

A Checklist of the Families Lonchaeidae, Pallopteridae, Platystomatidae, and Ulidiidae (Insecta: Diptera: Tephritoidea) in Korea with Notes on 12 Species New to Korea

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ABSTRACT

A preliminary list of the following four tephritoid families is provided including 30 Korean species, of which 12 are new to Korea: two Lonchaeidae, three Pallopteridae (two new to Korea), 17 Platystomatidae (two new to Korea), and eight Ulidiidae (all new to Korea). This list is mainly based on the insect collection at the Yonsei University Wonju Campus and on previous publications concerning these taxa. Although a full taxonomic revision for each family is required in the long term, this preliminary list will provide a useful starting point to further investigation of these families. For the other three tephritoid families known in Korea but not treated in the present study, 89 species of Tephritidae, 14 species of Pyrgotidae, and one species of the rare family Ctenostylidae have been reported previously. A total of 134 species in seven families are officially recognized for the Korean fauna of the superfamily Tephritoidea.

Keywords: Tephritoidea, Lonchaeidae, Pallopteridae, Platystomatidae, Ulidiidae, Korea

INTRODUCTION

The Tephritoidea is a large superfamily of ten acalyptrate fly families including over 7,300 described species worldwide (Korneyev, 1999; Han and Ro, 2005): the Lonchaeidae, Piophilidae, Pallopteridae, Eurygnathomyiidae, Richardiidae, Ulidiidae, Platystomatidae, Pyrgotidae, Ctenostylidae, and Tephritidae. Except for the Piophilidae, Eurygnathomyiidae and Richardiidae, a total of seven families have been reported in Korea.

A preliminary list of the following four families is provided including 30 Korean species, of which 12 are new to Korea: two Lonchaeidae, three Pallopteridae (two new to Korea), 17 Platystomatidae (three new to Korea), and eight Ulidiidae (all new to Korea). This list is mainly based on the insect collection at the Yonsei University Wonju Campus and on previous publications concerning these taxa. Although a full taxonomic revision for each family is required in the long term, this preliminary list will provide a useful starting point to further investigate these families. Photographs of all species listed are provided to aid in their identification.

For the other three tephritoid families known in Korea but not treated in the present study, Han and Kwon (2000, 2010) reported 89 species of Tephritidae, Kim and Han (2009) reported 14 species of Pyrgotidae, and Han (2006) reported a single species of the rare family Ctenostylidae. Therefore, 134 species in seven families are now officially recognized for the Korean fauna of the superfamily Tephritoidea.

MATERIALS AND METHODS

The Korean specimens used in this study were deposited at the Division of Biological Science and Technology, Yonsei University, Wonju, Korea (YSUW). The abbreviations of the other institutions mentioned in the text are as follows: DEI, Deutsches Entomologisches Institut, Deutschen Akademie der Landwirtschaftswissenschaften zu Berlin, Germany; HNHM, Hungarian Natural History Museum, Budapest, Hungary; HUS, Entomological Institute, Faculty of Agriculture, Hokkaido University, Sapporo, Japan; MHNG, Muséum d'histoire naturelle Genève, Switzerland; NIAES, Laboratory of

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Insect Systematics, National Institute of Agro-Environmental Sciences, Tsukuba, Ibaraki, Japan; NRS, Naturhistoriska Riksmuseet, Sektionen fur entomologi, Stockholm, Sweden; SIZK, Schmalhausen Institute of Zoology, Kiev, Ukraine; USNM, United States National Museum of Natural History, Washington, DC, USA; UZMH, Zoological Museum, Finnish Museum of Natural History, University of Helsinki, Finland; ZISP, Zoological Museum, Academy of Sciences, Russian Academy of Sciences, St. Petersburg, Russia; ZMC, University of Copenhagen, Zoological Museums, Denmark; ZMHB, Museum fur Naturkunde der Humboldt Universitat zu Berlin, Germany; ZMHU, Museum fur Naturkunde der Humboldt Universitat zu Berlin, Bereich Zoologisches Museum, Berlin, Germany; ZMM, Zoological Museum, University of Moscow, Moscow, Russia; ZSZMH, Zoologisches Staatsinstitut und Zoologisches Museum, Hamburg, Germany.

RESULTS

Order Diptera

^{1*}Family Lonchaeidae (Fig. 1)

Lonchaeid flies are found in all zoogeographical regions with 470 valid species, of which 111 are recognized in the Palaearctic region, as of September 2012 (The Diptera Site, 2012). Lonchaeid flies are usually stout, metallic green, or bluish black, small to medium sized (3–6 mm) flies (Oosterbroek, 2006). The larvae of most species are found in molding wood and underneath the bark of dying or dead trees, with several species associated with particular tree species. In other species, larval development occurs in rotting vegetable matter such as onions, conifer seeds, fruits, vegetables, galls on grasses, or other substances (Oosterbroek, 2006).

MacGowan (2007) described the following two new species as the first official record of this family in Korea, based on specimens collected by Bernhard Merz in 2005. The holotypes of these species are currently deposited at YSUW. When compared side by side, they are easily distinguished from each other by tarsal coloration (*Lonchaea gachilbong*-yellowish brown vs. *Setisquamalonchaea korea*-black; Fig. 1A vs. 1B). However, thorough descriptions and illustrations by MacGowan (2007) should be consulted for more accurate species identification, as there are many similar looking species waiting to be described in Korea. According to our collection (YSUW), at least ten species of Lonchaeidae could occur in Korea.

Genus *Lonchaea* Fallén

^{2*}**1. *Lonchaea gachilbong* MacGowan, 2007 (Fig. 1A)**
Lonchaea gachilbong MacGowan, 2007: 6. Holotype ♂, Korea, Gangwon-do, Hongcheon-gun, Nae-myeon, Mt. Gachilbong, 37° 52'N, 128° 28'E, 17 Jun 2005, Merz B et al. (YSUW).

Korean record. *Lonchaea gachilbong* MacGowan, 2007: 6 (original description).

Distribution. Korea.

Remarks. The holotype from Korea is the only known specimen of this species. See MacGowan (2007) for accurate identification.

Genus *Setisquamalonchaea* Morge

^{3*}**2. *Setisquamalonchaea korea* MacGowan, 2007 (Fig. 1B)**

Setisquamalonchaea korea MacGowan, 2007: 12. Holotype ♂, Korea, Gangwon-do, Jeongseon-gun, Mt. Mindungsan, 37° 16.2'N, 128° 45.5'E, 24 Jun 2005, Merz B et al. (YSUW). Paratype 2♂2♀ from 4 localities in Gangwon-do (MHNG).

Korean record. *Setisquamalonchaea korea* MacGowan, 2007: 12 (original description).

Distribution. Korea.

Remarks. The type series are the only known Korean specimens of this species. See MacGowan (2007) for accurate identification.

^{4*}Family Pallopteridae (Fig. 2)

The family Pallopteridae includes 64 valid species with the greatest number of species in the Palaearctic region where 39 are currently recognized, as of September 2012 (The Diptera Site, 2012). They are small to medium sized (2.5–7 mm), slender flies varying in color from pale yellow to reddish, grey or black (Oosterbroek, 2006). According to Merz (1998), the larvae of all species studied so far either live in plant stems (Umbelliferae, Graminea, or Juncaceae), or in flowerheads of Asteraceae.

