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NOTES ON THE JAPANESE *CARCELIA* AND *CALOCARCELIA* (Diptera: Tachinidae)[1)]

By Hiroshi Shima

Entomological Laboratory, Facuty of Agriculture, Kyushu University

In the previous paper I reported Japanese *Calocarcelia* Townsend and *Eucarcelia* Baranov (Shima, 1968). Since then I have been able to examine 8 known species of the genus *Carcelia* Robineau-Desvoidy from Japan. In the following lines I describe a new, redescribe a known species of the genus *Carcelia* and give a distinguishing key to the Japanese species. A new species described below belongs to the subgenus *Carcelina* Mesnil, which is characteristic in the absence of posterodoral seta of hind coxa. As to the subgenus *Carcelina*, a single species, *C.* (*Carcelina*) *pallidipes* Uéda, has been known from Japan. This species is, however, very similar to *Calocarcelia excisoides* Mesnil and may be a synonym of the latter. But, at the moment I can not determine whether this is a distinct species or not. I have also been able to examine a female specimen of *Calocarcelia hirsuta* Baranov, which has not been known to us. I give some distinguishing characters of the female of the species below.

Before going further I wish to express my hearty thanks to Prof. K. Yasumatsu and Prof. Y. Hirashima of the Entomological Laboratory, Kyushu University, for their constant guidance and encouragement. I am also much indepted to Dr. S. Takano of Sapporo City, Dr. M. Shibuya of Kagoshima City, Prof. E. Ninomiya of Senshu University, Prof. C. Watanabe of Hokkaido University and Dr. K. Baba of Niigata Pref., for their kind help in literature and in other ways and for their valuable suggestions. My deep thanks are due to Dr. D. M. Wood of the Entomology Research Institute, Canada Department of Agriculture, for the loan of many valuable specimens to compare with the Japanese species. Acknowledgment is also made to the entomologists who kindly offered me many specimens.

Genus **Carcelia** Robineau-Desvoidy

(Type species: *Tachina lucorum* Meigen, 1824 = *T. gnava* Meigen, 1824. Subsequent designation by Robineau-Desvoidy in 1863)

Carcelia Robineau-Desvoidy, 1830, Mém. Akad. Sci. Inst. France II: 176.

Chaetolyga Rondani, 1856, Dipt. Ital. Prodr. I: 66.

Bremia Robineau-Desvoidy, 1863, Hist. nat. Env. Paris I: 243.

Euryclaea Robineau-Desvoidy, 1863, Ibid.: 290.

[1)] Contribution Ser. 2, No. 297, Entomological Laboratory, Kyushu University.

Senometopia Macquart, 1883, Mém. Soc. Sci. Lille : 296 (partim).

Pelmatomyia Brauer & Bergenstamm, 1889, Denkschr. Akad. Wien LVI: 88.

Paraexorista Brauer & Bergenstamm, 1889, Ibid.: 163 (partim).

Sisyropa Brauer & Bergenstamm, 1889, Ibid.: 163 (partim).

Chaetomyia Brauer & Bergenstamm, 1889, Ibid. LVIII: 317.

Isocarcelia Villeneuve, 1926, Ann. Soc. Ent. Belg. LXVI: 197.

Senexorista Townsend, 1927, Suppl. Ent. XVI: 63.

Isocarceliopsis Baranov, 1934, Trans. R. ent. Soc. Lond. LXXXII: 406.

Head almost black in ground color, with whitish, greyish white or yellowish pollinosity; antenna almost black; palpus yellow, at most darkened basally. Vertex narrower in male than in female; face well concave; occiput very flattened. Ocellar bristle strong; 2 reclinate inner orbital bristles; outer orbital one absent in male; parafrontal with hairs; parafacial usually bare; facial ridge with several fine setae on its lower 1/4; upper occiput without any black setae behind postocular row; eye with dense long hairs.

Thorax almost black, postalar callus sometimes reddish, with greyish yellow, greyich white or yellowish pollinosity; scutellum reddish at least posteriorly. Propleura and barette bare; prosternum with several fine hairs; 3-4 humerals, of which 3 basals are usually in a line; 3+3 acrostichals; 3+4 dorsocentrals; prealar stronger than 1st postsutural intraalar; 1+1 sternopleurals; scutellum with 4 pairs of marginal (basal, lateral, subapical and apical) scutellar bristles and a pair of preapical scutellar bristles.

