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FURTHER REVISION OF THE GENUS MACROCENTRUS CURTIS IN JAPAN WITH DESCRIPTIONS OF TWO NEW SPECIES*

(HYMENOPTERA, BRACONIDAE)

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In 1932 a revision of the genus *Macrocentrus* Curtis occurring in Japan was given by Watanabe, and the known Japanese forms except for *M. philippinensis* Ashmead (=*M. japonicus* Watanabe) were identified with those known in Europe. Recently Eady & Clark (1964) have fully revised the European forms of this genus. Having read their excellent publication I have keenly felt that Japanese forms should be revised again. In the course of the present study thirteen species have been known to occur in Japan. It seems that Japan, as defined in this work, has a comparatively rich fauna of *Macrocentrus*. It is interesting to note that ten of these species appear to have a wide distributional range extending from Europe to Japan: above all three of them, *M. marginator* (Nees), *M. linearis* (Nees), and *M. grandii* Goidanich, have been also known to occur in North America. Of the rest the one, *M. philippinensis*, is an only Oriental species having been known to occur in the Philippine Islands, Taiwan, China, Korea, and Japan, and the other two are new to science, one being closely related to *M. grandii*, and the other to be placed between *M. marginator* and *M. nidulator* (Nees).

Subfamily **Macrocentrinae**

Genus ***Macrocentrus*** Curtis

Macrocentrus Curtis, Ent. Mag. 1: 187, 1833.

Type-species: (*Macrocentrus bicolor* Curtis, 1833)=*Macrocentrus thoracicus* (Nees, 1811).

The genera *Macrocentrus* Curtis and *Zele* Curtis were formerly treated as components of the subfamily Macrocentrinae. However, Nixon (1938) is the first author who points out that the relationship between the two genera might be not so much close as one considered previously. Recently Muesebeck and Walkley (1951) have referred *Zele* to the other subfamily Helconinae to which *Helcon* Nees and *Cenocoelius* Haliday are also referred. This genus is readily distinguished from *Zele* by the following features:—occiput entirely immargined; eyes not at all emarginate; 1st segment of flagellum much longer than scape; ovipositor usually long, rarely short.

This genus is widely distributed over the world. There are several synonyms of

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this genus: detailed synonymy may be found in Muesebeck and Walkley (1951). So far as their habits are known the species are internal parasites of lepidopterous larvae dwelling in stems, under bark, in flower heads, or in rolled or spun leaves. In *Macrocentrus* are seen two forms solitary and gregarious: in general, the larger species seem to be solitary, while the smaller ones to be gregarious. Polyembryonic development has been known to occur in some gregarious species.

In the present paper are given thirteen species of *Macrocentrus* as inhabitants of Japan. These species can be distinguished by the following key, of which the completion owes much to the key to the European species published by Eady and Clark (1964).

Key to the Japanese species of *Macrocentrus*

1. Tarsal claws with a distinct acute basal lobe, generally toothlike (cf. Figs. 18 & 19) 2
- Tarsal claws simple or with an indistinct basal lobe (cf. Figs. 20 & 21) 6
2. Eyes larger in size, more protuberant; malar space very shorter; temples shorter, converging immediately behind eyes (cf. Fig. 9); ocelli usually large. Species with corpus variable in colour from black to testaceous 3
- Eyes smaller in size, less protuberant; malar space longer; temples longer, convex, not strongly converging behind eyes (cf. Fig. 10); ocelli smaller. Species with corpus usually black. . . 4
3. Abdomen with 1st tergite longitudinally striate. Fore wing (Fig. 1) with 1st abscissa of radius originating not so far beyond middle of stigma; 1st abscissa of cubitus slightly sinuate; nervulus clearly postfurcal; 2nd discoidal cell shorter, angulate apically. Antenna without a pale yellow ring.

   Species variable in colour from black to testaceous; thorax not always predominately testaceous. Legs including coxae yellow with hind tibia sometimes fuscous apically. Fore wing (Fig. 1) with 2nd discoidal cell 2 times as long as breadth; submedial cell with a conspicuous hairless patch. Abdomen with 1st tergite a little more than 2 times as long as apical breadth, longitudinally striate-rugose; 2nd tergite and basal half of the 3rd more finely striate; ovipositor as long as or a little longer than corpus, the apex being acute. 5–8 mm. . . . *thoracicus* (Nees)
- Abdomen with 1st tergite transversely striate. Fore wing (Fig. 2) with 1st abscissa of radius originating far beyond middle of stigma; 1st abscissa of cubitus bent at middle towards 1st discoidal cell; nervulus just postfurcal; 2nd discoidal cell longer, rounded apically. Antenna with a broad pale yellow ring.

   Head and apical segments of abdomen black. Thorax and three basal segments of abdomen yellow with fuscous markings, rarely almost black. Legs including coxae yellow; hind femur and tibia tinged with brown. Fore wing (Fig. 2) with 2nd discoidal cell longer, a little less than 3 times as long as breadth; submedial cell with a conspicuous hairless patch, and often with an infuscation. Abdomen with 1st tergite more slender, almost 3 times as long as apical breadth; 2nd tergite and basal half of the 3rd longitudinally striate; ovipositor as long as or a little shorter than corpus, the apex being acute. 6–8 mm. . . . . *philippinensis* Ashmead
4. Fore wing (Fig. 4) with 1st abscissa of radius originating far beyond middle of stigma; inner side of stigma usually more than 2 times as long as outer side. Head with face more sculptured and almost flat; eyes and ocelli more often larger; corpus less shining.

   Eyes medium in size; ocelli usually large, the distance between posterior ocelli less than 2 times as long as diameter of an ocellus. Antenna with apical segments long. Fore wing with 2nd discoidal cell 2 times as long as apical breadth; submedial cell with a conspicuous hairless patch and with an infuscation. Abdomen with 1st tergite short, less than 2 times as long as apical breadth; 1st and 2nd tergites and basal half of the 3rd longitudinally striate; ovipositor a little longer than corpus, the apex being slender and acute. 7–9 mm. . . . *marginator* (Nees)
- Fore wing (cf. Figs. 3 & 5) with 1st abscissa of radius originating not so far beyond middle

of stigma; inner side of stigma usually less than 2 times as long as outer side. Head with face convex, more finely punctate; eyes and ocelli smaller. Corpus more shining. 5

5. Fore wing (Fig. 5) with 2nd discoidal cell shorter, less than 2 times as long as broad; submedial cell with a conspicuous hairless patch apically. Eyes and ocelli larger in size; antenna with apical segments short in female. Fore coxa usually dark brown to black, rarely reddish yellow. Abdomen with 1st tergite more robust, not more than 2 times as long as apical breadth; ovipositor a little longer than corpus with the apex being more robust and less acute. 6–8 mm. . . . . *nidulator* (Nees)

– Fore wing (Fig. 3) with 2nd discoidal cell longer, usually more than 2 times as long as broad; submedial cell entirely hairy. Eyes and ocelli smaller in size; antenna with apical segments longer in both sexes. Fore coxa usually yellow. Abdomen with 1st tergite more slender, more than 2 times as long as apical breadth. Ovipositor a little longer than corpus, the apex being more slender and more acute. 6–8 mm. . . . . *pilosus*, sp. nov.

6. Antenna (Fig. 14) shorter than corpus with basal segments of flagellum shorter; fore femur shorter, more robust, not or scarcely curved; palpi shorter.