Merz and Sueyoshi (2002) described *Temnosira reducta* as the first record of the family Pallopteridae in Korea, based on specimens provided by me (the holotype is currently deposited at YSUW). Ozerov (2009) synonymized this species with *Toxoneura orientana* (Kovalev). Two additional species are reported here as new to Korea. A more comprehensive study of Korean Pallopteridae including three additional species is currently underway.

Korean name: ^{1*}감장파리과 (신칭), ^{2*}가칠봉깜장파리 (신칭), ^{3*}한국깜장파리 (신칭), ^{4*}신선파리과 (신칭)

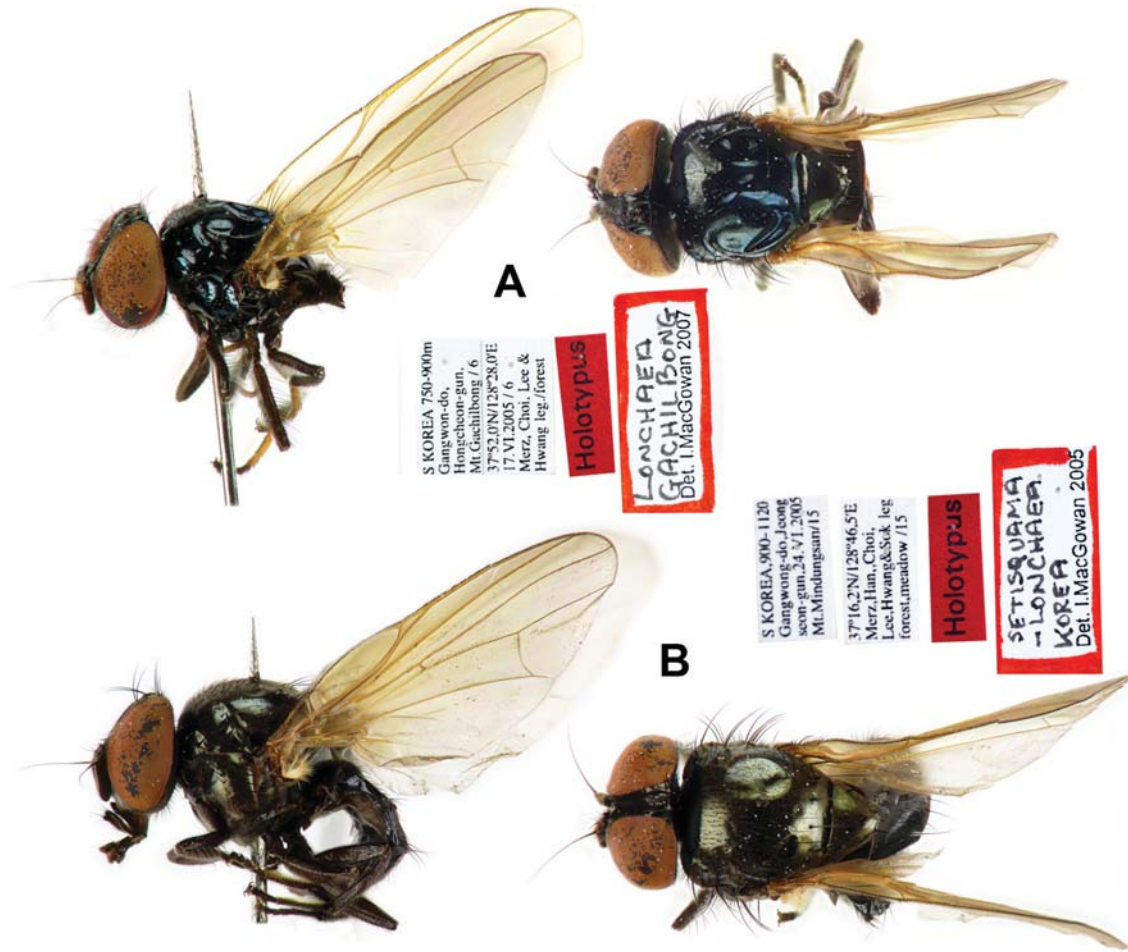


Fig. 1. Korean species of the family Lonchaeidae. A, *Lonchaea gachilbong* MacGowan; B, *Setisquamalonchaea korea* MacGowan.

Genus *Palloptera* Fallén

¹*1. *Palloptera ustulata* Fallén, 1820, new Korean record (Fig. 2A, B)

Palloptera ustulata Fallén, 1820: 24. Type locality: Sweden, Skane, Esperod.

Material examined. Korea: Gangwon-do, 2♂5♀, Jeongseon-gun, Mt. Mindungsan, 16 Jul 2005, Han HY et al. (YSUW).

Distribution. Central and Southern Europe, and east to FE Russia and Korea.

Remarks. This is a widely distributed species, easily distinguished by their characteristic body and wing patterns (Fig. 2A, B): vertex, occiput, and thorax except for scutellum dark blue with moderate whitish pruinosity; anterior half of head, scutellum oftentimes, legs and abdomen yellowish brown;

wing almost entirely hyaline with dark anterior apical spot; head with 1 strong proclinate ocellar, 1 long reclinate orbital, 1 erect postocellar, 1 inclinate median vertical, and 1 lateroclininate lateral vertical setae; thorax with 1+3 strong dorso-central, and no distinguishable prescutellar dorsocentral setae. See Ozerov (2009) for the latest treatment of this species.

Genus *Toxoneura* Macquart

²*2. *Toxoneura carterosoma* Ozerov, 1993, new Korean record (Fig. 2C)

Toxoneura carterosoma Ozerov, 1993: 79. Holotype ♀, paratype 2♀, Russia, Primorsky Prov., Kedrovaya Pad Reserve, 30 Aug 1980, Shatalkin A (ZMM).

Material examined. Korea: Gangwon-do, 7♀, Hoengseong-gun, Dunnae-myeon, Mt. Cheongtaesan, Sapgyo-ri to 1,200

Korean name: ¹*끝검정신선파리 (신칭), ²*청신선파리 (신칭)

