INSECT FAUNA
OF KOREA

Volume 5, Number 1

Syrphidae I

Arthropoda: Insecta: Diptera: Brachycera: Syrphidae: Microdontinae

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Arthropoda: Insecta: Diptera: Brachycera: Syrphidae: Microdontinae

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The Flora and Fauna of Korea logo was designed to represent six major target groups of the project including vertebrates, invertebrates, insects, algae, fungi, and bacteria.

PREFACE

The biological resources include all the composition of organisms and genetic resources which possess the practical and potential values essential to human live. Biological resources will be firmed competition of the nation because they will be used as fundamental sources to make highly valued products such as new lines or varieties of biological organisms, new material, and drugs. As the Nagoya Protocol was adopted in 2010 and entered into force in the 12th Conference of Parties of the Convention on Biological Diversity (CBD) in 2014, it is expected that the competition to get biological resources will be much intensive under the rapidly changed circumstance on the access and benefic sharing of the genetic resources (ABS). To cope with a new international paradigm on all kinds of issues related to biological resources, the Ministry of Environment of Korea enforced a new law called 'An act on access and benefit sharing of genetic resources' on August 17th, 2017.

Each nation in the world is investigating and clearing information of native species within its territory in order to secure its sovereignty rights over biological resources. The National Institute of Biological Resources (NIBR) of the Ministry of Environment has published the 'Flora and Fauna of Korea' since 2006 to manage biological resources in comprehensive ways and to enhance national competitiveness by building up the foundation for the sovereignty over biological resources. Professional research groups consisting of professors and related experts of taxonomy examined systematically a total of 14,336 species for the past eight years to publish 173 volumes in both Korean and English versions, and two volumes of World Monograph covering 216 species of invertebrates. This year, 13 volumes of the Flora and Fauna of Korea in both Korean and English versions including 1,407 species of invertebrates, insects and vascular plants are additionally published. Flora and Fauna of Korea are the first professional records to describe all the species of the nation in a comprehensive way, and they would contribute to level up the taxonomic capacity.

The NIBR will continue to publish flora and fauna of Korea that will contribute conservation and application of biological resources for successful implementation of the ABS protocol. Finally, I would like to express my sincere appreciation to authors who spared no effort to publish *the Flora and Fauna of Korea*.

President
of the National Institute of Biological Resources

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INTRODUCTION

Syrphidae (Diptera: Brachycera) commonly called 'hoverflies' or 'flowerflies', with almost 6,000 described species and is a speciose family of Diptera (Miranda et al., 2013; Pape and Thompson, 2013). Syrphid flies provide crucial ecosystem services as pollinations, biological control agents and in environmental assessment (Kevan, 2002; Ssymank et al, 2008; Mengual and Thompson, 2011). Almost all adult syrphids visit flowers for pollen and nectar. Larvae, on the other hand, are found in a very diverse array of habitatas, including fungal fruiting bodies (mycophagy), dung, nests of social Hymenoptera, decaying wood and water bodies of several types (saprophagy), mining in leafs and stems of numerous plant families (phytophagy), and as predators of arthropods (Thompson and Rotheray, 1998).

The family Syrphidae is traditionally divided into three subfamilies, Microdontinae, Milesiinae (= Eristalinae) and Syrphinae, and 15 tribes are currently recognized in the family (Young et al., 2016). Immature stages of Microdontinae are inquilines in ant's nests feeding on eggs, larvae and pupae, whereas larvae of Milesiinae include saprophages in a wide range of decaying media from dung to dead wood, while some species of the genus *Volucella* are wasp- and bee- brood predators (Rotheray, 2003; Mengual et al., 2008). Larvae of Syrphinae are mostly predaceous on soft-bodied Hemiptera such as aphids, coccids and psyllids, but some species feed on Thysanoptera, immature Coleoptera and / or Lepidoptera (Rotheray, 1993; Rojo et al., 2003; Mengual et al., 2008).

Historical review of the family Syrphidae in Korea

Eristalis cerealis Fabricius was the first Korean syphid species reported by Ichigawa (1906). Later, Shiraki (1930) for the first time provided a serious revisionary work based on a collection primarily from Taiwan, Korea, Japan, and Sakhalin. In this revision, he described 302 species, among which 27 were from Korea. More recently, Kim, CW (1971) revised Korean Syrphidae, providing descriptions and illustrations of 82 nominal species. Kim, CW (1980) later provided detailed distribution maps of 34 Korean syrphid species. Kim, JI (1975, 1980) reviewed Korean syrphid references and provided a check list of 109 species with source references. ESK & KSAE (1994) included a total 127 syrphid species without providing source references. Han and Choi (2001) provided a check list of 150 species, including 12 newly recorded species in Korea. Han et al. (2014), in the most updated check list, included a total 175 species. Suk and Han (2014), Suk et al. (2015) and Jeong et al. (2017) added new records of 13 additional species in Korea. In total, three subfamilies, 70 genera and 188 species of the family Syrphidae are now officially recognized for the Korean fauna.