Head smooth and shining dorsally; temples rounded, not converging immediately behind eyes; eyes and ocelli small in size; maxillary palpi with 5th segment a little shorter than the 6th; labial palpi small; antenna shorter than corpus with 28–31 segments. Fore wing with stigma fuscous, pale at base. Abdomen with basal three tergites more or less weakly longitudinally striate; ovipositor a little longer than corpus, the apex apparently narrowed, sinuate. Species with corpus black, more often thorax tinged with reddish yellow. 3 mm. . . . . *blandus* Eady & Clark

– Antenna (cf. Figs. 13, 15, 16 & 17) as long as or longer than corpus, with basal segments of flagellum longer; fore femur longer, more slender, usually curved; palpi longer. 7

7. Mandible long and slender, not or scarcely twisted distally and both teeth acute, the 1st tooth much longer than the 2nd. Ovipositor short, about as long as abdomen, the apex being narrowed and sinuate.

Head smooth and shining dorsally; temples rounded, not converging immediately behind eyes; eyes medium in size; maxillary palpi clearly longer than head; clypeus strongly protuberant; antenna as long as corpus. Fore wing with stigma fuscous, broadly pale at base. Abdomen with 1st and 2nd tergites and basal half of the 3rd longitudinally striate. Species with corpus black; legs usually yellow; mesonotum sometimes tinged with reddish brown. 2.5–3 mm. . . . . *equalis* Lyle

– Mandible stout, strongly twisted distally, the 2nd tooth sometimes not acute; ovipositor usually as long as or a little longer than corpus, with a pre-apical notch dorsally. 8

8. Larger species resembling *thoracicus*, from which it differs in the shape of tarsal claws. Head with temples short, converging immediately behind eyes; teeth of mandible longer, acute, the 1st tooth apparently longer than the 2nd.

Head transverse with temples contracted behind eyes like *thoracicus*; eyes and ocelli very large; vertex weakly rugose; tarsal claws (Fig. 20) simple with an indistinct basal lobe. Fore wing with submedial cell hairless apically; 2nd discoidal cell 2 times as long as broad; nervulus clearly postfurcal. Abdomen with 1st and 2nd tergites and basal half of the 3rd longitudinally striate; ovipositor longer than corpus. Species with corpus black, sometimes thorax tinged with reddish yellow. Legs including coxae yellow; stigma of fore wing dark brown. 10 mm. . . . . *gibber* Eady & Clark

– Smaller species. Teeth of mandible (cf. Figs. 22, 23, 24 & 26) shorter and broader, the 2nd tooth scarcely acute, if acute as *resinellae*, then mesoscutum with prescutum shorter and broader. . . 9

9. Mandible (Fig. 24) with teeth longer, both acute, never subequal; mesoscutum with prescutum apparently shorter and broader.

Head transverse dorsally, with temples convex, subparallel behind eyes; eyes medium in size, not strongly protuberant; ocelli medium in size; clypeus flat. Fore wing with nervulus just postfurcal. Abdomen with 1st and 2nd tergites, and basal half of the 3rd strongly longi-

tudinally striate; ovipositor a little longer than corpus. Species variable in colour from black to reddish yellow; fore wing with stigma (Fig. 7) dark brown, pale at extreme base. 4 mm. . . . . *resinellae* (Linné)

– Mandible with teeth shorter, the 2nd tooth scarcely acute; mesoscutum with prescutum longer and narrower. 10

10. Mandibles (cf. Figs. 22 & 23) very short and stout, hardly touching each other when closed; 1st tooth of mandible hardly longer than the 2nd. 11

– Mandibles (cf. Fig. 26) longer and more slender, touching each other when closed; 1st tooth of mandible clearly longer than the 2nd. 12

11. Eyes larger; ocelli medium in size; antenna (Fig. 16) a little longer than corpus in both sexes with apical segments longer than broad; vertex not protuberant in frontal view.

Species variable in colour from black to testaceous. Head usually dark brown to black. Abdomen usually with a pale band on apical half of 3rd tergite. Stigma of fore wing entirely fuscous, rarely pale at extreme base. 4 mm. . . . . *grandii* Goidanich

– Eyes smaller; ocelli smaller in size; antenna (Figs. 13 & 15) a little shorter than corpus with apical segments as long as broad in female, while longer than corpus with apical segments longer than broad in male; vertex (Fig. 12) much protuberant in frontal view.

Species with corpus black. Abdomen with 2nd tergite on apical half and 3rd tergite yellowish. Stigma of fore wing (Fig. 6) fuscous, pale at extreme base. 4 mm. . . . . *mandibularis*, sp. nov.

12. Eyes (Fig. 11) larger; ocelli larger, the distance between posterior ocelli and eye-margin 1.3 times as long as diameter of an ocellus; face less transverse.

Species variable in colour from black to testaceous; stigma of fore wing (Fig. 8) fuscous, pale at both ends in various degrees. 4 mm. . . . . *linearis* (Nees)

– Eyes smaller; ocelli smaller, the distance between posterior ocelli and eye-margin 2.5 times as long as diameter of an ocellus; face more transverse.

Species with corpus dark brown to black; thorax sometimes tinged with testaceous; stigma of fore wing fuscous, only pale at extreme base. 4 mm. . . . . *pallipes* (Nees)

1. ***Macrocentrus thoracicus*** (Nees) (Figs. 1 & 9)

Bracon thoracicus Nees, Mag. Ges. nat. Fr. Berlin 5: 14, 1811.

Macrocentrus bicolor Curtis, Ent. Mag. 1: 188, 1833.

Macrocentrus gracilipes Telenga, Arb. physiol. angew. Ent. 2: 271, 1935.

Macrocentrus marginator: Watanabe, Ins. Mats. 6: 131, 1932; idem, Jour. Facul. Agr., Hokkaido Imp. Univ. 42: 157, 1937. (Partim).

Macrocentrus abdominalis: Watanabe, Ins. Mats. 6: 131, 1932.

Macrocentrus thoracicus: Haeussler, U. S. Dept. Agr., Tech. Bull. 726: 15, 1940.

Macrocentrus thoracicus: Eady & Clark, Ent. Gazet. 15: 111, 1964.

This species is very variable in size and colour as Eady & Clark (1964) already stated. In Japan variation seems to be more conspicuous than in Europe. In the specimens examined the corpus is 5–9 mm. in length, and from black to testaceous variously in colour. The thorax is not always predominately testaceous but sometimes almost entirely black. In some specimens the whole corpus is black or testaceous. Generally, the black form is larger in size, being found all over Japan, Saghalien and Korea, while the testaceous form is smaller, being found in the southern part of Japan. The 1st tergite of the abdomen is very variable in length.

Specimens examined. A lot of specimens have been examined, their localities being as follows:—Saghalien (3♀♀): Kawakami, Ichinosawa & Maoka. Japan (65♀♀, 11♂♂): Hokkaido—Sapporo, Jôzankei, Shimamatsu, Uryu, Nukabira, Sounkyo, Asahigawa & Bibai. Honshu—Hiraniwa, Hayachine, Haguro, Tokyo, Shizuoka, Mie, Kyoto

& Osaka. Kyushu—Fukuoka, Hikosan, Kumamoto, Miyazaki, Kagoshima & Amami-oshima. Korea (9♀♀, 1♂): Sambo & Suwon.