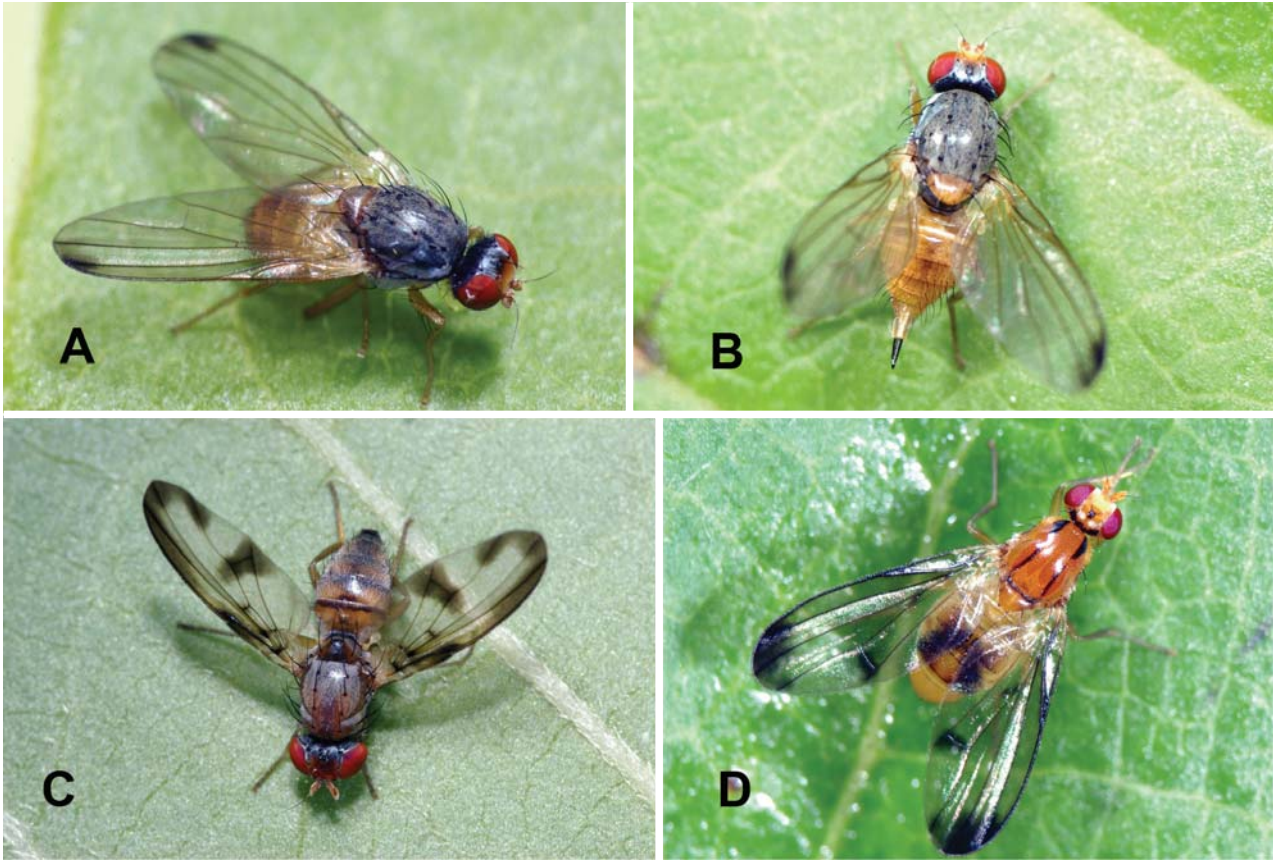


Fig. 2. Korean species of the family Pallopteridae. A, B, *Palloptera ustulata* Fallén; C, *Toxoneura carterosoma* Ozerov; D, *Toxoneura orientana* (Kovalev).

m peak, 31 Aug 2005, Byun HW et al. (YSUW).

Distribution. Korea, FE Russia.

Remarks. This species is easily distinguished by the characteristic color pattern and chaetotaxy (Fig. 2C): head yellowish brown ground color with vertex and upper half of vertex bluish; thorax and abdomen brown in ground color with bluish patterns as in Fig. 2C; wing hyaline with blackish C-shaped band in apical 2/5, thick band from cell r_{4+5} , through crossvein DM-Cu, and all the way to the posterior margin of wing; cell sc and surrounding areas dark brown; head with 1 strong proclinate ocellar, 1 long reclinate orbital, 1 hairlike erect postocellar, 1 inclinate median vertical and 1 laterocline lateral vertical setae; thorax with 1+3 strong dorsocentral, and 1 fine prescutellar dorsocentral setae. See Ozerov (2009) for the latest treatment of this species.

¹*3. *Toxoneura orientana* (Kovalev, 1972) (Fig. 2D)

Palloptera orientana Kovalev, 1972: 755. Holotype ♂, paratype 6♂6♀, Far East Russia, Komarovskij Preserve, Sin-

anca (ZISP).

Temnosira reducta Merz and Sueyoshi, 2002: 295. Holotype ♂ (YSUW), paratype 1♀ (MHNG), paratype 2♀ (YSUW), Korea, Gangwon-do, Wonju-si, Panbu-myeon, Mt. Baegunsan, 700–1,087 m, 5 Jul 1998, Han HY, Ro KE; synonymized by Ozerov, 2009: 140.

Korean records. *Temnosira reducta*: Merz and Sueyoshi, 2002: 295 (original description). *Toxoneura orientana*: Ozerov, 2009: 140 (redescription and distribution).

Distribution. Korea, FE Russia.

Remarks. Kovalev (1972) reared this species from larvae developing under the bark of *Juglans manshurica* Maxim. This species (as *Temnosira reducta*) was the first member of the family Pallopteridae recorded in Korea (Merz and Sueyoshi, 2002). This is a predominantly yellowish brown species with reduced chaetotaxy (Fig. 2D), by which it can be distinguished from other species of Pallopteridae: body shiny yellowish brown except upper half of lateral occiput black,

Korean name: ¹*노랑신선파리 (신칭)

pair of black stripes laterally on the line of the dorsocentral setae; median blackish vertical stripe on anepisternum; blackish spots on abdominal tergites 3–4; head with 1 strong proclinate ocellar, 1 long reclinate orbital, 1 hairlike erect postocellar, 1 inclinate median vertical and 1 laterocline lateral vertical setae; thorax with 1+1 dorsocentral and no distinguishable prescutellar dorsocentral setae. See Ozerov (2009) for the latest treatment of this species.

¹* Family Platystomatidae (Fig. 3)

Platystomatid flies are found in all zoogeographical regions, with the greatest number of species in the Old World tropics (McAlpine, 1998). This family currently includes 1,148 valid species, of which eight genera and 67 species are recognized in the Palaearctic region, as of September 2012 (The Diptera Site, 2012). They are usually small to large (3–11 mm), dark flies, in *Platystoma* with brown wings with numerous hyaline dots and stout, microtrichose body and usually bright yellow ventral part of abdomen, in *Rivellia* with dark banded or spotted wings and shiny, narrow body (Oosterbroek, 2006). Adults of many species inhabit forests, whereas others live in sand dunes and other vegetation types (McAlpine, 1998). According to Ferrar (1987) and McAlpine (1998), many live in decaying plant material or in soil, and several *Rivellia* species have been recorded as feeding on the nitrogen-fixing root nodules of leguminous plants. *Elassogaster linearis* (Walker) are predatory on eggs of *Locusta* in several countries.

For the Korean platystomatid fauna, Hara (1987) described a new species, *Prosthiochaeta bifasciata* (type locality: Mt. Naejangsan), Park et al. (1993) discovered Korean specimens of *Euprosopia grahami* Malloch, and Byun et al. (1998, 2001), and Byun and Han (2004, 2006) recognized 13 species of the genus *Rivellia* including five new species. Two additional species are reported here new to Korea, totaling to five genera and 17 species for the platystomatid fauna of the Korean Peninsula.

