

New Species of the Genera *Methocha* Latreille and *Hylomesa* Krombein from Japan (Hymenoptera: Tiphidae)

Mamoru TERAYAMA¹⁾ and Toshiharu MITA²⁾

¹⁾ Nakacho 2-12-29, Iwatsuki-ku, Saitama, 339-0054 Japan,
e-mail: terayama@fa2.so-net.ne.jp

²⁾ Entomological Laboratory, Faculty of Agriculture, Kyushu University, Hakozaki 6-10-1, Higashi-ku, Fukuoka, 812-8581 Japan,
e-mail: t3mita@agr.kyushu-u.ac.jp

Abstract Four new species of the tiphid wasps are described from Japan: *Methocha okinawensis* sp. nov., *M. uchinanensis* sp. nov., *M. yaeyamensis* sp. nov., and *Hylomesa akitsushimana* sp. nov.

Introduction

The genus *Methocha* Latreille, 1804 of the subfamily Methochinae comprises 75 species and distributed in the world excepting the Australian and Antarctic regions (Agnoli, 2005, 2011; Guichard, 1971; Lin, 1966; Krombein, 1979, 1982; Kimsey, 2011). In Japan, 3 species (2 described and 1 unnamed) have been known up to the present (Iwata, 1936; Yamane, 1999; Yasumatsu, 1931, 1933).

The genus *Hylomesa* Krombein, 1968 of the subfamily Myzininae is distributed in the Oriental region, and is represented by 3 species only (Bartalucci, 2004; Krombein, 1968, 1982; Tsuneki, 1986). In Japan, it is known from one unnamed species (reported as *Mesa* sp.) recorded from Tsushima Island, Kyoto and Shizuoka Prefectures (Haneda *et al.*, 2006; Matsumoto & Inoue, 2009; Mita & Muraki, 2014). The genus *Hylomesa* has the relatively long head (much shorter in the genus *Mesa*), the 2-toothed mandibles (single toothed in *Mesa*) and the convex anterior surface of mesopleuron (flat in *Mesa*).

In the course of our study on the aculeate wasps of Japan, we have examined several specimens of the tiphid genera *Methocha* and *Hylomesa*, and concluded that the genus *Methocha* consists of 5 species of which 3 species are new to science, and the genus *Hylomesa* contains a single species, which is new to science.

The recent molecular phylogenetic study suggests that both Methochinae and Myzininae should be members of the family Thynnidae in the superfamily Thynnoidea (Pilgrim *et al.*, 2008; Debevec *et al.*, 2012). In this paper, we tentatively follow the previous taxonomic view by Gauld & Bolton (1988) and Brothers (1999).

Material and Methods

Descriptions were based on specimens collected from Japan. Those are dry condition with pinned labels. Specimens were observed under a stereomicroscope, and photo images were created using a digital camera and an image stacking software, Combine ZP (Hadlay, 2010). The type specimens are deposited in the following institutes: ELKU-Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan; TUA-Laboratory of Agriculture, Tokyo University of Agriculture, Atsugi, Japan; NIAES-National Institute for Agro-Environmental Sciences, Tsukuba, Japan;

OMNH-Osaka Museum of Natural History, Osaka, Japan. Holotypes of Taiwanese *Methocha*, *M. caripyga* Lin, 1966 and *M. priorrecta* Lin, 1966 were also examined for comparison. They are preserved in TARI-Taiwan Agricultural Research Institute, Taichung, Taiwan.

The following abbreviations are used in the description: HL-head length; HW-head width; WF-width of frons; FWL-fore wing length; TL-total body length; EL-eye length; POL-distance between posterior ocelli; AOL-distance between the anterior ocellus and a posterior ocellus; OOL-distance from a posterior ocellus to nearest eye margin; WOT-distance across and including posterior ocelli; DAO-diameter of the anterior ocellus.

Taxonomic Accounts

Family Tiphidae

Three genera in 3 subfamilies have been known in Japan.

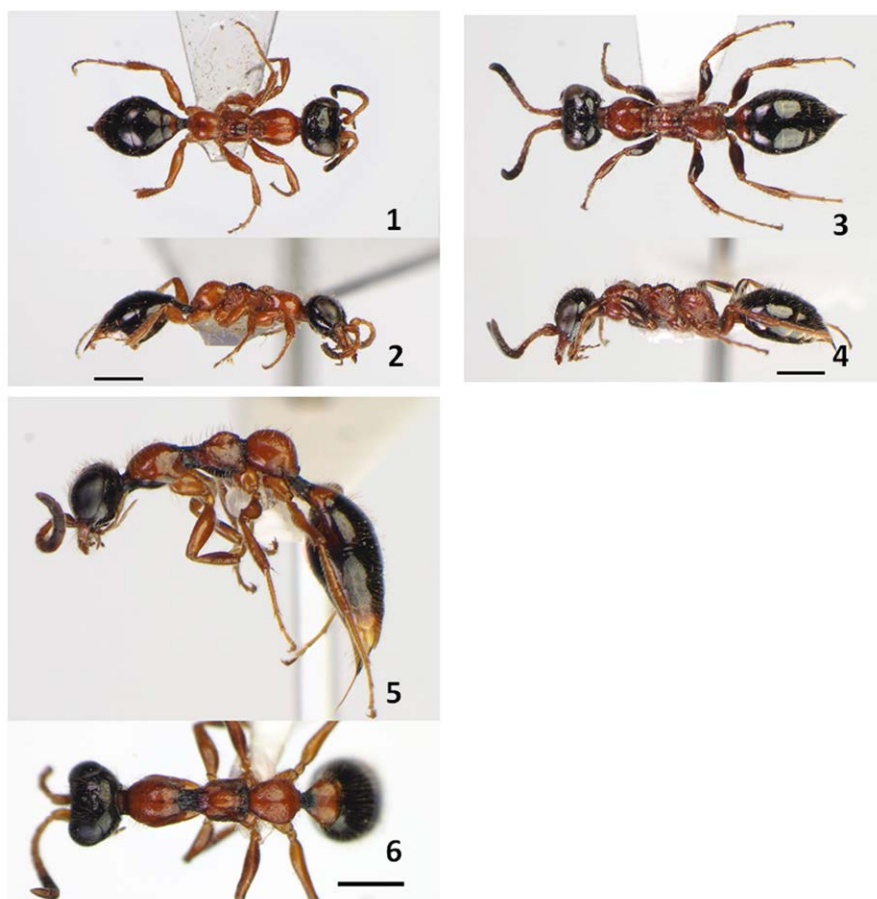
Key to Japanese genera of the family Tiphidae

