Original article

Distribution Records and Re-descriptions of Some Japanese Species of the Subfamily Phygadeuontinae (Hymenoptera, Ichneumonidae)

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Abstract. New distribution records of six species of Japanese Phygadeuontinae, *Acrolyta spola* Momoi, 1970 (from Tokunoshima Is.), *Diatora lissonota* (Viereck, 1912) (from Tokunoshima Is.), *Mastrus oshimensis* (Uchida, 1930) (from Honshu), *Phygadeuon elongatus* (Uchida, 1930) (from Honshu), *P. yonedai* Kusigemati, 1986 (from Honshu and Izuoshima Is.), and *Theroscopus maruyamanus* (Uchida, 1930) (from Honshu), are recorded. These species except *A. spola* and *P. yonedai* are re-described. In addition, *P. akaashii* Uchida, 1930 and *T. fukuiyamensis* (Uchida, 1936) are also re-described. *Mastrus oshimensis* and *T. maruyamanus* have only been recorded in the original description and these are the second record for both species.

Key words: Asia, fauna, new record, parasitoid wasps, zoogeograph

Introduction

The subfamily Phygadeuontinae Förster, 1869 is a large-sized subfamily of the family Ichneumonidae, consisting of over 120 genera and 1900 species from the world (Yu *et al.*, 2016). They are idiobiont parasitoid, while the strategy and the host preference are highly varied. In Japan, 41 genera and 126 species of this subfamily have been recorded (Watanabe, 2021). In this study, I provide additional distribution data of the Japanese Phygadeuontinae. Furthermore, some re-descriptions of Japanese species (e.g., species described by Dr. Toichi Uchida (1898–1974)) are provided.

Materials and methods

Dried specimens deposited in Kanagawa Prefectural Museum of Natural History, Odawara, Kanagawa, Japan (KPM-NK), Museum of Nature and Human Activities, Sanda, Hyogo, Japan (MNHAH), and Systematic Entomology, Hokkaido University, Sapporo, Japan (SEHU) were examined.

A stereomicroscope (Nikon SMZ800) was used for morphological observation. Photographs were taken using OLYMPUS TG-4 digital camera joined with the stereomicroscope. Digital images were edited using Adobe Photoshop® CC. Morphological terminology follows Broad *et al.* (2018). Eady (1968) is also referred to for the description of micro-sculpture. The following abbreviations are used in this paper: female (F), the segment of antennal flagellum (FL), Malaise trap (MsT), the diameter of lateral ocellus (OD), ocello-ocular line (OOL), postocellar line (POL), standard Japanese name (SJN), the segment of tarsus (TS), and metasomal tergite (T).

In this study, I treat the subtribes of Gelini *sensu* Townes (1970) as a genus-group because the monophyly of these groups is still debated and there is little reliable evidence.

Results and discussion

New distribution records are found for the following six species of Japanese Phygadeuontinae: *Acrolyta spola* Momoi, 1970; *Diatora lissonota* (Viereck, 1912); *Mastrus oshimensis* (Uchida, 1930); *Phygadeuon elongatus* (Uchida, 1930); *P. yonedai* Kusigemati, 1986; *Theroscopus maruyamanus* (Uchida, 1930). All species except *A. spola* and *P. yonedai* were insufficiently described. Therefore, they are re-described below.

Phygadeuon akaashii Uchida, 1930 and *T. fukuiyamensis* (Uchida, 1936) have been recorded from several areas of Japan. Similar to the case of the above-mentioned species, however, the descriptions of these species were

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insufficient. Therefore, these species are also re-described based on the additional materials below.

Mastrus oshimensis and *T. maruyamanus* have only been recorded in the original description (Uchida, 1930), and the additional specimens reported in this study are the second records of both species.

Subfamily Phygadeuontinae Förster, 1869

Acrolyta genus group
(subtribe Acrolytina *sensu* Townes (1970))

Genus ***Acrolyta*** Förster, 1869

Acrolyta Förster, 1869: 174. Type: *Acrolyta empretiae* Ashmead, 1896 (= *Ischnoceros nigricapitatus* Cook & Davis, 1891). Designated by Viereck (1914).
Rhadinocera Förster, 1869: 177. Type: *Hemiteles* (*Rhadinocera*) *algonquinus* Viereck, 1917 (= *Ischnoceros nigricapitatus* Cook & Davis, 1891). Included by Viereck (1922).
Mosia Seyrig, 1952: 69. Type: *Mosia crassicornis* Seyrig, 1952. Original designation.
Parhemiteles Seyrig, 1952: 82. Type: *Parhemiteles flaviger* Seyrig, 1952. Original designation.

Since Watanabe (2021), a single specimen of *A. spola* Momoi, 1970 has been collected from Tokunoshima Island and its record is reported here.

Acrolyta spola Momoi, 1970
(SJN: *Munebuto-mame-togari-himebachi*)

Acrolyta spola Momoi, 1970: 344.

Description. See Momoi (1970).

Material examined. JAPAN: KPM-NK 81409, F, Kagoshima Pref., Tokunoshima Is., Isen Town, Itokina, 30. V. 2007, K. Watanabe leg.

Distribution. Japan (Yakushima Is., Amamioshima Is., Tokunoshima Is., Okinawajima Is., and Ishigakijima Is.).

Remarks. This is the first record of this species from Tokunoshima Island.

Genus ***Diatora*** Förster, 1869

Diatora Förster, 1869: 180. Type: *Diatora prodeniae* Ashmead, 1904. Included by Ashmead (1904).
Microtoridea Viereck, 1912: 150. Type: *Microtoridea lissonota* Viereck, 1912. Original designation.
Zaparaphylax Viereck, 1913: 647. Type: *Zaparaphylax perinae* Viereck, 1913 (= *Microtoridea lissonota* Viereck, 1912). Original designation.
Apanteloctonus Seyrig, 1952: 135. Type: *Apanteloctonus albiscapus* Seyrig, 1952. Original designation.

A single species, *D. lissonota* (Viereck, 1912), has been recorded from Japan. In this study, I newly record this species from Tokunoshima Island and re-describe it herein.

Diatora lissonota (Viereck, 1912)
(SJN: *Okinawa-mame-togari-himebachi*)
(Figs 1A–D)

Microtoridea lissonota Viereck, 1912: 150.
Zaraparaphylax perinae Viereck, 1913: 647.
Microtoridea secunda Cushman, 1934: 1.
Hemiteles guamensis Fullaway, 1946: 223.

Description. Female (n=1). Body length 3.7 mm. Body polished, covered with silver setae.

Head 0.57 times as long as wide in dorsal view. Clypeus 0.5 times as wide as maximum length, sparsely punctate, its anterior margin thin. Face densely punctate laterally, punctate medially. Length of malar space 0.95 times as long as basal width of mandible. Frons, gena, and vertex sparsely punctate. OD: POL: OOL = 0.5: 0.75: 0.7. Occipital carina complete except for dorsal part narrowly absent, its lower end joined with hypostomal carina distant from mandibular base. Upper tooth of mandible slightly shorter than lower tooth. Base of mandible flat, with a weak transverse concavity near base. Antenna with 19 flagellomeres, subapical part not widened. Length of FL I 5.0 times as maximum depth of FL I in lateral view and 1.05 times as long as length of FL II.