MATERIAL AND METHODS

The morphological terminology and interpretations used in this study largely follow Thompson (1999) and McAlpine (1981). The Korean terms used here basically follows KSAE & ESK (1998) and Park et al. (2013). For synonymy, we followed peck (1988), Han and Choi (2001), Pape and Thompson (2013) and Han et al. (2014). All photographs were obtained using Olympus C-2500L, Panasonic DMC FZ50 digital camera and Leica DMS300 camera attached to a stereo microscope, processed using Leica Application Suite software (LAS EZ).

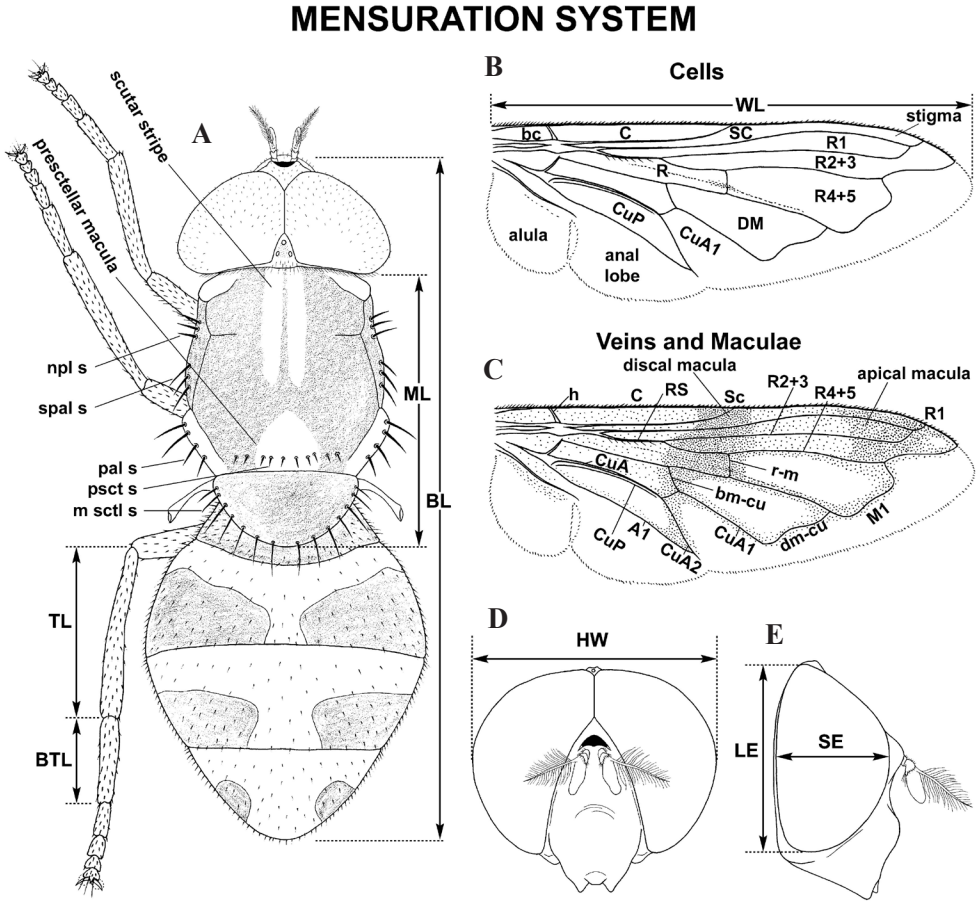

Fig. 1. Mensuration system (A, D, E: *Volucella. nigropicta*, male, B, C: *V. nigricans*). A. Body in dorsal view (wings and right legs removed); B. Cells of wing; C. Veins and maculae of wing; D. Head in anterior view; E. Head in lateral view.

Abbreviations: BL-body length, BTL-basotarsomere length, HW-head width, LE-longest eye diameter, ML-mesonotum length, SE-shortest eye diameter, TL-tibia length, WL-wing length, m sctl s-marginal scutellar seta, npl s-notopleural seta, pal s-postalar seta, psct s-prescutellar seta, spal s-supra-alar seta.

We examined more than 500 specimens of Syrphidae from Korea. Detailed collection data are provided for each species, the acronyms of collecting localities are as follows: Chungcheongbuk-do (CB), Chungcheongnam-do (CN), Gyeongsangbuk-do (GB), Gyeongsangnam-do (GN), Gyeonggi-do (GG), Gangwon-do (GW), Jeollabuk-do (JB), Jeollanam-do (JN), Jeju-do (JJ). The majority of the examined specimens are deposited in the YSUW (Division of Biological Science and Technology, Yonsei University, Wonju-si) and APQA (Animal and Plant Quarantine Agency, Gimcheon-si), Korea.

The acronyms of the terms and zoogeographical regions mentioned in the text are as follows: Holotype (HT), Monotypy (MO), Original designation (OD), Type locality (TL), Type species (TS); Afrotropical (AF), Australasian (AU), Nearctic (NE), Neotropical (NT), Oriental (OR), Palaearctic (PA).

