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Braconid Parasitoids (Hymenoptera) of the Gall-making Cecidomyiidae (Diptera) in Japan

Kaoru MAETÔ

Hokkaido Research Center, Forestry and Forest Products Research Institute, Hitsujigaoka, Toyohira, Sapporo, 062 Japan

Abstract Six braconid species are dealt with as parasitoids of the gall-making Cecidomyiidae in Japan. All of them, *Bracon asphondyliae* (WATANABE), comb. nov. (=*Ipobracon scurra* FISCHER, syn. nov.), *B. sunosei* sp. nov., *B. tamabae* sp. nov. (=*Ipobracon scurra* auct. partim), *Simplicibracon curticaudis* sp. nov., *Testudobracon longicaudis* sp. nov., and *T. pleuralis* (ASHMEAD), comb. nov., belong to the tribe Braconini of the subfamily Braconinae. They are all described and keyed. *B. tamabae* and *B. curticaudis* parasitize the leaf gall midges on broad-leaved evergreen trees, while the others parasitize the fruit, pod or flower gall midges on various Dicotyledoneae.

Key words: Braconid parasitoids; gall-making; Cecidomyiidae; Braconini; Japan.

Introduction

The family Braconidae contains important elements of parasitoid complex on the gall-making Cecidomyiidae (*e.g.*, YUKAWA, 1987). Three braconid species, *Campyloneurus asphondyliae* WATANABE, *Philomacroploea pleuralis* (ASHMEAD) and *Ipobracon scurra* FISCHER, have been known as parasitoids of the Cecidomyiidae in Japan (WATANABE, 1940, 1952; FISCHER, 1980), but their generic treatments need to be revised. Moreover, I have recognized some undescribed braconids that have been reared from gall midges. In this paper, I am going to describe six braconid species parasitic on the Cecidomyiidae in Japan, with proposals of some generic changes.

Terminology for the description follows VAN ACHTERBERG (1979) and QUICKE (1987). The holotypes of the new species described hereinafter will be deposited in the Laboratory of Insect Systematics, National Institute of Agro-Environmental Sciences, Tsukuba, 305 Japan.

Group of *Bracon asphondyliae*

Three species of *Bracon* FABRICIUS, *B. asphondyliae* (WATANABE) comb. nov., *B. sunosei* sp. nov. and *B. tamabae* sp. nov., share the following character-states in common, as well as they all parasitize the gall-making Cecidomyiidae exclusively:

Scape short, truncate apically, shorter ventrally than dorsally in lateral view. Apical antennal segment short-acuminate. Eyes glabrous, and not distinctly

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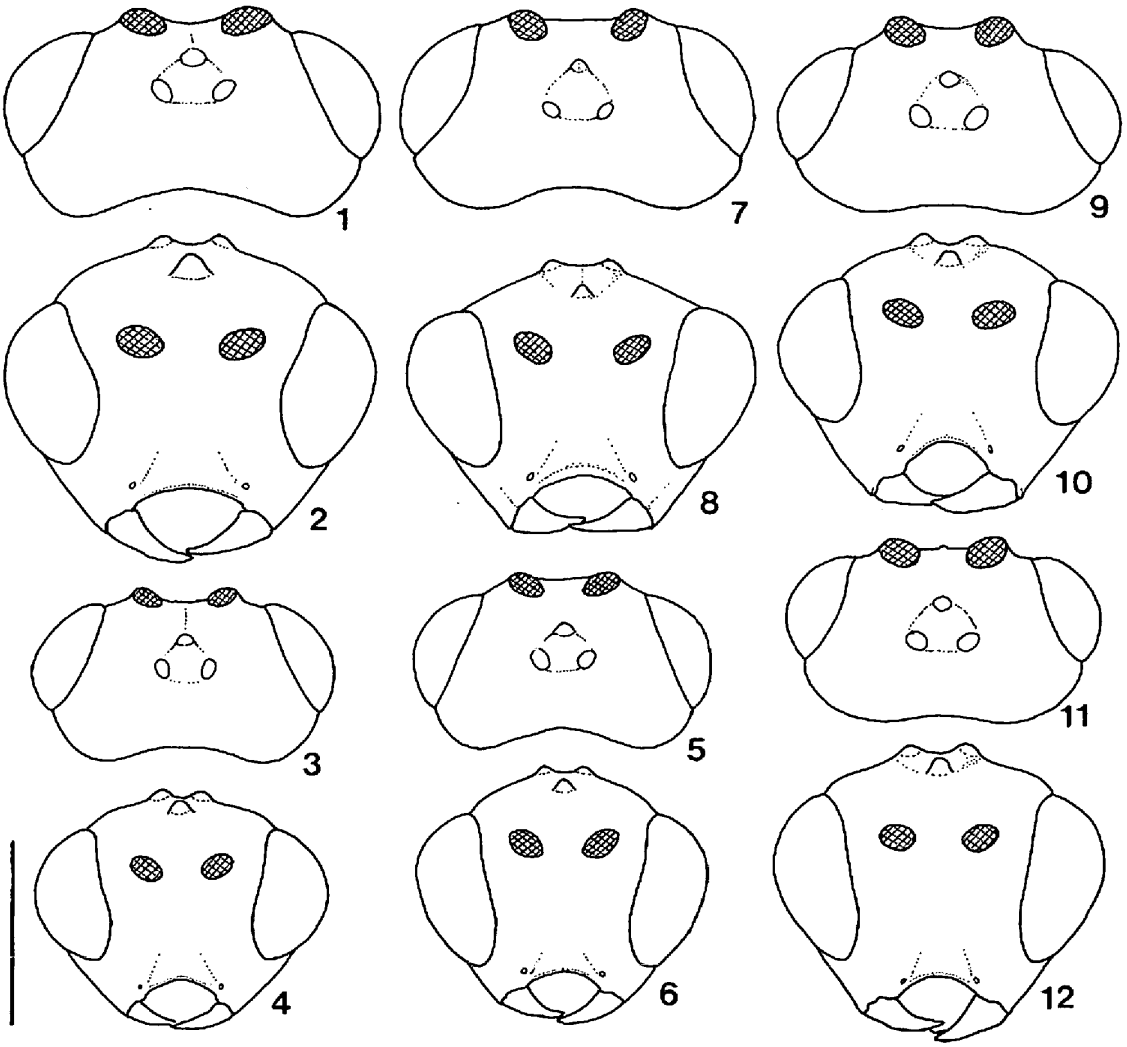
emarginate (Figs. 2, 4, 6). Temple smooth, roundly narrowed posteriorly (Figs. 1, 3, 5). Vertex convex, smooth and sparsely setose. Frons with a medio-longitudinal groove. Face weakly convex. Clypeus without a dorsal carina; transverse median carina lamelliform, weakly protruding anteriorly (Fig. 13). Malar suture absent, but the area coriaceous.

Antescutal depression deep and narrow. Notauli shallowly impressed, smooth, with long setae. Mesoscutal lobes largely smooth and glabrous, but with long setae and fine punctures medio-posteriorly (Fig. 25). Scutellar sulcus deep, narrow and crenulate. Mesoscutellum setose, with some fine punctures.



Figs. 1–12. 1–2, *Bracon asphondyliae*; 3–4, *B. sunosei*; 5–6, *B. tamabae*; 7–8, *Simplicibracon curticaudis*; 9–10, *Testudobracon pleuralis*; 11–12, *T. longicaudis*. —— 1, 3, 5, 7, 9, 11, Head in dosal view, female; 2, 4, 6, 8, 10, 12, same in frontal view, female. Scale line: 0.42 mm.