Mesosoma. Upper side of collar with a weak median carina. Lateral part of pronotum sparsely punctate. Epomia present. Mesoscutum smooth (Fig. 1C), with a few, very sparse punctures. Notaulus distinct and sharp, its posterior end beyond the centre of mesoscutum. Scutellum smooth, with a few, sparse punctures, without a lateral longitudinal carina except for base. Mesopleuron covered with fine longitudinal striae and fine punctures except for smooth area on speculum. Epicnemial carina present laterally, its dorsal end not reaching anterior margin of mesopleuron. Sternaulus complete. Posterior transverse carina of mesosternum largely absent in front of middle coxa. Metapleuron punctate, with a weak, complete juxtacoxal carina. Propodeal carinae and areas complete. Postero-lateral corner of area densipara not

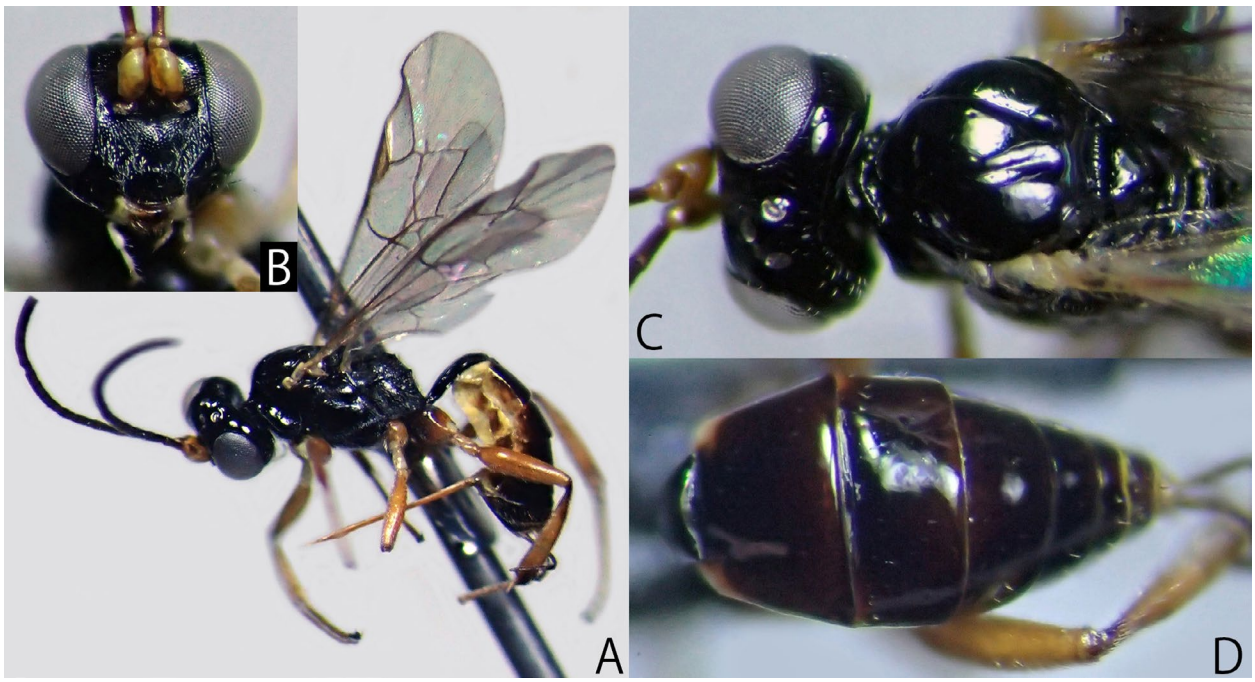

Fig. 1. *Diatora lissonota* (Viereck, 1912), female, KPM-NK 81410. A: lateral habitus; B: head, frontal view; C: head, mesoscutum, and scutellum, dorsal view; D: T II to T IV, dorsal view.

projected. Area basalis wider than area superomedia. Area superomedia slightly wider than long, receiving lateral section of anterior transverse carina near the antero-lateral corner (thus shape of area superomedia rectangle). Length of fore wing 3.0 mm. Areolet absent. Vein 1cu-a interstitial to vein M&RS. Nervellus subvertical, intercepted near middle. Hind femur 3.9 times as long as maximum depth in lateral view. Hind TS I: II: III: IV: V = 2.0: 0.8: 0.6: 0.3: 0.5. Tarsal claws simple.

Metasoma. T I to T VII smooth (Fig. 1D), with a few, fine punctures. T I 2.0 times as long as maximum width. Dorso-lateral carina of T I present except for posterior part. T II 0.55 times as long as maximum width. Ovipositor sheath 1.0 times as long as hind tibia. Ovipositor straight, with a nodus and ventral teeth.

Coloration (Figs. 1A–D). Body (excluding wings and legs) black to blackish brown. Mandible except for apex, postero-dorsal corner of pronotum, tegula, and membranous part of metasomal sternites yellow. Scape, pedicel, and ovipositor yellowish brown. Flagellum more or less tinged with brown. Wings hyaline. Veins and pterostigma brown to yellowish brown except for yellow wing base. Legs yellowish brown. Fore coxa and fore and mid trochanters and trochantelli yellow. Base and apex of hind tibia darkened.

Male. Not examined in this study.

Material examined. JAPAN: KPM-NK 81410, F, Kagoshima Pref., Tokunoshima Is., Tokunoshima Town, Kedoku, 20. V. 2008, K. Watanabe leg.

Distribution. Japan (Tokunoshima Is. and Okinawajima Is.); China, Guam, India, Malaysia, Palau, Philippines, Taiwan, and Truk Island.

Bionomics. Unknown in Japan. According to Yu *et al.* (2016), some lepidopterous and braconid hosts are recorded in other countries.

Remarks. KPM-NK 81410 has been compared with a specimen deposited in MNHAH (1 F, Taiwan, Hsien, III. 1966, K. Yano & H. Kajita leg., det. by S. Momoi). By the result of the comparison, no noteworthy morphological differences were observed. In Japan, only a single male collected from Okinawa Island was recorded (Momoi, 1970). Therefore, the KPM-NK 81410 is the second record of this species from Japan. This is also the first record of this species from Tokunoshima Island.

Mastrus genus group
(subtribe Mastrina *sensu* Townes (1970))

Genus ***Mastrus*** Förster, 1869

Mastrus Förster, 1869: 176. Type: *Phygadeuon* (*Mastrus*) *neodiprioni* Viereck, 1911. Included by Viereck (1911).
Daictes Förster, 1869: 176. Type: *Phygadeuon* (*Daictes*) *fukaii* Viereck, 1911 (= *Hemiteles aciculatus* Provancher, 1886). Included by Viereck (1911).
Aenoplex Förster, 1869: 176. Type: *Aenoplex betulaecola* Ashmead, 1896 (= *Orthocentrus pilifrons* Provancher, 1879). Included by Ashmead (1896).

Seven species, *M. ecornutus* Momoi, 1970, *M. fukaii* (Viereck 1911), *M. molestae* (Uchida, 1933), *M. oshimensis* (Uchida, 1930), *M. sugiharai* (Uchida, 1936), *M. takadai* Momoi, 1970, and *M. tenuibasalis* (Uchida, 1940), have been recorded from Japan. I found more than ten undetermined species from Japan. The taxonomic treatment of these species requires the additional specimens and comparison with European species. In this study, I newly record *Ma. oshimensis* from Honshu and re-describe it herein.

Mastrus oshimensis (Uchida, 1930)
(SJN: *Ooshima-chibi-togari-himebachi*)
(Figs 2A–C)

Hemiteles oshimensis Uchida, 1930: 342.

Description. Female (n=2). Body length 4.6–5.6 mm. Body covered with silver setae.