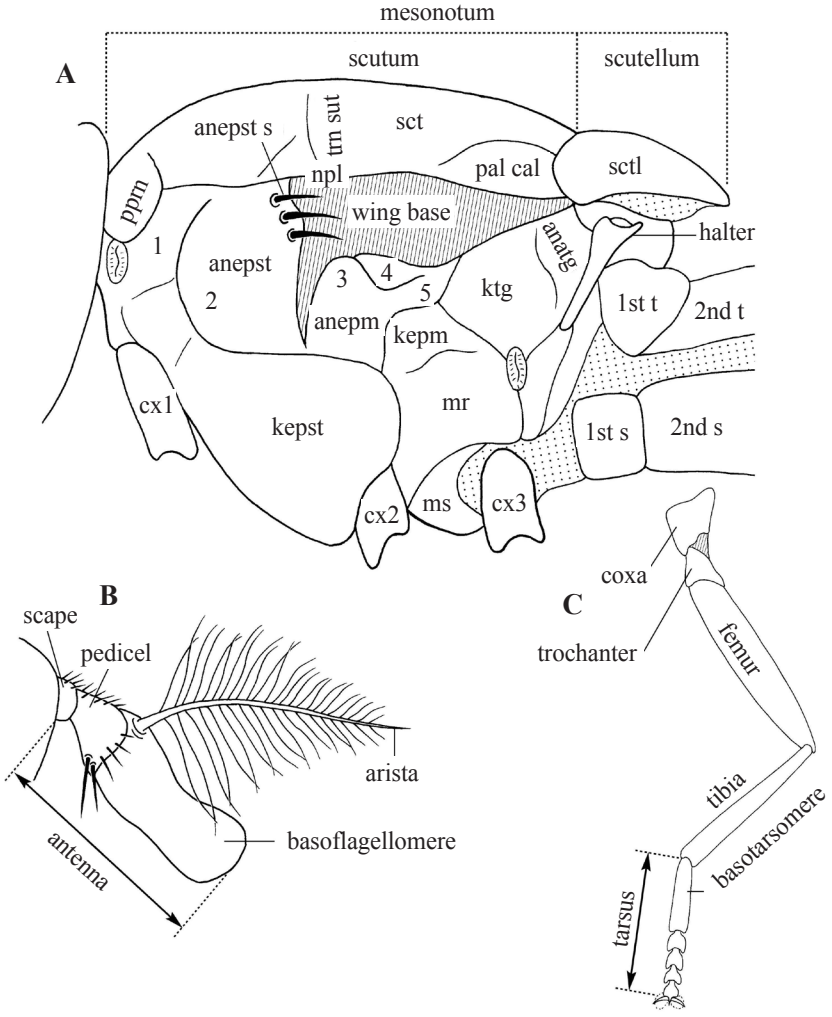

Fig. 2. A–C (*Volucella thompsoni*). A. Thorax in lateral view (modified from Thompson, 1999); B. Antenna in lateral view; C. Leg in lateral view.

Abbreviations: 1-anterior anepisternum, 2-posterior anepisternum, 3-anterior anepimeron, 4-dorsomedial

anepimeron, 5-posterior anepimeron, anatg-anatergite, anepim-anepimeron, anepst-anepisternum, anepst s-anepisternal seta, cx-coxa, kepm-katepimeron, kepst-katepisternum, ktg-katatergite, mr-meron, ms-metasternum, npl-notopleuron, pal cal-postalar callus, pprm-postpronotum, sct-scutum, sctl-scutellum, trn sut-transverse suture.