Genus *Euprosopia* Macquart

²*1. *Euprosopia grahami* Malloch, 1931 (Fig. 3A)

Euprosopia grahami Malloch, 1931: 4. Holotype ♂, allotype and 11 paratypes, China, Sichuan, Mt. Omei, Shin Kai Si (USNM).

Korean records. *Euprosopia grhami* (misspelling): Park et al. 1993: 208 (Mt. Jiri, first record in Korea). *Euprosopia*

grahami: Kim et al. 1994: 116 (Cheonan-si, Mt. Gwangdeoksan).

Distribution. Korea, China (Anhui, Chekiang, Sichuan), Japan.

Remarks. This species can be easily distinguished from any other known Korean platystomatid species by its characteristic body coloration and wing pattern (Fig. 3A). However, two possible new *Euprosopia* species from Korea are available, which are similar looking (Han, in preparation). The wing pattern shown here (Fig. 3A) should be carefully compared to preclude any possible misidentification.

Genus *Lamprophthalma* Portschinsky

³*2. *Lamprophthalma japonica* Frey, 1964, new Korean record (Fig. 3B)

Lamprophthalma japonica Frey, 1964: 5. Holotype ♂, Japan, “Karyizava”, 30 Jul 1952, R. Vitalis de Salvaza (UZMH).

Material examined. Korea: Gangwon-do: 1 ♀, Wonju-si, Gwirae-myeon, Wungye-ri, black and mercury light trap, 25 Jun 1999, Choi DS et al. (YSUW); 1 ♀, Wonju-si, Heungeop-myeon, Maeji-ri, Hwaechon, 7 Jul 1997, Byun HW, Choi DS (YSUW); 1 ♂, Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. campus, 23 Jun 1998, Byun HW (YSUW); 1 ♀, ditto, attracted to street light, 6 Jul 1999, Kim SK, Kim DW (YSUW); 1 ♂, Wonju-si, Panbu-myeon, Mt. Baegunsan, black and mercury light trap, 17 Jul 1996, Han HY et al. (YSUW); 1 ♀, Wonju-si, Sinlim-myeon, Jeolgol, south of Mt. Chiaksan, 3 Jul 1996, Han HY, Byun HW (YSUW); Gyeonggi-do: 1 ♂, Suweon-si, Geongseon-gu, Rural Development Administration, 23 Jul 2001, Byun HW (YSUW); 1 ♂, Yangpyeong-gun, Mt. Yongmunsan, 30 Jul 1998, Byun HW et al. (YSUW); Gyeongsangnam-do: Sancheong, Mt. Jirisan, 4 Jul 1990, Chung JG (YSUW); Jeollabuk-do: 1 ♀, Buan-gun, Naebyeonsan-myeon, 26 Jun 1991, Lee SW (YSUW).

Distribution. Korea, Japan.

Remarks. This species has been occasionally collected in Korea, usually as a single individual either by sweeping vegetation or black and mercury light trapping at night. Adult flies are relatively large and elongated (13–15 mm) (Fig. 3B), with a metallic dark blue body and yellow face, gena, and femora. They also have a characteristic wing pattern: hyaline with dark brown anterior apical band; cell sc dark brown; area between cell sc and vein R₄₊₅ (from node to crossvein R-M) brown; rest of the anterior wing margin yellowish.

Genus *Platystoma* Meigen

1*3. *Platystoma mandschuricum* Enderlein, 1937, new Korean record (Fig. 3C)

Platystoma mandschuricum Enderlein, 1937: 71. Syntype ♂ ♀, China, "Mandschukuo, Charbin", "6/8/1935" (ZMHB).

Material examined. Korea: Gangwon-do: 1♂, Wonju-si, Yonsei Univ. campus, 21 May 1996, Byun HW (YSUW); 4♂ 6♀, ditto, 23 Jul 1996, Byun HW; 1♀, ditto, 23 Jun 1998, Byun HW (YSUW); 1♀, ditto, 23 May 2000, Min MK et al. (YSUW); 1♀, ditto, 26 May 2000, Kwak TS et al. (YSUW); 1♀, Wonju-si, Panbu-myeon, Seogok-ri, on compost pile, 17 May 2005, Han HY (YSUW); Wonju-si, Munmak-eup, along Seomgang River, 11 May 2002, Choi DS et al. (YSUW); Gyeongsangnam-do: 1♂, Changnyeong-gun, Wupo-neup (swamp), 29 Aug 2003, Han HY, Ro KE (YSUW).

Distribution. Korea, NE China.

Remarks. The specimens deposited at YSUW have been mostly collected by sweeping vegetation, but one specimen was collected from a compost pile. This species can be distinguished by its characteristic body and wing coloration: body almost entirely dark brown to black; scutum, scutellum, anepisternum, anepimeron, and abdominal tergites rugose and covered with numerous small brownish white pruinose patches; wing blackish with numerous hyaline dots, as in Fig. 3B. This is the only Korean *Platystoma* species currently known. Among the Korean platystomatid species, *Prosthiochaeta bifasciata* may be somewhat similar but can be readily distinguished by its large size, orange colored head, and different wing pattern (Fig. 3C vs. 3D).

Genus *Prosthiochaeta* Enderlein

2*4. *Prosthiochaeta bifasciata* Hara, 1987 (Fig. 3D)

Prosthiochaeta bifasciata Hara, 1987: 688. Holotype ♂, Korea, Chungcheongbuk-do, Mt. Sogrisan, 600 m, 10 Jun 1982, Masaki Suwa (HUS). Paratype 1♀, Korea, Gangwon-do, Gangneung, 28 Apr 1967, Park SH (NIAES).

Korean records. *Prosthiochaeta bifasciata* Hara, 1987: 688 (original description); Kwon et al., 1994: 295 (in Korean checklist, new Korean name given); Byun and Han; 2006: 149 (used as outgroup for phylogenetic analysis of Korean *Rivellia* based on 16S rDNA).

Distribution. Korea.

Remarks. Although this is one of the most common and conspicuous platystomatid species in Korea, it has never been reported from other East Asian countries. Adult flies are often found in spring (mostly mid-May to mid-June) on animal feces. This species can be easily distinguished by its

orange colored head, shiny black body, and characteristic wing pattern (Fig. 3D).

Genus *Rivellia* Robineau-Desvoidy

3*5. *Rivellia alini* Enderlein, 1937 (Fig. 3E)

Rivellia alini Enderlein 1937: 72. Syntype ♂ ♀, China, Mandschurei, Charbin (ZMHU).

Korean records. *Rivellia alini*: Byun et al., 1998: 328 (redescription, new Korean name); Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA); Han and Kwon, 2010: 256 (North Korean record).

Distribution. Korea, NE China, Japan.

Remarks. This dark colored species is very similar to *R. mandschurica* but can be distinguished by the apical parts of cell sc hyaline (Fig. 3E vs. 3N).

4*6. *Rivellia apicalis* Hendel, 1934 (Fig. 3F)

Rivellia apicalis Hendel 1934: 10. Holotype ♂, China, N. E. Sechuan (NRS).