Female:

- 1a. Female fully winged..... 2
- 1aa. Female apterous..... Subfamily Methochinae; *Methocha*
- 2a. Lower part of frons producing and concealing torulus.
 - b. Antennal pedicel reduced and concealed in distal apex of scape..... Subfamily Myzininae; *Hylomesa*
- 2aa. Lower part of frons normal.
 - bb. Antennal pedicel not concealed by scape, well exposed..... Subfamily Tiphinae; *Tiphia*

Male:

- 1a. Tegula elongate or semicircular; posteriorly reaching or exceeding transscutellar suture.
- b. Sixth metasomal sternum much longer than 5th sternum; 7th sternum not exposed..... Subfamily Tiphinae; *Tiphia*
- 1aa. Tegula short; posteriorly not reaching transscutellar suture.
 - bb. Sixth metasomal sternum shorter than 5th sternum; 7th sternum partly exposed..... 2
- 2a. Fore wing with 2 submarginal cells enclosed by tubular veins.
 - b. Eye setose..... Subfamily Methochinae; *Methocha*
- 2aa. Fore wing with 3 submarginal cells enclosed by tubular veins.
 - bb. Eye glabrous..... Subfamily Myzininae; *Hylomesa*



Figs. 1–6. *Methocha* spp., female. 1, 2, *Methocha japonica* (Yasumatsu, 1931), 1, body, dorsal view; 2, ditto, lateral view; 3, 4, *Methocha okinawensis* sp. nov., holotype; 3, body, dorsal view; 3, ditto, lateral view; 5, 6, *Methocha yasumatsui* (Iwata, 1936); 5, body, lateral view; 6, ditto, dorsal view. Scale bars = 1.0 mm.

Subfamily Methochinae

The subfamily contain two genera, *Methocha* Latreille, 1804 (nec *Methoca* Latreille, 1805, unjustified emendation), and *Karlissa* Krombein, 1979, which includes single species from Sri Lanka. Among the 75 species of *Methocha*, 33 species has been known from the Oriental region and 8 from the Palaearctic region (Agnoli, 2011; Krombein, 1979, 1982; Lin, 1966; Tsuneki, 1986).

Methocha japonica (Yasumatsu, 1931)

[Japanese name: Tsuya-aribachi]

(Figs. 1, 2, 7–10)

Methocha japonica Yasumatsu, 1931: 12.

Methocha japonica: Lin, 1966: 201.

Diagnosis. Female: Head from above rectangular, with weakly convex posterior margin and dully angulate postero-lateral corners; pronotal disc with median longitudinal stria; mesoscutum strongly convex in profile, and posteriorly clearly separated from scutellum by strong constriction; propodeum smooth and shining; head and metasoma black, mesosoma reddish brown, legs reddish brown.

Male: Head from above rectangular, with almost straight posterior margin and dully angulate posterolateral corners; clypeus flat, with distal tubercle at middle and with 2 teeth at anterior margin; discal tubercle of clypeus in lateral view forming acute triangle; mesopleuron without large fovea at under portion; propodeum rounded in profile; 2nd to 6th

sterna at most partly flattened or very weakly depressed along median line; hypopygium flattened, without excavation; body black, legs black.

Specimens examined. 1♂, Oketo-rindo, Oketo, Hokkaido, 26. vii. 1997, R. Matsumoto leg.; 1♀, Katori-gun, Chiba Pref., 14. vi. 1997, H. Suda leg.; 1♀, Iwatsuki-ku, Saitama Pref., 5. viii. 2006, M. Terayama leg.; 1♂, Satte-shi, Saitama Pref., 12. v. 1999, M. Uchida leg.; 2♀♀1♂, Hanyu-shi, Saitama Pref., 8. vi. 1974, T. Nambu leg.; 1♀1♂, Gyoda-shi, Saitama Pref., 10. ix. 1985, T. Nambu leg.; 1♀, Kawasaki-shi, Kanagawa Pref., 15. vii. 1979, M. Terayama leg.; 1♂, Minomo, Osaka Pref., N. Tosawa leg. (no collecting date); 2♀♀, Minomo, Osaka Pref., 11. vii. 1921, N. Tosawa leg.