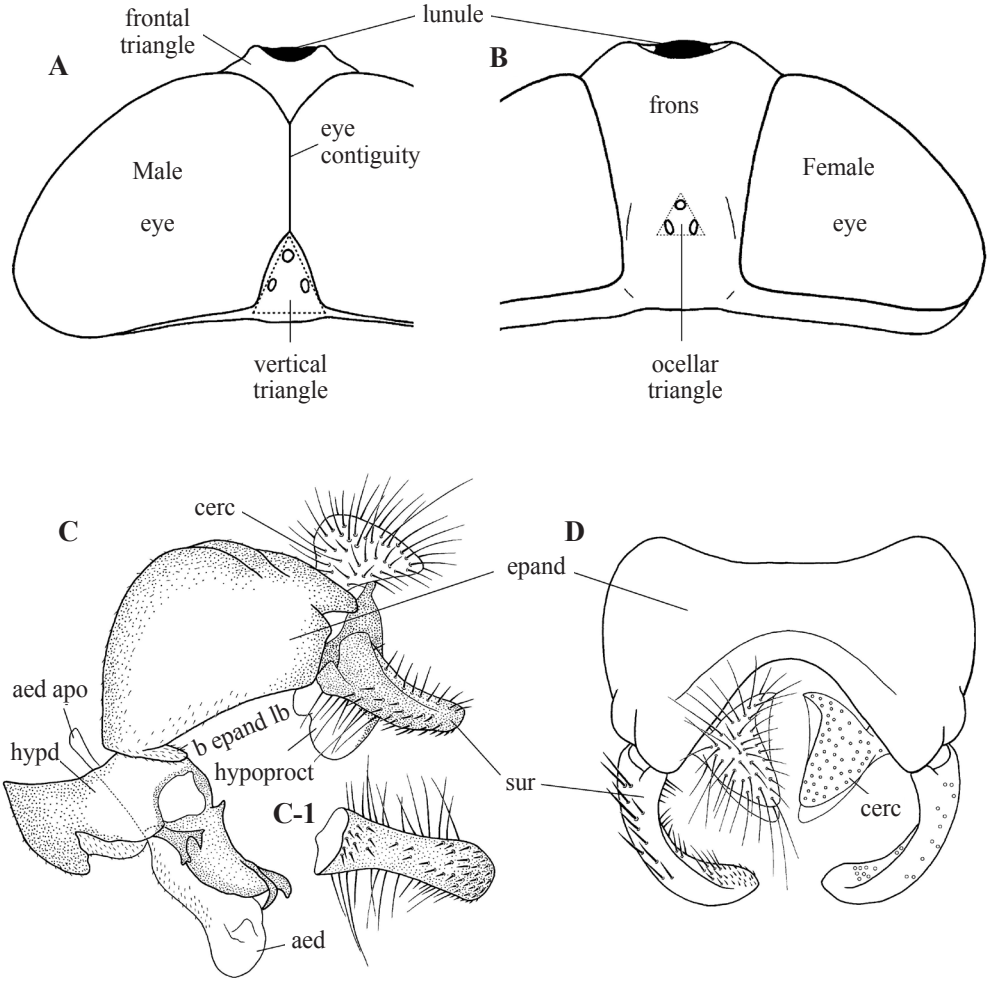

Fig. 3. A–D (A and B: *Volucella nigropicta*, C and D: *V. elegans*). A. Male head in dorsal view; B. Female head; C. Male genitalia in lateral view; C-1. Sutylus, innerview; D. ditto, posterodorsal view.

Abbreviations: aed-aedeagus, aed apo-aedeagal apodeme, b epand lb-basal epandirial lobe, cerc-cercus, epand-epandrium, hypd-hypandrium, sp lb-superior lobe, sur-surstylus.

TAXONOMIC NOTES

Phylum Arthropoda von Siebold, 1848

Class Insecta Linnaeus, 1758

Order Diptera Linnaeus, 1758

Suborder Brachycera Macquart, 1834

Family Syrphidae Latreille, 1802

Type: *Syrphus* Fabricius.
Species: ca. 6,000 (188 in Korea).
Distribution: Worldwide.
Korea: CB, CN, GB, GN, GG, GW, JB, JN, JJ.

Key to subfamilies of Korean Syrphidae (after Vockeroth and Thompson, 1987)

1. Postpronotum bare; Head posteriorly strongly convex and closely appressed to thorax; Postpronotum partly or entirely hidden; Male abdomen with tergite 5 visible in dorsal view ····· Syrphinae
− Postpronotum pilose; Head posteriorly less strongly convex; Postpronotum clearly exposed; Male abdomen with tergite 5 not visible in dorsal view ····· Milesiinae and Microdontinae

Subfamily Microdontinae Rondani, 1845

Genus *Microdon* Meigen, 1803

Microdon Meigen, 1803: Mag. Insektenk., 2: 275. TS: *Musca mutabilis* Linnaeus (MO) (as *Mulio mutabilis* Fabricius).

Aphritis Latreille, 1804: Nouv. dict. Hist. nat., 24 (Tabl. méth. Ins.): 193. TS: *Aphritis auropubescens* Latreille (subsequent monotypy, Latreille, 1805: l.c.: 358) [= *mutabilis* (Linnaeus)].

Key to species of *Microdon* from South Korea

1. Scutellum black ····· 2
− Scutellum brown to dark brown ····· 3
2. Body (except antenna) shorter than 10 mm ····· *M. simplex*
− Body (except antenna) longer than 10 mm ····· 4
3. Scutellum without spines ····· *M. auricomus*
− Scutellum with two tiny spines ····· *M. mutabilis*
4. Scutellum black with metallic greenish tinge ····· *M. oitanus*
− Scutellum black without metallic greenish tinge ····· 5
5. Fore femur with short black hairs, hind tarsomere 1 black ····· *M. miki*
− Fore femur with pale yellow or brown hairs, hind tarsomere 1 brown ····· 6
6. Scutellar spines tiny ····· *M. bifasciatus*
− Scutellar spines projecting distinctly ····· *M. japonicus*

1. *Microdon auricomus* Coquillett, 1898 (Pl. 1A)

Microdon auricomus Coquillett, 1989: 320.
Microdon auricomus nigripes Shiraki, 1930: 22 (as var. of *auricomus*).

