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Ten species of the tribe Syrphini (Insecta: Diptera: Syrphidae) newly recorded in Korea

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A total of 69 genera and 202 species of the family Syrphidae have been previously recognized in Korea. In the present study, we report the following 10 species new to Korea: *Epistrophe aeka* Kimura, 1989, *Epistrophe aino* (Matsumura, 1917), *Epistrophe annulitarsis* (Stackelberg, 1918), *Epistrophe griseofasciata* (Matsumura, 1918), *Epistrophe sasayamana* (Matsumura, 1918), *Epistrophe shibakawae* (Matsumura, 1917), *Fagisyrphus cinctus* (Fallén, 1817), *Melangyna olsufjevi* (Violovitsh, 1956), *Melangyna pavlovskyi* (Violovitsh, 1956), and *Paragus clausseni* Mutin, 1999. Among the four genera, the genus *Fagisyrphus* Dušek and Láska, 1967 is recognized for the first time in Korea. As a result, 70 genera and 212 species of the family Syrphidae are now officially recognized for the Korean fauna. For each newly recognized Korean species, we provide synonymy, diagnosis, and description with color photographs. In addition, we provide new Korean names for all newly recorded species as well as the genera *Epistrophe*, *Fagisyrphus*, and *Melangyna*, which previously did not have Korean names.

Keywords: *Epistrophe*, *Fagisyrphus*, *Melangyna*, *Paragus*, Syrphidae, Syrphinae, Syrphini

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Introduction

Syrphidae is a large family of flies including over 6,000 valid species worldwide (Catalogue of Life as of June, 2022). Many syrphid species are important pollinators in the adult stage and predators in the larval stage, playing important roles in agriculture and forestry (Han and Choi, 2001; Rader *et al*., 2016; Wotton *et al*., 2019). On the Korean Peninsula, a total of 69 genera and 202 species of three subfamilies are currently recognized (NIBR, 2019; Han *et al*., 2021; Kim and Han, 2022).

In the present study, we report 10 newly discovered species of the tribe Syrphini (subfamily Syrphinae) in Korea: *Epistrophe aeka* Kimura, 1989, *Epistrophe aino* (Matsumura, 1917), *Epistrophe annulitarsis* (Stackelberg, 1918), *Epistrophe griseofasciata* (Matsumura, 1918), *Epistrophe sasayamana* (Matsumura, 1918), *Epistrophe shibakawae* (Matsumura, 1917), *Fagisyrphus cinctus* (Fallén, 1817), *Melangyna olsufjevi* (Violovitsh, 1956), *Melangyna pavlovskyi* (Violovitsh, 1956), and *Paragus clausseni* Mutin, 1999. Among the four genera, the genus *Fagisyrphus* Dušek and Láska, 1967, is recognized for the first time in Korea.

As a result, 70 genera and 212 species of the family Syrphidae are now officially recognized for the Korean syrphid fauna. We also provide taxonomic diagnoses, descriptions, color photographs, and new Korean names for these 10 newly recognized species, as well as the genera *Epistrophe* Walker, 1852, *Fagisyrphus*, and *Melangyna* Verrall, 1901, which previously did not have Korean names.

Materials and Methods

Collecting was mainly conducted in South Korea, but also done in Russia and Japan. We tried to obtain hoverflies from various habitats such as grasslands, streams, valleys, and from a range of mountain altitudes. Most specimens were collected by insect nets through brandishing and sweeping methods.

The morphological terminology and interpretations used in this study mainly follow Cumming and Wood (2017), but we also follow Vujić *et al*. (2008) for some

genitalic terminology not in Cumming and Wood (2017). In addition, two lengths and eleven ratios used in the descriptions were modified from Han and Norrbom (2005): body length (anterior margin of head excluding antenna to posterior margin of abdomen); wing length (anterior margin of tegula to apex of vein R_{4+5}); head ratio (head length/head height); face-head ratio (widest width of face in anterior view/width of head); eye ratio (shortest eye diameter/longest eye diameter); gena-eye ratio (genal height/longest eye diameter); antenna-head ratio (length of antenna/length of head); postpedicel-pedicel ratio (length of postpedicel/length of pedicel); arista-antenna ratio (length of arista/length of antenna excluding arista); wing ratio (wing length/wing width); wing-thorax ratio (wing length/thorax length); vein M ratio (distance along vein M between crossveins r-m and dm-cu/distance between crossveins r-m and bm-cu); and vein R_{4+5} ratio (distance along vein R_{4+5} between crossvein r-m and vein R_{4+5} apex/distance between crossvein r-m and basal node of vein R_{4+5}).

Photographs were taken with Panasonic FZ2500 (Osaka, Japan) or Fujifilm X-S1 (Tokyo, Japan) cameras equipped with Raynox DCR-250 macro-conversion lenses. Photographs of the male genitalia were obtained with a Nikon D90 camera (Tokyo, Japan) mounted on an Olympus CX41 compound microscope (Tokyo, Japan). The consecutive digital images in different focal planes (usually 50 or more shots per a single figure) were stacked using Helicon Focus software® (version 7.7.4, Helicon Soft, Ltd., Kharkiv, Ukraine).

Most of the examined specimens are deposited in the Division of Biological Science and Technology, Yonsei University, Mirae Campus, Korea (YSUW). Some specimens are deposited in the National Institute of Biological Resources, Incheon, Korea (NIBR), and the Korea National Arboretum, Pocheon, Korea (KNA). Abbreviations of the other institutions mentioned in the text are as follows: HUS: Entomological Institute, Faculty of Agriculture, Hokkaido University, Sapporo, Hokkaido 060, Japan; IBSS: Institute of Biology and Soil Science, Vladivostok 690950, Russia; KPU: Kyoto Prefectural University, Shimogamohangi-cho, Sakyo-gu, Kyoto Pref. 606-8522, Japan; MNHNP: Museum National d'Histoire Naturelle, National Collection of Insects, 45, rue Buffon, Paris 75005, France; NIAES: National Institute for Agro-Environmental Sciences, Kannondai, Tsukuba, Ibaraki Pref. 305-8604, Japan; TKPM: Tokushima Prefectural Museum, Tokushima Pref. 770-8070, Japan; ZISP: Zoological Museum Academy of Sciences, Russian Academy of Sciences, Universitetskaya, Naberzhnayal B-164, St. Petersburg, Russia; and ZSI: Zoological Survey of India, National Zoological Collection, 34, Chittaranjan Avenue, Calcutta, West Bengal 700 012, India.