Wing hyaline, sometimes with very slightly brownish tinge anteriorly; basicosta black or reddish; veins brown; calypter white or yellowish white. Costal spine indistinct; 2nd costal sector bare ventrally; basal portion of vein R_{4+5} with a few fine setae. Cell R_5 opened before wing tip.

Legs black, tibia sometimes reddish at least interiorly; pulvillus yellowish. Hind coxa with several fine setae on its posterodorsal margin (in the subgenus *Carcelina* such setae absent); fore tibia usually with 2 posterior setae; mid-tibia with 1-2 anterodorsal, 2 posterodorsal and 1 ventral setae. Fore claw and pulvillus in male rarely shorter than 5th tarsomere, in female very short.

Abdomen black, sometimes broadly reddish on sides of 2nd to 4th terga, with greyish white or yellowish pollinosity. Second tergum excavated to hind margin on dorsum, with 2-4 median marginal bristles; intermediate abdominal terga sometimes with discal bristles.

Key to the Japanese species of the genus *Carcelia*

1. Hind coxa with several fine setae on posterodorsal margin .... Subgenus *Carcelia* s. str. ...3
- Hind coxa bare posterodorsally; pollinosity usually golden yellowish .... Subgenus *Carcelina* Mesnil ...2

2. Basicosta reddsh yellow; 1st antennal segment entirely and 2nd segment at least interiorly reddish; 2 postvertical setae on each side; sides of 2nd to 4th abdominal terga reddish; vertix nearly 3/4 × as wide as single eye width in male, in female nearly 4/5; 3rd antennal segment 3.5 × as long as 2nd in male, thrice in female; tarsus reddish yellow; whitish yellow pollinosity on abdomen ..... *pallidipes* Uéda, 1961: *Japan (Hokkaido, Honshu, Shikoku & Kyushu)*

- Basicosta black; antenna almost black, at most base of 3rd segment very narrowly reddish; postvertical seta only 1; 3rd antennal segment 4 × as long as 2nd in male; tarsus brown-black; dense golden yellow pollinosity on abdominal dorsum ..... *unisetosa* sp. nov.: *Japan (Honshu)*

3. Apical scutellar bristle strong, at least nearly as long as lateral scutellar bristle; facial length shorter than frontal one; female 5th tarsomere not widened and elongated..... 4

- Apical scutellar bristle very fine, less than 1/2 of subapical scutellar bristle; frontal length shorter than facial one; scutellum black, posteriorly narrowly reddish; female 5th tarsomere of fore tarsus widened and elongated, at least longer than 4th tarsomere; abdomen with discal bristles 10

4. Mid-tibia with only one anterodorsal seta; discal bristle absent on intermediate abdominal terga 5

- Mid-tibia with 2–3 anterodorsal setae; basicosta brown-black..... 8

5. Vertex more than 1/2 of single eye width in male, 3/5 in female; thorax at most with reddish postalar callus; 5th tergum with distinct discal bristles...6

- Vertex very narrow, less than 3/7 of single eye width in male, 1/2 in female; thorax with posterior triangular part of scutum widely reddish; abdomen widely reddish at sides; 5th tergum without distinct discal bristles 7

6. Basicosta reddish yellow; undermost frontal bristle nearly at the level of base of 3rd antennal segment; hairs on abdominal dorsum fine and dense ... . *bombylans* Robineau Desvoidy, 1830: *Europe & Japan (Hokkaido, Honshu, Shikoku & Kyushu)*

- Basicosta brownish black; undermost frontal bristle sitting on the level of base of arista or more below; abdominal dorsum with more or less stronger hairs.....*atricosta* Herting, 1960: *Europe & Japan (Hokkaido)*

7. Pollinosity pale yellowish grey; calypter whitish; in male median marginal bristle on 3rd abdominal tergum very weak ..... *amphion* Robineau-Desvoidy, 1863: *Europe & Japan (Hokkaido, Honshu & Kyushu)*