Korean record: *Microdon auricomus*: Doi 1938: 9 (Korean check., presumably first Korean record); ZSK 1968: 180 (Korean check.); Shiraki 1968a: 5 (redescrip.); Kim, CW 1971: 875 (redescrip.); Kim, JI 1975: 41 (Korean check.); Kim, JI 1980: 383 (Korean check.); Peck 1988: 227 (Palaearctic cat.); Han & Choi 2001: 185 (Korean check.); Paek et al. 2010: 232 (Korean check.); Han et al. 2014: 8 (Korean check.). ***Microdon auricomus nigripes*:** Peck 1988: 227 (Palaearctic cat.); ESK & KSAE 1994: 292 (Korean check.); Han et al. 1998: 153 (Korean cat.); Choi et al. 2000: 145 (Baegunsan & Yonsei Univ. Maeji Campus).

Description: Body length 11.5–13 mm.

Male. Body entirely greenish black with yellowish brown pubescence on thoracic dorsum. Head largely shiny black; frons shiny black with black and brown hairs mixed; ocellar triangle black with dense black hairs; ocelli brown; face shiny black with whitish yellow pubescence; gena with gray pruinosity; eyes brown to black without short hairs; antenna brown to black with scape as long as pedicel and basoflagellomere together; scape and pedicel shiny black with strong short black hairs; basoflagellomere brown, apically rounded, tapering toward apex. Thorax shiny greenish black with three faint purple median longitudinal stripes, clothed with blackish brown pubescence; scutum dorsally with short yellowish brown sparse hairs,

laterally with long yellowish brown sparse hairs; scutellum dark brown with dense long yellowish brown pubescence, without spines. Wing hyaline with brown tinge. Legs almost entirely black; femora black with black hairs; tibiae largely black, apically 1/5 brown; tarsomere 1–5 brown with long black hairs except hind tarsomere 1 blackish brown. Abdomen black with yellowish brown pubescence; the basal half of tergite 4 and 5 black; sternites dark brown with long dense yellowish brown hairs.

Female. Similar to male except for following non-genitalic characters: frons slightly broader with black hairs; abdomen more than convex above to male.

Specimen examined: Korea: GB: Cheongsong-gun, Budong-myeon, 4. vi. 1989, CM Kim, 1♀. GG: Pocheon-gun, Idong-myeon, Mt. Myeongseongsan, 6. vi. 1981, KS Kang, 1♂. GW: Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Campus, 7. v. 2005, DS Choi, 1♂; ditto, 26. v. 2006, SW Suk, 1♀; ditto, 11. vi. 2008, JS Lim, 1♂.

Distribution: Korea, Japan [PA].

Biology: Unknown.

Korea: CB, CN, GB, GN, GG, GW, JB, JN, JJ.

2. *Microdon bifasciatus* Matsumura, 1916 (Pls. 1B, C)

Microdon bifasciatus Matsumura, 1916: 254, pl. XVII, fig. 29.

Korean record: ***Microdon bifasciatus*:** Choi et al. 2000: 145 (Baegunsan & Yonsei Univ. Maeji Campus, first Korean record); Han & Choi 2001: 187 (Korean check.); Paek et al. 2010: 232 (Korean check.); Han et al. 2014: 9 (Korean check.).

Description: Body length 11–13.2 mm.

Male. Body entirely black with two yellowish brown abdominal bands. Head largely shiny black; frons shiny black with brown hairs; ocellar triangle black with dense black hairs; ocelli brown; face shiny black with yellowish brown pubescence; gena with gray pruinosity; eyes brown to black with short hairs; antenna dark brown to black with scape shorter than pedicel and basoflagellomere together; scape and pedicel dark brown with strong short black hairs; basoflagellomere black, apically rounded, tapering toward apex; arista brown. Thorax enrirely black; scutum black and clothed with short yellowish brown pubescence; scutellum similarly colored, pubescent with two very tiny spines. Wing hyaline with brown tinge. Legs almost entirely brown with pale yellow hairs; fore and midfemur largely black with pale yellow pubescence, apically 1/3 brown; hind femur black with pale yellow pubescence, apically 1/2 brown; tibiae brown with short pale yellow pubescence and a medial balck band; tarsomere 1–5 brown with short pale yellow hairs. Abdomen

black with two yellowish brown bands; tergite 2 with rather pale yellow pubescence band on hind margin; tergite 3 with distinct yellowish brown pubescence band on hind margin; tergite 4 with broad and extended forward triangularly yellowish brown marking; sternites balck with dense short brown hairs.

Female. Similar to male except for following non-genitalic characters: tergite 4 with thick yellowish brown pubescence band on hind margin; wing with deeper brown tinge bigger than male.

Specimen examined: Korea: GW: Hongcheon-gun, Nae-myeon, Gyebangsan, N. Valley, 16. vi. 1998, HY Han & KE Ro, 1♂; Jeongseon-gun, Jeongseon-eup, Gariwangsan, 31. v. 1998, HY Han et al., 1♂; Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Campus, 11. vi. 1998, SK Kim, 1♀.

Distribution: Korea, Japan [PA].

Biology: Unknown.

Korea: GW.