Korean records. *Rivellia apicalis*: Kim and Chang, 1984: 175 (Isl. Geomundo); 1987: 114 (Mt. Taebaeksan); Kim and Yoo, 1987a: 518 (Paju-gun, Isl. Ganghwa-do, and Isl. Gyeongdongdo); 1987b: 226 (Isl. Baegryongdo); Kim, 1995: 145 (Byeonsanbando, new Korean name); Byun et al., 2001: 111 (redescription, new Korean name); Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA); Han and Kwon, 2010: 257 (North Korean record).

Distribution. Korea, China, Japan.

Remarks. This species is similar to *R. depicta* in wing pattern (Fig. 3F vs. 3J) and body coloration but can be distinguished by having almost hyaline wing cells bc and sc, and entirely yellowish brown legs. In contrast, *Rivellia depicta* has reddish brown wing cells bc and sc, and predominantly dark brown legs except for yellowish brown mid and hind tarsi.

5*7. *Rivellia asiatica* Hennig, 1945 (Fig. 3G)

Rivellia asiatica Hennig 1945: 8. Syntype 1♂2♀, China, Mandschuria (DEI).

Korean records. *Rivellia asiatica*: Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*; redescription; new Korean name); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA); Han and Kwon, 2010: 257

Korean name: 1*만주참알락파리 (신칭), 2*날개알락파리, 3*알린콩알락파리, 4*민무늬콩알락파리, 5*아시아콩알락파리

(North Korean record).

Distribution. Korea, NE China, FE Russia (new record), Siberia.

Remarks. This is one of the rarest *Rivellia* species in South Korea, but a large number of flies were found at almost all collection sites during a trip to Primorsky-Krai in Russian Far East in 2008. Therefore, South Korea might be the southern tip of the distribution range of this common species. This species can be easily distinguished from the other Korean *Rivellia* species by its characteristic wing pattern (Fig. 3G).

¹***8. *Rivellia basilaris* (Wiedemann, 1830) (Fig. 3H)**

Trypeta basilaris Wiedemann, 1830: 510. Holotype ♂, Indonesia, Sumatra (ZMC).

Korean records. *Rivellia basilaris*: Byun et al., 2001: 106 (redescription; new Korean name); Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA).

Distribution. Korea, Japan, Taiwan, from Sri Lanka to Samoa.

Remarks. This species is similar to *Rivellia flaviventris* Hendel but can be distinguished by its shiny clypeus, whereas the latter species has a clypeus laterally whitish pruinose. They can be further distinguished by their male genitalic structures (Byun et al., 2001).

²***9. *Rivellia cestoventris* Byun and Suh, 2001 (Fig. 3I)**

Rivellia cestoventris Byun and Suh in Byun et al., 2001: 109. Holotype ♂, Korea, Gangwon-do, Wonju-si, Yonsei Univ. campus, 17 Jun 1998, Byun HW (YSUW). Paratype 60♂ 112♀ from various localities in Korea (YSUW).

Korean records. *Rivellia cestoventris* Byun and Suh in Byun et al., 2001: 109 (original description); Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA).

Distribution. Korea.

Remarks. This species is similar to *Rivellia nigroapicalis* Byun and Suh in wing pattern but can be distinguished by the subcostal band not joined with the radial-medial band at crossvein R-M, whereas these two bands are clearly joined at crossvein R-M in the latter species, (Fig. 3I). See Byun et al. (2001) for further character differences.

³***10. *Rivellia depicta* Hennig, 1945 (Fig. 3J)**

Rivellia depicta Hennig, 1945: 10. Syntype 3♂5♀, China, Mandschuria (DEI).

Korean records. *Rivellia depicta*: Byun and Han, 2004: 87 (redescription; new Korean name); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA).

Distribution. Korea, NE China.

Remarks. See *R. apicalis* remarks.

⁴***11. *Rivellia flaviventris* Hendel, 1914 (Fig. 3K)**

Rivellia basilaris var. *flaviventris* Hendel, 1914: 155. Syntype 3♀, Singapore, Biró (HNHM).

Rivellia flaviventris: Hara, 1993: 824 (lectotype ♀ and paralectotype 2♀ designated).

Korean records. *Rivellia flaviventris*: Byun et al., 2001: 107 (redescription, new Korean name); Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA).

Distribution. Korea, NE China, Japan, SE Asia, Nepal.

Remarks. See *R. basilaris* remarks.

⁵***12. *Rivellia harai* Byun and Suh, 1998 (Fig. 3L)**

Rivellia harai Byun and Suh in Byun et al., 1998: 335. Holotype ♂, Korea, Gangwon-do, Wonju-si, Yonsei Univ. campus, 11 Jul 1996, Byun HW (YSUW). Paratype 31♂ 34♀ from various localities in Korea (YSUW).

Korean records. *Rivellia harai* Byun and Suh in Byun et al., 1998: 335 (original description); Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA).

Distribution. Korea.

Remarks. This species can be easily distinguished from other Korean *Rivellia* species by its characteristic wing pattern (anterior half of wing dark brown) (Fig. 3L).

⁶***13. *Rivellia longialata* Byun and Suh, 1998 (Fig. 3M)**

Rivellia longialata Byun and Suh in Byun et al., 1998: 337. Holotype ♂, Korea, Gangwon-do, Yonsei University, Maeji-ri, Wonju-si, 12 Jun 1996, Byun HW (YSUW). Paratype 29♂33♀ from various localities in Korea (YSUW).

Korean records. *Rivellia longialata* Byun and Suh in Byun et al., 1998: 337 (original description); Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA).

Distribution. Korea.

Remarks. *Rivellia longialata* is similar to *Rivellia parilis* Frey, but can be distinguished by the almost entirely dark brown legs and wing with basal and apical bands separated.

Korean name: ¹*노랑콩알락파리, ²*배무늬콩알락파리, ³*답은민무늬콩알락파리, ⁴*갈색콩알락파리, ⁵*하라콩알락파리, ⁶*긴날개콩알락파리