Host. This species has been recorded as a solitary parasite of larvae of Tortricidae and Oecophoridae. According to Haeussler (1940) it is parasitic on the twig-infesting larva of *Grapholitha molesta* in Japan and Korea. Bred specimens are seen from the following hosts:—

1) *Depressaria culcitella* Herrich-Schäffer
   Kagoshima, Kyushu, 1♀, 22-v-63, K. Kusigemati leg.
2) *Depressaria* sp. on the flower head of *Angalis ursina*.
   Asahigawa, Hokkaido, 1♀, 1965, S. Suzuki leg.
3) *Choristoneura consiferana* Issiki
   Bibai, Hokkaido, 2♀♀, 19-vi-65, K. Kamijo leg.
4) *Cymolomia hartigiana* (Ratzeburg)
   Bibai, Hokkaido, 1♂, 17-vi-64 & 1♀, 6-vii-64, K. Kamijo leg.
5) *Grapholitha molesta* (Busck)
   Tokyo, 1♀, 18-vi-33, J. Minamikawa leg.
6) *Brachmia macroscopa* Meyrick
   Okinawa, Ryukyu Is., 4♀♀, 1♂, 10-x-40.

Distribution. Europe; Japan; Korea; Ryukyu Is.

2. ***Macrocentrus philippinensis*** Ashmead (Fig. 2)

Macrocentrus philippinensis Ashmead, Proc. U. S. Nat. Mus. 28: 145, 1904.
Macrocentrus japonicus Watanabe, Ins. Mats. 6: 133, 1932.
Macrocentrus japonicus: Watanabe, Kontyû 7: 247, 1937; idem, Ins. Mats. 8: 205, 1934; Chu, 1934 Year Book, Bur. Ent. Hangschow p. 19, 1935; Watanabe, Jour. Facul. Agr., Hokkaido Imp. Univ. 42: 157, 1937; idem, Ins. Mats. 12: 43, 1937.
Macrocentrus philippinensis: Chu, 1934 Year Book, Bur. Ent. Hangschow p. 19, 1935; Watanabe, Kontyû 13: 233, 1939; idem, Ins. Mats. 14: 93, 1940.

On account of the large eyes, the short temples and the tarsal claws with a distinct basal lobe this species appears to be closest to *thoracicus*, from which it is readily distinguished by the colouring of the corpus, by the striation of the 1st tergite of the abdomen and by the venation of the fore wing.

It should be noted that a female specimen from Hokkaido is aberrant, differing from normal ones in colour as follows:—

Corpus black; antenna wholly black without a broad pale yellowish ring; abdomen black except for the venter of basal segments tinged with yellow; fore and middle legs testaceous except for coxae dark brown; hind leg black except for trochanters brownish; and tibia at both ends with spurs and tarsus pale yellow.

Specimens examined. A lot of specimens have been seen, their localities being as follows:—Japan (20♀♀, 15♂♂): Hokkaido—Soranuma-dake (1♀, 21-viii-64, bred from a larva of *Palpita nigropunctalis* by T. Kumata). Honshu—Kyoto, Wakayama, Shizuoka, Tokyo & Chiba. Shikoku—Kochi, Koodasan & Matsuyama. Kyushu—Yoshii-machi & Kagoshima. Korea (3♀♀): Suwon. Taiwan (1♀, 2♂♂): Horisha, Ranrum & Taihoku. China (1♀, 1♂): Yugakujo, North China (Manchuria).

Host. This species has been recorded as a solitary parasite of *Glyphodes pyloalis* (Walker) in Japan, Taiwan and South China, and *Pyrausta diniasalis* (Walker) in North China. On the basis of bred material from Hokkaido *Palpita nigropunctalis* (Bremer)

is added to the host list of this parasite for the first time.

Distribution. Japan; Korea; China; Taiwan; Philippine Islands.

3. ***Macrocentrus marginator*** (Nees) (Figs. 4, 10 & 18)

Bracon marginator Nees, Mag. Ges. nat. Fr. Berlin 5: 14, 1811.

Macrocentrus aegeriae Rohwer, Proc. Ent. Soc. Washing. 17: 56, 1915.

Macrocentrus marginator: Watanabe, Ins. Mats. 6: 131, 1932; idem, Jour. Facul. Agr., Hokkaido Imp. Univ. 42: 157, 1937.

Macrocentrus marginator: Eady & Clark, Ent. Gazet. 15: 113, 1964.

In general structure and colour the specimens (11♀♀) examined agree with an authentic European specimen (1♀) determined by Eady as *marginator*. Variations of the Japanese specimens are as follows:—

Infuscation in submedial cell of fore wing (Fig. 4) present in various degrees; fore coxa usually reddish yellow, but hind coxa wholly black in one female from Sapporo; abdomen with 1st tergite variable in length, in some females rather longer than 2 times as long as apical breadth.

Having examined the specimens determined by Watanabe (1932 & 1937) as *marginator* I have found that most of those specimens are not referred to *marginator* but to *thoracicus*. Moreover, in 1937 on the basis of a specimen (1♀, Kyuhabon, Taiwan, 18-viii-28, K. Kikuchi leg.) I gave Taiwan as a locality of *marginator*, but the specimen should be, in reality, referred to another species.

Specimens examined. Saghalien: Konuma, 1♀, 10-viii-27, K. Tamanuki leg. Kuriles: Etorofu I., 1♀, 1-viii-27, K. Doi leg. Japan: Hokkaido—Sharidake, 1♀, 27-vii-37, C. Watanabe leg.; Sapporo, 1♀, 3-ix-35, T. Uchida leg. & 1♀, 27-viii-63, K. Kusigemati leg.; Soranuma-dake, 2♀♀, 17-vi-67, K. Kusigemati & M. Suwa leg.; Shimamatsu, 3♀♀, 12-vi-67, K. Kusigemati leg.

Host. This species has been recorded as a solitary parasite of larvae of Aegeriidae and Oethrutidae in Europe and North America. No host record has been given in Japan.

Distribution. Europe; Siberia; Saghalien; Kurile Is.; Japan; North America.

4. ***Macrocentrus nidulator*** (Nees) (Fig. 5)

Rogas nidulator Nees, Hymen. Ichn. aff. Monog. 1: 204, 1834.

Macrocentrus nidulator: Eady & Clark, Ent. Gazet. 15: 111, 1964.

On the basis of three specimens (1♀, 2♂♂) examined I give Japan as a locality of *nidulator* for the first time. By courtesy of Eady I have had the opportunity to see an authentic European specimen (1♀) of this species, with which the present female specimen agrees well enough except that the fore coxa is not black but reddish yellow and infuscated basally. The male of this species has not yet been described. The present male specimens, however, resemble closely the female, apart from usual sexual differences, except that the 1st tergite of the abdomen is longer, and that apical segments of the antenna are not so short as in the female. Furthermore, in the present male specimens the fore coxa is dark brown.

Specimens examined. Japan: Honshu—Tokyo, 1♂, 9-x-63, H. Takada leg.; Kyoto, 1♀, 1♂, 28-ix-65, H. Takada leg.

Host. In Europe this species has been recorded as a solitary parasite of larvae of Olethreutidae and Gelechiidae. No bred material has been seen in Japan.

Distribution. Europe; Japan.

5. ***Macrocentrus pilosus***, sp. nov. (Fig. 3 & 19)

♀. Head transverse dorsally with temples convex, subparallel behind eyes; ocelli medium in size, the distance between posterior ocelli 2 times as long as diameter of an ocellus; eyes small, not protuberant; malar space 2 times as long as basal breadth of mandible; vertex smooth and shining; frons with a transverse depression just behind antennae; face slightly convex, closely punctate; tentorial pits small, a little closer to eye-margin than each other; antennae with 47–49 segments, the apical segments being longer than broad; clypeus convex, weakly punctate; maxillary palpi very long, the 4th segment being longer than the 3rd or 6th, and the 5th a little shorter than the 6th; labial palpi with 4th segment 2 times as long as the 3rd.