Results and Discussion

Order Diptera Linnaeus, 1758
Family Syrphidae Latreille, 1802
Subfamily Syrphinae
Genus *Epistrophe* Walker, 1852
여리꽃등에속 (신칭)

1. *Epistrophe aeka* Kimura, 1989

애검정여리꽃등에 (신칭) (Figs. 1A–F, 4A–D)

Epistrophe aeka Kimura, 1989: 1 (type locality - Japan, Kyoto; holotype ♂, KPU; paratypes 8♂ same data as holotype, TKPM); Schmid, 1995: 31 (in Palaearctic list); Ôhara *et al*., 2014: 467 (in Japanese catalog).

Diagnosis. *Epistrophe aeka* is a relatively small (8.20 mm) species in the genus having a predominantly blackish body. It can be readily distinguished from Korean congeners by the following combination of characteristics: 1) compound eye densely covered with long brown hairs (Fig. 1D); 2) face with brownish-black vertical facial stripe (Fig. 1D); 3) gena brownish black and wide (over 0.25× as long as eye height) (Fig. 1C, F); 4) pterostigma largely dark brown but apically paler (Fig. 1A, E); and 5) basiphallus only with single pair of wide and slightly serrated apico-ventral processes (Fig. 4C-b, D-b). The above characteristics 1 and 5 especially are only observed in this species among Korean *Epistrophe*.

Description of Korean material. Male. Lengths and ratios: body length 8.20 mm; wing length 7.93 mm; head ratio 0.76; face ratio 0.64; eye ratio 0.64; gena-eye ratio 0.30; antenna-head ratio 0.48; postpedicel-pedicel ratio 2.11; arista-antenna ratio 0.91; wing ratio 3.31; wing-thorax ratio 2.56; vein M ratio 2.60; vein R_{4+5} ratio 3.92. Head holoptic with eye contiguity slightly shorter than vertical triangle (Fig. 1A); compound eye dark brown with slight purplish tinge, densely covered with relatively long brown hairs (Fig. 1D); vertex black with slightly wavy brownish-yellow hairs; frons black almost entirely with yellowish pruinosity except for bare anterior margin, with slightly wavy brownish yellow and brownish black hairs mixed approximately at 1 : 2 ratio (Fig. 1A, D); lunule largely brownish black except for dark brown medio-ventral and latero-ventral margins, bare; antenna brownish black; face largely brownish yellow ground color with yellowish grey pruinosity, with wavy brownish-yellow hairs, and with brownish-black vertical facial stripe from lower facial margin up to area below antennal sockets, about 0.46× as wide as facial width (Fig. 1D); facial knob rounded, almost bare; gena brownish black with yellowish grey pruinosity, and with wavy brownish-yellow hairs (Fig. 1C). Thorax largely blackish with greyish pruinosity, except for brownish yellow scutellum (baso-ventral corners of scutellum brownish

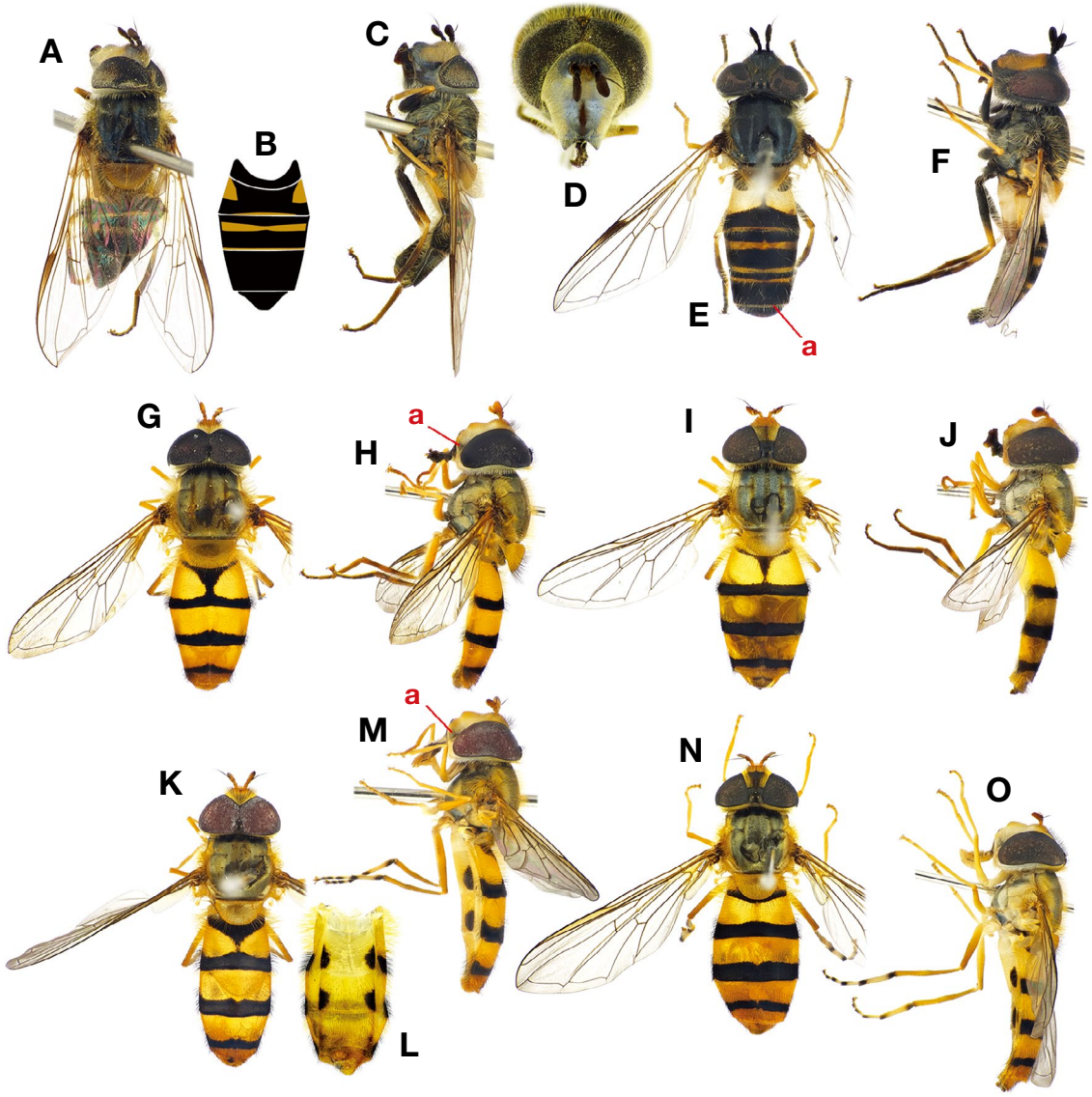


Fig. 1. A–F. *Epistrophe aeka* Kimura, 1989: (A, C) male body, dorsal and lateral view; (B) male abdomen, dorsal view (reconstructed from Fig. 1A); (D) male head, frontal view; (E, F) female body, dorsal and lateral view. G–J. *Epistrophe aino* (Matsumura, 1917): (G, H) male body, dorsal and lateral view; (I, J) female body, dorsal and lateral view. K–O. *Epistrophe annulitarsis* (Stackelberg, 1918): (K, M) male body, dorsal and lateral view; (L) male abdomen, ventral view; (N, O) female body, dorsal and lateral view. Voucher specimen codes: A–D - EpiAek_M1; E, F - EpiAek_F1; G, H - EpiAin_M4; I, J - EpiAin_F2; K, M - EpiAnn_M2; L - EpiAnn_M3; N, O - EpiAnn_F1.