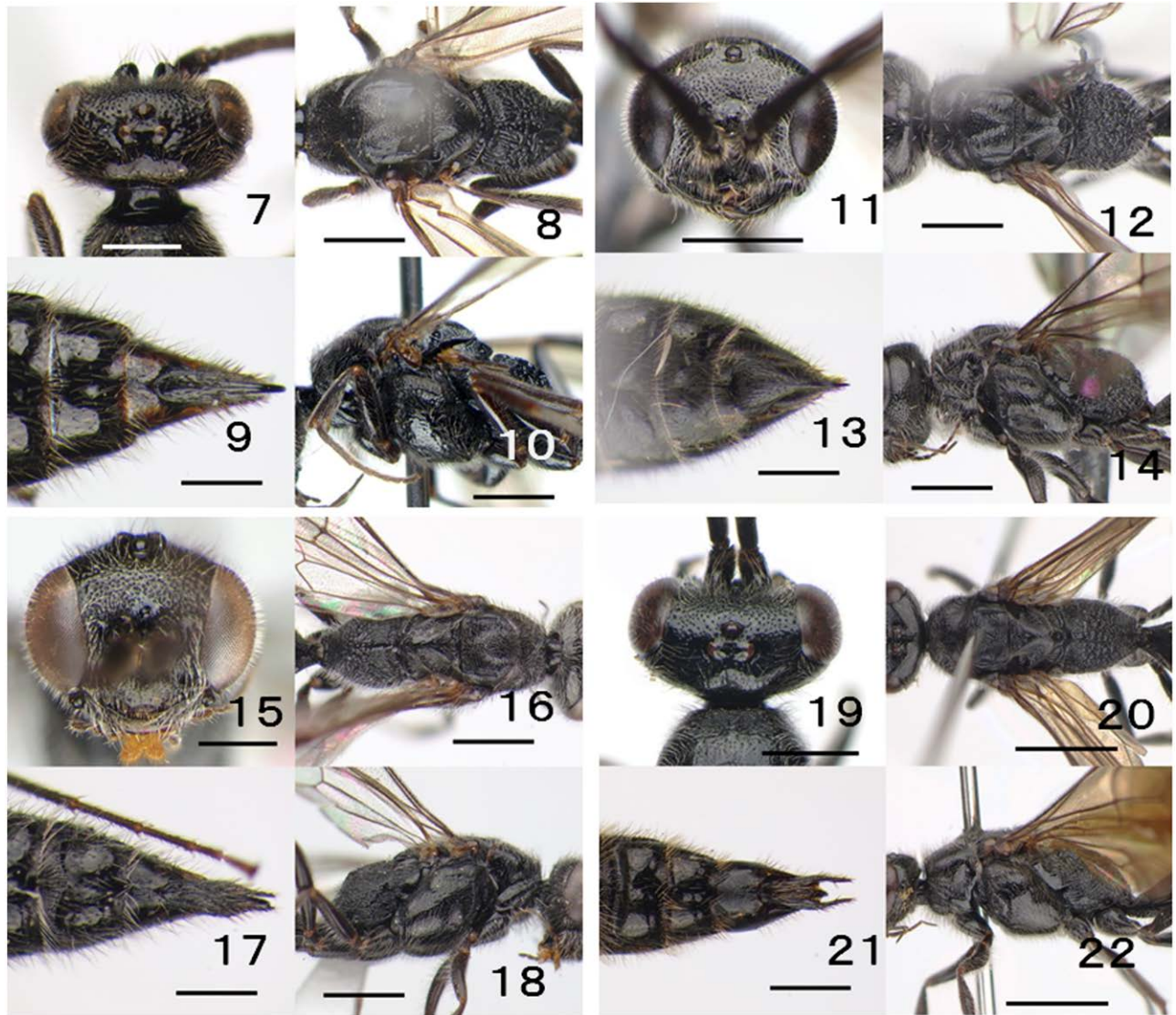
Distribution. Japan (Hokkaido (new record), Honshu, Kyushu).

Methocha okinawensis sp. nov.

[Japanese name: Okinawa-tsuya-aribachi]

(Figs. 3, 4)

Diagnosis. Among the Asian congeners, this species especially in female resembles *M. japonica* (Yasumatsu, 1931) from Japan, *M. priorrecta* Lin, 1966, from Taiwan and *M. malayana* Pagden, 1949, from Malaysia in the strongly convex mesoscutum. However, it is separated from *M. japonica* and *M. priorrecta* by the absence of median longitudinal stria on pronotal disc and the presence of transverse striae on posterior surface of propodeum (smooth and shining in both *M. japonica* and *M. priorrecta*), and from *M. malayana*



Figs. 7–22. *Methocha* spp., male. 7–10, *Methocha japonica* (Yasumatsu, 1936); 11–14, *Methocha uchinanensis* sp. nov., holotype; 15–18, *Methocha yaeyamensis* sp. nov., holotype; 19–22, *Methocha yasumatsui* (Iwata, 1936). 7, 19, head, dorsal view; 8, 11, 16, 20, mesosoma, dorsal view; 9, 13, 17, 21, hypopygium; 10, 14, 18, 22, mesosoma, lateral view; 11, 15, head, full-face view. Scale bars: 0.5 mm for 13, 15, 17, 19, 21; 1.0 mm for 7, 9, 11, 12, 14, 16, 18, 20, 22; 2.0 mm for 8, 10.

by the eyes with erect hairs (glabrous in *M. malayana*) and the presence of transverse striae on posterior surface of propodeum (absent in *M. malayana*).

Description. Holotype. Female. Structure: Head including eyes, 0.59 times as long as wide, with gently convex posterior margin in full-face view; posterolateral corner round, not forming angle; frons smooth with a few scattered shallow punctures, without a pair of cornicle above antennal sockets. Mandible long, smooth and shining, with apical and subapical teeth. Clypeus smooth and shining, anterior margin with trapezoidal median lobe and small concavity at midlength. First 5 antennomeres in a ratio of 13 : 5 : 9 : 9 : 8 in length; scape 1.6 times as long as wide; pedicel slightly longer than wide; 3rd antennomere 1.8 times as long as wide; 4th antennomere 2.2 times as long as wide; 5th to 8th antennomeres each longer than wide; 9th to 11th antennomeres each as long as wide; 12th (terminal) antennomere 1.5 times as long as wide. Eye large and convex, with many long erect hairs. WF 0.94 times EL.

Head from above relatively thick, with ratio of width to length 7 : 4; posterior margin convex, genal margins converging posteriorly. Vertex smooth and shining. Ocelli forming obtuse triangle; POL : AOL = 9.5 : 4.5; OOL 1.0 times WOT; anterior ocellus ca. 0.08 mm in diameter.

Pronotal disc slightly wider than long, with weakly convex anterior margin in dorsal view; anterolateral corner round, not forming distinct angle; anterior 2/3 of disc sparsely punctate with smooth and shining interspaces; posterior 1/3 impunctate; disc without median longitudinal stria; collar with transverse striae. Mesoscutum strongly convex in profile, posteriorly clearly separated from scutellum by strong constriction; surface smooth and shining in most part, and a few punctures; scutellum with scattered punctures. Mesopleurum with strong rugae, postero-under portion reticulate. Propodeum widest at posterior end in dorsal view; surface even opaque, near anterior margin and dorso-lateral margin rugose; posterior surface with many transverse striae.

Metasoma oval, largely smooth, with scattered small and shallow punctures.

Color. Head black; mandible reddish brown; antenna with 1st to 6th antennomeres reddish brown, 7th to terminal antennomeres blackish brown. Mesosoma reddish brown; dorsal discs of mesoscutum and scutellum darker. Coxae, trochanters and femora largely black; tibiae dark brown to reddish brown; tarsi reddish brown. Metasoma black, excepting 1st tergum largely reddish brown.