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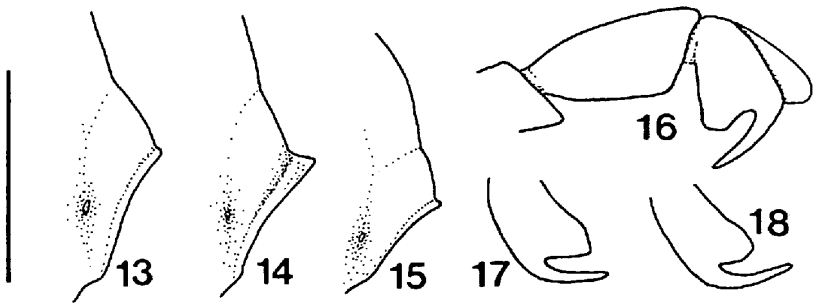

Figs. 13–18. 13, 16, *Bracon asphondyliae*; 14, 17, *Simplicibracon curticaudis*; 15, 18, *Testudobracon pleuralis*. —— 13–15, Clypeus in lateral view, female; 16–18, hind tarsal claw, female. Scale line: 0.21 mm.

Metanotum smooth, without a median carina. Dorsal surface of propodeum smooth and largely glabrous, with an incomplete, medio-longitudinal carina running from posterior margin (Fig. 25). Propleuron normal, not concave. Mesopleuron and side of pronotum smooth and largely glabrous; precoxal sulcus absent; pleural sulcus smooth.

Fore wing (Figs. 19–21): SR1 straight; m-cu antefurcal; 1-SR+M weakly curved posteriorly; angle between 1-SR and C+SC+R 60–70°; cu-a interstitial or slightly postfurcal. Hind wing: 2-SC+R longitudinal; 1r-m shorter than SC+R1.

Hind coxa smooth. Tarsal claws with obtusely protruding basal lobes (Fig. 16).

First metasomal tergite with crenulate sublateral grooves united into a deep medio-basal groove; posterior transverse carina distinct or indistinct (Figs. 28–30); dorso-lateral carinae strong and complete. Second tergite with a distinctly delimited, smooth area medio-longitudinally; with a pair of more or less developed sublateral grooves (Figs. 31–33). Second suture straight or weakly sinuate, wide and crenulate. Third tergite with crenulate antero-lateral grooves and a more or less indicated subapical transverse groove (Figs. 31–33). Posteorior margin of 6th tergite not emarginate. Hypopygium large and acute apically. Ovipositor with preapical nodus and apico-ventral serrations (Fig. 43). Length of ovipositor sheath 0.6–1.0 times fore wing.

Remarks. Being placed tentatively in a vast genus *Bracon*, this species-group is aberrant in having the distinctly delimited, smooth, medio-longitudinal area of the 2nd metasomal tergite (Figs. 31–33), the wide and crenulate 2nd metasomal suture, the smooth propodeum with a medio-longitudinal carina (Fig. 25), the posterior transverse carina (may be united dorsal carinae) of the 1st metasomal tergite (Figs. 28–29), the obtusely protruding basal lobes of the tarsal claws (Fig. 16) and the long ovipositor.

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Bracon asphondyliae (WATANABE, 1940), comb. nov.

[Japanese name: Mifushi-tamabae-komayubachi]

(Figs. 1–2, 13, 16, 19, 25, 28, 31, 42)

Campyloneurus asphondyliae WATANABE, 1940, Ins. matsum., 14: 138 (Japan); SHENEFELT, 1978, Hym. Cat., 15: 1656.; QUICKE, 1989, Entomologist's mon. Mag, 125: 201.
Ipobracon scurra FISCHER, 1980, Frustula Entomol., Nouva Ser., 1: 147 (Japan). **Syn. nov.**

Female. Length of body 2.8–3.6 mm, of fore wing 3.0–4.2 mm.

Antennal segments 22–26; length of 3rd segment 1.1–1.3 times 4th segment; length of 3rd, 4th and penultimate segments 2.7–3.3, 2.4–2.8 and 2.0–2.5 times their width, respectively. Shortest distance between eyes 0.46–0.49 times width of head. Length of eye in dorsal view 1.8–2.2 times temple. PLO and OOL 1.0–1.2 and 2.5–3.0 times diameter of posterior ocellus, respectively. Frons slightly coriaceous. Face coriaceous, but transversely striate medially. Length of malar space 0.6–0.9 times basal width of mandible.

Length of mesosoma 1.4 times its height.

Fore wing (Fig. 19): 3-SR/r=1.5–1.9; 3-SR/2-SR=0.7–1.0; m-cu/1-M=0.4–0.5; cu-a vertical, and interstitial. Hind wing: 1r-m/SC+R1=0.6–0.7.

Length of hind tibia 1.3–1.4 times hind femur (except trochantellus). Length of hind femur and tibia 4.0–4.5 and 7.5–8.5 times their width, respectively.

Length of 1st metasomal tergite 0.8–1.0 times its apical width. First tergite smooth and somewhat rugulose anteriorly, but distinctly rugose behind a posterior transverse carina (Fig. 28). Second tergite longitudinally rugulose, except for smooth medio-longitudinal area and smooth posterior margin (Fig. 31). Third–6th tergites rugulose or coriaceous, with (often crenulate) subapical transverse grooves and smooth apical rims. Length of ovipositor sheath 3.0–4.0 mm, 0.85–1.00 times fore wing.

Antenna brown, infuscated apically. Head red-orange or brownish-yellow except for (dark) brown stemmaticum. Mesosoma red-orange or brownish-yellow, but pronotum medially, mesopleuron ventrally, metanotum and propodeum dark brown; mesoscutal lobes occasionally with dark spots. Wing membrane hyaline, veins and pterostigma (dark) brown. Palpi and legs largely pale yellow, but hind coxa dark brown or brownish-yellow. Metasoma dark or blackish-brown, but yellowish in ventral and lateral portions. Ovipositor sheath dark brown.

Male. Similar to female except as follows:

Length of body 2.0–2.8 mm, of fore wing 2.5–3.2 mm. Antennal segments 22–25. Length of eye in dorsal view 1.7–2.0 times temple. POL 1.0–1.5 times diameter of posterior ocellus. Length of 1st tergite 1.0–1.3 times its apical width. Hind coxa light yellow.

Specimens examined: [Honshu] 5 ♀ 1 ♂ (holotype and paratypes of *Campyloneurus asphondyliae* WATANABE, Hokkaido University, Sapporo), "Takao-