- Pollinosity golden yellow; calypter brownish yellow; median marginal bristles on 3rd abdominal tergum normally in male ..... *sumatrana* Townsend, 1924: *China, Sumatra & Japan (Hokkaido, Honshu, Kyushu & Ryukyus)*

8. Arista thickened on basal half; interfrontal area nearly as wide as parafrontal at middle; intermediate abdominal terga without discal bristles, with dense fine hairs; vertex nearly 1/2 of single eye width in male, 3/5 in female ... *excavata* Zetterstedt, 1884: *Europe & Japan (Hokkaido, Honshu & Kyushu)*

- Arista thickend on at most basal 1/3; interfrontal area narrower than parafrontal at middle; abdominal dorsum with more or less strong bristle-like hairs 9

9. Vertex nearly 4/5 × as wide as single eye width in male, in female subequal in width; parafacial subequal in width to 3rd antennal segment at middle; intermediate abdominal dorsum without distinct discal bristles ... *laxifrons* Villeneuve, 1912: *Europe & Japan* (*Hokkaido*, after Mesnil & Pschorn-Walcher, 1968)
- Vertex nearly 1/2 × as wide as single eye width in male, in female 3/5; parafacial narrower; abdominal dorsum with irregular discal bristles .... *lucorum* Meigen, 1824: *Europe & Japan* (*Hokkaido, Honshu & Kyushu*)
10. 3rd antennal segment very long and wide in male, nearly 6-7.5× as long as 2nd; facial length distinctly longer than frontal one; male claw and pulvillus shorter than 5th tarsomere; female 5th tarosmere nearly as long as 4th; female palpus normal ..... *hemimacquartioides* Baranov, 1934: *Formosa & Japan* (*Hokkaido & Honshu*)
- 3rd antennal segment nearly 3.5-4 × as long as 2nd; facial length slightly longer than frontal one; male claw and pulvillus longer than 5th tarsomere; female 5th tarsomere longer than the total length of 3rd and 4th tarsomeres; female palpus strongly widened ..... *tibialis* Robineau-Desvoidy, 1863: *Europe & Japan* (*Hokkaido, Honshu & Kyushu*)

Carcelia (Carcelina) unisetosa sp. nov.

♂ Head black, gena below eye reddish; epistoma pale yellow; face and parafacial silvery white pollinose; pollinosity on parafacial becoming golden yellowish at the level of base of 3rd antennal segment; parafrontal golden yellow pollinose; interfrontal area brown-black; occiput somewhat yellowish white pollinose; antenna black, base of 3rd segment very slightly reddish; arista brown-black; palpus yellow. Facial length slightly shorter than frontal one; vertex nearly 1/2 × as wide as single eye width; interfrontal area widened anteriorly, nearly 1/2 × as wide as parafrontal at middle; parafacial very slightly narrower than the width of 3rd antennal segment at middle; face well concave; epistoma very slightly projected forward. Parafrontal with rather sparse and fine hairs, which are not descending below the undermost frontal bristle; ocellar bristle strong, nearly as strong as inner vertical bristle; 2 inner orbital bristles, anterior one slightly longer than posterior one, and slightly shorter than ocellar bristle; inner vertical bristle nearly 2/5 of eye height; outer vertical bristle indistinct; 7 frontal bristles, of

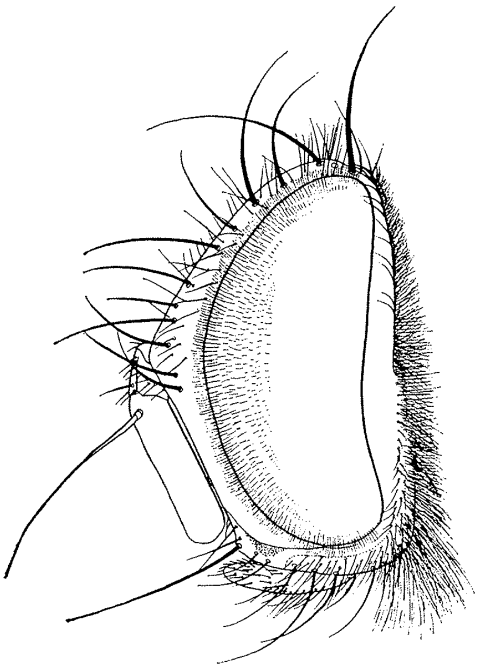

Fig. 1. *Carcelia* (*Carcelina*) *unisetosa* sp. nov. Head in profile (male).

which 3 are descending to parafacial and the undermost is at the level of base of 3rd antennal segment; 1 postvertical seta on each side; 2 postocellar setae; vibrissa slighty shorter than arista; facial ridge with 3-4 fine short hairs on its lower 1/6. Antenna with 3rd segment nearly 4 × as long as 2 nd. Arista long, longer than the entire length of antenna; 2nd segment nearly as long as wide; 3rd segment thickened on basal 1/5. Palpus nearly cylindrical, with short black hairs.