black), with wavy brownish-yellow hairs (Fig. 1A); scutum with 4 narrow longitudinal subshiny bluish-grey pruinose stripes on paramedial and latero-marginal area, connected postero-marginally (detectable in better prepared specimens); medial scutal area between 2 inner bluish stripes with pair of longitudinal greyish pruinose stripes (can be observed under appropriate lighting) interrupted at anterior 3/4; pleura blackish, mostly with greyish pruinosity (Fig. 1C); anterior anepisternum, anterior 1/3 of posterior anepisternum, dorsomedial anepimeron, posterior anepimeron, meron, anatergite, mediotergite and metasternum bare; katepisternum with upper and lower wavy brownish-yellow hair patches, narrowly connected on posterior margin; halter with stem brown to pale yellow, knob brownish yellow. Legs with coxae and trochanters brownish black with brownish-yellow hairs (Fig. 1C); femora largely brownish black except for brownish-yellow apex, with brownish-yellow hairs (hind femur apically mixed with short black hairs); fore and mid tibiae largely brownish yellow but apical half slightly darkened, with short brownish-yellow hairs; hind tibia about basal 2/5 brownish

yellow, about apical 3/5 dark brown to brownish black, largely with short black hairs but ventrally with short brownish-yellow hairs; fore and mid tarsi dorsally pale brown to brown, ventrally brown to dark brown, largely with short brownish-yellow hairs but some short black hairs sparsely mixed; hind tarsus dorsally dark brown to brownish black with short black hairs, ventrally brown with short brownish-yellow hairs. Wing largely hyaline with slight pale brownish tinge (Fig. 1A); veins pale brown to dark brown; pterostigma largely dark brown but apically paler; cell sc before pterostigma yellowish; wing membrane largely covered with microtrichiae except for basal bare areas; upper and lower calypters brownish yellow with long brownish-yellow marginal hairs. Abdominal tergites unmargined, black ground color with yellowish markings on tergites 2 and 3, with wavy brownish-yellow hairs (wave getting weaker towards apex) (Fig. 1B); tergite 1 subshiny black with greyish pruinosity; tergite 2 antero-lateral marginally with pair of subquadrate yellowish spots (about 2/3 as long as tergite) reaching lateral margins, medio-posterior margin narrowly brownish yellow; tergite 3 subanteriorly with narrow brownish yellow transverse band separated from lateral margins, posterior margin narrowly brownish yellow; tergites 4 and 5 entirely brownish black to black; sternites 1 and 2 yellowish with wavy pale yellow hairs; sternites 3−8 dark brown to brownish black with pale yellow to brownish-yellow hairs. Male genitalia (Fig. 4A−D) with epandrium slightly longer than height in lateral view (Fig. 4B); surstylus long in caudal view (middle width about 2/5 of length when oriented to show broadest area) (Fig. 4A), slightly curved anteriorly with rounded apex in lateral view, basally with long brownish-yellow hairs, apically with short hairs (Fig. 4B); hypandrium with almost straight lingula (Fig. 4B); lateral protuberance of hypandrium longer than lingula, with rounded apex; distiphallus apically widened as trumpet shape in lateral view (Fig. 4C); apico-dorsal lip of distiphallus about 1/4 of apex width, narrow (Fig. 4C-a); about apico-ventral 1/3 of distiphallus densely with short spiny hairs (Fig. 4C); basiphallus only with single pair of wide and slightly serrated apico-ventral processes (Fig. 4C-b, D-b). Female. Similar to male except for the following characteristics. Lengths and ratios: body length 6.80−9.60 mm; wing length 6.00−8.47 mm; head ratio 0.73−0.74; face ratio 0.55−0.56; eye ratio 0.55−0.6; gena-eye ratio 0.25−0.28; antenna-head ratio 0.52−0.54; postpedicel-pedicel ratio 2.30−2.57; arista-antenna ratio 0.90−0.93; wing ratio 3.33−3.34; wing-thorax ratio 2.61−2.65; vein M ratio 3.00−3.20; vein R_{4+5} ratio 3.72−3.73. Head dichoptic with vertex about 0.19× as wide as head in dorsal view (Fig. 1E); vertex black, largely with slightly wavy brownish-yellow hairs but anteriorly mixed with some black hairs; brownish-black vertical facial stripe about 0.33−0.39× as wide as facial width. Abdominal tergite 1 medio-posteriorly brownish yellow; yellowish spots on tergite 2 distinctly wider, covering almost entire width of tergite (Fig. 1B vs. E); tergite 4 subanteriorly with narrow brownish-yellow transverse band (occasionally interrupted in middle), posterior margin narrowly brownish yellow (Fig. 1E-a).

Material examined. KOREA: Gangwon-do: Wonju-si, Gwirae-myeon, Mt. Sibjabong from Cheoneunsa Temple, N37°13′34″ E127°54′36″, 5.V.2005, H.-W. Byun *et al*., 1♀; Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Mirae Campus, N37°17′10″ E127°54′01″, 31.V.2005, D.-S. Choi *et al*., 1♂ (NIBR); Pyeongchang-gun, Jinbu-myeon, Jangjeon-ri, Jangjeon Valley, N37°27′59.2″ E128°32′18.7″, 14.VI.2021, C.-O. Kim, M.-H. Park, 1♀. JAPAN: Ibaraki Pref., Mito C., Forest Park, N36°25.2′ E140°22.2′, 14.VI.2002, K. Ichige, 3♂; ditto, 26.IV.2006, K. Ichige, 1♀.

Distribution. Japan (Honshu and Kyushu), Korea.

Biology. This species is known to visit *Prunus* and *Acer* trees in Japan (Kimura, 1989).

Remarks. The three available Korean specimens agree well with the original description (Kimura, 1989) as well as four Japanese specimens donated by Katsuyoshi Ichige. The new Korean name of this species translates as "small and black *Epistrophe* fly" referring to its small body size and dark coloration.

2. *Epistrophe aino* (Matsumura, 1917)

노랑배여리꽃등에 (신칭) (Figs. 1G−J, 4E−H)

Syrphus (*Macrosyrphus*) *aino* Matsumura and Adachi, 1917: 27 (type locality - Japan, Hokkaido, Sapporo; syntype 1♂, HUS; syntype 1♂, NIAES); Shiraki, 1930: 374 (redescription).