Measurements (mm). HL 1.43, HW 1.40, WF 0.85, EL 0.68, TL 6.1.

Holotype. Female, Mt. Nago-dake, Nago-shi, Okinawa-jima, Okinawa Pref., 21. v. 2004, T. Mita leg., (ELKU).

Paratype. 1♀, same data as holotype, (TUA).

Etymology. The specific epithet is based on the name of type locality, Okinawa-jima Island.

Distribution. Japan (Okinawa-jima Is.).

Remarks. The paratype specimen is smaller than that type: HL 0.93 mm, HW 1.15 mm, and TL 4.9 mm. The male is unknown, but *M. uchinanensis* could be the male of *M. okinawensis* (see the remarks of *M. uchinanensis*).

***Methocha uchinanensis* sp. nov.**

[Japanese name: Kubomi-tsuya-aribachi]

(Figs. 11–14)

Methocha sp.: Yamane, 1999: 404.

Diagnosis. In male, this species is easily separable from the other Asian congeners by the clypeus raised towards apex and the mesopleuron with a large fovea.

Description. Holotype. Male. Structure: Head including eyes, 0.73 times as long as wide, with convex posterior margin in full-face view; posterolateral corner round, not forming angle; frons densely punctate; punctures ca. 0.02–0.03 mm in diameters. Mandible gently narrowed to apices, with almost straight upper margin, with 2 teeth apically; outer surface coarsely punctate. Clypeus with longitudinal striae, raised toward apex, without discal tubercle; anterior margin with 2 obtuse teeth. Antenna long; first 5 antennomeres in a ratio of 7 : 1.5 : 1 : 4 : 5 in length; scape short, 1.6 times as long as maximum width; pedicel shorter than width; 3rd antennomere 2.0 times as long as wide; 4th antennomere 2.7 times as long as wide, 5th to 12th antennomeres each longer than wide; 13th (terminal) antennomere 4.0 times as long as wide, with acute tip. Eye large and convex, with many long erect hairs. WF 1.19 times EL. Head from above rectangular, with ratio of width to length 19 : 31, with almost straight posterior margin; posterolateral corner convex, not forming angle. Vertex moderately punctate; punctures sparser than those on frons. Ocelli forming obtuse triangle; POL : AOL = 11 : 4 ; OOL 0.89 times WOT; anterior ocellus ca. 0.06 mm in diameter.

Pronotal disc wider than long, 0.57 times as long as wide, with weakly convex sides and anterior margin, and concave posterior margin in dorsal view; anterolateral corner forming distinct angle; anterior margin carinate; disc anteriorly with transverse striae, posterior portion subopaque with sparsely shallow punctures. Mesoscutum moderately punctate;

scutellum with shallow punctures; large rectangular scutellar pit present at anterior margin, ca. 0.50 mm in length, with 5 longitudinal septums in the pit. Msopleurum moderately punctate, with reverse L-shaped furrow at anterior portion and a large fovea at lower portion. Propodeum rounded in profile; dorsum wider than long in dorsal view, coarsely reticulate, without median longitudinal furrow; anterior border depressed; lateral surface coarsely reticulate.

Metasoma slender, 1st to 6th terga smooth and shining; 7th tergum with small shallow punctures: 2nd to 6th sternum smooth and shining, medially depressed; hypopygium smooth, without depression, roundly cleft.

Color. Body black; mandible black excepting brownish apices; antenna and legs black; wings subhyaline, even brownish; pterostigma and wing veins blackish brown.

Measurements (mm). HL 1.28, HW 1.75, WF 0.95, EL 0.80, FWL 5.6, TL 7.9.

Holotype. Male, Takeyamaru, Okinawa-shi, Okinawa Pref., 29. vii. – 26. viii. 2013, M. Sano leg. (by Malaise trap), (ELKU).

Paratypes. 2♂♂, same locality and method, 23. ix. – 3. x. 2013, M. Sano leg., (ELKU, NIAES).

Distribution. Japan (Okinawa-jima Is.).

Etymology. The specific epithet is based on the name of type locality, Okinawa (= Uchinan in Okinawan dialect).

Remarks. This species corresponds with *Methocha* sp. by Yamane (1999). All the types were captured by Malaise traps. Although there is a possibility that *M. uchinanensis* is the male of *M. okinawensis*, we treat it here as a separate species because of a confirmed case of male-female association.

***Methocha yaeyamensis* sp. nov.**

[Japanese name: Yaeyama-tuya-aribachi]

(Figs. 15–18)

Diagnosis. This species is most similar to *M. caripyga* Lin, 1966, from Taiwan in the shape of hypopygium (7th sternum) with median half smooth and deeply, sharply excavated. However, it is separated from the latter by the longitudinal median furrow on the propodeal dorsum.

Description. Holotype. Male. Structure: Head including eyes, 0.86 times as long as wide, with convex posterior margin in full-face view; posterolateral corner round, not forming angle; frons densely punctate; punctures ca. 0.03–0.05 mm in diameters, separated less than 0.5 times their diameters. Mandible steeply narrowed at apical half, its upper margin gently sloping, with 2 teeth apically; outer surface coarsely punctate. Clypeus punctate with discal tubercle; anterior margin convex and with 2 obtuse angle. In lateral view, discal tubercle forming right triangle. Antenna long; first 5 antennomeres in a ratio of 11 : 4 : 12 : 19 : 19 in length; scape short, 1.4 times as long as maximum width; pedicel shorter than width; 3rd antennomere 1.5 times as long as wide; 4th antennomere 2.7 times as long as wide; 5th antennomere 3.2 times as long as wide; 6th to 12th antennomeres segments each longer than wide; 13th (terminal) antennomere 4.0 times as long as wide, with acute tip. Eye large and convex, with many long erect hairs. WF 0.89 times EL. Head from above

thin and rectangular, with ratio of width to length 15 : 31, with almost straight posterior margin; posterolateral corner convex, not forming angle. Vertex moderately punctate; punctures sparser than those on frons. Ocelli forming obtuse triangle; POL : AOL = 3 : 2 ; OOL 0.88 times WOT; anterior ocellus ca. 0.13 mm in diameter.