Head matt (Fig. 2B), 0.6 times as long as wide in dorsal view. Clypeus 0.45 times as wide as maximum length, sparsely punctate dorsally, its anterior margin narrowly marginate, with a minute median concavity. Length of malar space 0.9–0.95 times as long as basal width of mandible. OD: POL: OOL = 0.5: 0.65: 0.8. Occipital carina complete, its lower end joined with hypostomal carina distant from mandibular base. Upper tooth of mandible longer than lower tooth. Base of mandible flat. Antenna with 20–21 flagellomeres, subapical part not widened. Length of FL I 4.0 times as maximum depth of FL I in lateral view and 0.9 times as long as length of FL II.

Mesosoma polished. Lateral part of pronotum coriaceous, sparsely punctate dorsally. Epomia present. Mesoscutum matt. Notaulus distinct and weak, its posterior end not beyond the centre of mesoscutum. Scutellum densely punctate, without a lateral longitudinal carina except for base. Mesopleuron covered with fine longitudinal striae with coriaceous surface and fine punctures except for a smooth area on speculum and its anterior area. Epicnemial carina present laterally, its dorsal end not reaching anterior margin of mesopleuron. Sternaulus present except for posterior 0.4. Posterior transverse carina of mesosternum largely absent in front of middle coxa. Metapleuron punctate, with a complete juxtacoxal carina. Propodeal carinae and areas complete. Postero-lateral corner of area densipara not projected. Area basalis as wide as area superomedia. Area superomedia longer than wide, receiving lateral section of anterior transverse carina just in front of middle (Fig. 2C). Length of fore wing 4.3–4.9 mm. Areolet absent. Vein 1cu-a slightly postfurcal to vein M&RS. Nervellus inclivous, intercepted posterior to middle. Hind femur 4.8 times as

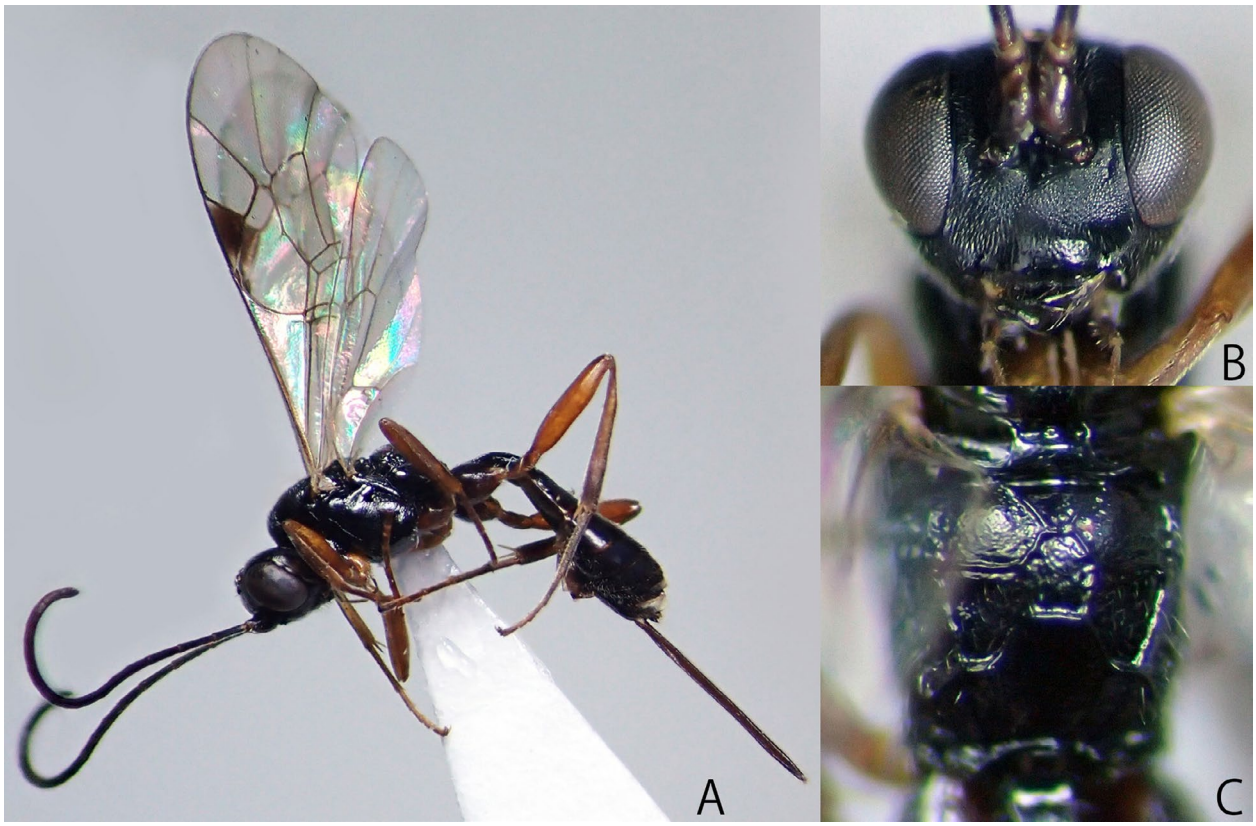

Fig. 2. *Mastrus oshimensis* (Uchida, 1930), female, KPM-NK 81411. A: lateral habitus; B: head, frontal view; C: propodeum, dorsal view.

long as maximum depth in lateral view. Hind TS I: II: III: IV: V = 2.0: 0.9: 0.6: 0.35: 0.5. Tarsal claws simple.

Metasoma. T I 1.9–2.05 times as long as maximum width, coriaceous. Median dorsal carina of T I present except for posterior part. Dorsolateral carina of T I complete. T II 0.7 times as long as maximum width, coriaceous except for smooth posterior margin. T III to T VII polished and finely punctate. Ovipositor sheath 1.3–1.45 times as long as hind tibia. Ovipositor straight, with a weak nodus and ventral teeth.

Coloration (Figs. 2A–C). Body (excluding wings and legs) black to blackish brown. Ventral surface of pedicel and base of FL I tinged with yellowish brown. Posterior areas of T VI and T VII white. Membranous part of metasomal sternites whitish brown. Posterior margins of T I to T V narrowly tinged with reddish yellow. Median area of T III sometimes slightly tinged with reddish brown. Ovipositor reddish brown. Wings hyaline. Veins and pterostigma brown to blackish brown except for base and apex of pterostigma yellowish brown. Legs reddish brown. Mid and hind coxae, hind trochanter, hind trochantellus, and apical part of hind tibia blackish brown to black.

Male. Unknown.

Materials examined. JAPAN: SEHU (lectotype), F, "Oshima", 2. IV. 1928, K. Sato leg.; KPM-NK 81411, F, Kanagawa Pref., Hiratsuka City, Okazaki, Hiraokanomori, 14. XI. 2018, Y. Hotta leg.

Distribution. Japan (Honshu and Izuoshima Is.).

Bionomics. Unknown.

Remarks. KPM-NK 81411 is the second record of this species and also the first record of this species from Honshu.

Phygadeuon genus group
(subtribe Phygadeuontina *sensu* Townes (1970))

Genus ***Phygadeuon*** Gravenhorst, 1829

Phygadeuon Gravenhorst, 1829: 635. Type: *Phygadeuon flavimanus* Gravenhorst, 1829. Designated by Westwood (1840).

Apterophygas Förster, 1869: 172. Type: *Apterophygas paradoxus* Bridgman, 1889. Included by Schmiedeknecht (1897).

Gunopaches Förster, 1869: 174. Type: *Gunopaches crassus* Perkins, 1962. Designated by Perkins (1962).

Habromma Förster, 1869: 176. Type: *Habromma nigrum* Ashmead, 1902 (= *Isochresta unicincta* Ashmead, 1902). Included by Ashmead (1902).

Pantolispa Förster, 1869: 178. Type: *Gunopaches crassus* Perkins, 1962. Designated by Perkins (1962).