Epistrophe aino: Ninomiya, 1957: 188 (immature biology); Okuno, 1967: 126 (immature biology); Mutin and Barkalov, 1997: 185 (in review of Sakhalin and Kuril Islands syrphids); Mutin and Barakalov, 1999: 382 (in Russian Far East key); Rojo *et al*., 2003: 36 (in world aphidophagous syrphid revision); Ôhara *et al*., 2014: 467 (in Japanese catalog); Mutin *et al*., 2016: 21 (in list of Tumnin river area, Russia); Barkalov and Mutin, 2018: 495 (in Russian checklist).

Diagnosis. *Epistrophe aino* can be distinguished from Korean congeners by the following combination of characteristics: 1) frons largely brownish yellow except for narrowly brownish-black posterior corner in males and posterior 3/4−4/5 in females (Fig. 1G, I); 2) lunule brownish yellow; 3) antenna largely brownish yellow except for variably darkened dorsal area of postpedicel (Fig. 1H, J); 4) wing-cell br almost bare; 5) abdominal sternites yellowish without any blackish markings except for male sternite 8 having large blackish spot; 6)

basiphallus with 2 pairs of ventral processes (Fig. 4G-a, -b, H); 7) basiphallic apico-ventral processes relatively wide with serrated apex in ventral view (Fig. 4H-a); and 8) basiphallic baso-ventral processes with irregularly serrated posterior side in lateral view (Fig. 4G-b).

Description of Korean material. Male. Lengths and ratios: body length 8.9−11.5 mm; wing length 7.73−9.73 mm; head ratio 0.71−0.74; face ratio 0.43−0.45; eye ratio 0.52−0.57; gena-eye ratio 0.05−0.06; antenna-head ratio 0.39−0.43; postpedicel-pedicel ratio 1.78−2.00; arista-antenna ratio 1.03−1.18; wing ratio 3.56−3.63; wing-thorax ratio 2.23−2.42; vein M ratio 1.59−2.08; vein R_{4+5} ratio 2.95−3.57. Head holoptic with eye contiguity slightly shorter than vertical triangle (Fig. 1G); compound eye dark brown with slight purplish tinge, bare; vertex black with slightly wavy brownish yellow and black hairs; frons largely brownish yellow except for narrowly brownish-black posterior corner, about posterior half with yellowish grey pruinosity, with variably mixed wavy brownish yellow and black hairs (usually brownish-yellow hairs more than black hairs); lunule brownish yellow, bare; antenna largely brownish yellow except for variably darkened dorsal area of postpedicel (Fig. 1H); face almost entirely brownish yellow ground color except for pair of small brownish-black lateral spots on lower facial margin (Fig. 1H-a), with greyish pruinosity, with wavy pale yellow hairs; facial knob rounded, almost bare; gena pale yellow to brownish yellow with greyish pruinosity, with pale yellow hairs (Fig. 1H). Thorax largely blackish with yellowish-grey pruinosity, with wavy brownish-yellow to pale yellow hairs (Fig. 1G); scutum with 4 wide longitudinal subshiny yellowish-grey pruinose stripes connected postero-marginally; medial scutual area between 2 inner yellowish grey stripes with pair of longitudinal greyish pruinose stripes (can be observed under appropriate lighting) interrupted at anterior 3/4; lateral margins of scutum matte yellow (Fig. 1G, H); scutellum brownish yellow, largely with wavy black hairs, but anterior to lateral side with wavy brownish-yellow hairs (sometimes brownish-yellow haired area larger than black haired area); pleura blackish, mostly with yellowish-grey pruinosity (Fig. 1H); anterior anepisternum, anterior 1/4−1/3 of posterior anepisternum, dorsomedial anepimeron, posterior anepimeron, meron, anatergite, mediotergite and metasternum bare; katepisternum with upper and lower wavy pale yellow hair patches, narrowly connected on posterior margin; halter with stem brownish yellow to pale yellow, knob pale yellow to yellow. Legs with coxae and trochanters basally brownish black, apically brownish yellow (sometimes almost entirely brownish yellow), with brownish-yellow hairs (Fig. 1H); femora brownish yellow with brownish-yellow hairs (hind femur apically mixed with short black hairs); fore and mid tibiae brownish yellow with short brownish-yellow hairs; hind tibia largely brownish yellow to pale brown, apically partially darkened, largely with short black hairs but apico-ventrally with short brownish-yellow hairs; fore and mid tarsi basally brownish yellow, apically pale brown to brown, with short brownish-yellow hairs (sometimes a few short black hairs sparsely mixed); hind tarsus dorsally brownish black to dark brown with short black hairs, ventrally pale brown to brown with short brownish-yellow hairs. Wing largely hyaline with slight pale brownish tinge (Fig. 1G); veins pale brown to brownish black; pterostigma pale brown; cell sc before pterostigma yellowish; wing membrane largely covered with microtrichiae except for basal bare areas (especially, cell br almost bare); upper and lower calypters pale yellow to brownish yellow with long brownish-yellow marginal hairs. Abdominal tergites unmargined, brownish-yellow ground color with black markings, with wavy brownish-yellow and black hairs (wave getting weaker towards apex) (Fig. 1G); tergite 1 largely brownish yellow except for subshiny black posterior margin (occasionally subshiny black area covering half or more area); tergite 2 with anteriorly widened black mid-stripe connected to narrow black transverse postero-marginal band; tergite 3 postero-marginally with narrow black transverse band, anetero-medially slightly protruded; tergite 4 with narrow black transverse subposterior band, antero-medially slightly protruded; terigte 5 entirely brownish yellow; sternites 1 and 2 pale yellow with wavy pale yellow hairs; sternites 3 and 4 pale yellow, largely with wavy pale yellow and short pale yellow hairs but posterior 1/3−1/2 mixed with short black hairs; sternite 5 brownish yellow to pale brown, anteriorly with brownish-yellow hairs, posteriorly with black hairs; sternites 6 and 7 pale brown to brown, largely with black hairs but anteriorly mixed with some brownish-yellow hairs; sternite 8 with rounded blackish spot of about 1/3−4/5 of sternite width, medially with black hairs, marginally with brownish-yellow hairs. Male genitalia (Fig. 4E−H) with epandrium slightly longer than height in lateral view (Fig. 4F); surstylus longer than width in caudal view (middle width about 2/3 of length when oriented to show broadest area) (Fig. 4E), slightly curved anteriorly with rounded apex in lateral view, basally with long brownish-yellow hairs, apically with short hairs (Fig. 4F); hypandrium with slightly up-curved lingula (Fig. 4F); lateral protuberance of hypandrium slightly longer than lingula, with widely rounded apex; distiphallus apically slightly widened in lateral view (Fig. 4G); about apico-ventral 2/5 of distiphallus densely with short spiny hairs; basiphallus with 2 pairs of ventral processes (Fig. 4G-a, -b, H); apico-ventral processes relatively wide, with serrated apex in ventral view (Fig. 4G-a, H-a); baso-ventral processes with irregularly serrated posterior