Pronotal disc wider than long, 0.25 times as long as wide, with weakly convex sides and straight anterior margin, and strongly concave posterior margin in dorsal view; anterolateral corner forming distinct angle; anterior margin carinate; disc with longitudinal median carina; anterior surface punctate-reticulate, posterior surface moderately punctate. Dorsum of mesoscutum with densely punctate median surface and transversely striate lateral surfaces; median surface of scutellum largely smooth and shining, with sparse shallow punctures; lateral surface with about 10 oblique rugae; large rectangular scutellar pit present at anterior margin, ca. 0.45 mm in length, with 8 longitudinal septums in the pit. Mesopleurum shining, sparsely punctate, with reverse L-shaped furrow at anterior portion. Propodeum forming distinct corner between dorsal and posterior surface in profile; dorsum wider than long in dorsal view, with thick medial longitudinal furrow; anterior half of disc with longitudinal and oblique rugae, and microreticulate interspaces; posterior half coarsely reticulate; lateral and posterior surfaces coarsely reticulate.

Metasoma slender, 1st to 6th terga covered with small shallow punctures, interspaces smooth and shining; 7th tergum moderately punctate; 1st and 2nd sternum moderately punctate; 3rd to 6th sterna largely smooth and shining, sparsely punctate, and medially very weakly depressed; intersegmental parts of sterna densely punctate; hypopygium with median half microsculptured and depressed around median furrow, apically sharply cleft.

Color. Body black; mandible black excepting brownish apices; antenna black; coxae, trochanters, and femora black, tibiae and tarsi blackish brown; wings hyaline; pterostigma and wing veins blackish brown.

Measurements (mm). HL 1.51, HW 1.75, WF 0.84, EL 0.96, FWL 5.9, TL 9.1.

Holotype. Male, Sonai-dake, Iriomote-jima, Okinawa Pref., 15. iii. 2002, T. Yoshida leg., (ELKU).

Paratypes. 3♂♂, same data as holotype; 1♂, Mt. Omotodake, Ishigaki-jima, Okinawa Pref., 6. v. 2004, T. Tsuru leg. (by flight interception trap), (TUA); 1♂, Kampire Falls, Iriomote-jima, Okinawa Pref., 26. iv. 2004, T. Mita leg., (TUA); 1♂, same locality, 18–19. iii. 2002, T. Yoshida leg., (NIAES); 2♂♂, Aira-gawa, Iriomote-jima, Okinawa Pref., 13–17. iii. 2002, T. Yoshida & H. Sugaya leg., (by Malaise trap), (NIAES).

Distribution. Japan (Ishigaki-jima Is. and Iriomote-jima Is.).

Etymology. The specific epithet is based on the name of type locality, the Yaeyama Islands.

***Methocha yasumatsui* (Iwata, 1936)**

[Japanese name: Hosotsuya-aribachi]

(Figs. 5, 6, 19–22)

Methocha yasumatsui Iwata, 1936: 58.

Methocha yasumatsui: Lin, 1966: 202.

Diagnosis. Female: Head from above triangular, with convex posterior margin and weakly convex, not angulate posterolateral corners; pronotal disc without median longitudinal stria; mesoscutum straight, not separated from scutellum; propodeum smooth and shining; head black, mesosoma reddish brown (pronotum often darker), metasoma black excepting 1st segment reddish brown, legs reddish brown.

Male: Head from above triangular, with convex posterior margin and weakly convex, not angulate posterolateral corners; clypeus flat, with discal tubercle at middle and with 2 blunt teeth at anterior margin; discal tubercle of clypeus in lateral view forming acute triangle; mesopleuron without large fovea at under portion; propodeum rounded in profile; 2nd to 6th sterna at most partly flattened or very weakly depressed along median line; hypopygium flattened, without excavation; body black, legs black.

Specimens examined. 1♂, Tazawa-ko, Akita Pref., 10. ix. 1996, M. Suwa leg.; 1♀, Tateyama-shi, Chiba Pref., 10. viii. 2007, M. Terayama leg.; 1♂, Ichikawa-shi, Chiba Pref., 15. vii. 2003, H. Suda leg.; 4♀♀, 1♂, Chousei-gun, Chiba Pref., 2. viii. 2004, H. Suda leg.; 2♂♂, Sakura-shi, Chiba Pref., 2. ix. 2005, H. Suda leg.; 1♂, Shiroy-shi, Chiba Pref., 18. viii. 2005, H. Suda leg.; 1♂, same locality, 4. vi. 2006, H. Suda leg.; 1♂, same locality, 289. ix. 2006, H. Suda leg.; 1♀, 1♂, Takasuga, Saitama Pref., 12. v. 1999, M. Uchida leg.; 1♀, Urawaku, Saitama-shi, Saitama Pref., 27. viii. 2006, S. Hoshizaki leg.; 1♀, Ogose-machi, Saitama Pref., 26. v. 1979, T. Nambu leg.; 1♀, Yorii-machi, Saitama Pref., 24. ix. 1984, T. Nambu leg.; 1♀, Minano-machi, Saitama Pref., 19. vi. 1976, T. Nambu leg.; 1♂, Arashi, Fukui Pref., 15. viii. 1986, T. Okumura leg.; 1♂, Minomo, Osaka Pref., 6. ix. 1938; 1♂, Kuroiso, Iwakuni-shi, Yamaguchi Pref., 1. viii. 2003, M. Terayama leg.; 1♂, Mt. Hiko-san (650–700 m alt.), Fukuoka Pref., 23. vii. 1969, K. Takeno leg. (by Malaise trap); 1♂, Sakitorida-machi, Kobayashi-shi, Miyazaki Pref., 29. ix. 2003, R. Matsumoto leg.; 1♀, Fukuyama-cho, Kagoshima Pref., 12. vi. 1990, H. Watanabe leg.; 1♂, Ibusuki, Kagoshima Pref., 3. ix. 1966, K. Kushigemati leg.; 3♂♂, Uken-son, Mt. Yuwan-dake, Amami-oshima, Kagoshima Pref., 25. vii. 2008, T. Murota leg.; 1♂, same locality, 25. vii. 2008, H. Kurokawa leg.; 1♀, same locality, 29. vii. 2008, H. Kurokawa leg.