Isochresta Förster, 1869: 181. Type: *Isochresta unicincta* Ashmead, 1902. Included by Ashmead (1902).

Bathymetis Förster, 1869: 182. Type: *Phygadeuon* (*Bathymetis*) *cylindricus* Brischke, 1891 (= *Phygadeuon dimidiatus* Thomson, 1884). Designated by Viereck (1914).

Iselix Förster, 1869: 182. Type: *Phygadeuon nitidus* Gravenhorst, 1829. Designated by Viereck (1914).

Homelys Förster, 1869: 182. Type: *Phygadeuon lapponicus* Thomson, 1884. Designated by Viereck (1914).

Ernoctona Förster, 1869: 183. Type: *Phygadeuon rugulosus* Gravenhorst, 1829. Designated by Perkins (1962).

Zaphleges Förster, 1869: 184. Type: *Phygadeuon leucostigmus* Gravenhorst, 1829. Designated by Ashmead (1900).

Ischnocryptus Kriechbaumer, 1892: 351. Type: *Phygadeuon nitidus* Gravenhorst, 1829. Designated by Viereck (1914).

Eight species, *P. akaashii* Uchida, 1930, *P. bidentata* (Uchida, 1930), *P. elongatus* (Uchida, 1930), *P. kiashii* Uchida, 1930, *P. kochiensis* Uchida, 1936, *P. sapporoensis* (Ashmead, 1906), *P. similis* (Uchida, 1930), and *P. yonedai* Kusigemati, 1986, have been recorded from Japan. I found more than 20 undetermined species from Japan. The taxonomic treatment of these species requires the additional specimens and comparison with European species. In this study, I re-describe *P. akaashii* and *P. elongatus* and record some distribution data of these species and *P. yonedai*.

Phygadeuon akaashii Uchida, 1930
(SJN: *Akaashi-futakobu-chibi-togari-himebachi*)
(Figs 3A–D)

Phygadeuon akaashii Uchida, 1930: 338.

Description. Female (n=6). Body length 4.6–6.4 mm. Body polished, covered with silver setae.

Head 0.65–0.7 times as long as wide in dorsal view. Clypeus 0.4 times as wide as maximum length, sparsely punctate dorsally (Fig. 3C), its anterior margin narrowly marginate except for a pair of median teeth. Face densely punctate. Frons with smooth areas above antennal sockets. Length of malar space 0.7–0.75 times as long as basal width of mandible. Maximum width of gena as wide as eye in lateral view. OD: POL: OOL = 0.5: 0.6–0.8:

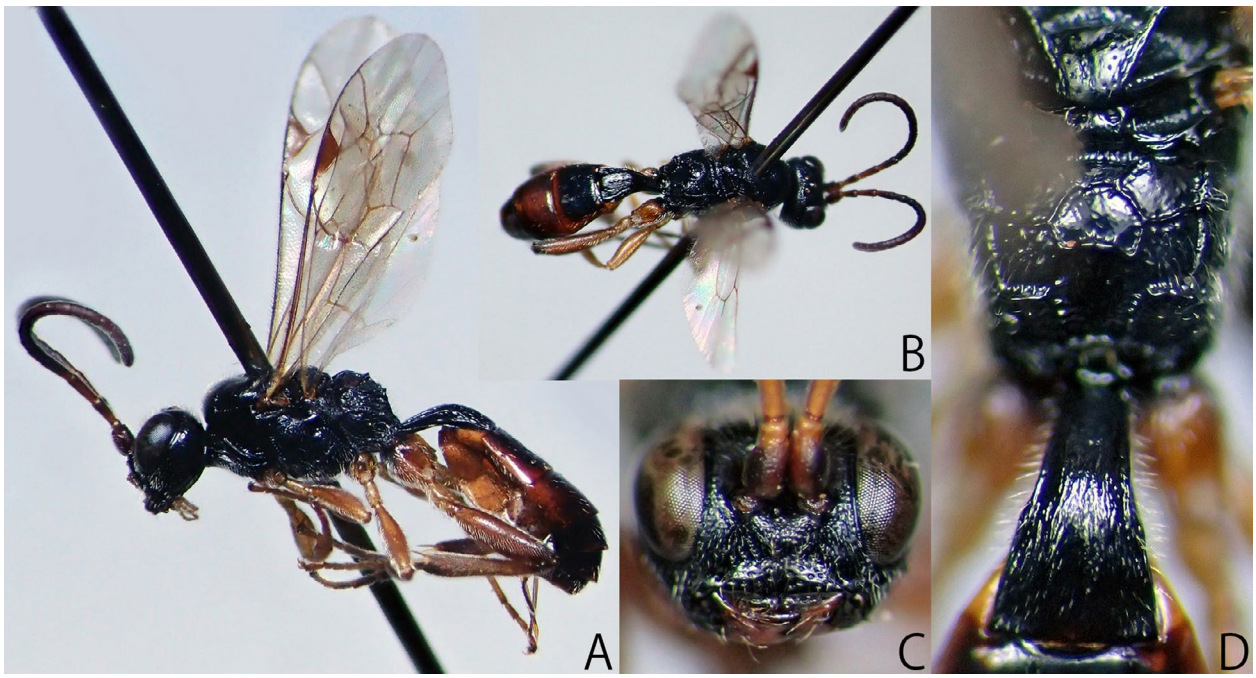

Fig. 3. *Phygadeuon akaashii* Uchida, 1930, females (A, B, D: KPM-NK 81851; C: KPM-NK 81853). A: lateral habitus; B: dorsal habitus; C: head, frontal view; D: scutellum, propodeum, and T I, dorsal view.

0.85–1.0. Occipital carina complete, its lower end joined with hypostomal carina distant from mandibular base. Upper tooth of mandible slightly longer than lower tooth. Base of mandible flat. Antenna with 17–18 flagellomeres, subapical part slightly widened. Length of FL I 2.2–2.5 times as maximum depth of FL I in lateral view and 0.7–0.9 times as long as length of FL II.

Mesosoma. Lateral part of pronotum punctate dorsally, with oblique and longitudinal rugae postero-ventrally. Epomia weakly present. Mesoscutum punctate. Notaulus distinct and weak, its posterior end not beyond the centre of mesoscutum. Scutellum punctate, without a lateral longitudinal carina except for base. Mesopleuron covered with sparse punctures except for a large smooth area on speculum and its anterior area. Epicnemial carina present laterally, its dorsal end not reaching anterior margin of mesopleuron. Sternaulus complete. Posterior transverse carina of mesosternum largely absent in front of middle coxa. Metapleuron punctate, with a complete juxtacoxal carina. Propodeal carinae and areas complete. Postero-lateral corner of area densipara weakly projected. Area basalis as wide as area superomedia. Area superomedia wider than long, receiving lateral section of anterior transverse carina near or just behind of middle (Fig. 3D). Length of fore wing 4.1–5.0 mm. Areolet present. Vein 1cu-a interstitial to vein M&RS. Nervellus subvertical, intercepted near posterior 0.75. Hind femur 3.9–4.1 times as long as maximum depth in lateral view. Hind TS I: II: III: IV: V = 2.0: 0.9: 0.7: 0.3: 0.8. Tarsal claws simple.

Metasoma. T I 1.8–1.9 times as long as maximum width, smooth except for postero-lateral area with a few longitudinal striae (Fig. 3D). Median dorsal carina of T I present except for area near posterior margin. Dorsolateral carina of T I complete except for area near spiracle. T II 0.55–0.73 times as long as maximum width, largely smooth. T III largely smooth. T V to T VI smooth basally and finely punctate posteriorly. T VI and T VII usually concealed under T V in dried specimen. Ovipositor sheath 0.4–0.5 times as long as hind tibia. Ovipositor straight, with an indistinct nodus and ventral teeth.