3. *Microdon japonicus* Yano, 1915 (Pl. 1D)

Microdon japonicas Yano 1915: 5.
Microdon jezoensis Matsumura, 1916: 255, pl. XVII, fig. 30.

Korean record: ***Microdon japnica*:** Doi 1938: 9 (Korean check., presumably first Korean record); ZSK 1968: 180 (Korean check.). ***Microdon japnicus*:** Kim, CW 1971: 875 (redescrip.); Kim, JI 1975: 42 (Korean check.); Kim, JI 1980: 383 (Korean check.); ESK & KSAE 1994: 292 (Korean check.); Han et al. 1998: 154 (Korean cat.); Choi et al. 2000: 145 (Baegunsan & Yonsei Univ. Maeji Campus); Han & Choi 2001: 188 (Korean check.); Paek et al. 2010: 232 (Korean check.); Han et al. 2014: 9 (Korean check.).

Description: Body length 11–12.5 mm.

Male. Body entirely black with two yellowish brown abdominal bands. Head largely shiny black; frons shiny black with yellowish brown hairs; ocellar triangle black with brown hairs; ocelli brown; face black with brown pubescence; gena black with brown hairs; eyes brown to black without short hairs; antenna dark brown to black with scape shorter than pedicel and basoflagellomere together; scape black with strong short black hairs; pedicel dark brown with strong short black hairs; basoflagellomere dark brown, apically rounded, tapering toward apex; arista brown. Thorax entirely black; scutum black and clothed with yellowish brown pubescence; scutellum similarly colored, pubescence, with two very tiny spines. Wing hyaline with brown tinge. Legs almost entirely black with pale yellow to brown hairs; femora black with brown pubescence; tibiae largely brown with short pale yellow pubescence, apically 1/3 black; tarsomere 1–5 brown with short brownish yellow hairs. Abdomen black with two yellowish brown bands; tergite 2 with yellowish brown

pubescence band on hind margin; tergite 3 with a little thicker yellowish brown pubescence band on hind margin; tergite 4 with broad and extended forward triangularly yellowish brown marking; sternites black with dense yellowish brown hairs.

Female. Similar to male except for following non-genitalic characters: abdomen more than convex tergite 2 on hind margin; wing with deeper brown tinge.

Specimen examined: Korea: GG: Gwangju-gun, Jungbu-myeon, Eommi-ri, 30. v. 1981, JM Song, 1♂; Namyangju-si, Sudong-myeon, Cheonmasan, 2. vi. 1984, MJ Kang, 1♂; Sudong-myeon, Maseok, 14. v. 1975, HO Kim, 1♂; Seoul, Seocho-gu, Yeomgok-dong, Heoninneung, 4. v. 1989, IS Lee, 1♂. GW: Chuncheon-si, Seo-myeon, Gangchon, 22. v. 1977, ES Oh, 1♀; Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Campus, 5. vi. 1996, HW Byun, 1♀. JJ: Bukjeju-gun, Aewol-eup, Noro-oreum, 25. vi. 2003, HY Han et al., 1♂.

Distribution: Korea, Japan [PA].

Biology: Unknown.

Korea: GG, GW, JJ.

4. *Microdon miki* Doczkal & Schmid, 1999 (Pls. 1E, F)

Microdon miki Doczkal et Schmid 1999: 48.

Korean record: *Microdon miki*: Suk & Han 2014: 180 (Korean indigenous sp., first Korean record).

Description: Body length 11–11.5 mm.

Male: Body entirely black with two whitish yellow abdominal bands. Head largely shiny black; frons shiny black with black and yellowish brown hairs mixed; ocellar triangle black with black and yellowish brown hairs mixed; ocelli brown; face black with whitish yellow pubescence; gena black with brown short hairs; eyes brown to black with short hairs; antenna dark brown to black with scape shorter than pedicel and basoflagellomere together; scape black with strong short black hairs; pedicel black with strong short brown hairs; basoflagellomere dark brown, apically rounded, tapering toward apex; arista dark brown. Thorax black without metallic greenish tinge; scutum black and clothed with yellowish brown pubescence; scutellum similarly colored, yellow pubescence, with two very tiny spines. Wing hyaline with brown tinge. Legs almost entirely black with pale yellow to brown hairs; femora black with short brown pubescence; tibiae largely brown with whitish yellow hairs, apically 1/2 black; tarsomere 1 black with short yellowish brown hairs; tarsomere 2–5 dark brown with short yellowish brown hairs. Abdomen black with two whitish yellow bands; tergite 2 with whitish yellow pubescence band on hind margin; tergite 3 with a little thicker whitish yellow

pubescence band on hind margin; tergite 4 with broad and extended forward triangularly whitish yellow marking; sternites black with dense whitish yellow hairs.

Female. Similar to male except for following non-genitalic characters: abdomen more than convex tergite 2 on hind margin.