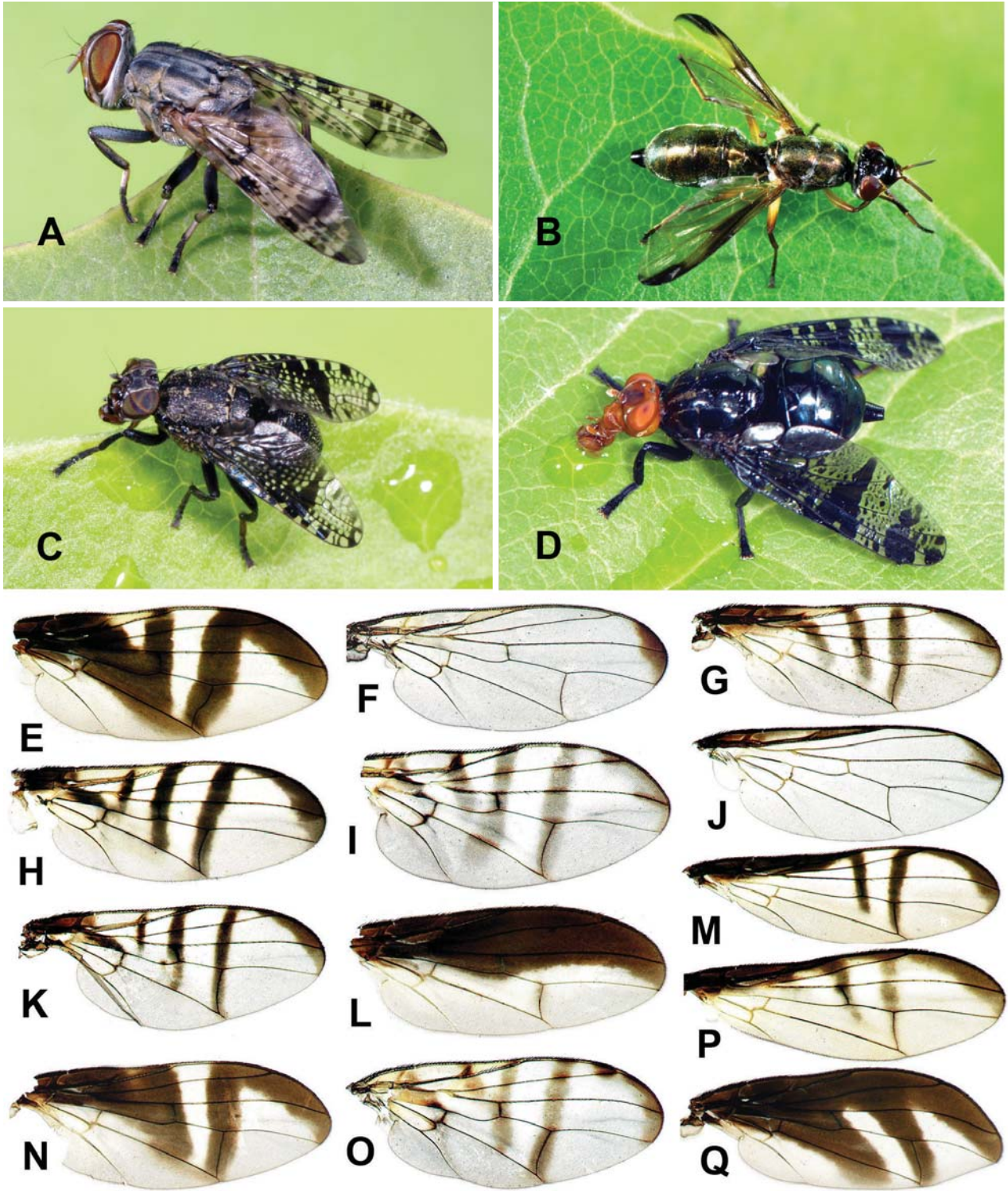


Fig. 3. Korean species of the family Platystomatidae. A, *Euprosopia grahami* Malloch; B, *Lamprophthalma japonica* Frey; C, *Platystoma mandshuricum* Enderlein; D, *Prosthiochaeta bifasciata* Hara; E, *Rivellia alini* Enderlein; F, *R. apicalis* Hendel; G, *R. asiatica* Hennig; H, *R. basilaris* (Wiedemann); I, *R. cestoventris* Byun and Suh; J, *R. depicta* Hennig; K, *R. flaviventris* Hendel; L, *R. harai* Byun and Suh; M, *R. longialata* Byun and Suh; N, *R. mandshurica* Hennig; O, *R. nigroapicalis* Byun and Suh; P, *R. parilis* Frey; Q, *R. tridentata* Byun and Suh.

^{1*}**14. *Rivellia mandschurica* Hennig, 1945 (Fig. 3N)**

Rivellia mandschurica Hennig, 1945: 10. Syntype 2♂2♀, China, Mandschurei, Erzendjanzsy, 25 Jul 1937; Sjaolin, 29 Jul 1937; Maoerschan, 7 Jan 1940, Alin W (DEI).

Korean records. *Rivellia mandschurica*: Hara, 1994: 162 (supplementary description; new Korean record); Byun et al., 1998: 330 (redescription, new Korean name); Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA).

Distribution. Korea, NE China, Siberia, Japan.

Remarks. See *R. alini* remarks.

^{2*}**15. *Rivellia nigroapicalis* Byun and Suh, 2001 (Fig. 3O)**

Rivellia nigroapicalis Byun and Suh in Byun et al., 2001: 108. Holotype ♂, Korea, Gangwon-do, Yonsei University, Maeji-ri, Wonju-si, 23 Jun 1998, Byun HW (YSUW). Paratype 61♂90♀ from various localities in Korea (YSUW).

Korean records. *Rivellia nigroapicalis* Byun and Suh in Byun et al., 2001: 108 (original description); Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA); Han and Kwon, 2010: 258 (North Korean record).

Distribution. Korea.

Remarks. See *R. cestoventris* remarks.

^{3*}**16. *Rivellia parilis* Frey, 1964 (Fig. 3P)**

Rivellia parilis Frey, 1964: 11. Holotype ♂, Russia, Vladivostok, Suchan, Malaise (UZMH).

Korean records. *Rivellia parilis*: Byun et al., 1998: 332 (redescription, new Korean name); Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA).

Distribution. Korea, FE Russia, China.

Remarks. See *R. longialata* remarks and Byun et al. (1998) for the wide wing variation of this species.

^{4*}**17. *Rivellia tridentata* Byun and Suh, 1998 (Fig. 3Q)**

Rivellia tridentata Byun and Suh in Byun et al., 1998: 334. Holotype ♂, Korea, Gangwon-do, Wonju-si, Yonsei Univ. campus, 26 May 1998, Byun HW (YSUW). Paratype 47♂48♀ from various localities in Korea (YSUW).

Korean records. *Rivellia tridentata* Byun and Suh in Byun et al., 1998: 334 (original description); Byun and Han, 2004: 84 (in revised key to Korean *Rivellia*); 2006: 149 (phylogenetic analysis of Korean *Rivellia* based on 16S rDNA).

Distribution. Korea.

Remarks. This species can be easily distinguished from other *Rivellia* species by its unique wing pattern (Fig. 3Q).

^{5*}**Family Ulidiidae, new Korean record (Fig. 4)**

Ulidiid flies are found in all zoogeographical regions, with the greatest number of species in Neotropical and Palaearctic regions. This family currently includes 635 valid species, of which 225 species are recognized in the Palaearctic region, as of September 2012 (The Diptera Site, 2012). They are usually small to large (3–11 mm), moderately robust flies, color varying from partially yellow and dark to all black, in some cases grey or metallic (Oosterbroek, 2006). Their biology is little known but Oosterbroek (2006) summarized it as follows. Larvae are found in rotting vegetable matter, leaf litter, fruit, dung, sap exuding from tree wounds, and underneath tree bark; some species are fully phytophagous, feeding on sugar beet, onions, and maize. Adults are found in various habitats ranging from saline biotopes to sandy areas or moist and marshy grounds, on flowers, tree trunks, or on excrement.

Eight species of Ulidiidae are reported here for the first time in Korea. This is the first report of this family in Korea.