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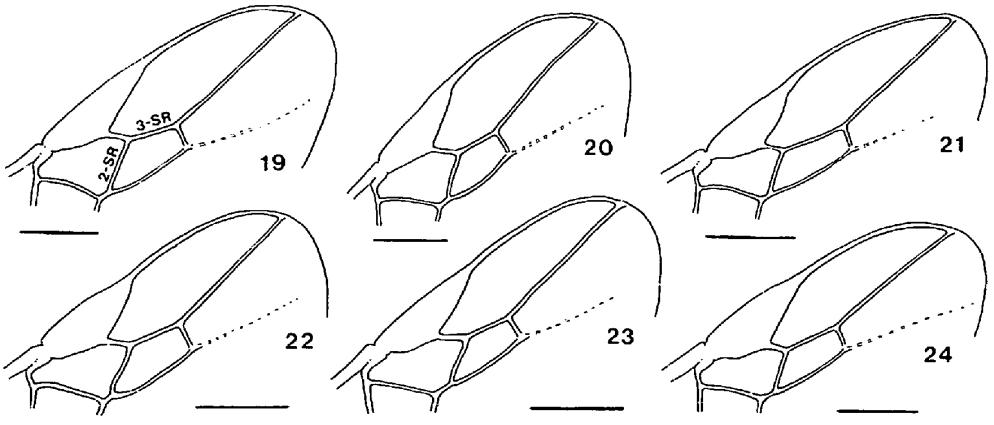
san, Japan", "22-23/IX 1930, N. Fujita", "Host *Asphondylia matatabi* Yuasa et Kurosawa"; 1 ♀, Kiyosumi, Chiba Pref., 19.ix.1976, S. USUBA, ex *Asphondylia baca*; 4 ♀ (paratypes of *C. asphondyliae*), Gifu, Gifu Pref., 5.x.1937, H. YUASA, ex *A. matatabi*; 14 ♀, Kanazawa, Ishikawa Pref., H. NAKAMURA, ex *Asphondylia aucubae*; 2 ♀ 1 ♂, Ichinomiya, Hakui City, Ishikawa Pref., 22-23.v.1980, T. SUNOSE, ex *Asphondylia* sp. on *Aucuba japonica*; 1 ♀ 1 ♂, Daigo, Kyoto City, Kyoto Pref., 21.vi.1976, M. HOTTA, ex *A.* sp. on *A. japonica*. [Kyushu] 2 ♀ (holotype and paratype of *Ipobracon scurra* FISCHER, Naturhistorisches Museum Wien), "Mt. Shiroyama, Kagoshima-shi, Kyushu, Japan", "17.v.1971, J. Yukawa and N. Ohsaki leg.", "ex *Asphondylia aucubae* Yukawa (n. sp.), *Aucuba japonica* Thunb."; 1 ♀ 1 ♂, Shiroyama, Kagoshima City, Kagoshima Pref., 5-6.v.1977, J. YUKAWA, ex *A.* sp. on *A. japonica*; 9 ♀ 4 ♂, same locality, 10-20.v.1977, J. YUKAWA, ex *A. aucubae*; 4 ♀ 2 ♂, same locality, K. MIYAMOTO, ex *Asphondylia sphaera*; 1 ♀, Iso, Kagoshima City, Kagoshima Pref., 29.v.1977, J. YUKAWA, ex *Asphondylia* sp. on *Helwingia japonica*; 1 ♀, Mt. Takakuma, Kagoshima Pref., 3.x.1969, J. YUKAWA, ex *Pseudasphondylia matatabi*; 1 ♀ 1 ♂, Kagoshima, 25.iv.-21.v.1977, K. MIYAMOTO, ex *A. sphaera*.

Distribution. Japan (Honshu, Kyushu).

Hosts. Pseudasphondylia matatabi (YUASA et KUROSAWA) (WATANABE, 1940), *Asphondylia aucubae* YUKAWA et OHSAKI, *A. baca* MONZEN, *A. sphaera* MONZEN, and *A.* sp. on *Helwingia japonica* (Cecidomyiidae, Asphondyliidi).

Remarks. This species can be readily recognized by the relatively short vein 3-SR of the fore wing (3-SR/2-SR<1.0, Fig. 19), the long ovipositor (its sheath 0.85-1.00 times length of fore wing), the broad tergite 1 with a posterior transverse carina and the light colored head and mesothorax. It is an ectoparasitoid, attacking the third instars or pupae of the host midge (YUKAWA & OHSAKI, 1988, as



Figs. 19-24. Antero-distal part of female fore wing. —— 19, *Bracon asphondyliae*; 20, *B. sunosei*; 21, *B. tamabae*; 22, *Simplicibracon curticaudis*; 23, *Testudobracon pleuralis*; 24, *T. longicaudis*. Scale lines: 0.5 mm.

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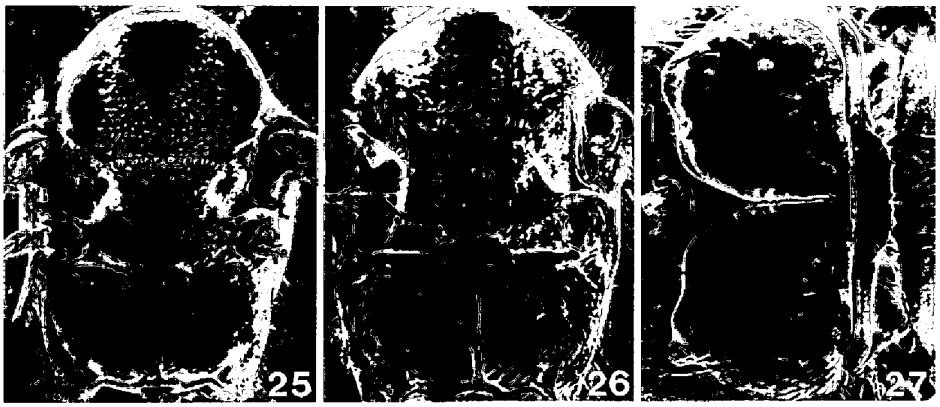

Figs. 25–27. 25, *Bracon asphondyliae*; 26, *Simplicibracon curticaudis*; 27, *Testudobracon pleuralis*. —— 25, 26, Mesosoma in dorsal view, female; 27, metanotum and propodeum in dorsal view, female.

Ipobracon scurra).

Bracon sunosei sp. nov.

[Japanese name: Kita-tamabae-komayubachi]

(Figs. 3–4, 20, 29, 32)

Female. Length of body 2.2–3.4 mm, of fore wing 3.2–4.2 mm.

Antennal segments 22–27; length of 3rd segment 1.1–1.3 times 4th segment; length of 3rd, 4th and penultimate segments 3.1–3.5, 2.6–3.0 and 1.7–2.0 times their width, respectively. Shortest distance between eyes 0.49–0.52 times width of head. Length of eye in dorsal view 2.0–2.4 times temple. PLO and OOL 0.9–1.1 and 2.4–2.7 times diameter of posterior ocellus, respectively. Frons smooth. Face finely coriaceous. Length of malar space 0.7–0.9 times basal width of mandible.

Length of mesosoma 1.2–1.3 times its height.

Fore wing (Fig. 20): 3-SR/r=1.6–2.0; 3-SR/2-SR=0.9–1.1; m-cu/1-M=0.5–0.7; cu-a vertical or somewhat inclivous, and interstitial. Hind wing: 1r-m/SC+R1=0.6–0.7.

Length of hind tibia 1.2–1.4 times hind femur (except trochantellus). Length of hind femur and tibia 4.0–5.0 and 7.5–9.0 times their width, respectively.

Length of 1st metasomal tergite 0.8–1.1 times its apical width. First tergite smooth, but more or less rugose behind a posterior transverse carina (Fig. 29). Second tergite weakly rugose only submedially (Fig. 32). Third–6th tergites smooth, with indistinct subapical transverse grooves. Length of ovipositor sheath 2.4–3.8 mm, 0.75–0.90 times fore wing.

Antenna dark brown, scape and pedicel yellowish. Head dark brown, but

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face, clypeus and malar space yellowish. Mesosoma dark brown, but side of pronotum and tegula yellowish. Wing membrane hyaline, veins and pterostigma dark brown. Palpi and legs brownish-yellow. Metasoma dark brown, but yellowish in ventral and lateral portions. Ovipositor sheath dark brown.

Male. Similar to female except as follows:

Length of body 1.8–3.4 mm, of fore wing 2.0–3.4 mm. Antennal segments 20–25. Length of eye in dorsal view 1.6–2.2 times temple. POL 0.9–1.5 times diameter of posterior ocellus. Mesosoma and metasoma almost completely brownish-yellow in some small specimens.

Holotype: ♀, "Asari, Otaru City, Hokkaido, Japan", "19.ix.1980, Col. T. Sunose", "Host *Asphondylia baca* Monzen".

Paratypes: [Hokkaido] 2♂, same locality as holotype, 17–22.ix.1979, T. SUNOSE, ex *A. baca*; 5♀ 4♂, same locality, 19–28.ix.1980, T. SUNOSE, ex *A. baca*; 1♀ 12♂, same locality, 7–16.vii.1979, T. SUNOSE, ex *Asphondylia diervillae*; 3♀, same locality, 12–18.vii.1980, T. SUNOSE, ex *A. diervillae*.

Distribution. Japan (Hokkaido).

Hosts. *Asphondylia baca* MONZEN and *A. diervillae* FELT (Cecidomyiidae, Asphondyliidi).