Specimen examined: Korea: GW: Wonju-si, Heungeop-myeon, Maeji-ri, Hoechon, 23. v. 1998, HW Byun et al., 1♂; ditto, 7. vi. 1998, HY Han & KE Ro, 1♂; Wonju-si, Gwirae-myeon, from Cheoneunsa to Mt. Sipjabong peak, 7. vi. 1998, DS Choi & SK Kim, 1♂1♀; Inje-gun, Misan-ri, Mt. Bangtaesan, 25. vi. 1996, JY Cha, 1♂.

Distribution: Korea, Germany, Austria, Italy [PA].

Biology: Unknown.

Korea: GW.

5. *Microdon mutabilis* (Linnaeus, 1758) (Pls. 1G, H)

Musca mutabilis: Linnaeus 1758: 592.
Microdon apiformis: De Geer 1776: 128.
Microdon novus: Schrank 1776: 93.
Microdon apiarius: Fabricius 1781: 422.
Microdon auropubescens: Latreille 1805: 358.
Microdon scutellaris: Schummel 1842: 116.

Korean record: ***Microdon mutabilis*:** Suk & Han 2014: 180 (Korean indigenous sp., first Korean record).

Description: Body length 10.8–11.8 mm.

Male. Body entirely black with two whitish yellow abdominal bands. Head largely shiny black; frons shiny black with yellowish brown hairs; ocellar triangle black with brown hairs; ocelli dark brown; face black with whitish yellow pubescence; gena black with brown short hairs; eyes brown to black with short hairs; antenna dark brown to black with scape about as long as pedicel and basoflagellomere together; scape and pedicel dark brown with strong short black hairs; basoflagellomere shiny black, apically rounded, tapering toward apex; arista dark brown. Thorax black with yellowish brown pubescence; scutum black and clothed with yellowish brown pubescence; scutellum brown with similarly pubescence, two very tiny spines. Wing hyaline with brown tinge. Legs almost entirely brown with pale yellow to brown hairs; femora largely black with short brown pubescence, apically 1/5 brown; tibiae largely brown with short pale yellow pubescence, a medial black band; tarsomere 1–5 dark brown with short brownish yellow hairs. Abdomen black with

two whitish yellow bands; tergite 2 with yellowish brown pubescence band on hind margin; tergite 3 with a little thicker yellowish brown pubescence band on hind margin; tergite 4 with broad and extended forward triangularly yellowish brown marking; sternites black with yellowish brown hairs.

Female. Similar to male except for following non-genitalic characters: abdomen more than convex tergite 2 on hind margin, tergite 4 with thick yellowish brown pubescence band on hind margin; bigger than male.

Specimen examined: Korea: GG: Namyangju-si, Sudong-myeon, Maseok, 14. v. 1972, HO Kim, 1♂; ditto, Mt. Cheonmasan, 2. vi. 1984, MJ Kang, 1♂; Seoul, Seocho-gu, Yeomgok-dong, Heoninneung, 4. v. 1989, IS Lee, 1♂. GW: Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Campus, 22. v. 1998, HW Byun & SK Kim, 1♂; ditto, 5. vi. 1996, HW Byun, 1♀; Chuncheon-si, Seo-myeon, Gangchon, 22. v. 1977, ES Oh, 1♀.

Distribution: Korea, Europe, Kazakhstan, West Siberia, Far East [PA].

Biology: Unknown.

Korea: GG, GW.

6. *Microdon oitanus* Shiraki, 1930 (Pl. 1I)

Microdon oitanus Shiraki 1930: 18.

Korean record: ***Microdon oitanus*:** Kim, JI & Kim, CW 1972: 12 (new Korean record); Kim, JI 1975: 42 (Korean check.); Kim, CW 1980: 284 (distr. Map); ESK & KSAE 1994: 292 (Korean check.); Han et al. 1998: 154 (Korean cat.); Han & Choi 2001: 188 (Korean check.); Paek et al. 2010: 232 (Korean check.); Han et al. 2014: 9 (Korean check.). ***Microdon oitamus* [misspelling]:** Kim, JI 1980: 383 (Korean check.).

Description: Body length 11.2–13.3 mm.

Male. Body entirely greenish black with goldish hairs on abdomen. Head largely shiny black; frons shiny black with black and yellowish brown hairs mixed; ocellar triangle black with black and yellowish brown hairs mixed; ocelli brown; face black with whitish yellow pubescence; gena with gray pruinosity; eyes brown to black with short hairs; antenna dark brown to black with scape short than pedicel and basoflagellomere together; scape and pedicel dark brown with strong short black hairs; basoflagellomere black, apically rounded, tapering toward apex; arista dark brown. Thorax metallic greenish black; scutum metallic greenish black and clothed with yellowish brown pubescence; scutellum similarly colored, hairy, with two very tiny spines. Wing hyaline with brown tinge. Legs almost entirely brown with pale yellow to brown hairs; femora shiny black with blackish brown hairs; tibiae largely black with short whitish yellow hairs, apically 1/5 brown; tarsomere 1–4 dark brown with short black and yellowish brown hairs mixed; tarsomere 5 yellowish brown with long black and yellowish brown hairs mixed. Abdomen almost metallic greenish black with

goldish hairs; tergite 2 metallic greenish black with goldish pubescence; tergite 3 metallic greenish black with goldish pubescence band on hind margin; tergite 4 black with broad and extended forward triangularly goldish marking; sternites black with dense whitish yellow hairs.