Coloration (Figs. 3A–D). Body (excluding wings and legs) black to blackish brown. Basal segments of flagellum, pedicel, mandible except for apex and base, tegula, and apical margin of T II tinged with reddish brown. Membranous part of metasomal sternites yellowish brown. Ovipositor reddish brown. Metasomal tergites sometimes partly tinged with dark reddish brown. Wings hyaline. Veins and pterostigma brown to blackish brown except for base of pterostigma whitish yellow. Legs reddish brown. Apex of hind femur, base and apical part of hind tibia, and hind tarsus blackish brown.

Male. Not examined in this study.

Materials examined. JAPAN: KPM-NK 81851, F, Yamanashi Pref., Ichinose, 7. IX. 1982, T. Murota leg.; KPM-NK 81854, F, Fukui Pref., Arashi, 23. IX. 1973, T. Tano leg.; KPM-NK 81855, F, ditto, 29. IX. 1973.; KPM-NK 81853, 81856, 81857, 3 F, ditto, 4. X. 1973.

Distribution. Japan (Hokkaido, Honshu, and Shikoku).

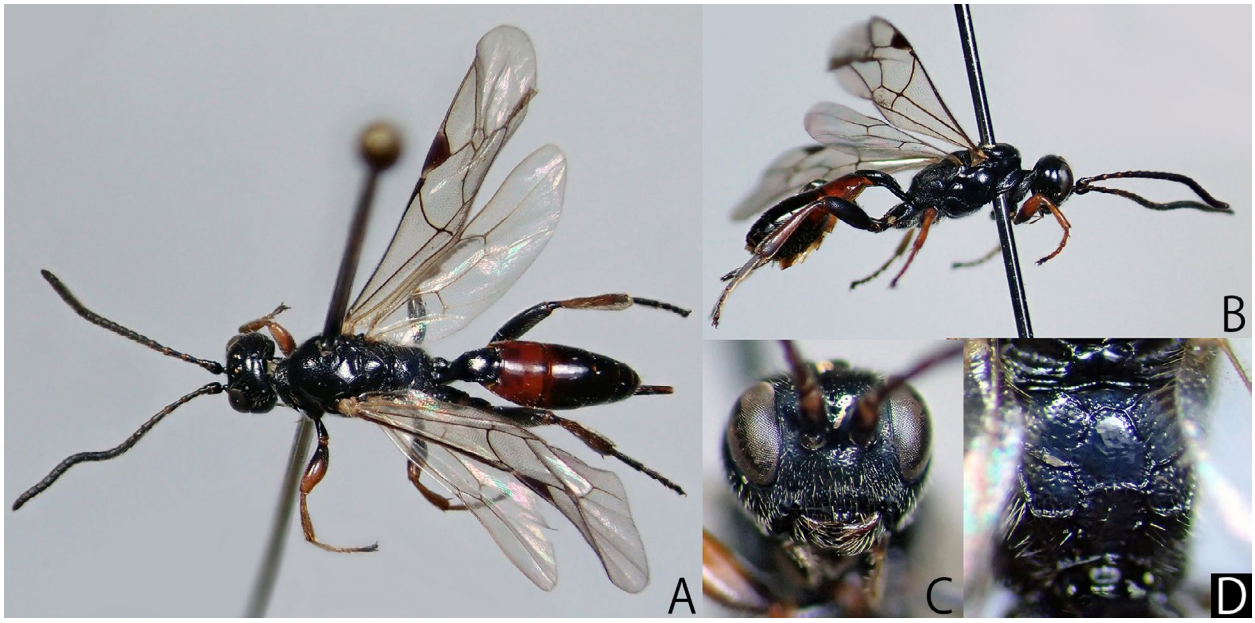

Fig. 4. *Phygadeuon elongatus* (Uchida, 1930), female, KPM-NK 81801. A: dorsal habitus; B: lateral habitus; C: head, frontal view; D: propodeum, dorsal view.

Bionomics. Host record: *Istochaeta aldrichi* (Mesnil, 1953) (Diptera, Tachinidae) (Kato, 1935); *Sarcophaga* sp. (Diptera, Sarcophagidae) (Minamikawa, 1969).

Remarks. KPM-NK 81853 has been compared with the lectotype deposited in SEHU.

Phygadeuon elongatus (Uchida, 1930)
(SJN: *Naga-futakobu-chibi-togari-himebachi*)
(Figs 4A–D)

Ischnocryptus elongatus Uchida, 1930: 338.

Description. Female (n=3). Body length 6.9–8.0 mm. Body polished, covered with silver setae.

Head 0.65–0.7 times as long as wide in dorsal view. Clypeus 0.4 times as wide as maximum length, sparsely punctate dorsally, punctate along anterior margin except for a pair of median teeth. Face densely punctate. Frons largely smooth above antennal sockets. Length of malar space 0.7–0.75 times as long as basal width of mandible. Maximum width of gena distinctly wider than eye in lateral view. OD: POL: OOL = 0.5: 0.7–1.0: 1.1–1.2. Occipital carina complete, its lower end joined with hypostomal carina distant from mandibular base. Upper tooth of mandible slightly longer than lower tooth. Base of mandible shallowly concave. Antenna with 18–20 flagellomeres, subapical part slightly widened. Length of FL I 2.2 times as maximum depth of FL I in lateral view and 0.7–0.85 times as long as length of FL II.

Mesosoma. Lateral part of pronotum punctate dorsally, with oblique and longitudinal rugae postero-ventrally. Epomia weakly present. Mesoscutum sparsely punctate. Notaulus indistinct and weak. Scutellum sparsely punctate, without a lateral longitudinal carina except for base. Mesopleuron covered with sparse punctures except for a smooth area on speculum. Epicnemial carina present laterally, its dorsal end not reaching anterior margin of mesopleuron. Sternaulus present except for posterior 0.1. Posterior transverse carina of mesosternum largely absent in front of middle coxa. Metapleuron punctate, with a complete juxtacoxal carina. Propodeal carinae and areas complete (sometimes carinae partly and narrowly indistinct: Fig. 4D). Postero-lateral corner of area densipara not projected. Area basalis as wide as area superomedia. Area superomedia as long as wide, receiving lateral section of anterior transverse carina just behind of middle (Fig. 4D). Length of fore wing 5.9–6.7 mm. Areolet present. Vein 1cu-a interstitial to vein M&RS. Nervellus subvertical, intercepted near posterior 0.6–0.7. Hind femur 3.2–3.6 times as long as maximum depth in lateral view. Hind TS I: II: III: IV: V = 2.0: 0.9–1.0: 0.7: 0.3–0.35: 0.8–0.9. Tarsal claws simple.

Metasoma. T I 1.9–2.4 times as long as maximum width, largely covered with minute and fine striae. Median dorsal carina of T I present except for posterior part. Dorsolateral carina of T I present in front of spiracle. T II 0.8–1.1 times as long as maximum width, largely smooth. T III to T VII smooth, with minute punctures. Ovipositor sheath (HT: 0.55) 0.65–0.75 times as long as hind tibia. Ovipositor straight to slightly decurved, without nodus and indistinct ventral teeth.

Coloration (Figs. 4A–D). Body (excluding wings and

legs) black to blackish brown. Basal segments of flagellum and pedicel partly tinged with brown. Mandible except for base and apex, T II, and T III reddish brown. Membranous part of metasomal sternites and ovipositor dark yellowish brown. Wings hyaline. Veins and pterostigma brown to blackish brown except for apex and base of pterostigma whitish yellow. Legs black to blackish brown. Fore and mid trochantelli, femora, tibiae, and tarsus reddish brown. Tibial spurs yellowish brown. Subbasal part of hind tibia tinged with reddish brown.