Mesoscutum smooth and shining, with scattered punctures posteriorly; notaulices very deep, crenulate; scutellum shallowly punctate; mesopleuron almost entirely punctate; metapleuron weakly punctate on upper half and punctate-rugose on lower half. Propodeum transversely rugose. Legs slender; hind femur decurved dorsally; tarsal claws (Fig. 19) with a distinct basal lobe. Fore wing (Fig. 3) with radius originating beyond middle of stigma; ratio of inner side of stigma to outer side 3 : 2; 2nd discoidal cell long, 2 times as long as wide; submedial cell completely hairy.

Abdomen slender; 1st tergite slightly diverging towards apex, about 2.7 times as long as broad at apex, deeply foveolate basally, longitudinally striate-rugose; 2nd tergite and basal half of the 3rd more finely striate. Ovipositor long, one and one-fourth length of corpus, the apex being very acute. Length 7–8 mm.

Black; palpi and tegulae pale yellow; legs including coxae yellow; hind tibia fuscous on apical two-thirds; all tarsi slightly tinged with brown; antenna dark brown to black; wings subhyaline; stigma dark brown.

♂. Agrees with the above-mentioned description of the female, apart from usual sexual differences, except that the corpus is more smooth; abdomen is more slender, the 1st tergite being more widened towards the apex and the striation finer. Length 6–7 mm.

Holotype (♀): Sapporo, 22–ix–65, K. Kusigemati leg. Paratypes: Sapporo, 3♀♀, 1♂, 22–ix–65 & 3♀♀, 20–ix–66, K. Kusigemati leg.; Soranuma-dake, 2♀♀, 23–ix–66, K. Kusigemati leg.; Asahigawa, 1♀, 14–vi–66, bred from a larva of *Epinotia* sp., K. Kamijo leg.; Jôzankei, 1♀, 2–viii–65, K. Kusigemati leg.; Hirasan near Kyoto, 1♀, 3♂♂, 29–ix–65, H. Takada leg.; Kyoto, 1♀, 26–ix–65, H. Takada leg.; Hirakura, Mie-ken, 1♀, 25–v–62, M. Matsuura leg.

Host. A female specimen has been bred from the larva of *Epinotia* sp. living in *Abies sachalinensis*.

This species is to be placed between *maginator* and *nidulator*. It resembles *nidulator* in having its shining corpus, convex face and small ocelli. On the other hand it resembles *marginator* in having its long apical segments of antenna, long ovipositor with the apex acute, and long 2nd discoidal cell. The present species is distinct from both those species in having the 1st tergite of the abdomen longer, the submedial cell completely hairy and the eyes smaller.

6. ***Macrocentrus blandus*** Eady & Clark (Figs. 14 & 25)

Macrocentrus blandus Eady & Clark, Ent. Gazet. 15: 118, 1964.

Macrocentrus infirmus: Watanabe, Ins. Mats. 6: 132, 1932.

This species is new to Japan. Having compared the specimens (11♀♀) examined with paratypes (1♀, 1♂) of *blandus* I have been convinced that they should be identified with *blandus*. The present specimens agree well enough with the original description of *blandus*, but differ in having the following aspects:—

Thorax predominately testaceous; antenna black with 28–33 segments, the basal three segments being testaceous in female; 2nd tergite of abdomen sometimes longitudinally striate almost on whole.

On account of the short 5th segment of the maxillary palpus, the shining, broad face, etc. the Saghalien specimens stated under the name of *Macrocentrus infirmis* (Nees) by Watanabe (1932) should be referred to this species.

Specimens examined. Saghalien (5♀♀): Toyohara, Suzuya-dake, Todoroki-toge, Konuma & Takinosawa. Japan (6♀♀): Hokkaido—Sapporo, 1♀, 3-vii-65, H. Takada leg., & 1♀, 25-viii-65, K. Kusigemati leg.; Shimamatsu, 1♀, 15-vi-65 & 1♀, 14-vi-67, K. Kusigemati leg. Honshu—Shizuoka, 2♀♀, 31-viii-28, C. Watanabe leg.

Host. This species has been recorded as a gregarious parasite of larvae of Noctuidae in Europe. No host record has been given in Japan.

Distribution. Europe; Saghalien; Japan.

7. ***Macrocentrus equalis*** Lyle

Macrocentrus equalis Lyle, Entomologist 47: 261, 1914.
Macrocentrus equalis: Eady & Clark. Ent. Gazet. 15: 120, 1964.

This species is new to Japan. On account of the short ovipositor, the protuberant clypeus, the long maxillary palpi, etc. the specimens (5♀♀) examined should be identified with *equalis*. In these specimens the mesoscutum is reddish brown; antenna with 37 or 38 segments; abdomen with 3rd tergite smooth and shining; fore wing with stigma pale at extreme base.

Specimens examined. Japan: Hokkaido—Tomakomai, 3♀♀, 1-vii-64, H. Takada leg.; Tôya, 1♀, 10-vii-67, K. Kusigemati leg. Honshu—Azuma-yama, 1♀, 3-vii-34, H. Kôno & T. Sawamoto leg.

Host. This species has been known to be a gregarious parasite of Noctuidae in Europe. No host record has been given in Japan.

Distribution. Europe; Japan.

8. ***Macrocentrus gibber*** Eady & Clark (Fig. 20)

Macrocentrus gibber Eady & Clark, Ent. Gazet. 15: 144, 1964.
Macrocentrus marginator: Watanabe, Ins. Mats. 26: 65, 1963.

This species is new to Japan. It was originally described on the basis of two female representatives from Sweden and Austria in Europe. It is closest to *thoracicus* in structure and colour, but differs from the latter in having the simple claws without an distinct basal lobe. Previously it was often confused with species of the *marginator*-group. The specimens recorded under the name of *M. marginator* by Watanabe, 1963, as a parasite of *Rhacionia duplana* should be, in reality, referred to this species.

In the present female specimens (12♀♀) the thorax is not always black as in the original description but sometimes testaceous: in two females from Daisen and Azuma-yama the meso- and metapleura are testaceous. Further, the antennae are 46–50 segmented (56-segmented in the original description).

The male was not previously known. It resembles the female, apart from usual sexual differences, except that the antenna is somewhat elongate, with 49 segments (2♂♂). In all male specimens (4♂♂) examined the thorax is entirely black.

Specimens examined. Japan: Hokkaido—Jôzankei, 1♀, 17-x-30, Y. Ohota leg. Honshu—Azuma-yama, Fukushima-ken, 1♀, 3-vii-34, H. Kôno & T. Sawamoto leg.; Koma, Kanagawa-ken, 1♀, 1♂, 5-vii-62, bred from *Rhacionia duplana*, K. Kato leg.; Kumanotaira, Fukushima-ken, 1♀, 5-vii-24, H. Kôno leg.; Kanaya, Shizuoka-ken, 1♀, 7-v-48, J. Minamikawa leg.; Daisen, Tottori-ken, 1♀, 15-vii-20. K. Takeuchi leg.; Hirakura, Mie-ken, 1♀, 30-v-62, M. Matsuura leg.; Toyohashi, Aichi-ken, 2♀♀, 1♂, K. Kanamitsu leg. Kyushu—Fukuoka, 2♀♀, 1♂, 23-iv-65, K. Nozato leg.; Miyazaki, 1♀, 1♂, 7-iv-66, bred from *Evetria cristata*, Z. Kuranaga leg.