side in lateral view (Fig. 4G-b). Female. Similar to male except for the following characteristics. Lengths and ratios: body length 10.2–11.8 mm; wing length 8.93–9.60 mm; head ratio 0.70–0.74; face ratio 0.42–0.45; eye ratio 0.53–0.56; gena-eye ratio 0.04–0.07; antenna-head ratio 0.44–0.46; postpedicel-pedicel ratio 2.20–2.27; arista-antenna ratio 1.02–1.08; wing ratio 3.39–3.60; wing-thorax ratio 2.20–2.48; vein M ratio 1.53–2.00; vein R_{4+5} ratio 2.75–3.21. Head dichoptic with vertex about 0.15× as wide as head in dorsal view (Fig. 1I); anterior 1/5–1/4 of frons brownish yellow, posterior 3/4–4/5 brownish black to black, with variably mixed brownish yellow and black hairs except for antero- and postero-marginal bare areas; frons heavily pruinose except for narrow median longitudinal and posterior 1/3 areas. Thorax (Fig. 1I): 4 wide longitudinal scutal pruinose stripes with more bluish tinge. Abdominal tergites: black mid stripe on tergite 2 distinctly narrow (Fig. 1G vs. I); black bands on tergites 3 and 4 almost straight (Fig. 1G vs. I).

Material examined. KOREA: Chungcheongbuk-do: Okcheon-gun, Gunbuk-myeon, Daechoeng Dam, N36° 21.363′ E127°35.33.7′, 31.V–2.VII.2005, P. Tripotin, 1♀; Daejeon-si: Daedeok-gu, Wa-dong, N36°24.02′ E 127°25.98′, 17.IX–6.X.2006, P. Tripotin, 1♀; Gangwon-do: Donghae-si, Samhwa-dong, Mureung Valley, N37°28′02″ E129°01′53″, 11.VI.2012, S.-W. Suk *et al*., 1♂ (NIBR); Goseong-gun, Goseong-eup, Sottongnyeong, N38°18′06″ E126°21′53″, 24.IX.2016, S.-S. Euo, C.-O. Kim, W.-R. Ha, 2♂, 3♀; Hongcheon-gun, Nae-myeon, Bangnae-ri, N37°51′11″ E128°16′52″, 27.IX.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♀; Hongcheon-gun, Nae-myeon, Gwangwon-ri, Woldoon-gol, N37°50′52″ E128°25′24″, 16.VI.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 4♂; ditto, 26.VII.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♂; Inje-gun, Girin-myeon, Mt. Jeombongsan, from Jindong-ri to Gombaeryeong, N38°1′40″ E128° 25′59″, 9.VII.2016, S.-S. Euo, C.-O. Kim, W.-R. Ha, 4♂; Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Mirae Campus, N37°17′10″ E127°54′01″, 30.VI.2006, H.-W. Byun, J.-S. Lim, 1♀; ditto, 6.X.2016, S.-S. Euo, 2♀; ditto, 3.X.2017, S.-S. Euo, C.-O. Kim, 1♂, 1♀; ditto, 26.V.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♀; ditto, 7.VI.2018, C.-O. Kim, J.-H. Choi, 1♀; ditto, 25. VI.2018, S.-S. Euo, 1♀; ditto, 29.VI.2018, S.-S. Euo, 1♂, 2♀; ditto, 30.VI.2018, S.-S. Euo, 1♀; ditto, 3.VII. 2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♀; Wonju-si, Panbu-myeon, Seogok-ri, Mt. Baegunsan, N37°14′59″ E127°57′46″, 27.VI.2017, S.-S. Euo, C.-O. Kim, J.-H. Choi, 2♂; Gyeonggi-do: Gwacheon-si, Makgye-dong, Mt. Cheonggyesan, N37°24′51″ E127°02′29″, 13.V. 2021, S.-S. Euo, C.-O. Kim, 1♂; Gyeongsangbuk-do: Pohang-si, Buk-gu, Heunghae-eup, Gokgang-ri, N36° 06′51″ E129°23′37″, 4.VI.2011, S.-W. Suk *et al*., 1♀; Gyeongsangnam-do: Hamyang-gun, Hyucheon-myeon, Songjeon-ri, Mt. Jirisan, Munsusa Temple (400 m), N35° 24.739′ E127°43.818′, 6–27.VI.2004, P. Tripotin, 2♀; ditto, 4–19.VI.2005, P. Tripotin, 1♀; Incheon-si: Gyeyang-gu, Gyesan-dong, Mt. Gyeyangsan, N37°32′24″ E126°41′57″, 15.IX.2016, C.-O. Kim, 1♂; Jeollabuk-do: Sunchang-gun, Bokheung-myeon, Hwayang-ri, Mt. Hwagaesan, N35°27′42″ E128°54′8″, 20.IX.2020, S.-S. Euo, C.-O. Kim, S.-P. Han, 1♂; ditto, 12.IX.2021, S.-S. Euo, C.-O. Kim, 3♂. RUSSIA: Primorsky-Krai, Luk' yanovka, lower Sukhodol River, N43°10.71′ E132° 42.81′, 29–30.VIII.2002, K.-C. Holston, 1♀.

Distribution. Japan (Kuril Islands, Hokkaido, Honshu, Shikoku, Kyushu), Korea, Russian Far East.

Biology. *Epistrophe aino* is relatively common in Korea. Its flight period extends from May to October with a peak in June. To date, the following seven aphid species are recognized as its prey: *Aphis medicaginis* Koch, 1854, *Brevicoryne brassicae* (Linnaeus, 1758), *Hyalopterus pruni* (Geoffroy, 1762), *Myzus persicae* (Sulzer, 1776), *Tuberocephalus sakurae* (Matsumura, 1917), and *Uroleucon formosanum* (Takahashi, 1921) (Ninomiya, 1957; Okuno, 1967).

Remarks. The examined Korean specimens agree well with the original description (Matsumura and Adachi, 1917) and a syntype in HUS. The new Korean name of this species translates as "*Epistrophe* fly having yellow abdomen" referring to its predominantly yellowish abdomen.

3. *Epistrophe annulitarsis* (Stackelberg, 1918)
얼룩발여리꽃등에 (신칭) (Figs. 1K–O, 4I–L)

Syrphus annulitarsis Stackelberg, 1918: 2155 (type locality - Russia, Novgorod, SE of Leningrad; holotype ♂, ZISP); Violovitsh, 1983: 41 (in Siberian key).