Male. Unknown.

Materials examined. JAPAN: KPM-NK 81800, F, Gunma Pref., Katashina Vil., Marunuma, Yuzawa, 12. VII. 2014, K. Watanabe leg.; KPM-NK 81801, F, Nagano Pref., Outaki Vil., Mt. Ontakesan, Hakkaisan, 17. VII. 2007, K. Watanabe leg.; KPM-NK 81802, F, Fukui Pref., Ikeda town, Mizuumi Mt. Heko-san, 18. VI. 2016, S. Shimizu leg.

Distribution. Japan (Hokkaido and Honshu); Far East Russia.

Bionomics. Unknown.

Remarks. KPM-NK 81802 has been compared with the holotype deposited in SEHU. The above additional specimens differ from the holotype in the body length (6.9–8.0 mm in the additional specimens, "11 mm" in holotype) (Uchida, 1930), while I judged that this character state is an intraspecific variation. The above record is the first of this species from Honshu.

Phygadeuon yonedai Kusigemati, 1986
(SJN: *Yoneda-futakobu-chibi-togari-himebachi*)

Phygadeuon yonedai Kusigemati, 1986: 257.

Description. See Kusigemati (1986).

Materials examined. JAPAN: KPM-NK 81841–81843, 3 F, Tokyo, Izuoshima Is., Ohshima Town, Mt. Omaru, 17. VIII. – 5. X. 2012, K. Tsujii leg. (MsT); KPM-NK 81844, F, Tokyo, Izuoshima Is., Ohshima Town, Kandachi, 12. IX. 2012, K. Tsujii leg. (MsT); KPM-NK 81850, F, Kanagawa Pref., Ebina City, Sagamigawa-Riv., 20. IX. 1992, H. Nagase leg.; KPM-NK 81848, 81849, 2 F, ditto, 25. V. 2006, M. Ooishi & R. Watanabe leg. (Yellow pan trap); KPM-NK 81845, 81846, 2 F, Toyama Pref., Toyama City, Arimine, Inonedani, 1–8. IX. 2009, M. Watanabe *et al.* leg. (MsT); KPM-NK 81847, F, ditto, 15–22. IX. 2009, M. Watanabe *et al.* leg. (MsT); SEHU, F (holotype), Saga Pref., Miyuki, Kitashigeyasu, 18. XII. 1984 m Y. Yoneda leg. (Host: puparium of *Sepedon aenescens*).

Distribution. Japan (Honshu, Izuoshima Is., and Kyushu); Taiwan.

Bionomics. Host: *Sepedon aenescens* Wiedemann, 1830 (Diptera, Sciomyzidae) (Kusigemati, 1986).

Remarks. This is the first record of this species from Honshu and Izu-oshima Is.

Genus ***Theroscopus*** Förster, 1850

Theroscopus Förster, 1850: 72. Type: *Ichneumon pedestris* Fabricius, 1775. Designated by Viereck (1914).

Chamerpes Förster, 1869: 172. Type: *Pezomachus hemipterus* Gravenhorst, 1829 (= *Ichneumon hemipterus* Fabricius, 1793). Designated by Viereck (1914).

Eriplanus Förster, 1869: 180. Type: *Hemiteles* (*Eriplanus*) *metacomet* Viereck, 1917 (= *Ichneumon rufulus* Gmelin, 1790). Designated by Viereck (1917).

Phyrtus Förster, 1869: 181. Type: *Pezomachus hemipterus* Gravenhorst, 1829 (= *Ichneumon hemipterus* Fabricius, 1793). Designated by Ashmead (1900a).

Thysiotorus Förster, 1869: 181. Type: *Thysiotorus brevipennis* Brischke, 1891 (= *Ichneumon hemipteron* Riche, 1791). Designated by Viereck (1914).

Aenoplegimorpha Viereck, 1912: 147. Type: *Aenoplegimorpha phytonomi* Viereck, 1912 (= *Ichneumon rufulus* Gmelin, 1790). Original designation.

Seven species, *T. akanensis* (Uchida, 1930), *T. daisetsuzanus* (Uchida, 1930), *T. fukuiyamensis* (Uchida, 1936), *T. maruyamanus* (Uchida, 1930), *T. pennulae* (Uchida, 1932), *T. shanaensis* (Uchida, 1936), and *T. striatus* (Momoi, 1970), have been recorded from Japan. I found more than ten undetermined species from Japan. The taxonomic treatment of these species requires the additional specimens and comparison with European species. In this study, I re-describe *Th. fukuiyamensis* and *Th. maruyamanus*.

Theroscopus fukuiyamensis (Uchida, 1936)
(SJN: *Fukuiyama-chibi-togari-himebachi*)
(Figs 5A–D)

Hemiteles (*Aenoplex*) *fukuiyamensis* Uchida, 1936: 13.

Description. Female (n=11). Body length 6.1–8.5 mm. Body polished, covered with silver setae.

Head 0.6 times as long as wide in dorsal view. Clypeus 0.45 times as wide as maximum length, sparsely punctate, its anterior margin with a pair of minute median teeth. Face almost flat, densely punctate. Length of malar space 0.85–0.95 times as long as basal width of mandible. OD: POL:

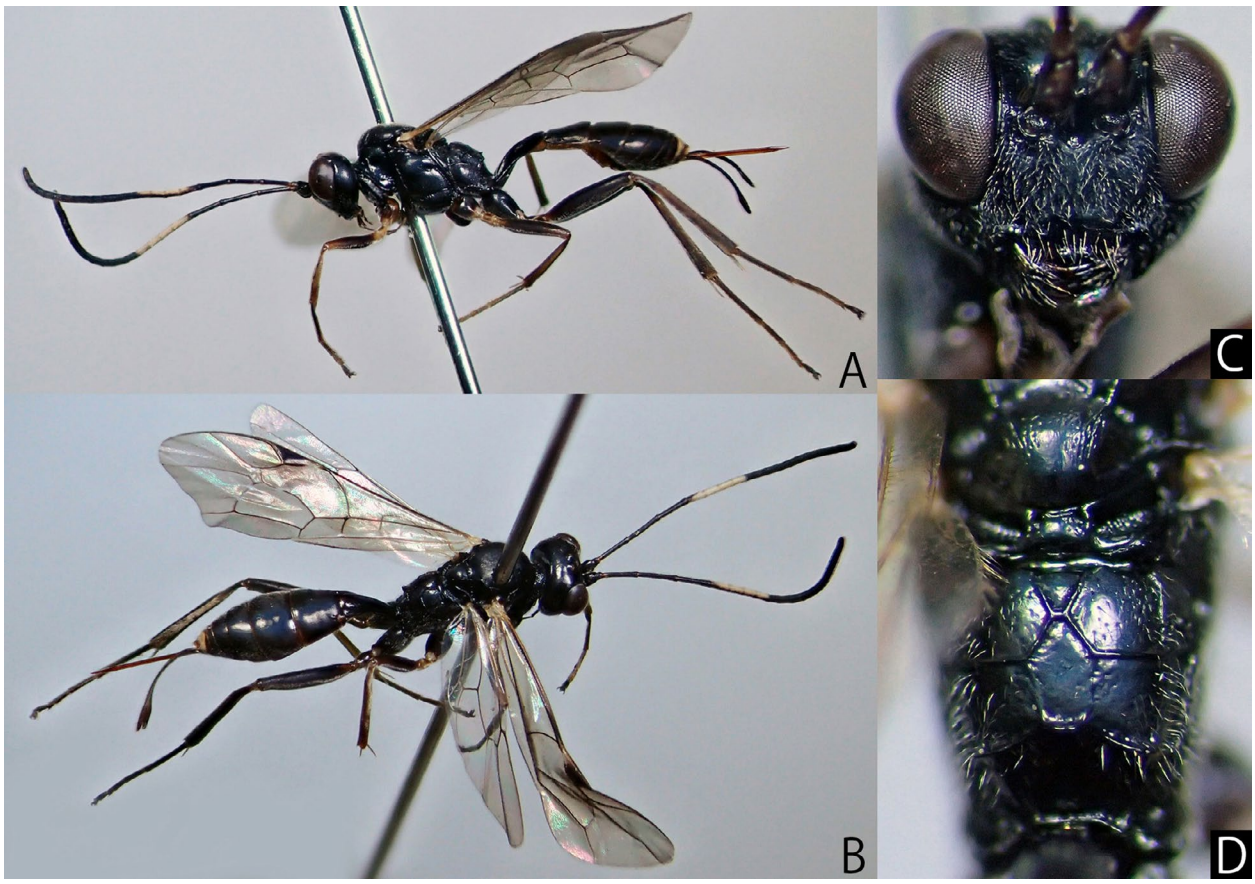

Fig. 5. *Theroscopus fukuiyamensis* (Uchida, 1936), female, KPM-NK 81812. A: lateral habitus; B: dorsal habitus; C: head, frontal view; D: scutellum and propodeum, dorsal view.

OOL = 0.5: 0.5–0.7: 1.0–1.2. Occipital carina complete, its lower end joined with hypostomal carina distant from mandibular base. Upper tooth of mandible slightly longer than lower tooth. Base of mandible flat. Antenna with 19–20 flagellomeres, subapical part slightly widened. Length of FL I 5.7–6.7 times as maximum depth of FL I in lateral view and 0.83–0.9 times as long as length of FL II.

Mesosoma. Lateral part of pronotum coriaceous and sparsely punctate dorsally, longitudinally striate posteriorly, smooth along sharp epomia. Mesoscutum matt, densely punctate. Notaulus distinct, its posterior end not beyond the centre of mesoscutum. Scutellum finely punctate, without a lateral longitudinal carina except for base. Mesopleuron covered with fine and dense punctures, with fine longitudinal striae ventrally, without a conspicuous smooth area. Epicnemial carina present laterally, its dorsal end not reaching anterior margin of mesopleuron. Sternaulus present except for posterior 0.35. Posterior transverse carina of mesosternum largely absent in front of middle coxa. Metapleuron punctate, with a complete juxtacoxal carina. Propodeal carinae and areas complete or sometimes lateromedian longitudinal carina and lateral longitudinal carina partly obtuse (Fig. 5D). Propodeum finely punctate except for area superomedia, area dentipara except lateral part, and area postero smooth. Postero-lateral corner of area densipara not projected. Area basalis narrower than area superomedia. Area superomedia longer than wide, receiving lateral section of anterior transverse carina just in front of middle (Fig. 5D). Length of fore wing 5.0–6.6 mm. Areolet absent. Vein 1cu-a interstitial to vein M&RS. Nervellus subvertical, intercepted posterior 0.75. Hind femur 4.95–5.2 times as long as maximum depth in lateral view. Hind TS I: II: III: IV: V = 2.0: 0.9: 0.6: 0.2–0.3: 0.4–0.5. Tarsal claws simple.

Metasoma. T I 2.0–2.6 times as long as maximum width, largely coriaceous. Median dorsal carina of T I present except for posterior part. Dorsolateral carina of T I complete. T II 0.7–0.85 times as long as maximum width. T II to T VII covered with minute punctures. Ovipositor sheath 0.85–0.95 times as long as hind tibia. Ovipositor straight, with a weak nodus and ventral teeth.

Coloration (Figs. 5A–D). Body (excluding wings and legs) black to blackish brown. FL IV to FL VII (sometimes also base of FL VIII) and posterior part of T VII white. Posterior margins of T II and T III tinged with reddish brown. Ovipositor reddish brown. Wings hyaline, slightly darkened behind of pterostigma. Veins and pterostigma brown to blackish brown except for base of pterostigma

whitish brown. Wing base whitish yellow. Fore and mid legs reddish brown (coxae and femora more or less darkened. Hind leg black to blackish brown. Hind trochanter, trochantellus, base of femur, and subbasal part of tibia tinged with reddish brown.

Male. Unknown.

Materials examined. JAPAN: KPM-NK 81809, F, Kanagawa Pref., Yokosuka City, Mt. Oogusu-yama, 7. V. 2014, K. Watanabe leg.; KPM-NK 81810, F, Kanagawa Pref., Hadano City, Mt. Koubou-yama, 29. IV. 2007, K. Watanabe leg.; KPM-NK 81811, 81812, F, ditto, 1. V. 2016, K. Watanabe & H. Utsugi leg.; KPM-NK 81803, F, Nagano Pref., Ueda City, Sugadairakogen, Tsukuba University, 3–26. IX. 2014, S. Shimizu leg. (MsT); KPM-NK 81807, 81808, 2 F, Toyama Pref., Nanto City, Togamura-kamimomose, 21–28. VII. 2009, M. Watanabe *et al.* leg. (MsT); KPM-NK 81805, 81806, 2 F, ditto, 25. VIII. 2009, 1. IX. 2009; KPM-NK 81804, F, ditto, 15–29. IX. 2009; SEHU, F (holotype), Kochi Pref., Kochi City, Fukuiyama, 18. V. 1931, Y. Sugihara leg.

Distribution. Japan (Honshu and Shikoku).

Bionomics. Unknown.

Remarks. KPM-NK 81812 has been compared with the holotype deposited in SEHU. The above additional specimens differ from the holotype in the body length (6.1–8.5 mm in the additional specimens, “10 mm” in holotype) (Uchida, 1936), while I judged that this character state is an intraspecific variation.

Theroscopus maruyamanus (Uchida, 1930)
(SJN: *Kitaguni-chibi-togari-himebachi*)
(Figs 6A–E)

Phygadeuon maruyamanus Uchida, 1930: 336.

Description. Female (n=1). Body length 5.9 mm. Body covered with silver setae.

Head matt, 0.6 times as long as wide in dorsal view. Clypeus 0.45 times as wide as maximum length, sparsely punctate dorsally, its anterior margin with a pair of minute median teeth. Frons with smooth areas above antennal sockets. Length of malar space 1.1 times as long as basal width of mandible. OD: POL: OOL = 0.5: 0.8: 0.95. Occipital carina complete, its lower end joined with hypostomal carina distant from mandibular base. Upper tooth of mandible slightly longer than lower tooth. Base of mandible flat, with a shallow concavity. Antenna broken in KPM-NK 81838, see remarks.