Host. In the original description no host record is given. *Rhacionia duplana* (Hübner) and *Evetria cristata* Walsingham are given as hosts of this parasite for the first time.

Distribution. Europe; Japan.

9. ***Macrocentrus resinellae*** (Linné) (Figs. 7 & 24)

Ichneumon resinellae Linné, Syst. Nat. Ed. 10, 1: 565, 1758.
Macrocentrus punctifrons Thomson, Opusc. ent. 20: 2211, 1895.
Macrocentrus sublaevis Thomson, op. cit. 20: 2212, 1895.
Macrocentrus resinellae: Eady & Clark, Ent. Gazet. 15: 124, 1964.

This species is new to Japan. Having compared a lot of specimens examined with authentic European specimens (1♀, 1♂) of *resinellae* I have come to the conclusion that the present specimens should be identified with *resinellae*. In general appearance this species is very similar to *linearis*, from which it is readily distinguished in the shape of the mandible and prescutum, and in having the stigma of the fore wing fuscous with a pale small spot at the extreme base. In Japan it is variable in colour as in Europe: in specimens from Hokkaido the corpus is entirely black, while in those from the Ryukyu Islands the thorax is predominately testaceous.

Specimens examined. Japan: Hokkaido—Sapporo, 6♀♀, v-58, bred from *Archips piceanus*, M. Inoue leg.; Asahigawa, 5♀♀, 5♂♂, vii-65, bred from *Ariola* sp. (Vernacular name: *Kurotatesuji-hamaki*), K. Kamijo leg., 6♀♀, 19♂♂, vii-65, bred from *Choristoneura coniferana*, K. Kamijo leg. & 4♀♀, vii-65, bred from *Choristoneura diversana*, K. Kamijo leg.; Bibai, 4♀♀, 2♂♂, vi-65, K. Kamijo leg. Ryukyu Is.: Ishigaki-jima, 6♀♀, 7♂♂, bred from *Dioryctia splendidulla*, K. Nozato leg.

Host. This species has been recorded as a gregarious parasite of various lepidopterous larvae of Tortrichidae, Olethreutidae and Pyralidae on *Pinus sylvestris*. On the basis of bred material *Archips piceanus* (Linné), *Choristoneura coniferana* Issiki, *C. diversana* (Hübner), *Dioryctria splendidella* (Herrich-Schäffer) and *Ariola* sp. are given as hosts of this parasite in Japan.

Distribution. Europe; Japan; Ryukyu Is.

10. ***Macrocentrus grandii*** Goidanich (Figs. 16 & 22)

Macrocentrus grandii Goidanich, Boll. Inst. Ent. Univ. Bologna 9: 196, 1937.
Macrocentrus gifuensis auctt.
Macrocentrus abdominalis f. *gifuensis*: Watanabe, Ins. Mats. 6: 131, 1932.
Macrocentrus gifuensis: Watanabe, Jour. Facul. Agr., Hokkaido Imp. Univ. 42: 156, 1937;

idem, Ins. Mats. 18: 66, 1964.

Macrocentrus grandii: Eady & Clark, Ent. Gazet. 15: 121, 1964.

For a long time previous authors have applied the name of *M. gifuensis* to the present species, a parasite of the European corn borer, *Ostrinea nubilalis*. Eady and Clark (1964) are the first authors who point out the wrong usage of the name and give *grandii* as valid name to this species. In general appearance this species is very similar to *linearis* (=*gifuensis*), but it differs from the latter in the shape of the mandible, the size of the ocelli and the colouration of the stigma.

Specimens examined. A lot of specimens have been seen in Japan, Korea and North China in the following localities:—

Japan: Hokkaido—Sapporo. Honshu—Hagurosan, Hayachine, Nachi, Kyoto, Niigata and Nagano. Kyushu—Hikosan and Sobosan. Korea: Suwon. North China (Manchuria): Kokuzan and Daiboshin.

Host. This species has been known to be a gregarious and polyembryonic parasite of *Ostrinia nubilalis* (Hübner) in Europe, Japan, Korea, China and North America. Eady & Clark (1964) give this species as a parasite of larvae of Nymphalidae, Noctuidae and Pyralidae in Europe. *Syllepte ruralis* (Scopoli) has been recorded by Watanabe (1964) as a host of this parasite in Japan.

Distribution. Europe; Japan; Korea; China; North America.

11. ***Macrocentrus mandibularis***, sp. nov. (Figs. 6, 12, 13, 15 & 23)

♀. Head (Fig. 12) transverse in dorsal view, with temples convex, subparallel behind eyes; vertex much protuberant in frontal view, smooth and shining; ocelli small; distance between posterior ocelli 2.5 times as long as diameter of an ocellus; distance between posterior ocelli and eye-margin 3.5 times as long as diameter of an ocellus; face convex, smooth and shining; eyes very small; malar space long, 2 times as long as basal breadth of mandible; clypeus convex, smooth and shining; tentorial pits distinct, oval, lying in deep depression, the distance between them 1.5 times as long as distance from either to eye-margin. Antenna (Fig. 13) short, as long as corpus, with 36 segments; 1st segment of flagellum about 9 times as long as broad, and the 4th about 7 times as long as broad; apical segments short, about 1.5 times as long as broad. Mandibles stout, short, hardly touching each other, with teeth very short, subequal, the 1st tooth a little longer than the 2nd like *grandii*. Maxillary palpus longer than head; 3rd segment longer than the 4th; 4th and 6th segments subequal in length; 5th a little shorter than the 6th. Labial palpus with apical segment longest, 1.8 times as long as the 3rd.

Thorax with mesoscutum smooth and shining with prescutum long and narrow in dorsal view; notaulices deep, weakly crenulate; scutellum smooth and shining; mesopleuron broadly punctate-rugose medially; metapleuron punctate-rugose. Propodeum irregularly transversely rugose. Legs slender; fore femur decurved dorsally; tarsal claws simple. Fore wing (Fig. 6) with radius originating just beyond middle of stigma; 1st abscissa of radius half as long as the 2nd, which is equal to 2nd intercubitus in length; 2nd cubital cell narrowed towards apex.

Abdomen with 1st tergite slender, 3 times as long as apical breadth; 1st and 2nd tergites and basal half of the 3rd longitudinally striate; thyridia of 2nd tergite long and narrow, situated at about middle; ovipositor longer than corpus, with apex acute.

Black; mandibles except for apex and tegulae yellow; palpi brown; antennae yellow, darkened towards apex. Legs yellow with femora and tibiae apically and tarsi fuscous. Abdomen with 2nd tergite on apical half, 3rd tergite on whole and venter of basal segments yellowish. Length 4 mm.

♂. Differs from the female, apart from usual sexual differences, only in the antenna as below:—

Antenna elongate, longer than corpus, with 36 or 37 segments; scape and pedicel yellow; flagellum dark brown with apical segments long, 2 times as long as breadth like *grandii*.

Holotype (♀) and paratypes (9♀♀, 6♂♂): Omagari, Akita-ken, 23-viii-64, bred from a larva of *Archips fuscocupreanus*, T. Hidaka leg. Paratype (1♀): Sapporo, 13-viii-64, K. Kusigemati leg.

Host. This species has been bred from the larva of *Archips fuscocupreanus* Walsingham living in the rolled leaf of *Agrostis* sp.