Genus *Ceroxys* Macquart

^{6*}**1. *Ceroxys amurensis* Hennig, 1939, new status and new Korean record (Fig. 4A)**

Ceroxys hortulana amurensis Hennig, 1939: 56. Holotype ♀, China, “Mandschurei”, 19 Sep 1937, Alin (DEI). Paratype 1♂, “Amur”, Gereke (ZSZMH).

Material examined. Korea: Gangwon-do: 2♂, Hongcheon-gun, Nae-myeon, Mt. Gachilbong, 24 May 1996 (YSUW); 2♂2♀, Pyeongchang-gun, Yongpyeon-myeon, S. Valley of Mt. Gyeongbongsan, 3 Oct 2003, Han HY et al. (YSUW).

Distribution. Korea, NE China, FE Russia.

Remarks. This species was initially described as a subspecies of *C. hortulana* (Rossi) distributed from Europe to Central Asia. The East Asian taxon is regarded here as a full species as they show clear and consistent differences in wing pattern; subapical and apical wing bands are joined anteriorly in *C.*

Korean name: ^{1*}만주콩알락파리, ^{2*}끝검정콩알락파리, ^{3*}노랑다리몽알락파리, ^{4*}세띠콩알락파리, ^{5*}띠날개파리과 (신칭), ^{6*}검정띠날개파리 (신칭)

amurensis (Fig. 4A) but separated in *C. hotulana*. *Ceroxys amurensis* can be distinguished from the other known Korean ulidiid species by its characteristic wing pattern as well as the wing cell r_{4+5} strongly narrowed at apex. The latter is the diagnostic character state for the genus *Ceroxys*.

¹*2. *Ceroxys urticae* (Linnaeus), 1758, new Korean record (Fig. 4B)

Musca urticae Linnaeus, 1758: 600. Type locality: Sweden [not given].

Material examined. Korea: Gyeonggi-do: 1 ♂, Isl. Gangh-wado, Mt. Manisan, 11 Jul 1991, Kim JI (YSUW); Incheon-si: 1 ♂, Seo-gu, Gyungseo-dong, National Institute of Biological Resources (NIBR), 6 Jul 2007, Byun HW (YSUW); 1 ♀, Seo-gu, Baekseok-dong, 22 Apr 2007, N37° 36'06'', E126° 43'50'' Choi DS (YSUW); 1 ♂, Seo-gu, 26 May 2006, Kwon YJ (YSUW); 2 ♀, Seo-gu, 6 Jul 2006, Kwon YJ; 1 ♂, Isl. Yeongyudo, 17 Sep 1997, Paek MK, Ahn NH (YSUW).

Distribution. Europe, Russia, Korea, Japan.

Remarks. This is a widely distributed species in Europe and Russia. As a result of recent surveys, I found this species in Korea as well as Japan (new record, 1 ♂, Hokkaido, Hama atsuma, N42° 36'14'', E141° 49'54'', 3 Jul 2009, Han HY, Suk SW). This species can be easily distinguished from other Korean ulidiid species by its shiny bluish black body with characteristic wing pattern (Fig. 4B). This species appears to be an inhabitant of coastal swamps.

Genus *Herina* Robineau-Desvoidy

²*3. *Herina hennigi* Hering, 1940, new Korean record (Fig. 4C)

Herina hennigi Hering, 1940: 294. Holotype ♀, China, Manchuria, "Gaolinszy", 2–8 Jul 1939, Alin W (DEI).

Material examined. Korea: Chungcheongbuk-do: 1 ♂, Jecheon-si, Songhak-myeon, 9 Jun 2007, Han HY et al. (YSUW); Gangwon-do: 1 ♂, Jeonseon-gun, Mt. Mindung-san, 20 Jun 2005, Han HY et al. (YSUW); 1 ♀, same, 24 Jun 2005; Gyeongsangnam-do: 1 ♀, Ulsan-si, Sangbuk-myeon, Mt. Sinbulsan, 28 Jun 2003, Han HY et al. (YSUW).

Distribution. Korea, NE China.

Remarks. *Herina hennigi* and *Herina zojae* Kameneva can be easily distinguished from the other Korean ulidiid species by their almost completely blackish body and narrow wing bands or spots along crossveins R-M and DM-Cu. These two species closely resemble each other but *H. hennigi* differs by the wing being completely darkened along the costal margin to R_{4+5} or M, with a separate spot around vein r-m (Kame-

neva, 1999) (Fig. 4C vs. 4D).

³*4. *Herina zojae* Kameneva, 1999, new Korean record (Fig. 4D)

Herina zojae Kameneva, 1999: 97. Holotype ♀, paratype 2 ♀, Russia, South of Primorsky kry, Khasan rayon, Zana-dvorovka, light trapping, Z. Berest (SIZK).

Material examined. Korea: Chungcheongbuk-do: 2 ♀, Jaecheon-si, Songhak-myeon, 9 Jun 2007, Han HY et al. (YSUW); Gangwon-do: 1 ♂, Jeongseon-gun, Mt. Mindung-san, 20 Jun 2005, Han HY et al.; 2 ♂, ditto, 24 Jun 2005 (YSUW).

Distribution. Korea, FE Russia.

Remarks. See *H. hennigi* remarks.

Genus *Meliera* Rovineau-Desvoidy

⁴*5. *Meliera omissa* (Meigen, 1826), new Korean record (Fig. 4E)

Ortalis omissa Meigen, 1826: 274. Type locality: Germany, Berlin.

Material examined. Korea: Gyeonggi-do: 1 ♂ 1 ♀, Isl. Ganghwado, Yeochi-ri wetland, Jun 1991, Park HC (YSUW); 8 ♂ 3 ♀, ditto, Jul 1991; 2 ♂ 1 ♀, ditto, Aug 1991 (YSUW); Incheon-si: 1 ♂, Seo-gu, Gyeonseong-dong, NIBR, 27 Jun 2007, Byun HW (YSUW); 1 ♂, Seo-gu, 22 Jul 2005, Kwon YJ (YSUW); 3 ♀, ditto, 25 May 2006; 2 ♂ 4 ♀, ditto, 26 May 2006 (YSUW); 3 ♂ 2 ♀, ditto, 29 Jun 2006 (YSUW); 1 ♂ 1 ♀, ditto, 1 Sep 2006 (YSUW).

Distribution. SE Europe, Inner Mongolia, Mongolia, Korea, Japan.

Remarks. As a result of recent surveys, I found this species in Korea as well as Japan (new record, 6 ♂ 11 ♀, Hokkaido, Hama atsuma, N42° 36'14'', E141° 49'54'', 3 Jul 2009, Han HY, Suk SW). This species can be easily distinguished from other Korean ulidiid species by its completely whitish pollinose body and the characteristic wing pattern (Fig. 4E). This species can be separated from other similar looking *Meliera* by the yellowish brown flagellomere 1, mostly yellowish brown legs, and not having dark posterior margins on the abdominal tergites. See also Kameneva (2001) for the latest taxonomic key. This species appears to be an inhabitant of coastal swamps.