Distribution. Japan (Honshu, Kyushu, Tanega-shima Is., Kuchino-erabu-jima Is., Amami-oshima Is.).

Key to Japanese species of the genus *Methocha*

[The male of *Methocha okinawensis* is unknown, while females of *M. uchinanensis* and *M. yaeyamensis* are unknown.]

Female:

- 1a. Mesoscutum strongly convex in profile, and posteriorly clearly separated from scutellum by strong constriction (Figs. 2, 4)..... 2
- 1aa. Mesoscutum straight, not separated from scutellum (Fig. 5). *Methocha yasumatsui* (Iwata, 1936)
- 2a. Pronotal disc with median longitudinal stria.

- b. Propodeum smooth and shining (Fig. 2).....
 *Methocha japonica* (Yasumatsu, 1931)
 2aa. Pronotal disc without median longitudinal stria.
 bb. Propodeum with reticulate postero-lateral portions and
 transversely striate posterior surface (Fig. 4).
 *Methocha okinawensis* sp. nov.

Male:

- 1a. Ventral margin of clypeus apicomediaally producing (Fig. 11).
 b. Large fovea present on mesopleuron (Fig. 14).....
 *Methocha uchinanensis* sp. nov.
 1aa. Clypeus with dorsal process but ventral margin never
 producing apicomediaally.
 bb. Large fovea absent on mesopleuron..... 2
 2a. Propodeum in profile forming distinct corner between
 dorsal and posterior surface (Fig. 18).
 b. Hypopygium distinctly depressed around median furrow
 and posterior margin deeply cleft (Fig. 17).....
 *Methocha yaeyamensis* sp. nov.
 2aa. Propodeum in profile rounded, not forming distinct
 corner between dorsal and posterior surface (Fig. 10).
 bb. Hypopygium various, if depression present, then median
 furrow shorter than depth of cleft (Figs. 9, 21)..... 3
 3a. Temple less developed; head from above rectangular (Fig.
 7).
 b. Scutum raised in profile (Fig. 10).....
 *Methocha japonica* (Yasumatsu, 1931)
 3aa. Temple developed, head from above triangular (Fig. 19).
 bb. Scutum not raised in profile (Fig. 22).....
 *Methocha yasumatsui* (Iwata, 1936)

Subfamily Myzininae

The subfamily is comprised of 4 tribes, namely Austromyzinini, Myzinini, Mesini and Meriini (Bartalucci, 2004, 2005a, b; Krombein, 1937). The tribe Mesini consists of 2 genera, *Mesa* Saussure, 1893 and *Hylomesa* Krombein, 1968. Genus *Hylomesa* is distributed in the Oriental region, from India to Malaysia and Taiwan (Krombein, 1968, 1982; Tsuneki, 1986).

***Hylomesa akitsushimana* sp. nov.**

[Japanese name: Futatsuba-kobu-tsuchibachi]
 (Figs. 23–26)

Mesa sp.: Haneda *et al.*, 2006: 41.

Diagnosis. In female, it is easily separated from the other congeners by the transverse head as viewed above (length from apex of antennal insertion to occiput ca. 3/4 times to width across eyes), the roundly incised anterior margin of clypeus, the posteriorly acutely produced epipygium (6th tergum), and the wholly black body.

Description. Holotype. Female. Structure: Head including eyes, 0.83 times as long as wide, with gently convex posterior margin in full-face view; posterolateral corner round, not forming angle. Mandible long and slender, with 2 teeth, apical and subapical tooth; surface weakly microreticulate and opaque, without punctures. Clypeus with median longitudinal

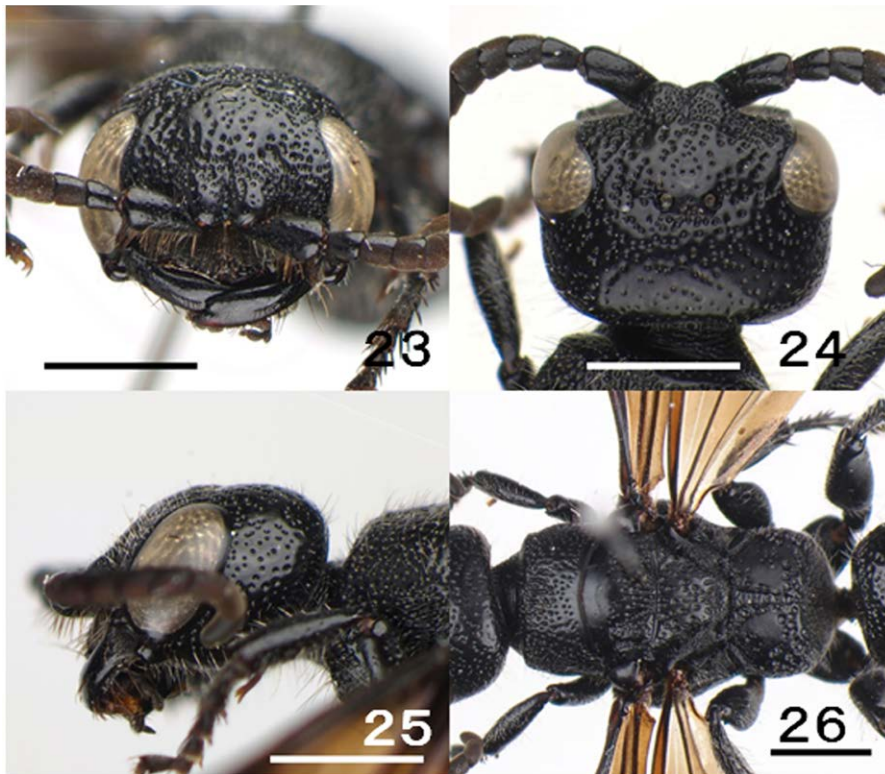
keel, anterior margin forming obtuse triangle and with half-circular incision medially. Antenna short, not reaching posterior margin of pronotum, 4th to 12th antennomeres conspicuously microreticulate, and covered with yellowish short hairs; scape 1.8 times as long as wide, very weakly microreticulate, with a few scattered shallow punctures, and with longitudinal furrow at middle which have 6 erect hairs; pedicel inserted in scape; 3rd to 6th antennomeres in a ratio of 6.5 : 6 : 8 : 8.2 in length; 3rd and 4th antennomeres each as long as wide, 5th and 6th antennomeres each 0.8 times as long as wide; 7th to 9th antennomeres each wider than long; 10th and 11th slightly longer than wide; 12th (terminal) antennomere 1.7 times as long as wide. Eye large and convex, with many long erect hairs. WF 1.39 times EL. Frontal lobe densely punctate, with median furrow. Frons densely punctate; punctures ca. 0.05–0.10 mm in diameters; interspaces weakly microreticulate. Head from above, length from apex of antennal insertion to occiput 0.76 times to width across eyes; posterior margin weakly convex, genal margins subparallel, posterolateral corner strongly convex. Vertex densely punctate with weakly microreticulate interspaces. Ocelli forming compact triangle; POL : AOL = 16 : 9 ; OOL 1.8 times WOT; frontal ocellus 0.15 mm in diameter.

