *Fauna of British India, including Ceylon and Burma. Hymenoptera Vol. III Ichneumonidae.* London., 531 pp.
- TOWNES, H. 1969. The genera of Ichneumonidae, part 3. *Mem. Amer. Ent. Inst.*, 11: 1–300.
- 1971. The genera of Ichneumonidae, part 4. *Ibid.*, 17: 1–372.
- UCHIDA, T. 1957. Beiträge zur Kenntnis der Diplazonien-Fauna Japans und seiner Umgegend (Hymenoptera, Ichneumonidae). *Jour. Fac. Agr. Hokkaido Univ.*, 50: 225–265.

(Received May 25, 1987)