Remarks. This species is very close to *B. asphondyliae* but is distinguished by its dark colored head and mesosoma, shorter ovipositor and less strongly sculptured metasoma (Figs. 29, 32).

Bracon tamabae sp. nov.

[Japanese name: Shirodamo-tamabae-komayubachi]

(Figs. 5–6, 21, 30, 33)

Ipobracon scurra: FISCHER, 1980, Frustula Entomol., Nouva Ser., 1: 147 (partim).
? *Bracon* sp.: SUNOSE, 1984, Kontyû, Tokyo, 52: 558.

Female. Length of body 2.0–3.0 mm, of fore wing 2.4–3.6 mm.

Antennal segments 22–25; length of 3rd segment 1.1–1.2 times 4th segment; length of 3rd, 4th and penultimate segments 3.0–3.5, 2.5–3.2 and 2.0–2.5 times their width, respectively. Shortest distance between eyes 0.48 times width of head. Length of eye in dorsal view 1.9–2.4 times temple. PLO and OOL 0.7–1.2 and 2.4–3.0 times diameter of posterior ocellus, respectively. Frons slightly coriaceous. Face coriaceous except for median smooth area. Length of malar space 0.4–0.7 times basal width of mandible.

Length of mesosoma 1.3–1.4 times its height.

Fore wing (Fig. 21): 3-SR/r=2.2–2.8; 3-SR/2-SR=1.2–1.5; m-cu/1-M=0.4–0.6; cu-a interstitial, and vertical or somewhat inclivous. Hind wing: 1r-m/SC+R1=0.6–0.9.

Length of hind tibia 1.3–1.4 times hind femur (except trochantellus). Length

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of hind femur and tibia 4.0–5.0 and 6.5–9.0 times their width, respectively.

Length of 1st metasomal tergite 1.0–1.2 times its apical width. First tergite smooth or somewhat rugulose anteriorly, and transversely rugose in posterior 1/3 (Fig. 30). Second tergite longitudinally rugose, except for smooth medio-longitudinal area and smooth posterior margin (Fig. 33). Third–6th tergites rugulose or coriaceous, with weak subapical transverse grooves and smooth apical rims. Length of ovipositor sheath 1.8–2.8 mm, 0.60–0.80 times fore wing.

Antenna (light) brown. Head brownish-yellow except for (dark) brown stemmaticum. Mesosoma dark brown, but mesoscutum medially, mesoscutellum, side of pronotum, mesopleuron (at least partly) and tegula yellowish. Wing membrane hyaline, veins and pterostigma (dark) brown. Palpi and legs pale yellow. Metasoma (dark) brown, ventrally and laterally pale. Ovipositor sheath dark brown.

Male. Similar to female except as follows:

Length of body 2.0–2.6 mm, of fore wing 2.2–2.6 mm. Antennal segments 23–25. Length of eye in dorsal view 1.7–2.0 times temple. POL 1.2–1.5 times diameter of posterior ocellus. In fore wing, 3-SR/2-SR=1.0–1.5, and cu-a occasionally somewhat postfurcal. Length of 1st tergite 1.4–1.8 times its apical width. mesoscutum entirely dark brown. Mesopleuron brownish-yellow. Second tergite pale yellow except for a dark medio-longitudinal area.

Holotype: ♀, "Tosashimizu, Kochi Pref., Shikoku, 12.iii.1979, T. Sunose leg.", "ex *Pseudasphondylia neolitseae* Y.".

Paratypes: [Honshu] 4 ♀ 3 ♂, Niijima, Tokyo, 21.iv.1980, T. SUNOSE, ex *P. neolitseae*. [Shikoku] 2 ♀ 3 ♂, same data as holotype; 6 ♀ 3 ♂, Hojo City, Ehime Pref., 23.iii.1979, T. SUNOSE, ex *P. neolitseae*. [Kyushu] 2 ♀ 2 ♂, Fukuoka-shi, 1.v.1966, J. YUKAWA, ex *P. neolitseae*; 6 ♀ 2 ♂, Shiroyama, Kagoshima City, iv.1977, J. YUKAWA, ex *P. neolitseae*; 2 ♀ 1 ♂, same locality, 13.v.1977, J. YUKAWA, ex *Daphnephila machilicola*; 2 ♀ 1 ♂, same locality, 7.iv.1978, J. YUKAWA, ex *P. neolitseae*; 5 ♀ 1 ♂, same locality, 8.v.1984, J. YUKAWA, ex *P. neolitseae*; 2 ♀, Kagoshima City, 6.v.1979, J. YUKAWA, ex *P. neolitseae*; 2 ♂, Kagoshima, 5.iv.1971, J. YUKAWA, ex *P. neolitseae*. [Yakushima Is.] 1 ♀, Kosugidani, 9.vi.1969, J. YUKAWA, ex *P. neolitseae*.

Other specimens examined. 2 ♂, Satsuma—Taki, Sendai City, Kagoshima Pref., Kyushu, 21.iii.1975, T. SUNOSE, ex *Masakimyia pustulae*; 1 ♂, same locality, 13.iv.1977, T. SUNOSE, ex *M. pustulae*; 6 ♂, same locality, 1.v.1978, T. SUNOSE, ex *M. pustulae*.

Distribution. Japan (Honshu, Shikoku, Kyushu, Yakushima Is.).

Hosts. *Pseudasphondylia neolitseae* YUKAWA and *Daphnephila machilicola* YUKAWA (Cecidomyiidae, Asphondyliidi). Parasitism of *Masakimyia pustulae* YUKAWA et SUNOSE (Cecidomyiidae, Oligotrophidi) should be confirmed.

Remarks. This species is easily distinguished from both *B. asphondyliae* and *B. sunosei* by its short ovipositor (its sheath 0.6–0.8 times length of fore wing),

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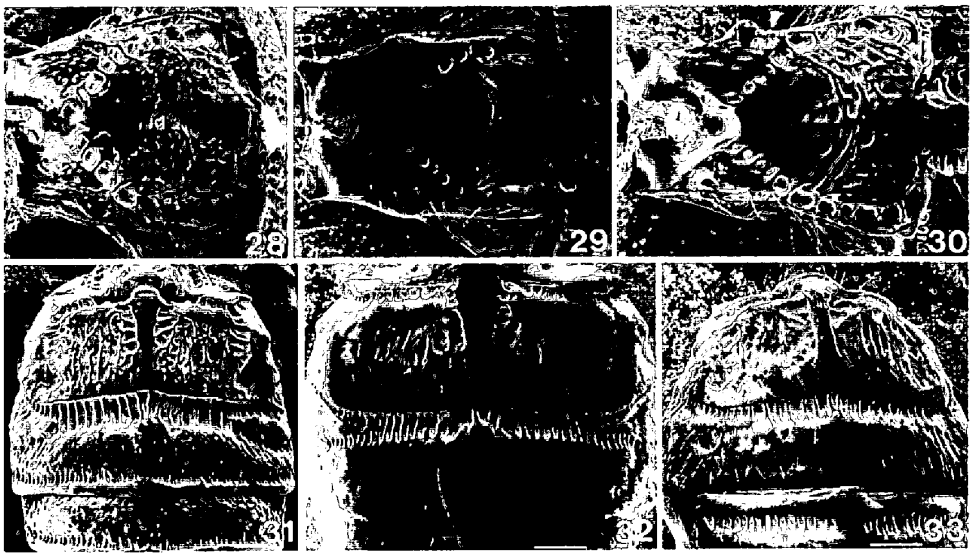

Figs. 28–33. 28, 31, *Bracon asphondyliae*; 29, 32, *B. sunosei*; 30, 33, *B. tamabae*. —— 28–30, First metasomal tergite in dorsal view, female; 31–33, 2nd–3rd metasomal tergites in dorsal view, female.

long vein 3-SR of the fore wing (3-SR/2-SR > 1.2), slender tergite 1 with transverse rugae posteriorly (Fig. 30) and rather short malar space. It is a common larval (or partly pupal) ectoparasitoid of *Pseudasphondylia neolitseae* (YUKAWA, 1983, as *Ipobracon scurra*).