Thorax shining black, postalar callus brownish; dorsum with dense golden yellow pollinosity; 4 black vittae present on prescutum and scutum; pollinosity on pleura rather thin greyish white. Scutellum reddish yellow, basally slightly darkened, with dense golden yellow pollinosity. Hairs on dorsum fine and dense, on pleura longer; barette with 1 very fine hairs anteriorly; 3 humerals nearly in a line; 3+4 dorsocentrals; pre-alar weaker than 3rd supraalar; 1+1 sternopleurals; 5-6 hypopleurals. Scutellum semicircular; hairs sparse, long and erect, especially on middle posterior part; subapical scutellar bristle nearly 2 × as long as scutellum, and nearly 4/3 × as long as lateral and apical ones; basal scutellar bristle slightly shorter than subapical one. Distance between two subapical scutellar bristles nearly 1.7 × as long as that between basal and subapical ones of the same side.

Wing hyaline, very slightly tinged with yellow anteriorly; basicosta black; veins yellowish brown; calypter whitish. Costal spine indistinct; basal portion of vein R_{4+5} with 2 fine setae. Second costal sector as long as 4th and 1.2 × as long as 3rd; length of vein M_1 from *tp* to bending portion nearly 2/3 × as long as that from bending portion to anterior end of vein M_1.

Legs black; tibia reddish yellow, darkened basally and apically; pulvillus yellowish. Hind coxa bare on posterodorsal margin. Fore tibia with 2 posterior setae; mid-tibia with 1 anterodorsal, 2 posterodorsal and 1 ventral setae; hind tibia with a rather closely set row of anterodorsal setae, of which middle one is stronger, 3 posterodorsal and 2-3 ventral setae. Fore claw and pulvillus longer than 5th tarsomere.

Abdomen ovate; entirely shining black; entire 3rd and 4th terga and anterior 4/7 of 5th terga with dense golden yellowish pollinosity; median longitudinal line indistinct; 5th tergum dull blackish on posterior triangular part; venter with thin whitish grey pollinosity. Hairs on dorsum strong and erect, on middorsal region of 3rd and 4th terga and on 5th tergum sparse, erect and bristle-like; 2nd and 3rd terga with 2 long median marginal bristles; 4th tergum with a row of marginal bristles; 5th tergum with an irregular row of discal and a regular row of marginal bristles, mixed with erect bristle-like hairs; hairs on venter more or less fine and recumbent.

Male genitalia: Cercus short and slightly longer than surstylus; basiphallus of aedeagus with a large broad dorsal process; pregonite rather broad.

Body length: 8 mm.

Female: Unknown.

Holotype ♂ Arayasu, Nagano City, Honshu, 7. vii. 1966, Y. Miyatake leg.

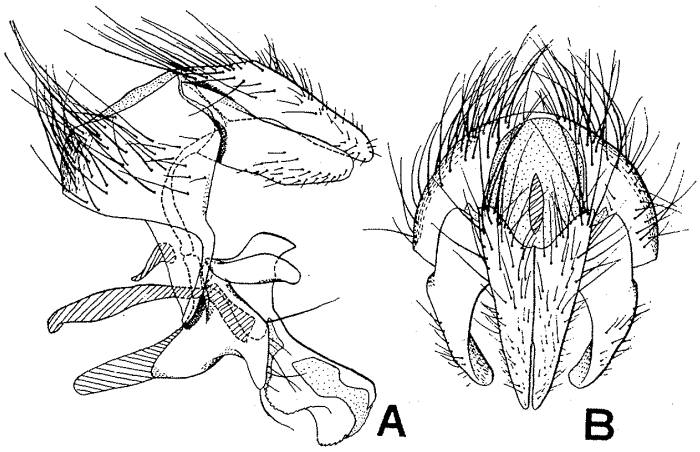

Fig. 2. *Carcelia* (*Carcelina*) *unisetosa* sp. nov. Male hypopygium, A: lateral view, B: dorsal view.