Pronotal disc slightly wider than long, 0.84 times as long as wide, with weakly convex sides, straight anterior margin and concave posterior margin in dorsal view; anterolateral corner dully angle, not acutely edged; anterior border marginate; anterior portion of surface with coarse punctures confluent in longitudinal rows, posterior portion with smaller separated punctures. Mesoscutum with smooth and shining anterior half and moderately punctate posterior portion; notauli distinct, converging posteriorly; scutellum moderately punctate. Metanotum strongly reticulate, without punctures. Mesopleuron densely punctate, interspaces weakly microreticulate; anterior margin with obtuse tooth at upper portion; anterior surface strongly concave.

Dorsal disc of propodeum wide, 0.44 times as long as wide, with subparallel sides and straight posterior margin, with a pair of median longitudinal carinae; about 10 transverse rugae present between carinae; surface largely smooth and shining; punctures present at near median carinae and near posterior margin; punctures on near posterior margin large, ca. 0.17 mm in diameter in the largest one; lateral surface with many oblique striae; posterior surface punctate-reticulate.

Metasoma long, weakly constricted between segments; anterior half of 1st tergum moderately punctate, posterior half largely smooth and shining, with a few punctures, anterior corner marginate; 2st tergum largely smooth, with small and shallow punctures sparsely; apical 1/4 of 3rd tergum with abundant small punctures, and the rest smooth and shining. 4th and 5th terga largely smooth with small shallow punctures sparsely; epipygium (6th tergum) flattened, longer than wide, with narrowly round posterior end; surface moderately punctate, excepting impunctate and microreticulate marginal portion; punctures larger than those on the 5th tergite.

Fore leg weakly punctate; middle coxa punctate, femora and trochanter very weakly microreticulate, without punctures; dorsal edge and outer surface of tibia with cornical spines;



Figs. 23–26. *Hylomesa akitsushimana* sp. nov., female, holotype: 23, head, full-face view; 24, ditto, dorsal view; 25, ditto, lateral view; 26, mesosoma, dorsal view. Scale bars = 2.0 mm.

outer surface of basitarsus with 3 spines; hind coxa large and broad, 1.7 times as long as wide; trochanter impunctate; femora broad, 2.2 times as long as wide, ventral portion with a strongly laminated, apical ventral border angled; outer surface of tibia with 4 rows of conical spines; spines present at dorsal edge; outer surface of basitarsus with 6 spines.

Fore wing with obsolete pterostigma; R1 vein detached from wing border, M vein not reaching wing outer border, Cu1 vein almost reaching outer border; 3 submarginal cells expressed. Hind wing Cu-a, M and Rs veins almost reaching wing outer border.

Pilosity: Head and mesosoma covered with pale yellow hairs; 1st metasomal segment with whitish hairs, 2nd to terminal segments with pale yellow hairs; legs with whitish hairs.

Color: Body black; mandible, clypeus, antenna and legs black. Wings uniformly infuscated; wing veins blackish brown.

Measurements (mm). HL 3.96, HW 3.28, WF 2.85, EL 2.05, FWL 12.5, TL 19.5.

Holotype. Female, Inatori, Hisgashi-izu-machi, Shizuoka Pref., 8. viii. 2009, T. Muraki leg., (ELKU).

Paratypes. 1♀, Kamiagata-cho, Tsushima, Nagasaki Pref., 29. viii. 2006, T. Murota leg., (NIAES); 1♀, Sumo, Mitsushima, Tsushima, Nagasaki Pref., 21. vii. 2012, Y. Komeda leg., (TUA); 1♀, Yakuno, Fukuchiyama-shi, Kyoto, 1. viii. 2007, H. Inoue leg., (OSMN).

Non-type material examined. 1♀, Mt. Daimonzi (200m), Sakyo-ku, Kyoto-shi, Kyoto, 12. ix. 2012, Y. Sugawara leg.; 1♀, Ohko Forest Road (100–300m), Yakushima Is., Yakushima-cho, Kogoshima Pref., 14–18. vii. 2012, T. Kawano leg.

Distribution. Japan (Honshu, Tsushima Is., Yakushima Is.).

Etymology. The name is derived from the old name of

Japan.

Remarks. Body size is variable. The measurement of the smallest specimen (from Yakushima Island) is as follows: HL 2.50 mm; HW 3.35 mm; TL 15.5 mm. The holotype is the largest. This is the first record of this genus from the Palearctic region. This species corresponds with *Mesa* sp. by Haneda *et al.*, (2006), Matsumoto and Inoue (2009), and Mita and Muraki (2014).