Genus *Simplicibracon* QUICKE, 1988

Simplicibracon was erected as a monobasic genus for the reception of *S. maculigaster* QUICKE, 1988, known from Taiwan. This genus is placed in the *Plesiobracon* CAMERON group of genera defined by VAN ACHTERBERG (1983) (QUICKE, 1988 a), and is characterized by the strongly protruding transverse median carina of the clypeus, the only weakly concave 6th metasomal tergite, the large angle between fore wing veins 1-SR and C+SC+R (more than 70°), the normal ovipositor with preapical dorsal nodus and apico-ventral serrations, the crenulate sublateral grooves of the 1st metasomal tergite and the weakly arched mesoscutellum. QUICKE (1988 a) made much account of the transverse vein 2-SC+R in the hind wing as a generic feature of *Simplicibracon*, but the state is unstable within the genus. The strongly protruding clypeal carina (Fig. 14) is unique and fairly important for discriminating *Simplicibracon*. There are no host records previously reported for the genus.

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Simplicibracon curticaudis sp. nov.

[Japanese name: Tabu-usufushi-tamabae-komayubachi]

(Figs. 7–8, 14, 17, 26, 34–35, 39, 43)

Female. Length of body 2.2–3.0 mm, of fore wing 2.6–3.2 mm.

Antennal segments 23–26; scape short, truncate apically, shorter ventrally than dorsally in lateral view; length of 3rd segment 1.2–1.4 times 4th segment; length of 3rd, 4th and penultimate segments 2.4–2.9, 1.8–2.2 and 1.5–1.7 times their width, respectively; apical segment short-acuminate. Eyes glabrous, weakly convergent ventrally (Fig. 8). Shortest distance between eyes 0.45–0.48 times width of head. Length of eye in dorsal view 2.2–2.5 times temple. Temple sparsely puncticulate, rather directly narrowed posteriorly (Fig. 7). PLO and OOL 1.0–1.2 and 2.7–3.0 times diameter of posterior ocellus, respectively. Vertex convex, finely coriaceous-puncticulate and densely setose. Frons coriaceous anteriorly, with a medio-longitudinal groove. Face weakly convex, and coriaceous or rugulose except for median smooth area. Clypeus without a dorsal carina; transverse median carina lamelliform and strongly protruding anteriorly (Fig. 14). Length of malar space 0.5–0.7 times basal width of mandible. Malar suture indistinct, but the area coriaceous.

Length of mesosoma 1.3–1.4 times its height. Antescutal depression deep and narrow. Notauli shallowly impressed, smooth. Mesoscutal lobes shallowly puncticulate and evenly setose (Fig. 26). Scutellar sulcus deep, narrow and crenulate. Mesoscutellum only weakly arched in lateral profile, shallowly puncticulate and evenly setose. Metanotum with a weak, medio-longitudinal carina anteriorly. Propodeum rugulose, with a strong medio-longitudinal carina (Fig. 26). Mesopleuron and side of pronotum smooth and largely glabrous; precoxal sulcus absent; pleural sulcus smooth.

Fore wing (Fig. 22): SR1 straight; 2-SR curved posteriorly; 3-SR/r=1.4–2.0; 3-SR/2-SR=0.9–1.1; m-cu antefurcal; m-cu/1-M=0.5–0.6; 1-SR+M weakly curved posteriorly; angle between 1-SR and C+SC+R 70–80°; cu-a vertical or somewhat inclivous, and interstitial or slightly antefurcal. Hind wing: 2-SC+R longitudinal; 1r-m distinctly curved posteriorly; 1r-m/SC+R1=0.4–0.6.

Tarsal claws with large basal lobes (Fig. 17). Hind coxa smooth, with fine punctures. Hind tibia with a lateral, longitudinal depression; 1.4–1.5 times as long as hind femur (except trochantellus). Length of hind femur and tibia 3.5–4.5 and 6.5–7.5 times their width, respectively.

Length of 1st metasomal tergite 0.7–1.0 times its apical width. First tergite strongly sloping in front, areolate-rugose, without a posterior transverse carina (Fig. 34); with coarsely crenulate sublateral grooves united anteriorly; dorsolateral carinae strong and complete. Second tergite areolate-rugose (Fig. 35). Second suture weakly curved, narrow and crenulate. Third–5th tergites longitudi-

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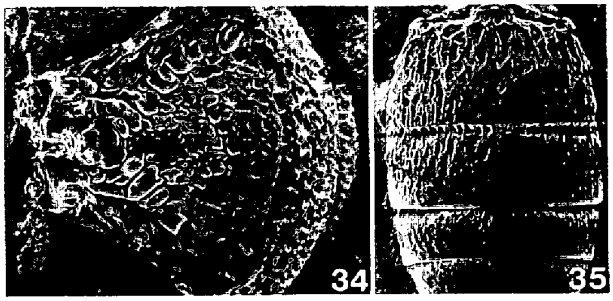

Figs. 34–35. *Simplicibracon curticaudis*, female. —— 34, First metasomal tergite in dorsal view; 35, 2nd–4th metasomal tergites in dorsal view.

nally rugose to rugulose, with smooth apical rims. Sixth tergite coriaceous, weakly concave posteriorly (Fig. 39). Hypopygium large and acute apically. Ovipositor very short, with preapical nodus and apico-ventral serrations (Fig. 43). Length of ovipositor sheath 0.3–0.4 mm, approximately 0.1 times fore wing.

Antenna brownish-yellow, but flagellum occasionally dark brown. Head brownish-yellow except for dark brown stemmaticum. Mesosoma brownish-yellow or brown. Wing membrane hyaline, veins and pterostigma (dark) brown. Palpi and legs pale yellow. Metasoma brownish-yellow or brown. Ovipositor sheath dark brown.

Male. Unknown.

Holotype: ♀, "Kagoshima, Kyushu, 15.v.1971, J. YUKAWA", "Host *Daphnephila machilicola* Yukawa".

Paratypes: [Kyushu] 2♀, same data as holotype; 1♀, Kagoshima City, Kagoshima Pref., 4.v.1977, T. SUNOSE, ex *D. machilicola*; 4♀, Yoshino, Kagoshima City, Kagoshima Pref., 9–11.v.1977, J. YUKAWA, ex *D. machilicola*.

Distribution. Japan (Kyushu).

Hosts. *Daphnephila machilicola* YUKAWA (Cecidomyiidae, Asphondyliidi).

Remarks. *S. curticaudis* is a second species of *Simplicibracon*, and is easily distinguished from the type-species, *S. maculigaster*, by the very short ovipositor, the smooth notauli and the longitudinal vein 2-SC+R of the hind wing.

Genus *Testudobracon* QUICKE, 1986

This genus is easily distinguished from other genera of the *Plesiobracon* group by the 6th tergite with only a median semicircular emargination (Figs. 40, 41) and the metanotum without a protruding median carina (QUICKE, 1986, 1988 a). Members have been known from the Indo-Australian and Afrotropical regions (QUICKE, 1987). Two additional species, both parasitic on *Asphondylia* spp. (Cecidomyiidae), occur on Japan and Taiwan.

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Testudobracon pleuralis (ASHMEAD, 1906), comb. nov.

[Japanese name: Hime-marubara-komayubachi]

(Figs. 9–10, 15, 18, 23, 27, 38, 40, 44)

Chelonogastra pleuralis: ASHMEAD, 1906, Proc. U.S. nat. Mus., 30: 196 (Japan); WATANABE, 1934, Ins. matsum., 8: 184 (Taiwan).

Philomacroploea pleuralis: WATANABE, 1937, J. Fac. Hokkaido imp. Univ., 42: 17; SHENEFELT, 1978, Hym. Cat., 15: 1714; VAN ACHTERBERG, 1984, Tijdschr. Ent., 127: 151.