Mesosoma polished. Lateral part of pronotum punctate dorsally, longitudinally rugulose along posterior margin. Epomia present. Mesoscutum punctate, matt medially. Notaulus weak and short. Scutellum densely punctate, without a lateral longitudinal carina except for base. Mesopleuron covered with fine longitudinal striae and fine punctures except for smooth area on speculum and its anterior area. Epicnemial carina present laterally, its dorsal end not reaching anterior margin of mesopleuron. Sternaulus present except for posterior 0.45. Posterior

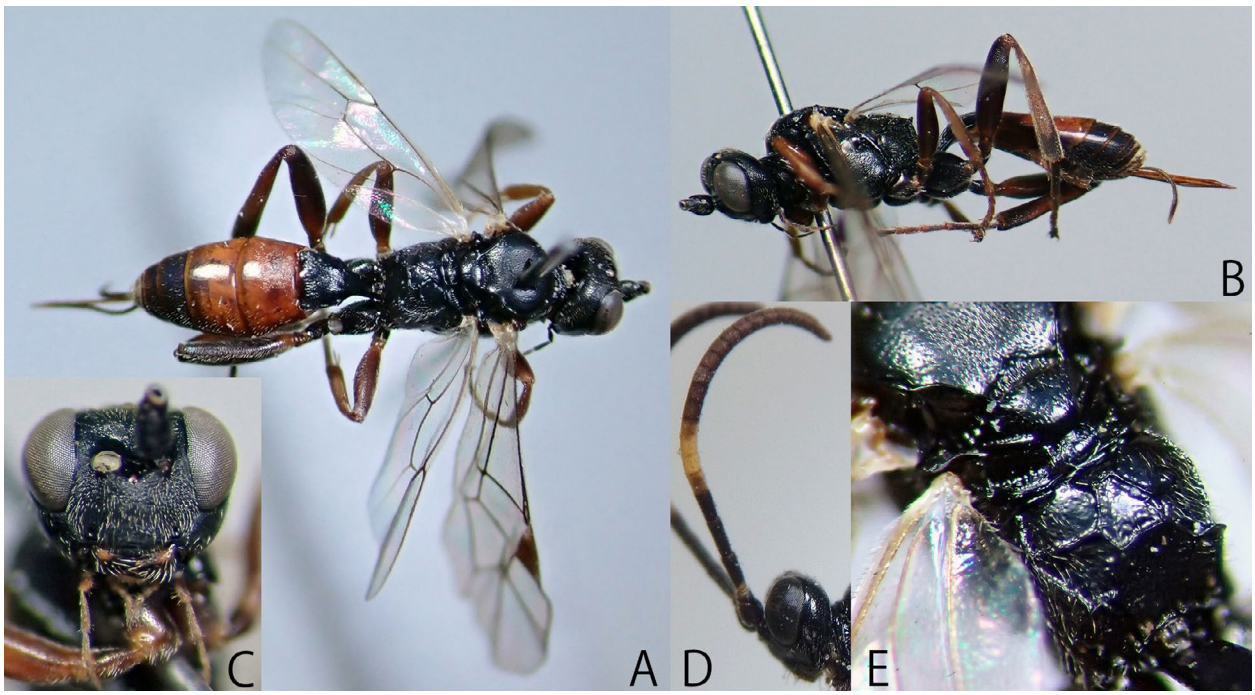

Fig. 6. *Theroscopus maruyamanus* (Uchida, 1930), females (A–C, E: KPM-NK 81838; D: lectotype deposited in SEHU) — A: dorsal habitus; B: lateral habitus; C: head, frontal view; D: head and antenna, lateral view; E: scutellum and propodeum, dorsal view.

transverse carina of mesosternum largely absent in front of middle coxa. Metapleuron punctate, with a complete juxtacoxal carina. Propodeal carinae and areas complete. Postero-lateral corner of area densipara projected. Propodeum punctate except for area superomedia largely smooth. Area basalis slightly narrower than area superomedia. Area superomedia as long as wide, receiving lateral section of anterior transverse carina just behind of middle (Fig. 6E). Length of fore wing 4.9–6.0 mm. Areolet absent. Vein 1cu-a interstitial to vein M&RS. Nervellus subvertical, intercepted posterior 0.75. Hind femur 4.0 times as long as maximum depth in lateral view. Hind TS I: II: III: IV: V = 2.0: 1.0: 0.7: 0.3: 0.7. Tarsal claws simple.

Metasoma polished. T I 1.5 times as long as maximum width, coriaceous anteriorly, longitudinally striate posteriorly. Median dorsal carina of T I present except for posterior part. Dorsolateral carina of T I complete except it on spiracle. T II 0.55 times as long as maximum width, coriaceous except for smooth posterior area. T III to T VII polished and finely punctate. Ovipositor sheath 0.8 times as long as hind tibia. Ovipositor straight, with a nodus and ventral teeth.

Coloration (Figs. 6A–C, E). Body (excluding wings and legs) black to blackish brown (pedicel and flagellum see remarks below). Basal spot of mandible yellowish brown. Tegula brown. T II, T III, and posterior margins of T IV and T V reddish brown. Posterior parts of T VI and T VII white. Membranous part of metasomal sternites and ovipositor reddish brown. Wings hyaline. Veins and pterostigma brown to blackish brown except for base of pterostigma yellowish brown. Legs reddish brown to dark reddish brown. Coxae and trochanters black. Hind trochantellus, femur, base and apical part of tibia, and tarsus darkened.

Male. Unknown.

Material examined. JAPAN: KPM-NK 81838, F, Tokyo, Hinohara Vil., Mt. Outakyama, 1. VI. 2008, T. Ban leg.

Distribution. Japan (Hokkaido and Honshu).

Bionomics. Unknown.

Remarks. KPM-NK 81838 has been compared with the lectotype deposited in SEHU. Although the antennae of KPM-NK 81838 are lost, I conclude that this specimen is *T. maruyamanus* by the other characteristics. KPM-NK 81838 is the second record of this species and is the first record of this species from Honshu. The character states of the antenna of lectotype: antenna with 20 flagellomeres, subapical part slightly widened; length of FL I 2.7 times as maximum depth of FL I in lateral view and 1.0 times as long as length of FL II; FL IV to FL VII white (Fig. 6D). KPM-NK 81838 differs from the lectotype in the following three characteristics: body length 5.9 mm (7.0 mm in lectotype); T I 1.5 times as long as maximum width (1.3 times in lectotype); ovipositor sheath 0.8 times as long as hind tibia (ca. 0.55 times in lectotype), while I judged that these character states are intraspecific variations.

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摘　要

渡辺恭平 , 2022. 日本産チビトガリヒメバチ亜科（ハチ目 , ヒメバチ科）数種の分布記録と再記載 . 神奈川県立博物館研究報告（自然科学）, (51): 61–72. [Watanabe, K., 2022. Distribution Records and Re-descriptions of Some Japanese Species of the Subfamily Phygadeuontinae (Hymenoptera, Ichneumonidae). *Bull. Kanagawa Pref. Mus.* (*Nat. Sci.*), (51): 61–72.]

日本産のチビトガリヒメバチ亜科 Phygadeuontinae の 6 種について、新分布記録を報告した。すなわち、徳之島からムネブトマメトガリヒメバチ *Acrolyta spola* Momoi, 1970 とオキナワマメトガリヒメバチ *Diatora lissonota* (Viereck, 1912) を、本州と伊豆大島からヨネダフタコブチビトガリヒメバチ *Phygadeuon yonedai* Kusigemati, 1986 を、本州からオオシマチビトガリヒメバチ *Mastrus oshimensis* (Uchida, 1930) 、ナガフタコブチビトガリヒメバチ *P. elongatus* (Uchida, 1930) およびキタグニチビトガリヒメバチ *Theroscopus maruyamanus* (Uchida, 1930) を新たに記録した。これらの種のうち、ムネブトマメトガリヒメバチとヨネダフタコブチビトガリヒメバチを除いた種は、先行研究で形態形質の十分な記載がされていないため、新たに再記載を行った。これらに加えて、同様に記載が不十分なアカアシフタコブチビトガリヒメバチ *P. akaashii* Uchida, 1930 とフクイヤマチビトガリヒメバチ *T. fukuiyamensis* (Uchida, 1936) についても、追加標本の情報とともに再記載を行った。オオシマチビトガリヒメバチとキタグニチビトガリヒメバチはいままで原記載による記録のみが知られており、今回の記録はそれぞれの種において 2 例目の記録となる。