This species resembles closely *M. grandii* in the shape of the mandible, but is readily distinguished from the latter by the longer malar space in both sexes and by the shorter antenna in the female.

12. ***Macrocentrus linearis*** (Nees) (Figs. 8, 11, 17, 21 & 26)

Ichneumon abdominalis Fabricius, Ent. System. 2: 183, 1793 (nec Geoffroy. in Fourcroy, Entom. Paris 2: 409, 1785).

Bracon linearis Nees, Mag. Ges. nat. Fr. Berlin 5: 13, 1811.

Ichneumon fissura Thunberg, Mém. Acad. imp. Sci. St.-Petersb. 8: 261, 1822.

Macrocentrus iridescens French, Canad. Ent. 12: 43, 1880. **Syn. nov.**

Macrocentrus gifuensis Ashmead, Proc. U. S. Nat. Mus. 30: 191, 1906. **Syn. nov.**

Macrocentrus amicroploides Viereck, Proc. U. S. Nat. Mus. 43: 579, 1912. **Syn. nov.**

Macrocentrus abdominalis f. *pallidipes*: Watanabe, Ins. Mats. 6: 132, 1932.

Macrocentrus linearis: Eady & Clark, Ent. Gazet. 15: 121, 1964.

Having compared the Japanese material examined with authentic European specimens (2♀♀) of *linearis* and North American specimens (3♀♀) of *iridescens* (=*amicroploides*) I have been convinced that all specimens should be referred to the same species. Furthermore, Muesebeck who has compared specimens of *gifuensis* including its type with those of *iridescens* and *linearis* suggested me that the three names might apply to a single species. Thus, I am much inclined to the opinion that *gifuensis*, *iridescens* and *amicroploides* should be supressed as synonyms of *linearis*.

This species is very variable in colour from testaceous to black. The stigma of the fore wing is usually fuscous with both ends pale in various degrees. In general, the black form seems to occur in Hokkaido and the testaceous one to occur in Honshu and Kyushu.

Specimens examined. A lot of specimens have been seen in Japan, their localities being as follows:—

Japan: Hokkaido—Sapporo, Jôzankei, Nopporo, Kamuikotan & Kanayama. Honshu—Omagari, Hayachine, Kanaya & Niigata. Kyushu—Kawakami, Miyazaki-ken.

Host. This species has been recorded as a gregarious parasite of larvae of Lymantridae, Thyatridae, Tortricidae, Gelechiidae and Coleophoridae in Europe, and those of Geometridae, Tortricidae, Olethreutidae and Plutellidae in North America. In Japan this species has been bred from the following lepidopterous larvae:—

1) *Pandemis heparana* (Schiffermüller)
Sapporo, 20♀♀, 17-vii-30, C. Watanaae leg.
2) *Archips longicellana* Walsingham
Sapporo, 15♀♀, vii-15, S. Kuwayama leg.
3) *Homona magnamia* Diakonoff
Kanaya, Shizuoka-ken, 5♀♀, 10-vii-36, T. Kaneko leg.

Distribution. Europe; Japan; North America.

13. ***Macrocentrus pallipes*** (Nees)

Bracon pallipes Nees, Mag. Ges. nat. Fr. Berlin 5: 14, 1811.
Macrocentrus pallipes: Eady & Clark, Ent. Gazet. 15: 122, 1964.

This species is new to Japan. Having compared the specimens (32♀♀) examined with an authentic European specimen (1♀) of *pallipes* I have come to the conclusion that the present material should be identified with *pallipes*. In the specimens examined the meso- and metapleura, the 2nd and 3rd tergites of the abdomen are tinged with brown; scape and pedicel pale yellow; stigma of the fore wing fuscous, only pale at extreme base; malar space longer than in *linearis*; ocelli smaller, the distance between a posterior ocellus and eye-margin being 2.5 times as long as diameter of an ocellus.

Specimens examined. Japan: Hokkaido—Asahigawa, 32♀♀, 24-vii-64, S. Suzuki leg.

Host. This species is a gregarious parasite having been bred from Oecophorid and Olethreutid larvae in rolled or between spun leaves in Europe. In Japan the present material has been bred from a Tortricid larva in the rolled leaf of *Cirsium boreale*.

Distribution. Europe; Japan.

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Host List

Host	Parasite
Nymphalidae	
**Vanessa atalanta* (Linné)	*M. grandii* Goidanich
Noctuidae	
**Amathes triangulum* (Hufnagel)	*M. equalis* Lyle
**Dasypolia templi* (Thunberg)	*M. blandus* Eady & Clark
**Gortyna petasitis* (Doubleday)	"
**Plusia* sp.	*M. grandii* Goidanich
Lymantriidae	
**Euproctis similis* (Fuessly)	*M. linearis* (Nees)

* This host-relationship occurs in Europe (after Eady & Clark, 1964).

Host	Parasite
Thyatiridae	
**Achlya flavicornis* (Linné)	*M. linearis* (Nees)
Geometridae	
***Ennomos subsignarius* (Hübner)	*M. linearis* (Nees)
Aegeriidae	
**Aegeria chrysidiformis* (Esper)	*M. marginator* (Nees)
**A. culiciformis* (Linné)	"
**A. flaviventris* (Staudinger)	"
**A. formicaeformis* (Esper)	"
**A. speciformis* (Schiffermüller)	"
**A. vespiformis* (Linné)	"
***Ramosia tipuliformis* (Clerck)	"
***Sanninoidea exitiosa* (Say)	"
***Synanthedon castaneae* (Busck)	"
***S. pictipes* (Grote & Robinson)	"
***Thamnosphecia americana* (Beutenmüller)	"
Pyralidae	
Dioryctria splendidella (Herrich-Schäffer)[1]	*M. resinellae* (Linné)
Glyphodes pyloalis (Walker)	*M. philippinensis* Ashmead
Ostrinia nubilalis (Hübner)[2]	*M. grandii* Goidanich
Palpita nigropunctalis (Bremer)	*M. philippinensis* Ashmead
Pyrausta diniasalis (Walker)	"
Syllepte ruralis (Scopoli)[1]	*M. grandii* Goidanich
Tortricidae	
***Archips argyrospilus* (Walker)	*M. linearis* (Nees)
***A. cerasivoranus* (Fitch)	"
***A. conflictanus* (Walker)	"
**A. crataeganus* (Hübner)	"
***A. fractivittanus* (Clemens)	"
A. fuscocupreanus Walsingham	*M. mandibularis*, sp. nov.
**A. hebenstreitellus* (Walker)	*M. linearis* (Nees)
A. longicellanus Walsingham	"
**A. oporanus* (Linné)	"
A. piceanus (Linné)	*M. resinellae* (Linné)
***A. rosaceanus* (Harris)	*M. linearis* (Nees)
***A. rosanus* (Linné)	"
**A. xylosteanus* (Linné)	"
**A. xylosteanus* (Linné)	*M. thoracicus* (Nees)
Ariola sp.	*M. resinellae* (Linné)
Choristoneura coniferana Issiki	*M. thoracicus* (Nees)
C. coniferana Issiki	*M. resinellae* (Linné)
C. diversana (Hübner)	"
***C. fumiferana* (Clemens)	*M. linearis* (Nees)
Homona magnaima Diakonoff	"
**Lozotaenia forsterana* (Fabricius)	"
**Pandemis cerasana* (Hübner)	"

** This host-relationship occurs in North America (after Muesebeck & Walkley, 1951 or Muesebeck, 1958 & 1967).

1) This host-relationship occurs in Europe and Japan.