Female. Length of body 2.2–3.0 mm, of fore wing 2.6–3.5 mm.

Antennal segments 23–26; scape short, truncate apically, shorter ventrally than dorsally in lateral view; length of 3rd segment 1.0–1.2 times 4th segment; length of 3rd, 4th and penultimate segments 2.2–2.4, 1.9–2.3 and 1.6–2.0 times their width, respectively; apical segment short-acuminate. Eyes glabrous, and not distinctly emarginate (Fig. 10). Shortest distance between eyes 0.50–0.55 times width of head. Length of eye in dorsal view 2.0–2.4 times temple. Temple sparsely puncticulate, rather directly narrowed posteriorly (Fig. 9). PLO and OOL 0.9–1.2 and 2.5–2.8 times diameter of posterior ocellus, respectively. Vertex convex, coriaceous and densely setose. Frons coriaceous, with an indistinct medio-longitudinal groove. Face weakly convex, finely rugulose except for a coriaceous medio-ventral convexity. Clypeus without a dorsal carina; transverse median carina lamelliform, only weakly protruding anteriorly (Fig. 15). Malar suture indistinct, but malar space widely rugulose; length of malar space 1.0–1.2 times basal width of mandible.

Length of mesosoma 1.2–1.3 times its height. Antescutal depression developed only laterally. Middle lobe of mesocsutum flat or somewhat concave anteriorly in dorsal view. Notauli deeply impressed, smooth. Mesoscutal lobes shallowly puncticulate and evenly setose. Scutellar sulcus wide, with 7–9 crenulae. Mesoscutellum strongly arched posteriorly in lateral profile, shallowly puncticulate and evenly setose. Metanotum without a medio-longitudinal carina. Propodeum smooth, setose laterally, with a medio-longitudinal carina forked posteriorly (Fig. 27). Side of pronotum smooth except for some crenulae. Mesopleuron setose and shallowly puncticulate; precoxal sulcus represented by a smooth pit; pleural sulcus smooth.

Fore wing (Fig. 23): SR1 straight; 2-SR slightly sinuate; 3-SR/r=1.7–2.1; 3-SR/2-SR=0.9–1.1; m-cu antefurcal; m-cu/1-M=0.5–0.6; 1-SR+M only weakly curved posteriorly; angle between 1-SR and C+SC+R approximately 70°; cu-a vertical or somewhat inclivous, and interstitial. Hind wing: 2-SC+R longitudinal; 1r-m/SC+R1=0.5–0.6.

Tarsal claws with large basal lobes (Fig. 18). Hind coxa densely setose, virtually smooth with fine punctures. Hind tibia with a shallow, lateral, longitudinal depression; 1.2–1.3 times as long as hind femur (except trochantellus). Length of

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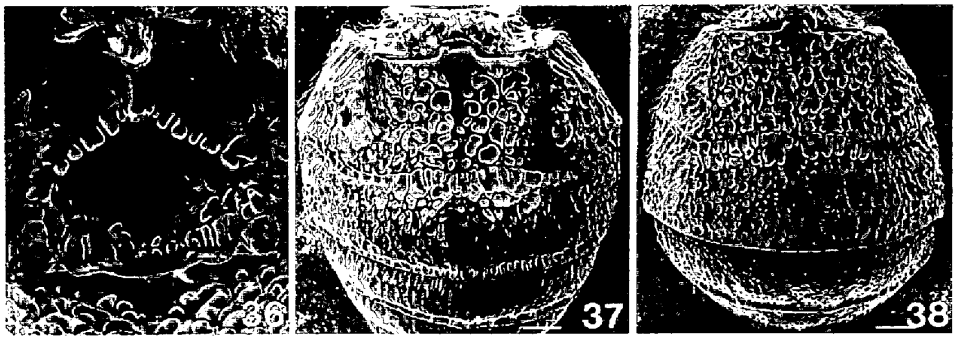
hind femur and tibia 3.5–4.0 and 6.0–7.0 times their width, respectively.

Length of 1st metasomal tergite 0.6–0.8 times its apical width. First tergite strongly sloping in front, smooth, behind a posterior transverse carina areolate-rugose; with crenulate sublateral grooves united into a deep median groove as in *longicaudis* (cf. Fig. 36); dorso-lateral carinae strong and complete. Second and 3rd tergites combined occupying about 3/5 of the length of metasoma, areolate-rugose, with a narrow subapical transverse groove (Fig. 38). Second tergite protruding anteroventrally, with a pair of subparallel sublateral grooves. Second suture sinuate, wide and crenulate. Fourth–6th tergites rugulose, with narrow subapical transverse grooves. Thrid–5th tergites roundly protruding posterolaterally. Posterior margin of 6th tergite with a deep and round, median emargination, and with a small projecting lobe at either side (Fig. 40). Hypopygium acute apically, not protruding beyond metasomal apex. Ovipositor with a weak apicodorsal angulation and apico-ventral serrations (Fig. 44). Length of ovipositor sheath 1.2–1.8 mm, 0.45–0.55 times fore wing.

Antenna dark brown. Head brownish-yellow, but stemmaticum, frons, vertex and temple infuscated in many specimens. Palpi pale yellow. Mesosoma largely blackish-brown to almost completely brownish-yellow (in holotype, blackish-brown, but pronotum, mesoscutum and mesoscutellum reddish-yellow, and tegula brownish-yellow); in many specimens, mesopleuron partly, metanotum and propodeum blackish. Wing membrane slightly infuscated, veins and pterostigma dark brown. Fore and middle legs brownish-yellow, but middle coxa usually dark brown. Hind leg almost completely brownish-yellow to partly blackish-brown (in holotype, largely dark brown); coxa, femur and tibia dark in many specimens, but trochanter, trochantellus, femur apically, tibia basally and tarsus always brownish-yellow. Metasoma completely brownish-yellow to largely dark brown; median areas of 2nd and 3rd tergites usually infuscated in various degrees. Ovipositor sheath dark brown.

Male. Similar to female except as follows:



Figs. 36–38. 36–37, *Testudobracon longicaudis*; 38, *T. pleuralis*. —— 36, First metasomal tergite in dorsal view, female; 37–38, 2nd–4th metasomal tergites in dorsal view, female.

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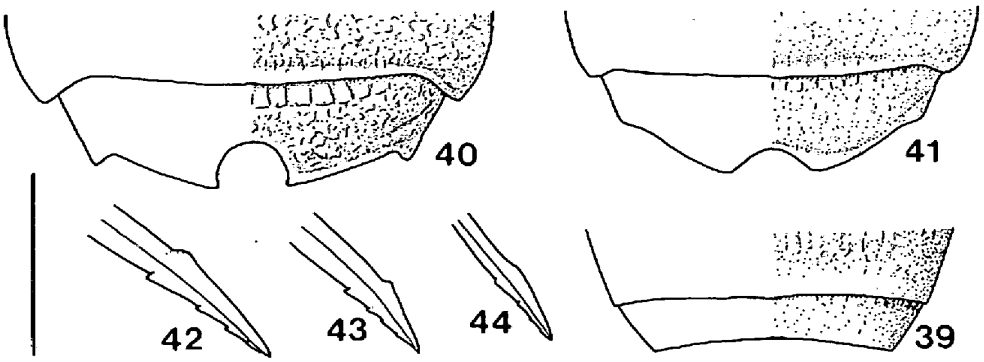

Figs. 39–44. 42, *Bracon asphondyliae*; 39, 43, *Simplicibracon curticaudis*; 40, 44, *Testudobracon pleuralis*; 41, *T. longicaudis*. —— 39–41, Sixth metasomal tergite in dorsal view, female; 42–44, apical portion of ovipositor in lateral view. Scale line: 0.42 mm (39–41); 0.21 mm (42–44).