(Holotype will be deposited in the collection of the Entomological Laboratory, Kyushu University).

Host: Unknown.

Remarks: This species is very closely related to *C.* (*Carcelina*) *nigrapex* Mesnil from China, but is differentiated as follows: (1) mid-tibia with only one antero-dorsal seta, (2) only one postvertical seta on each side, (3) only 4 black vittae on dorsum of thorax, (4) abdomen entirely black, (5) interfrontal area narrower.

Carcelia (Carcelia) hemimacquartioides (Baranov)

Isocarceliopsis hemimacquartioides Baranov, 1934, Trans. R. ent. Soc. Lond. LXXXII: 406.

Carcelia hemimacquartioides: Takano, 1956, Ann. Rep. Co-oper. Res. Minist. Educ., 1955, Agr.: 66.

Carcelia hemimacquartioides: Koizumi, 1964, in Yasumatsu & Watanabe "Tentat. Cat. Ins. Nat. Enem. Injur. Ins. Japan Pt. I": 123.

Carcelia hemimacquartioides: Mesnil & Pschorn-Walcher, 1968, Mushi 41 (12): 151.

♂ Head black, anterior part of parafacial and face reddish; epistoma pale yellow; parafrontal, face, parafacial and occiput with greyish white pollinosity; interfrontal area black; antenna black; arista brown-black; palpus yellow. Facial length longer than frontal one; vertex nearly 2/3 × as wide as single eye width; interfrontal area slighty narrower than parafrontal at middle; parafacial narrowed below, nearly 1/4 × as wide as the width of 3rd antennal segment at middle; gena wider than parafacial, nearly 1/8 of eye height; face well concave. Parafrontal with rather sparse and fine hairs; inner vertical bristle slightly less than 1/2 of eye height; 2 reclinate inner orbital bristles, anterior one stronger than posterior one, and nearly 4/5 × as long as inner vertical bristle; ocellar

bristle nearly as long as posterior inner orbital bristles; 2 fine postocellar setae; 1 fine postvertical seta on each side; 5-7 frontal bristles, of which the undermost is nearly at the level of base of arista; vibrissa nearly as long as the length of 3rd antennal segment; facial ridge with several fine setae on its lower 1/4. Antenna with 3rd segment wide and long ; 2nd segment nearly 1/6-1/8 × as long as 3rd ; 3rd segment nearly 1/3 × as wide as long. Arista with 2nd segment nearly as long as wide; 3rd segment thickened on its basal 1/3. Palpus flattened, with rather sparse black hairs.

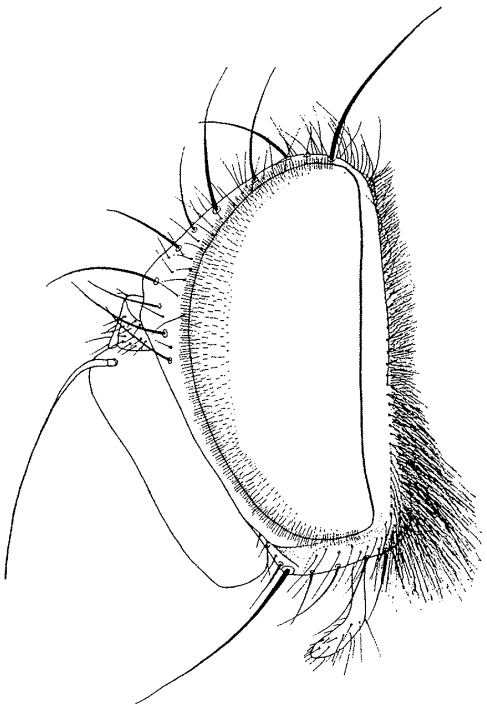

Fig. 3. *Carcelia* (*Carcelia*) *hemimacquartioides* (Baranov). Head in profile (male).