2) This host-relationship occurs in Europe, Asia & North America.

Host	Parasite
Pandemis heparana (Schiffermüller)	*M. linearis* (Nees)
**Tortrix viridana* Linné	"
Olethreutidae	
Cymolomia hartigiana (Ratzeburg)	*M. thoracicus* (Nees)
**Epinotia caparana* (Fabricius)	*M. marginator* (Nees)
**E. sordidana* Hübner	"
**E. sordidana* Hübner	*M. thoracicus* (Nees)
E. sp.	*M. pilosus*, sp. nov.
**Eucosma hohenwartiana* Schiffermüller	*M. nidulator* (Nees)
Evetria cristata Walsingham	*M. gibber* Eady & Clark
Grapholitha molesta (Busck)	*M. thoracicus* (Nees)
***Gretchiena bolliana* (Slingerland)	*M. marginator* (Nees)
**Hedya lacunana* (Schiffermüller)	*M. pallipes* (Nees)
**H. variegana* Hübner	"
**H. variegana* Hübner	*M. thoracicus* (Nees)
***Laspeyresia cupressana* (Kearfoott)	*M. marginator* (Nees)
**Lathronympha strigana* (Fabricius)	"
**Petrova resinella* (Linné)	*M. resinellae* (Linné)
Rhacionia duplana (Hübner)	*M. gibber* Eady & Clark
**Sciaphila branderiana* (Linné)	*M. thoracicus* (Nees)
***Spilonota ocellana* Dennis & Schiffermüller	*M. linearis* (Nees)
***Zeiranera ratzeburgiana* Saxesen	*M. marginator* (Nees)
Oecophoridae	
**Agonopterix alstroemeriana* (Clark)	*M. thoracicus* (Nees)
**A. angelicella* Hübner	"
**A. hypericella* Hübner	*M. pallipes* (Nees)
**Depressaria apiella* Hübner	*M. thoracicus* (Nees)
D. culcitella Herrich-Schäffer	"
**D. heracliana* DeGeer	"
D. sp.	"
**Diurnea fagella* (Fabricius)	"
Gelechiidae	
Brachmia macroscopa Meyrick	*M. thoracicus* (Nees)
**Epithectis mouffetella* Schiffermüller	*M. linearis* (Nees)
**Exoteleia dodecella* (Linné)	*M. resinellae* (Linné)
**Metzneria metzneriella* Stainton	*M. nidulator* (Nees)
Celeophoridae	
**Coleophora ibipennella* Zeller	*M. linearis* (Nees)
Plutellidae	
***Harpipteryx frustrella* (Walsingham)	*M. linearis* (Nees)
***H. xylostella* (Linné)	"

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Addendum

As a supplement to the foregoing statement an additional note will be given hereinafter. Recently I have received several specimens belonging to *Macrocentrus* from Dr K. Kamijo for identification. Having examined the specimens I have been convinced that they should be identified with the European species, *M. buolianae*, which is new to Japan.

14. ***Macrocentrus buolianae*** Eady & Clark

Macrocentrus buolianae Eady & Clark, Ent. Gazet. 15: 122, 1964.

This species was originally described from West Germany, Europe, as a parasite of *Evetria buoliana*. On account of the strongly contracted temples and the large eyes this species is very similar to *thoracicus* and *gibber*. It is, however, readily distinguished from the former in its smaller size and in having the simple claws, and from the latter in its smaller size and in the shape of the mandible. In size and colouring this species rather resembles *linearis*, from which it differs in the shape of the mandible, the shape of the mesoscutum and the more contracted temples.

The specimens examined agree well enough with the original description of

buolianae. On the basis of the present material of Japan, however, a short information may be given below:—

Head, metanotum, propodeum and abdomen dark brown; 3rd abdominal tergite on apical third and following tergites slightly tinged with yellowish brown; thorax and legs testaceous; fore wing (♀) with stigma pale yellow except for fuscous patch in middle, and that (♂) fuscous pale yellow at both ends. Antenna (♀) long and slender, with 47–49 segments, and that (♂) shorter and stouter than in female, with 45 or 46 segments. Fore wing with nervulus just postfurcal. Mesoscutum with prescutum truncate and declivous anteriorly. Length 5 mm. (♀) & 4.5 mm. (♂).

Specimens examined. Japan. Honshu—Morioka, 6 ♂♂, 12-vii-61 & 10 ♀♀, 21-vii-67, bred from larvae of *Archips piceanus*, H. Sato leg.

Host. This species has been known as a parasite of *Evetria buoliana* Schiffermüller (Olethreutidae) in Europe. On the basis of the present material *Archips piceanus* (Linné) (Tortricidae) is added to the host list of this parasite for the first time.

Distribution. Europe; Japan.

In my own key mentioned above *M. buolianae* runs directly to *M. resinellae* in couplet 9, but may easily be distinguishable by the characters I give in the revised couplet, below: —

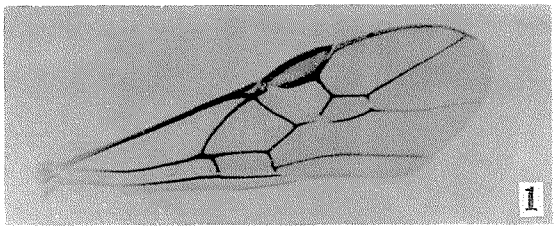
9. Mandible (cf. Fig. 24) with teeth longer, both acute, never subequal; mesoscutum with prescutum apparently shorter and broader. 9a
- Mandible with teeth shorter, the 2nd tooth scarcely acute; mesoscutum with prescutum longer and narrower. 10

9a. Head less transverse, with temples convex, subparalleled behind eyes; ocelli smaller; eyes medium in size, less prominent; clypeus not or weakly differentiated in profile and clearly flattened distally; mesoscutum with prescutum not truncate anteriorly. Corpus dark brown to black, sometimes thorax reddish brown. 4 mm. . . . . *resinellae* (Linné)
- Head strongly transverse with temples converging immediately behind eyes; ocelli larger; eyes large in size, more prominent; clypeus differentiated in profile, convex; mesoscutum with prescutum truncate anteriorly. Corpus testaceous, with head, metanotum, propodum and abdomen dark brown. 4.5–5 mm. . . . . *buolianae* Eady & Clark

Explanation of plates

Plate I. Figs. 1–5: Fore wing (♀). 1. *Macrocentrus thoracicus*; 2. *M. philippinensis*; 3. *M. pilosus*; 4. *M. marginator*; 5. *M. nidulator*. Figs. 6–8: Fore wing (♀), stigma. 6. *M. mandibularis*; 7. *M. resinellae*; 8. *M. linearis*.