Acknowledgments

We express our cordial thanks to S. Hoshizaki (the University of Tokyo), T. Kawano (Kyushu University), Y. Komeda (Kyushu University), R. Matsumoto (Osaka Museum of Natural History), T. Murota (Fukui), T. Nambu (Saitama), N. Ohara (Kyushu University), M. Sano (Institute of Vegetable and Tea Science, Shizuoka), H. Suda (Chiba), T. Yoshida (Okinawa Institute of Science and Technology Graduate University) for their kindness in offering valuable material. Thanks are also due to C.-J. Lin (Taipei), and G.-D. Shih (National College of Physical Education and Sports, Taoyuen) for their offering of literatures. C.-F. Lee (Taiwan Agricultural Research Institute) kindly helped us to examine the type materials of the Taiwanese *Methocha*.

References

- Agnoli, G. L., 2005. The genus *Methocha* in Europe: a discussion on taxonomy, distribution and likely origin of its known species and subspecies (Hymenoptera Tiphidae Methochinae). *Bulletin of Insectology*, **58**: 35–47.
- Agnoli, G. L., 2011. Chrysis. net website: *Methocha* (<http://www.chrysis.net/methocha/>). (sited Jan. 10. 2015)
- Bartalucci, M. B., 2004. Tribe-groups of the Myzininae with special regard to the palaeartic taxa of the tribe Meriini

- (Hymenoptera, Tiphiiidae). *Linzer Biologische Beiträge*, **36**: 1205–1308.
- Bartalucci, M. B., 2005a. Third contribution to the knowledge of the Old World Myzininae (Hymenoptera, Tiphiiidae). *Annali del Museo Civico di Storia Naturale*, **96**: 363–428.
- Bartalucci, M. B., 2005b. Anthoboscinae and Myzininae (Hymenoptera, Tiphiiidae) from Madagascar. *Linzer Biologische Beiträge*, **2005**: 1077–1097.
- Brothers, D. J., 1999. Phylogeny and evolution of wasps, ants, and bees (Hymenoptera, Chrysidoidea, Vespoidea, and Apoidea). *Zoologica Scripta*, **28**: 233–249.
- Debevec, A. H., S. Cardinal & B. N. Danforth, 2012. Identifying the sister group to the bees: a molecular phylogeny of Aculeata with an emphasis on the superfamily Apoidea. *Zoologica Scripta*, **41**: 527–535.
- Gauld, I. & B. Bolton, 1988. The Hymenoptera. 332 pp. Oxford University Press, U.K.
- Guichard, K. M., 1971. A new European species of the genus *Methoca* [sic.]. *The Entomologist*, **104**: 285–286.
- Hadley A., 2010. Combine ZP (image stacking software). Available from: <http://www.hadleyweb.pwp.blueyonder.co.uk/CZP/News.htm>.
- Haneda, Y., C. Nosaka, T. Tano, H. Kurokawa & T. Murota, 2006. Aculeate wasps collected on Tsushima, Nagasaki Prefecture, in June, 2006. *Tsunekibachi, Fukui*, **10**: 39–52. (In Japanese.)
- Iwata, K., 1936. Biology of two Japanese species of *Mathoca* [sic.] with the description of a new species (Hymenoptera, Thynnidae). *Kontyû, Tokyo*, **10**: 57–89.
- Kimsey, L. S., 2011. Tiphiiidae wasps of Madagascar (Hymenoptera, Tiphiiidae). *Journal of Hymenoptera Research*, **22**: 45–68.
- Krombein, K. V., 1937. Studies in the Tiphiiidae, I: a review of the genera of Myzininae. *Annals of Entomological Society of America*, **30**: 27–30.
- Krombein, K. V., 1968. Studies in the Tiphiiidae, X: *Hylomesa*, a new genus of myzinine wasp parasitic on larvae of longicorn beetles (Hymenoptera). *Proceedings of the United States National Museum*, **124**: 1–22.
- Krombein, K. V., 1979. Studies in the Tiphiiidae (Hymenoptera Aculeata). XII. A new genus of Methochinae with notes on the subgenera of *Methocha* (Latreille) (Hymenoptera Aculeata). *Proceedings of the Entomological Society of Washington*, **81**: 424–434.
- Krombein, K. V., 1982. Biosystematic studies of Ceylonese wasps. IX. A monograph of the Tiphiiidae (Hymenoptera: Vespoidea). *Smithsonian Contributions to Zoology*, **374**: 1–121.
- Lin, K. S., 1966. The Methochidae of Taiwan (Hymenoptera: Scolioidae). *Quarterly Journal of the Taiwan Museum*, **19**: 181–202.
- Matsumoto, R. & H. Inoue, 2009. Record on the species in the genus *Mesa* (Tiphiiidae) from Honshu. *Tsunekibachi, Fukui*, **15**: 43–44. (In Japanese.)
- Mita, T. & T. Muraki, 2014. Occurrence of *Mesa* sp. from Shizuoka Prefecture. *Kanagawa-Chuho, Odawara*, **183**: 73. (In Japanese.)
- Pagden, H. T., 1949. Descriptions and records of Austro-Malaysian Methocidae and Mutillidae (Hymenoptera). *Transactions of the Royal Entomological Society of London*, **100**: 191–231.
- Pilgrim, E. M., C. D. Von Dohlen & J. P. Pitts, 2008. Molecular phylogenetics of Vespoidea indicate paraphyly of the superfamily and novel relationships of its component families and subfamilies. *Zoologica Scripta*, **41**: 527–535.
- Tsuneki, K., 1986. A contribution to the knowledge of the Taiwanese Tiphiiidae (Hymenoptera, Tiphiiidae). *Special Publications of the Japan Hymenopterists Association*, **33**: 1–88.
- Yamane, Sk., 1999. Subfamily Methochinae. In Yamane, Sk., S. Ikudome and M. Terayama (eds.), Identification guide to the Aculeata of the Nansei Islands, Japan, Hokkaido University Press, Sapporo, 403–404.
- Yasumatsu, K., 1931. On a new methocid, *Mathoca* [sic.] *japonica* n. sp. from Japan (Hymenoptera. Methocidae). *Kontyû, Tokyo*, **5**: 12–16.
- Yasumatsu, K., 1933. On the male of *Methoca* [sic.] *japonica* Yasumatsu (Hymenoptera, Methocidae). *Kontyû, Tokyo*, **7**: 141–143.

[Received: April 21, 2015; accepted: November 24, 2015]