Length of body 1.6–2.5 mm, of fore wing 1.8–2.5 mm. Antennal segments 21–24. Length of eye in dorsal view 1.4–1.6 times temple. Temple roundly narrowed posteriorly. Length of 1st tergite 0.8–1.0 times its apical width. Third–5th metasomal tergites weakly costate. Posterior margin of 6th tergite not emarginate.

Specimens examined: [Honshu] 1 ♀ (holotype of *Chelonogastra pleuralis* Ashmead, Type No. 1290, U.S. National Museum, Washington), "Atami", "JAPAN, Koebele"; 1 ♀, Shimashima-dani (900–1300 m), Nagano Pref., 25.viii.1978, K. MAETÔ. [Kyushu] 1 ♀, Mt. Tachibana, Fukuoka City, Fukuoka Pref., 5.v.1979, K. MAETÔ; 1 ♀, same locality, 21.v.1979, K. MAETÔ; 3 ♀, Kagoshima, Kagoshima Pref., 31.viii.1951, M. SHIBUYA, ex soybean pod gall midge; 2 ♂, same locality, 25.iv–21.v.1977, K. MIYAMOTO, ex *Asphondylia sphaera*; 1 ♀, Kagoshima City, Kagoshima Pref., 12.vii.1982, J. YUKAWA, ex *Asphondylia* sp. on *Glycine max*; 1 ♂, same locality, 17.x.1979, H. IKENAGA, ex soybean pod gall midge; 1 ♀ 1 ♂, Shiroyama, Kagoshima Pref., 25.iv.1977, K. MIYAMOTO, ex *A. sphaera*. [Taiwan] 1 ♀, Kankau, Koshun, vi.1912, H. SAUTER

Distribution. Japan (Honshu, Kyushu); Taiwan.

Hosts. *Asphondylia* sp. on *Glycine max* (the soybean pod gall midge) (*e.g.*, WATANABE, 1952) and *A. spaera* MONZEN (YUKAWA & NAKAWATASE, 1985) (Cecidomyiidae, Asphondyliidi). The host record of *Etiella zinkenella* TREITSCHKE (Lep., Pyralidae) (WATANABE, 1951) should be confirmed.

Remarks. This species is very close to *T. niger* QUICKE, 1986, from Java, but it is distinguished by the medially smooth tergite 1, the stouter penultimate segment of antenna, the somewhat shorter ovipositor and different coloration. This is a common larval ectoparasitoid of the soybean pod gall midge in Japan (*e.g.*, YUKAWA & NAKAWATASE, 1985).

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Testudobracon longicaudis sp. nov.

[Japanese name: Onaga-marubara-komayubachi]

(Figs. 11-12, 24, 36-37, 41)

Female. Length of body 2.8-3.6 mm, of fore wing 3.0-3.4 mm.

Antenna similar to that of *pleuralis*, but its segments 26 or 27; length of 3rd segment 1.1-1.2 times 4th segment; length of 3rd, 4th and penultimate segments 2.1-2.5, 1.8-2.0 and 1.6-2.2 times their width, respectively. Eyes glabrous, and not distinctly emarginate (Fig. 12). Shortest distance between eyes 0.50-0.55 times width of head. Length of eye in dorsal view 1.7-2.1 times temple. Temple smooth, roundly narrowed posteriorly (Fig. 11). PLO and OOL 1.0-1.1 and 2.9-3.2 times diameter of posterior ocellus, respectively. Vertex and frons as in *pleuralis*. Face weakly convex, coriaceous except for a smooth, medio-ventral convexity. Clypeus as in *pleuralis*. Malar suture indistinct, but malar space widely coriaceous; length of malar space 0.7-0.9 times basal width of mandible.

Mesosoma similar to that of *pleuralis*, but the middle lobe of mesoscutum smooth and glabrous in anterior half; scutellar sulcus with 5-8 crenulae; side of pronotum smooth; mesopleuron smooth, shallowly puncticulate dorsally, and partly setose; precoxal sulcus absent.

Fore wing (Fig. 24) similar to that of *pleuralis*, but 2-SR straight; 3-SR/r=1.7-2.2; 3-SR/2-SR=1.1-1.2; 1-SR+M virtually straight; cu-a vertical, and interstitial or slightly postfurcal. Hind wing: 2-SC+R longitudinal or interstitial; 1r-m/SC+R1=0.6-0.7.

Tarsal claws with large basal lobes. Hind coxa smooth and densely setose. Hind tibia with a shallow, lateral, longitudinal depression; 1.1-1.3 times as long as hind femur (except trochantellus). Length of hind femur and tibia 3.6-4.2 and 6.5-7.5 times their width, respectively.

First metasomal tergite (Fig. 36) similar to that of *pleuralis*, but it is 0.7-0.9 times as long as its apical width. Second and 3rd tergites combined occupying about 1/2 of the length of metasoma. Second tergite coarsely areolate-rugose, protruding antero-ventrally, and with a pair of subparallel sublateral grooves (Fig. 37). Second suture sinuate, wide and crenulate. Third tergite areolate-rugose, with a crenulate subapical transverse groove (Fig. 37). Fourth-6th tergites rugulose, with narrow subapical transverse grooves. Third-5th tergites roundly protruding postero-laterally. Posterior margin of 6th tergite with a shallow, but distinct median emargination (Fig. 41). Hypopygium as in *pleuralis*. Ovipositor with a very weak, preapical dorsal nodus, and with apico-ventral serrations. Length of ovipositor sheath 2.8-3.5 mm, 0.9-1.1 times fore wing.

Antenna dark brown, but rarely brownish-yellow. Head brownish-yellow, but stemmaticum and vertex usually dark brown. Palpi pale yellow. Mesosoma dark brown to almost completely brownish-yellow (in holotype, dark brown except

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for yellowish pronotum and tegula). Wing membrane slightly infuscated, veins and pterostigma dark brown. Legs dark brown to brownish-yellow (in holotype, hind leg dark brown but tibia pale basally). First-3rd metasomal tergites (dark) brown, but 2nd tergite yellowish laterally. Fourth-6th tergites pale yellow except for dark lateral lobes. Ovipositor sheath dark brown.

Male. Similar to female except as follows:

Length of body 2.2-2.6 mm, of fore wing 2.4 mm. Antennal segments 23 or 24. Third-5th metasomal tergites weakly costate. Posterior margin of 6th tergite not emarginate.

Holotype: ♀, "Mt. Tachibana, Fukuoka City, 22.ix.1979, K. Maetô leg.".

Paratypes: [Kyushu] 2♀1♂, Kamigoto, Nagasaki Pref., 9-16.viii.1978, K. Miyamoto, ex *Asphondylia baca*; 1♀1♂, Kagoshima City, Kagoshima Pref., 26.x.1977, H. Ikenaga, ex. *A. baca*; 1♀, Shiroyama, Kagoshima City, Kagoshima Pref., 3.iv.1973, J. Yukawa, ex *Asphondylia* sp. on *Prunus zippeliana*.

Distribution. Japan (Kyushu).

Hosts. Asphondylia baca Monzen and *A.* sp. on *Prunus zippeliana* (Cecidomyiidae, Asphondyliidi).

Remarks. This species is distinct in lacking precoxal sulci and having a shallow median emargination of tergite 6 (Fig. 41) and very long ovipositor.