Plate II. Figs. 9–10: Head, dorsal view (♀). 9. *M. thoracicus*; 10. *M. marginator*. Figs. 11–12: Head, frontal view (♀). 11. *M. linearis*; 12. *M. mandibularis*. Figs. 13–17: Antenna. 13. *M. mandibularis* (♀); 14. *M. blandus* (♀); 15. *M. mandibularis* (♂); 16. *M. grandii* (♀); 17. *M. linearis* (♀). Figs. 18–21: Tarsal claw of hind leg (♀). 18. *M. marginator*; 19. *M. pilosus*; 20. *M. gibber*; 21. M. linearis. Figs. 22–26: Mandible (♀). 22. *M. grandii*; 23. *M. mandibularis*; 24. *M. resinellae*; 25. *M. blandus*; 26. *M. linearis*.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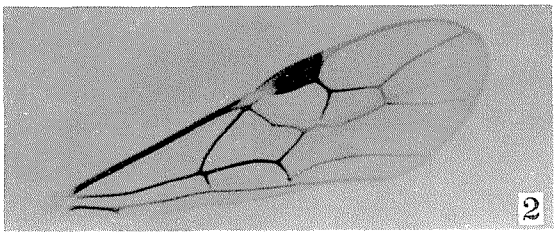
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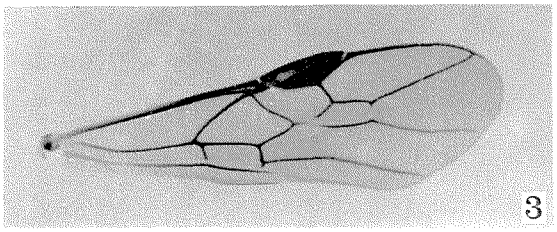
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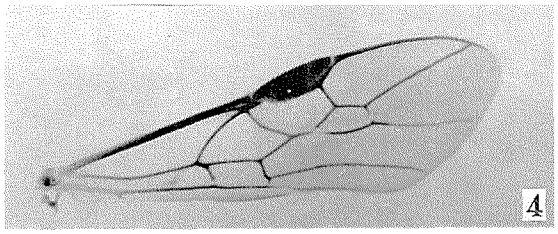
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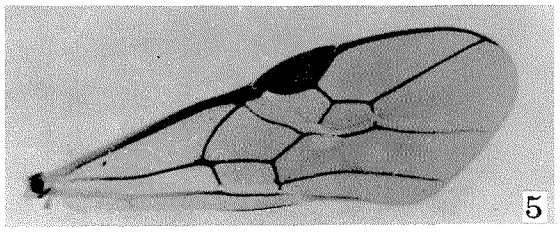
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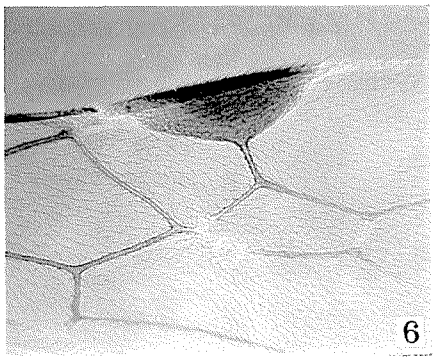
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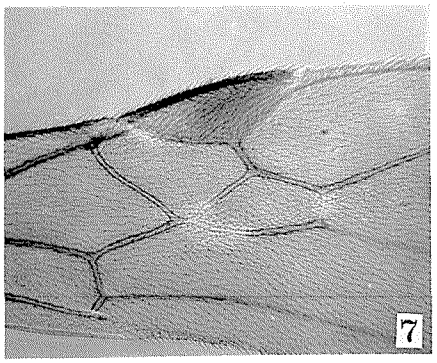
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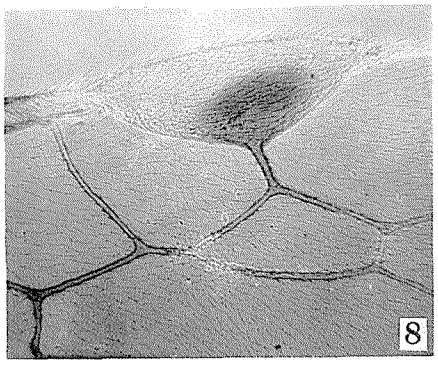
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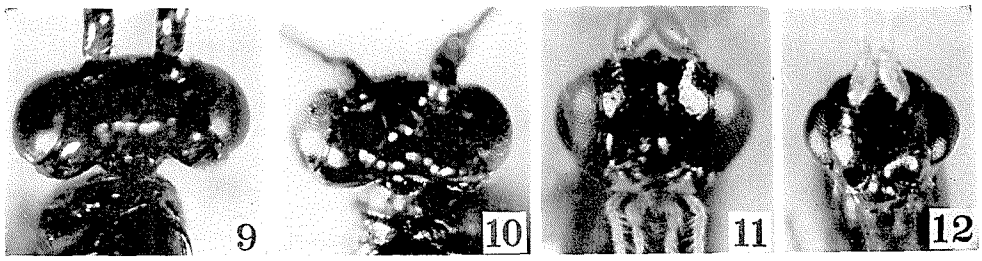
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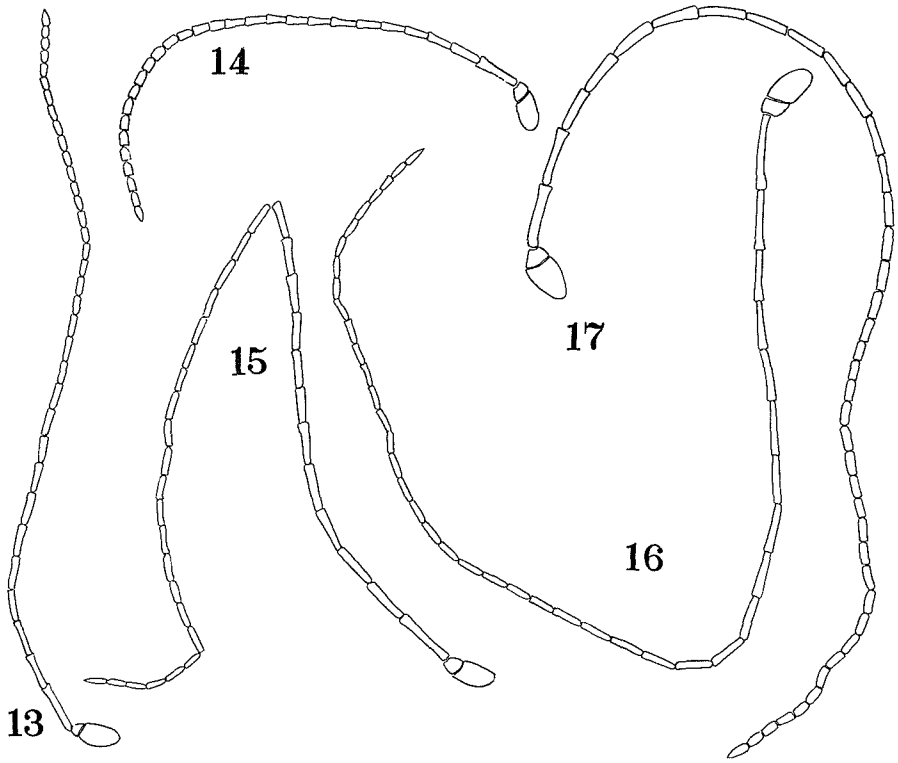
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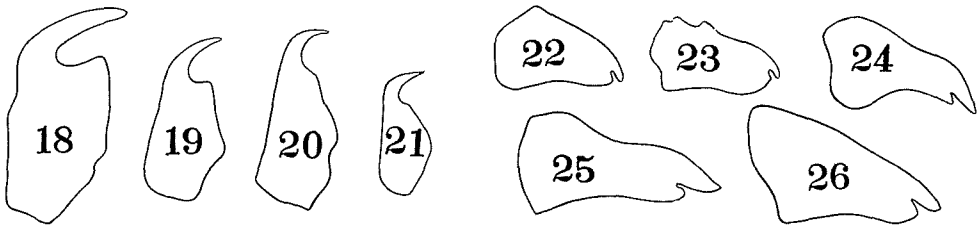
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