Epistrophe annulitarsis: Hippa, 1968: 23 (redescription); Vockeroth, 1969: 60 (in Syrphini generic revision); Peck, 1988: 19 (in Palaearctic catalog); Ôhara, 1989: 783 (in Japanese checklist); Huang *et al*., 1996: 142 (in Chinese checklist); Mutin and Barkalov, 1999: 382 (in Russian Far East key); Hua, 2006: 73 (in Chinese checklist); Ichige, 2007: 37 (redescription); Huang and Cheng, 2012: 182 (redescription); Ôhara *et al*., 2014: 468 (in Japanese catalog); Barkalov and Mutin, 2018: 495 (in Russian checklist); Huo in Yang *et al*., 2020: 152 (in Chinese catalog).

Diagnosis. *Epistrophe annulitarsis* can be readily distinguished from Korean congeners by the following characteristics: 1) hind tarsus pale yellow to pale brown with 6 blackish ringlets (basal and apical ringlets on 1st tarsomere plus apical ringlet on each of 2–5th tersomeres) (Fig. 1M, O); 2) sternites 2 and 3 each with pair of narrow semicircular black spots on lateral margins (Fig.

1L); and 3) basiphallus with 2 pairs of pointed ventral processes (Fig. 4K-a, -b, L).

Description of Korean material. Male. Lengths and ratios: body length 10.6−11.7 mm; wing length 9.4−10.4 mm; head ratio 0.69−0.73; face ratio 0.41−0.44; eye ratio 0.52−0.56; gena-eye ratio 0.06−0.07; antenna-head ratio 0.39−0.41; postpedicel-pedicel ratio 2.00−2.50; arista-antenna ratio 1.06−1.26; wing ratio 3.33−3.62; wing-thorax ratio 2.48−2.69; vein M ratio 2.20−2.83; vein R_{4+5} ratio 3.14−3.94. Head holoptic with eye contiguity slightly shorter than vertical triangle (Fig. 1K); compound eye dark brown with slight purplish tinge, bare; vertex black, anteriorly with slightly wavy black hairs, posteriorly with brownish-yellow hairs (sometimes largely with slightly wavy black hairs and postero-marginally mixed with some brownish-yellow hairs); frons anteriorly brownish yellow, posteriorly black, largely with yellowish grey to yellow pruinosity except for anterior margin, with black hairs; lunule brownish yellow, bare (sometimes dorso-medially with small blackish spot); antenna largely brownish yellow to pale brown except for variably darkened dorsal area of postpedicel (Fig. 1M); face almost entirely brownish yellow to yellow ground color except for pair of small brownish black lateral spots on lower facial margin (Fig. 1M-a), with greyish pruinosity, and with wavy brownish-yellow hairs; facial knob rounded, almost bare; gena pale yellow to brownish yellow with greyish pruinosity, and with brownish-yellow hairs (Fig. 1M). Thorax largely blackish with yellowish grey to yellow pruinosity, with wavy brownish yellow to pale yellow hairs (Fig. 1K); scutum with subshiny yellowish grey pruinosity; medial scutal area with pair of longitudinal greyish pruinose stripes (can be observed under appropriate lighting), interrupted at anterior 3/5−2/3; lateral margins of scutum matte yellow (Fig. 1K, M); scutellum brownish yellow, largely with wavy black hairs, but anterior to lateral side with wavy brownish-yellow hairs (sometimes brownish-yellow haired area larger than black haired area); pleura blackish, mostly with yellowish pruinosity (Fig. 1M); anterior anepisternum, anterior 1/3−1/2 of posterior anepisternum, dorsomedial anepimeron, posterior anepimeron, meron, anatergite, mediotergite and metasternum bare; katepisternum with upper and lower brownish yellow hair patches, narrowly connected on posterior margin; halter with stem brownish yellow to pale yellow, knob yellow to brownish yellow. Legs with variable colored coxae (pale yellow to brownish black) with brownish yellow hairs (Fig. 1M); trochanters brownish yellow with brownish yellow hairs; femora brownish yellow with brownish yellow hairs (hind femur antero-apically with short black hairs); fore and mid tibiae brownish yellow with short brownish yellow hairs; hind tibia brownish yellow to pale brown, subapically slightly darkened, largely with short black hairs but apico-ventrally with brownish yellow hairs; fore and mid tarsi brownish yellow with short brownish yellow hairs (sometimes a few short black hairs sparsely mixed); hind tarsus pale yellow to pale brown with 6 blackish ringlets (basal and apical ringlets on 1st tarsomere plus apical ringlet on each 2−5th tarsomeres), dorsally with short black hairs, ventrally with short brownish yellow hairs. Wing largely hyaline with slight pale brownish tinge (Fig. 1M); veins pale brown to brownish black; pterostigma pale brown; cell sc before pterostigma yellowish; wing membrane entirely microtrichose (sometimes with narrow bare area on baso-anterior margin of cell br); upper and lower calypters pale yellow to brownish yellow with long brownish yellow marginal hairs. Abdominal tergites unmargined, brownish yellow ground color with black markings, with wavy brownish yellow and black hairs (wave getting weaker towards apex) (Fig. 1K); tergite 1 largely subshiny black except for brownish yellow antero-lateral area (occasionally brownish yellow area covering half or more area); tergite 2 with black transverse antero- and postero-marginal band narrowly connected with narrow longitudinal mid-stripe (stripe occasionally missing), black antero-marginal band medio-posteriorly larger, black postero-marginal band anteriorly slightly undulated; tergite 3 with narrow black transverse postero-marginal band, anteriorly slightly undulated; tergite 4 with narrow black subposterior band, anteriorly slightly undulated; tergite 5 brownish yellow, medially with variable sized black spot of less than 1/5 of tergite width; sternite 1 pale yellow with wavy pale yellow hairs; sternites 2 and 3 pale yellow, each with pair of narrow semicircular black spots on lateral margins (Fig. 1L), largely with wavy pale yellow to brownish yellow hairs, postero-laterally mixed with a few black hairs (black hairs more on sternite 3 than on sternite 2); sternites 4−7 pale yellow to pale brown with black and brownish yellow hairs variably mixed; sternite 8 brownish yellow to pale brown with rounded blackish spot of about 2/5−3/4 of sternite width, with brownish yellow hairs. Male genitalia (Fig. 4I−L) with epandrium as long as height in lateral view (Fig. 4J); surstylus relatively short, slightly longer than width in caudal view (middle width about 4/5 of length when oriented to show broadest area) (Fig. 4I), slightly curved anteriorly with rounded apex in lateral view, basally with long brownish yellow hairs, apically with short hairs (Fig. 4J); hypandrium with slightly up-curved lingula (Fig. 4J); lateral protuberance of hypandrium slightly longer than lingula, with slightly down-curved and rounded apex; distiphallus apically slightly widened in lateral view; about apico-ventral 3/5 of distiphallus densely with short spiny hairs (Fig. 4K); basiphallus with 2 pairs of pointed ventral processes (Fig. 4K-a, -b,