Key to the Braconidae (Braconinae) on the gall-making Cecidomyiidae in Japan

1. Posterior margin of 6th metasomal tergite with a semicircular emargination (Figs. 40-41); medio-longitudinal carina of propodeum forked posteriorly (Fig. 27) ..... (*Testudobracon*) 2
— Posterior margin of 6th metasomal tergite without a semicircular emargination (cf. Fig. 39); medio-longitudinal carina of propodeum not forked posteriorly (Figs. 25-26) 3
2. Ovipositor sheath 0.45-0.55 times length of fore wing; median emargination of 6th tergite deep (Fig. 40); precoxal sulcus represented by a smooth pit ..... *Testudobracon pleuralis*
— Ovipositor sheath 0.9-1.1 times length of fore wing; median emargination of 6th tergite shallow (Fig. 41); precoxal sulcus absent .... *Testudobracon longicaudis*
3. Ventral carina of clypeus strongly protruding anteriorly (Fig. 14); ovipositor sheath about 0.1 times length of fore wing; 2nd metasomal tergite largely areolate-rugose (Fig. 35); mesoscutal lobes evenly setose .... *Simplicibracon curticaudis*
— Ventral carina of clypeus not strongly protruding anteriorly (Fig. 13); ovipositor sheath more than 0.6 times length of fore wing; 2nd metasomal tergite with a smooth area medially (Figs. 31-33); mesoscutal lobes

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glabrous at least anteriorly ..... (*Bracon asphondyliae* group) 4

4. Vein 3-SR of fore wing 1.2–1.5 times length of vein 2-SR (Fig. 21); ovipositor sheath 0.6–0.8 times length of fore wing; head brownish-yellow; 1st metasomal tergite transversely rugose posteriorly, without a distinct posterior transverse carina (Fig. 30) ..... *Bracon tamabae*

— Vein 3-SR of fore wing less than 1.1 times length of vein 2-SR (Figs. 19–20); ovipositor sheath 0.8–1.0 times length of fore wing, if intermediate, then head dark brown dorsally; 1st metasomal tergite with a distinct posterior transverse carina (Figs. 28–29) 5

5. Head red-orange or brownish-yellow; 3rd–5th metasomal tergites rugulose or coriaceous (Fig. 31) ..... *Bracon asphondyliae*

— Head dark brown dorsally; 3rd–5th metasomal tergites largely smooth (Fig. 32) ..... *Bracon sunosei*

Host Associations

Regarding the family Braconidae, parasitism of the Cecidomyiidae seems to be limited to the tribe Braconini sensu VAN ACHTERBERG (1984) of the Braconinae (*e.g.*, TOBIAS, 1986; QUICKE, 1987). Even in the tribe, only three genera, *Bracon*, *Simplicibracon* and *Testudobracon*, are known to be parasitic on the gall midge. However, parasitism of gall-making insects (Cecidomyiidae, Curculionidae, Momphidae, etc.) is widespread within the Braconini and it may be an important factor in the morphological and biological diversification of the tribe (QUICKE, 1988 b).

Table 1. Braconid parasitoids of the gall-making Cecidomyiidae in Japan.

Host cecidomyiid	Host plant	Galled part	Braconid parasitoids[1]					
			Ba	Bs	Bt	Sc	Tp	Tl
Asphondyliidi								
Asphondylia aucubae	*Aucuba japonica*	Fruit	●					
Asphondylia baca	Vitaceae spp.	Fruit	●	●				●
Asphondylia diervillae	*Weigela* spp.	Leaf bud		●				
Asphondylia sphaera	*Ligstrum* spp.	Fruit	●				●	
Asphondylia sp. 1[2]	Leguminosae spp.	Pod					●	
Asphondylia sp. 2	*Helwingia japonica*	Fruit	●					
Asphondylia sp. 3	*Prunus zippeliana*	Fruit						●
Daphnephila machilicola	*Machilus* spp.	Leaf			●	●		
Pseudasphondylia matatabi	*Actinidia polygama*	Fruit	●					
Pseudasphondylia neolitseae	*Neolitsea sericea*	Leaf			●			
Oligotrophini								
Masakimyia pustulae	*Euonymus* spp.	Leaf			●?			

[1] Ba—*Bracon asphondyliae*; Bs—*B. sunosei*; Bt—*B. tamabae*; Sc—*Simplicibracon curticaudis*; Tp—*Testudobracon pleuralis*; Tl—*T. longicaudis*.

[2] The soybean pod gall-midge.

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Host relationships of the treated braconids are summarized in Table 1. They all parasitize the gall midges on the Dicotyledoneae, mostly belonging to the supertribe Asphondyliidi. The braconids are divided into two groups about the choice of microhabitats. *B. asphondyliae, B. sunosei* and *Testudobracon* spp. parasitize the fruit, pod or flower bud gall midges on various plant families. In sharp contrast, *B. tamabae* and *S. curticaudis* parasitize the leaf gall midges on broad-leaved evergreen trees (*i.e.*, Lauraceae). *B. asphondyliae* and *B. tamabae* attack the fruit galls and the leaf galls, respectively, while both inhabit evergreen broad-leaved forests of warm-temperate in Japan. This evidence suggests that the position and/or shape of galls may be important cues for the gall midge parasitoids.

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References

ACHTERBERG, C. VAN, 1979. A revision of the subfamily Zelinae auct. (Hym., Braconidae). *Tijdschr. Ent.*, 122: 241–479.

——— 1983. Six new genera of Braconidae from the Afrotropical Region (Hymenoptera, Braconidae). *Ibid.*, 126: 175–202.

——— 1984. Revision of the genera of Braconini with first and second metasomal tergites immovably jointed (Hymenoptera, Braconidae, Braconinae). *Ibid.*, 127: 137–164.

FISCHER, M., 1980. Fünf neue Raupenwespen (Hymenoptera, Braconidae). *Frustula Ent., Nouva Ser.*, 1: 147–160.

QUICKE, D. L. J., 1986. Seven new genera and species of Braconinae (Hym., Braconidae) from Australasia and Indonesia. *Entomologist's mon. Mag.*, 122: 9–29.

——— 1987. The Old World genera of braconine wasps (Hymenoptera: Braconinae). *J. nat. Hist.*, 21: 43–157.

——— 1988 a. Four new genera of the *Plesiobracon* CAMERON group (Insecta, Hymenoptera, Braconidae). *Zool. Scr.*, 17: 411–418.

——— 1988 b. Higher classification, biogeography and biology of the Braconinae (Hymenoptera: Braconidae). *In* GUPTA, V. K. (ed.), *Advances in Parasitic Hymenoptera Research*, 117–138. E. J. Brill, Leiden/New York.

TOBIAS, V. I., 1986. Opredelitel nasekomych evopeiskoi tsasti SSSR, vol. 3, Hymenoptera, part 4. *Opred. Faune SSSR*, 145: 1–500.

WATANABE, C., 1940. A new braconid parasite of the gall midge of *Actinidia polygama* MAXIMOWICZ (Hymenoptera: Braconidae). *Ins. matsum.*, 14: 138–140.

——— 1951. Descriptions of new or little known species of Braconidae, with notes on synonymy (Hymenoptera). *Ibid.*, 17: 93–101.

——— 1952. Synonymy and other notes on Braconidae (Hymenoptera). *Ibid.*, 18: 41–42.

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The Entomological Society of Japan

YUKAWA, J., 1983. Arthropod community centered upon the neolitsea leaf gall midge, *Pseudasphondylia neolitseae* YUKAWA (Diptera, Cecidomyiidae) and its host plant, *Neolitsea sericea* (BLUME) KOIDZ. (Lauraceae). *Mem. Fac. Agr. Kagoshima Univ.*, 19: 89–96.

——— 1987. Life history strategies of univoltine gall-making Cecidomyiidae (Diptera) in Japan. *Phytophaga*, 1: 121–139.

——— & A. NAKAWATASE, 1985. Age structure and percentage parasitism of *Philomacroploea pleuralis* (Hymenoptera: Braconidae) attacking the soybean pod gall midge. *Proc. Assoc. Plant Prot. Kyushu*, 31: 132–134. (In Japanese with English summary.)

——— & J. OHSAKI, 1988. Separation of the aucuba fruit midge, *Asphondylia aucubae* sp. nov. from the ampelopsis fruit midge, *Asphondylia baca* MONZEN (Diptera, Cecidomyiidae). *Kontyû, Tokyo*, 56: 365–376.

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