Genus *Myennis* Robineau-Desvoidy

⁵*6. *Myennis sibirica* Portschinsky, 1892, new Korean record (Fig. 4F)

Myennis sibirica Portschinsky, 1892: 213. Type locality:

Korean name: ¹*네띠날개파리 (신칭), ²*가로띠날개파리 (신칭), ³*세로띠날개파리 (신칭), ⁴*밀가루띠날개파리 (신칭), ⁵*맵시띠날개파리 (신칭)

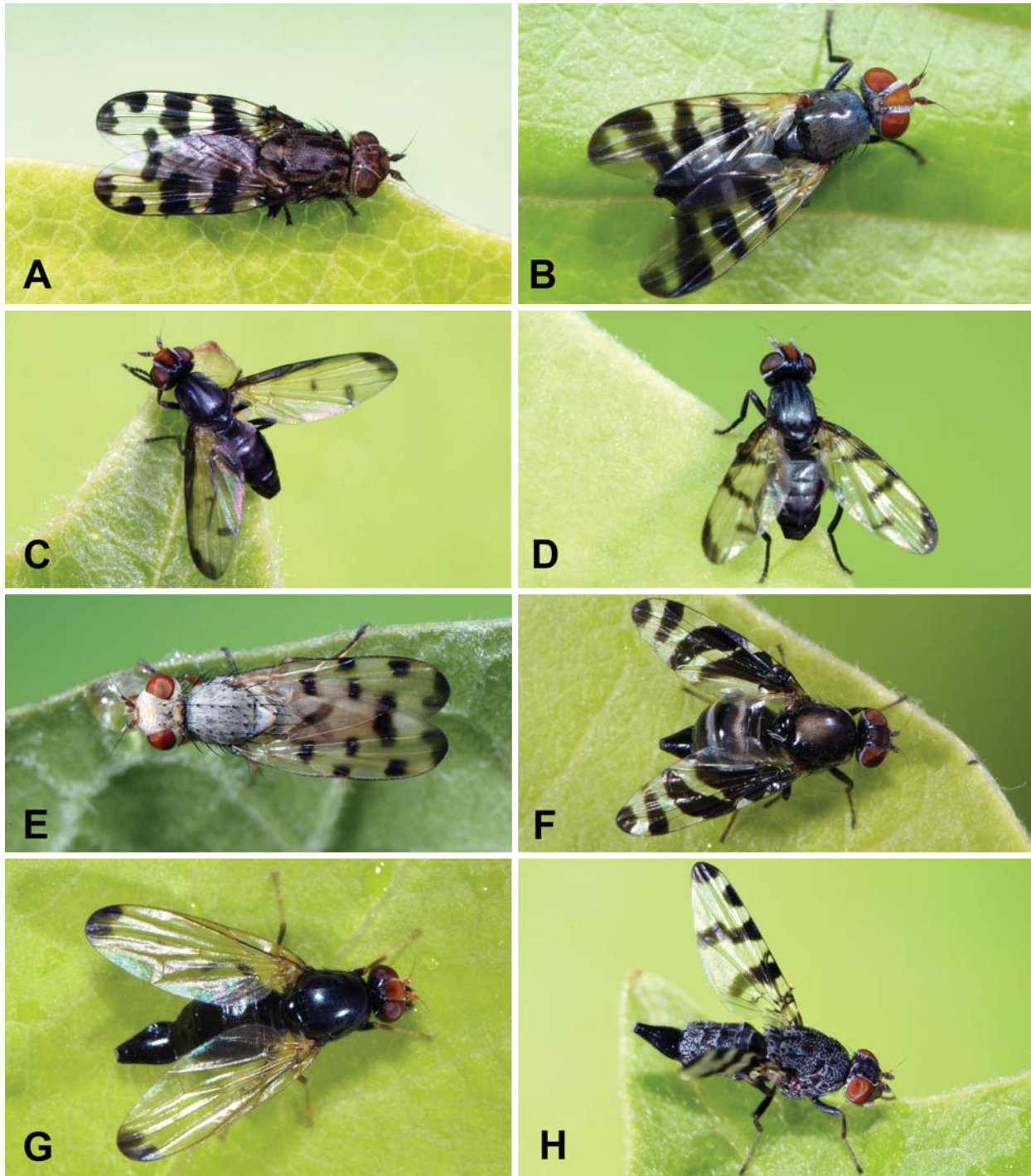


Fig. 4. Korean species of the family Ulidiidae. A, *Ceroxys amurensis* Hennig; B, *Ceroxys urticae* (Linnaeus); C, *Herina hennigi* Hering; D, *Herina zojae* Kameneva; E, *Melieria omissa* (Meigen); F, *Myennis sibirica* Portschnsky; G, *Pseudoseioptera demonstrans* (Hennig); H, *Pseudotephritis millepunctata* (Hennig).

Russia (Siberia).

Material examined. Korea: Gangwon-do, 1♂, Wonju-si,

Heungeop-myeon, Maeji-ri, Yonsei Univ. campus, 7 Jul 1996, Byun HW (YSUW); 1♀, ditto, 20 Jun 2008, Lee YB (YSUW).

Distribution. Russia (Siberia), Korea.

Remarks. A few specimens sitting on animal dung were observed along a mountain trail at Yonsei University, Wonju Campus. This species can be easily distinguished by its characteristic wing pattern (Fig. 4F).

Genus *Pseudoseioptera* Stackelberg

**¹*7. *Pseudoseioptera demonstrans* (Hennig, 1941),
new Korean record (Fig. 4G)**

Seioptera demonstrans Hennig, 1941: 75. Syntypes: 1 ♀, China, Manchuria, "Sjaolin", 11 Jun 1939, W. Alin; 1 ♀, Manchuria, "Gaolinsy", 8 Jul 1939, Alin W (DEI).

Material examined. Korea: Gangwon-do: 1 ♂, Jeongseon-gun, Mt. Mindungsan, 6 Jun 2006, Han HY et al. (YSUW); 1 ♀, Hongcheon-gun, Nae-myeon, Mt. Gachilbong, 2 Jun 2007, Lee HS et al. (YSUW).

Distribution. NE China, Korea.

Remarks. This is the only species of *Pseudoseioptera* in the Palaearctic region, as the other two species are Nearctic (Kameneva and Korneyev, 1994, 1995). The Korean male and female listed above agree very well with the redescription of this species provided by Kameneva and Korneyev (1995), but fit in the rarer end of the variation range by having a light yellow wing cell sc and almost completely red-dish yellow frontal vitta (Fig. 4G), whereas a typical specimen has a brown cell sc and a frontal vitta brownish black in posterior third.

Genus *Pseudotephritis* Johnson

**²*8. *Pseudotephritis millepunctata* (Hennig, 1939),
new Korean record (Fig. 4H)**

Myennis millepunctata Hennig, 1939: 73. Holotype ♀, Russia, "St. Siza, Sutschan, Ussuri-Gebiet", 15 Jun 1927, Stackelberg (ZISP).

Material examined. Korea: Gangwon-do, 1 ♀, Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. campus, 14 Sep 2005, Byun HW (YSUW).

Distribution. Korea, FE Russia.

Remarks. This species is clearly distinguishable from any other species of Ulidiidae by the numerous dark dots on its body (Fig. 4H).

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Korean name: ¹*끝검정떠날개파리 (신칭), ²*곰보떠날개파리 (신칭)

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