Thorax shining black, postalar callus somewhat reddish, with thin greyish white pollinosity on pleura denser ; 5 black vittae present on dorsum, of which middle one is indistinct on prescutum. Scutellum black, posteriorly narrowly reddish yellow, with very thin greyish white pollinosity. Hairs on dorsum fine and rather sparse, on pleura longer; 3 humerals in a line; 3+4 dorsocentrals; prealar weaker than hindmost supraalar; 1+1 sternopleurals; 4-6 hypopleurals; hairs on scutellum strong, suberect and sparse; subapical scutellar bristle nearly 2 × as long as scutellum; basal scutellar bristle subequal in length to lateral one, and nearly 4/5 × as long as subapical one; apical scutellar bristle very fine and nearly as long as preapical scutellar bristle. Distance between basal and subapical scutellar bristles of same side slightly longer than that between two subapical ones.

Wing hyaline, very slightly tinged with yellow anteriorly; basicosta black; veins yellowish brown; calypter white. Costal spine indistinct; basal portion of vein R_{4+5} with 2-3 fine setae. Proportion of costal sector 2nd, 3rd and 4th as 1:2:1; length of vein M_1 from *tp* to bendig portion nearly 2/3 × as long as that from bending portion to anterior end of vein M_1 ; cross-vein *R-M* nearly straight and slightly oblique. Cell R_5 narrowly opened slightly before wing tip.

Legs entirely brown-black; pulvillus yellow. Hind coxa setulose posterodorsally. Fore tibia with 2 posterior setae ; mid-tibia with 1 anterodorsal, 2 posterodorsal and 1 ventral setae; hind tibia with a regular row of anterodorsal setae, of which middle one is stronger, 2-3 posterodorsal and 2-3 ventral setae. Fore claw and pulvillus shorter than 5th tarsomere.

Abdomen long ovate; entirely shining black; dorsum of anterior 1/2 of 3rd, 3/5

of 4th and 1/2 of 5th terga rather thin yellowish white pollinose; black median longitudinal line rather broad. Hairs rather sparse and not erect, except on 5th tergum; 2nd tergum with 2 median marginal bristles; 3rd tergum with 2 discal and 2 median marginal bristles; 4th tergum with 2 discal and a row of marginal bristles; 5th tergum with rows of discal and marginal bristles, mixed with erect bristle-like hairs.

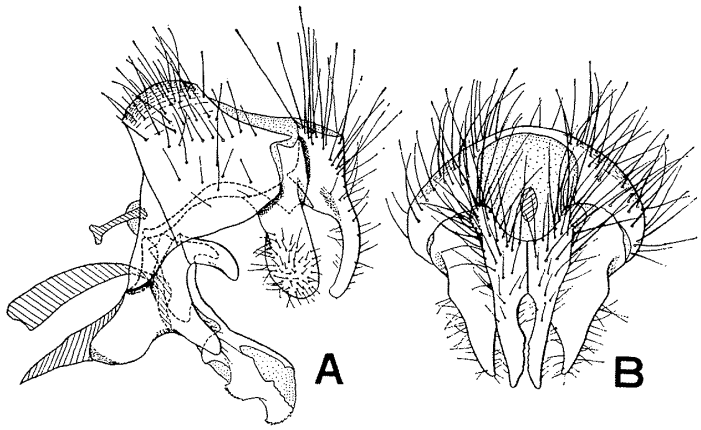

Fig. 4. *Carcelia (Carcelia) hemimacquartioides* (Baranov).
Male hypopygium, A: lateral view, B: dorsal view.

Male genitalia: Cercus in profile basally thickened and being slender at middle, nearly as long as surstylus; surstylus wider than in *C. tibialis*; basiphallus with rather long epiphallus.

♀ Resembling male but differing in the following points: Vertex nearly 4/5 × as wide as single eye width; interfrontal area nearly 2/3 × as wide as parafrontal; antenna with 3rd segment not stout, nearly 4 × as long as 2nd; arista slightly longer than the entire length of antenna; palpus slightly wider than in male; outer vertical bristle fine, nearly 1/3 of inner one; 2 proclinate outer orbital bristles present, which are stronger than inner orbital bristle; proportion of costal sector 2nd, 3rd and 4th nearly as 2:5:2; 5th tarsomere of fore tarsus nearly long ovate, and slightly longer than 4th tarsomere.