L). Female. Similar to male except for the following characteristics. Lengths and ratios: body length 9.8−11.9 mm; wing length 8.7−10.6 mm; head ratio 0.68−0.76; face ratio 0.39−0.43; eye ratio 0.52−0.59; gena-eye ratio 0.05−0.07; antenna-head ratio 0.44−0.50; postpedicel-pedicel ratio 2.09−2.40; arista-antenna ratio 1.11−1.16; wing ratio 2.86−3.53; wing-thorax ratio 2.59−2.82; vein M ratio 2.43−3.07; vein R_{4+5} ratio 3.27−3.62. Head dichoptic with vertex about 0.17× as wide as head in dorsal view (Fig. 1N); anterior 1/6−1/5 of frons brownish yellow, posterior 4/5−5/6 black; lateral margins of frons heavily with yellow to yellowish grey pruinosity, each of about 2/5 of shortest width of frons, except for median and posterior 1/3 areas. Thorax (Fig. 1N): scutal pruinosity with more greyish tinge; Wing membrane with larger basal bare areas than in males (especially, baso-anterior margin of cell br, along the posterior of vein CuP of cell cup, and occasionally baso-anterior margin of cell bm). Abdominal tergites: black transverse antero- and postero-marginal bands on tergite 2 separated (Fig. 1N) (these bands occasionally slightly connected as in males); black transverse bands on tergites 3 and 4 almost straight (less undulated than that of male - Fig. 1K vs. N).

Material examined. KOREA: Chungchengnam-do: Geumsan-gun, Nami-myeon, Bohyeonsa Temple, N36° 03.494′ E127°27.225′, 14.V−1.VI.2005, P. Tripotin, 3♀; Gangwon-do: Hoengseong-gun, Dunnae-myeon, Sapgyo-ri, Mt. Cheongtaesan, N37°30′40″ E128°18′01″, 15.VIII.2001, D.-S. Choi *et al*., 1♀ (NIBR); Hongcheon-gun, Nae-myeon, Bangnae-ri, N37°51′11″ E128°16′52″, 9.IX.2016, S.-S. Euo, C.-O. Kim, W.-R. Ha, 3♂, 2♀; Hongcheon-gun, Nae-myeon, Changchon-ri, north valley of Mt. Gyebangsan, N37°44′39″ E128°26′58″, 14.VIII.1998, H.-Y. Han, K.-E. Ro, 1♀; Hongcheon-gun, Nae-myeon, Gwangwon-ri, Woldoon-gol, N37°50′52″ E128°25′24″, 16.IX.2017, S.-S. Euo, C.-O. Kim, J.-H. Choi, 3♀; ditto, 1.IX.2019, S.-S. Euo, C.-O. Kim, 1♂; Hongcheon-gun, Nae-myeon, Mt. Gyebangsan, Undur-yeong, N37°43′41″ E128°27′55″, 23.VIII.2001, D.-S. Choi, H.-S. Lee, S.-H. Kim, 1♂; Hongcheon-gun, Seomyeon, Magok-ri, N37°42.97′ E127°35.45′, 24.VIII−31.IX.2006, P. Tripotin, 1♂; ditto, 4.V−6.VI.2006, P. Tripotin, 1♀; Hwacheon-gun, Sanae-myeon, Gwangdeok-ri, Mt. Gwangdeoksan, 29.VIII.2000, C.-H. Park, D.-W. Kim, 2♀; Jeongseon-gun, Gohan-eup, Mt. Hambaeksan, Manhang-jae, N37°8′53″ E128°54′14″, 29.VIII.2000, H.-Y. Han, K.-E. Ro, 1♂; Pyeongchang-gun, Bangrim-myeon, Ungyo-ri, N37°26′17.18″ E128°19′11.7″, 24.IX.2010, S.-W. Suk *et al*., 1♂; Pyeongchang-gun, Yongpyeong-myeon, Nodong-ri, Nodong Valley (900 m), N37°42.08′ E128°28.89′, 31.V−5.VI.2006, P. Tripotin, 1♀; ditto, 26.VIII−1.X.2006, P. Tripotin, 1♂, 1♀; Samcheok-si, Dogye-eup, Mugeon-ri, Moss waterfall, N37°15′32.6″ E129°06′34.8″, 17.IX.2019, S.-S. Euo, C.-O. Kim, 1♀; Samcheok-si, Geunsan-dong, Mt. Geunsan, N37°24′48″ E129°08′29″, 28.IV.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 2♂.

Distribution. Russia, Korea, China, Japan, widespread in Europe.

Biology. This species has been often observed while feeding on flowers in the foothills of mountains in Korea.

Remarks. The examined Korean specimens agree well with the original description (Stackelberg, 1918) as well as the redescriptions including male genitalia characters (Hippa, 1968; Ichige, 2007). The new Korean name translates as "*Epistrophe* fly with spotted foot" referring to its black ringlets on the hind tarsus.

4. *Epistrophe griseofasciata* (Matsumura, 1918)

검정여리꽃등에 (신칭) (Figs. 2A−E, 5A−D)

Eristalosyrphus griseofasciatus Matsumura, 1918: 15 (type locality - Japan, Hokkaido, Sapporo; holotype ♀, NIAES).

Syrphus orientalis Hervé-Bazin, 1914: 400 (type locality - Japan, Tochigi, Chuzenji; holotype ♂, MNHNP); Shiraki, 1930: 361 (East Asian distribution with redescription).

Syrphus angustifasciatus Violovitsh, 1956: 744 (type locality - Russia, Kuril Islands; holotype ♂, ZISP); Violovitsh, 1983: 44 (in Siberian key).

Epistrophe betasyrphoides Thompson, 1980: 513 (n. comb. from *Syrphus*, new name for *Syrphus orientalis* Hervé-Bazin, 1914 - invalid); Peck, 1988: 19 (in Palaearctic catalog); Ôhara, 1989: 783 (in Japanese checklist); Ôhara, 2014: 468 (in Japanese catalog).

Epistrophe angustifasciata: Hippa, 1968: 24 (n. comb. from *Syrphus*, redescription); Peck, 1988: 19 (in Palaearctic catalog).