Female. Similar to male except for following non-genitalic characters: abdomen more than convex tergite 2 on hind margin; bigger than male.

Specimen examined: Korea: GB: Yeongju-si, Buseok-myeon, Seondalsan, 29. vi. 1998, HY Han et al., 1♂. GG: Namyangju-si, Pyeongnae-dong, Cheonmasan, 20. v. 1983, KS Jang, 1♀; Sudong-myeon, Cheonmasan, 30. vi. 1999, HY Han et al., 2♂; Pocheon-gun, Gwangneung, 28. v. 1972, SW Kim, 1♂. GW: Hongcheon-gun, Nae-myeon, Gachilbong, 3. vii. 2000, HY Han et al., 1♂1♀; Jeongseon-gun, Jeongseon-eup, Gariwangsan, 31. v. 1998, HY Han et al., 1♂; Sokcho-si, Seoraksan, 16. vi. 1968, JI Kim, 1♂; Wonju-si, Heungeop-myeon, Maeji-ri, Hoechon, 23. v. 1998, HY Han & DS Choi, 1♂.

Distribution: Korea, Japan [PA].

Biology: Unknown.

Korea: GB, GG, GW.

7. *Microdon simplex* Shiraki, 1930 (Pl. 1J)

Microdon simplex: Shiraki, 1930: 15.
Microdon caeruleus simplex: Shiraki, 1930: 15 (as var. of *caeruleus*).

Korean record: ***Microdon simplex*:** Paek et al. 2010: 232 (Korean check.); Han et al. 2014: 9 (Korean check.). ***Microdon caeruleus simplex*:** Han & Choi 2001: 187 (Korean check., first Korean record).

Description: Body length 5.5–7.2 mm.

Male. Body entirely black with two abdominal whitish yellow bands. Head largely shiny black; frons shiny black with black and pale yellow hairs mixed; ocellar triangle black with black and brown hairs mixed; ocelli brown; face black with whitish yellow pubescence; gena black with brown hairs; eyes brown to black with short hairs; antenna dark brown with scape longer than pedicel and basoflagellomere together; scape and pedicel dark brown with strong short black hairs; basoflagellomere dark brown, apically rounded, tapering toward apex with gray pruinosity; arista brown. Thorax metallic black; scutum metallic black and clothed with yellowish brown pubescence; scutellum similarly colored, pubescence, without spine. Wing hyaline with brown tinge. Legs almost entirely brown with pale yellow to brown hairs; femora largely black with whitish yellow pubescence, apically 1/2 brown on fore femur, apically 1/3 brown on midfemur, apically ¼ brown on hind femur; tibiae yellowish brown with a black band, whitish yellow pubescence; tarsomere 1–5 yellowish

brown with short black hairs. Abdomen black with two whitish yellow bands; tergite 2 with whitish yellow sparse pubescence band on hind margin; tergite 3 with similarly colored pubescence band on hind margin; tergite 4 with broad and extended forward triangularly whitish yellow marking, partially goldish hairy; sternites dark brown with short whitish yellow hairs.

Female. Similar to male except for following non-genitalic characters: abdomen more than convex tergite 2 on hind margin; a little bigger than male.

Specimen examined: Korea: GG: Paju-si, Daeseon-dong, DMZ vicinities, HJ Yu, 1♂. GW: Wonju-si, Heungeop-myeon, Maeji-ri, Hoechon, 10. vi. 1998, HY Han & SK Kim, 1♀; ditto, 23. vi. 1998, 1♂; ditto, 6. vii. 1998, DS Choi & SK Kim, 1♀; Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Campus, 8. vii. 2005, HW Byun, 1♂; ditto, 20. vii. 2005, HW Byun, 1♀; Wonju-si, Panbu-myeon, Baegunsan, from Yongsugol to 1,087.1 m peak, DS Choi, 1♀.

Distribution: Korea, Japan, Taiwan [PA, OR].

Biology: Unknown.

Korea: GG, GW.

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PLATES

Plate 1. A. *Microdon auricomus* ♀, 12.8 mm (from Han and Choi, 2001); B. *M. bifasciatus* ♂, 11.2 mm (from Han and Choi, 2001); C. ditto ♀, 12.5 mm (from Han and Choi, 2001); D. *M. japonicus* ♂, 11.5 mm (from Han and Choi, 2001); E. *M. miki* ♂, 11.0 mm (from Suk and Han, 2014); F. ditto ♀, 11.5 mm; G. *M. mutabilis* ♂, 11.1 mm (from Suk and Han, 2014); H. ditto ♀, 11.5 mm; I. *M. oitanus* ♀, 12.5 mm (from Han and Choi, 2001); J. *M. simplex* ♀, 6.8 mm (from Han and Choi, 2001).

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