Body length: 4.5-6 mm.

Distribution: Japan (Hokkaido and Honshu) and Formosa.

Specimens examined: 1 ♀, Inada, Obihiro, Hokkaido, 10. vi. 1949, S. Takano leg.; 1 ♀, same locality as preceding, 14. vi. 1949, S. Takano leg.; 1 ♀, same locality as preceding, 22. vii. 1951, S. Takano leg.; 1 ♂, same locality as preceding, 11. vii. 1953, reared from *Amata fortunei* De l'Orza, S. Takano leg.; 1 ♀, Towada, Hokkaido, 12-13. vi. 1954, S. Takano leg.; 2 ♂♂ 3 ♀♀, Eniwa near Sapporo, 23. vi. 1961, T. Kumata leg.; 2 ♂♂, Shirarutoroetoro, Shibecha, Hokkaido, 1. viii. 1966, H. Shima leg.; 1 ♂, Ôgata, Niigata Pref., Honshu, 17. vii. 1966, H. Shima leg.; 1 ♀, Shimashimatani, Nagano Pref., Honshu, 4. vii. 1966, H. Shima leg.; 1 ♂, Matsumoto, Nagano Pref., 3. vii. 1966, H. Shima leg.

Host: *Amata fortunei* De l'Orza.

Remarks: This species is easily distinguishable from its allied species by its stout 3rd antennal segment and short fore claw and pulvillus in male.

Genus **Calocarcelia** Townsend

(Type species: *Calocarcelia fasciata* Townsend, 1926=*Musca cingulata* Fabricius, 1805. Original designation)

Calocarcelia Townsend, 1926, Gen. Musc. Hum. Trop. Am.: 266.

This genus is characteristic in its triangularly set basal humeral bristles, presence of ocellar bristle, very narrow gena and parafacial, etc. In Japan 5 species has been known to occur.

Calocarcelia hirsuta (Baranov)

Carcelia hirsuta Baranov, 1931, Inst. f. Hyg. Arb. Parasit. Abt. 3:28.

Myxocarcelia hirsuta: Baranov, 1934, Trans. R. ent. Soc. Lond. LXXXII: 398.

Calocarcelia hirsuta: Shima, 1968, Journ. Fac. Agr. Kyushu Univ. 14 (4): 510.

Since Baranov described this species, this is the first record of the female specimen. This specimen was obtained on Is. Yaku, Southern Kyushu, together with a male specimen.

♀ Closely resembling male but differing as follows: Facial length slightly shorter than frontal one (5:6); outer vertical bristle nearly 2/3 × as long as inner one; 2 proclinate subequally long outer orbital bristles present, nearly as long as anterior inner orbital bristle; 6-7 frontal bristles; 3rd antennal segment nearly 4 × as long as 2nd; wing almost hyaline, without distinct tinge; hairs on abdominal dorsum stronger and more sparse than in male.

Specimens examined: 1 ♂ 1 ♀, Suzukawa, Is. Yaku, Kyushu, 7. x. 1968, K. Kanmiya leg.

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キオビツヤハナバチの天敵, Hockeria sp. について

前　田　泰　生

筆者はヤマトツヤハナバチ *Ceratina japonica* Cockerell とキオビツヤハナバチ *C. flavipes* Smith を花粉媒介昆虫として利用したいと考え，両種のマネージメントの研究を始めた．その間に，数種の寄生性天敵を両種から発見した．

アシブトコバチ上科の *Hockeria* sp. もその一種で後種の巣から採集した．本種の同定をいただいた農業技術研究所，同定分類研究室の土生昶申博士によると，*Hockeria* は本邦からは未記録の属であるが，ヨーロッパでは同属の種類が鱗翅目，撚翅目に寄生することが知られているそうである．アシブトコバチがミツバチ上科のような高等なハチ類に寄生するのは大変興味深い事実とのことで，ここに本邦新記録として報告することにした．

本種は寄主（前蛹と蛹）の表皮だけを残し中部を全部食い尽して，そのまま透明になつた表皮中で成虫越冬する．生態その他については別の機会に報告したい．

最後に同定と御教示をいただいた土生昶申博士にお礼申し上げたい．