Epistrophe griseofasciata: Peck, 1988: 20 (in Palaearctic catalog); Ôhara, 1989: 783 (in Japanese checklist); Huang *et al*., 1996: 142 (in Chinese checklist); Mutin and Barkalov, 1999: 382 (in Russian Far East key); Hua, 2006: 73 (in Chinese checklist); Huang and Cheng, 2012: 183 (redescription); Ôhara, 2014: 468 (in Japanese catalog); Barkalov and Mutin, 2018: 495 (in Russian checklist); Huo in Yang *et al*., 2020: 153 (in Chinese catalog).

Diagnosis. *Epistrophe griseofasciata* can be readily distinguished from Korean congeners by the following combination of characteristics: 1) face with brownish-black vertical facial stripe (Fig. 2C); 2) gena brownish yellow to yellow (Fig. 2B, E); 3) pterostigma entirely dark brown (Fig. 2B, D); 4) abdominal tergites 2−4 each with narrow brownish yellow to grey transverse band (Fig. 2A, D); and 5) basiphallus with 2 pairs of pointed

ventral processes, each process basally significantly widened in ventral view (Fig. 5C-a, b, D).

Description of Korean material. Male. Lengths and ratios: body length 11.8−12.8 mm; wing length 10.1−11.5 mm; head ratio 0.69−0.73; face ratio 0.52−0.56; eye ratio 0.49−0.53; gena-eye ratio 0.09−0.16; antenna-head ratio 0.42−0.45; postpedicel-pedicel ratio 2.00−2.18; arista-antenna ratio 1.02−1.13; wing ratio 3.48−3.78; wing-thorax ratio 2.24−2.35; vein M ratio 1.82−2.18; vein R_{4+5} ratio 3.25−3.55. Head holoptic with eye contiguity slightly shorter than vertical triangle (Fig. 2A); compound eye dark brown with slight purplish tinge, bare (Fig. 2C); vertex black largely with slightly wavy black hairs, except for posterior margin with brownish yellow hairs; frons black, about posterior half with yellowish pruinosity, and with wavy black hairs (Fig. 2A, C); lunule black, bare (sometimes with brown medial and lateral margins); antenna brownish black to black (Fig. 2C); face largely brownish yellow ground color with yellowish-grey pruinosity, largely with brownish yellow hairs, sparsely mixed with some black hairs, and with brownish-black vertical facial stripe from lower facial anterior margin up to area below antennal sockets, about 0.3× as wide as facial width (Fig. 2C); facial knob rounded, almost bare; gena brownish yellow to yellow with greyish pruinosity, with brownish-yellow hairs (Fig. 2B). Thorax largely blackish with yellowish-grey pruinosity, with wavy brownish-yellow hairs (Fig. 2A); scutum with longitudinal subshiny yellowish-grey to grey pruinose stripes on paramedial and latero-marginal areas, connected postero-marginally (detectable in better prepared specimens); medial scutal area with pair of longitudinal greyish pruinose stripes (can be observed under appropriate lighting), interrupted at anterior 3/5−2/3; scutellum largley brownish yellow except for brownish black baso-ventral corners, largely with black hairs but anterior to lateral side with brownish yellow hairs (some long hairs wavy); pleura blackish, mostly with yellowish grey to grey pruinosity (Fig. 2B); anterior anepisternum, anterior 1/3 of posterior anepisternum, dorsomedial anepimeron, posterior anepimeron, meron, anatergite, mediotergite and metasternum bare; katepisternum with upper and lower wavy brownish-yellow hair patches, narrowly connected on posterior margin; halter with stem pale brown to yellow, knob brownish yellow to yellow. Legs with coxae and trochanters brownish black to dark brown (sometimes with partially brown apex), and with brownish-yellow and black hairs (Fig. 2B); femora basally brownish black, apically brownish yellow, largely with wavy brownish yellow hairs, but mixed with some black hairs; fore and mid tibiae largely brownish yellow, apically slightly darkened, with short brownish yellow hairs; hind tibia about basal half brownish yellow, about apical half brownish black to dark brown, largely with short black hairs but ventrally with brownish-yellow hairs; fore and mid tarsi dorsally pale brown to dark brown, ventrally brown, with short brownish-yellow hairs (sometimes a few short black hairs sparsely mixed); hind tarsus dorsally brownish black to dark brown with short black hairs, ventrally pale brown to dark brown with short brownish-yellow hairs. Wing largely hyaline with brownish tinge (Fig. 2B); veins brownish yellow to brownish black; pterostigma dark brown; cell sc before pterostigma brownish; wing membrane entirely microtrichose; upper and lower calypters brown to dark brown with long brownish-yellow to brown marginal hairs. Abdominal tergites unmargined, black ground color with wavy brownish-yellow and black hairs (wave getting weaker towards apex) (Fig. 2A); tergite 1 subshiny black; tergites 2−4 each with greyish pruinose brownish transverse band (tergite 2 medially, and tergites 3 and 4 subanteriorly), bands separated from lateral margins, band on tergite 2 distinctly narrower than other two bands; tergite 5 entirely black; sternite 1 anteriorly brownish black with wavy brownish-yellow hairs, posteriorly pale yellow and bare (occasionally almost entirely brownish black except for yellowish posterior margin); sternite 2 anterior 1/4−1/2 pale yellow, posterior 3/4−1/2 brownish black except for pale yellow posterior margin, largely with wavy brownish-yellow hairs but posteriorly mixed with a few black hairs (sometimes only with wavy brownish-yellow hairs); sternite 3 anterior 1/5−1/3 pale yellow, posterior 4/5−2/3 brownish black except for pale yellow posterior margin, anteriorly with wavy brownish-yellow hairs, posteriorly largely with wavy black and short black hairs mixed approximately at 1 : 1 ratio, but posteo-laterally mixed with some wavy brownish yellow hairs; sternite 4 anterior 1/8−1/4 pale yellow, posterior 7/8−3/4 brownish black except for pale yellow posterior margin, largely with wavy black and shorter black hairs mixed approximately at 1 : 1 ratio, but anterior to lateral margins mixed with some brownish-yellow hairs; sternites 5−8 brownish black with black hairs (occasionally a few brownish-yellow hairs mixed). Male genitalia (Fig. 5A−D) with epandrium as long as height in lateral view (Fig. 5B); surstylus relatively short, slightly longer than width in caudal view (middle width about 4/5 of length when oriented to show broadest area) (Fig. 5A), slightly curved anteriorly with rounded apex in lateral view, basally with long brownish-yellow hairs, apically with short hairs (Fig. 5B); hypandrium with slightly up-curved lingula (Fig. 5B); lateral protuberance of hypandrium about 2× as long as lingula, with slightly down-curved and rounded apex; distiphallus apically widened as trumpet shape in lateral view (Fig. 5C); about apico-ventral 4/5 of distiphallus densely with short spiny hairs; basiphallus with 2 pairs of pointed

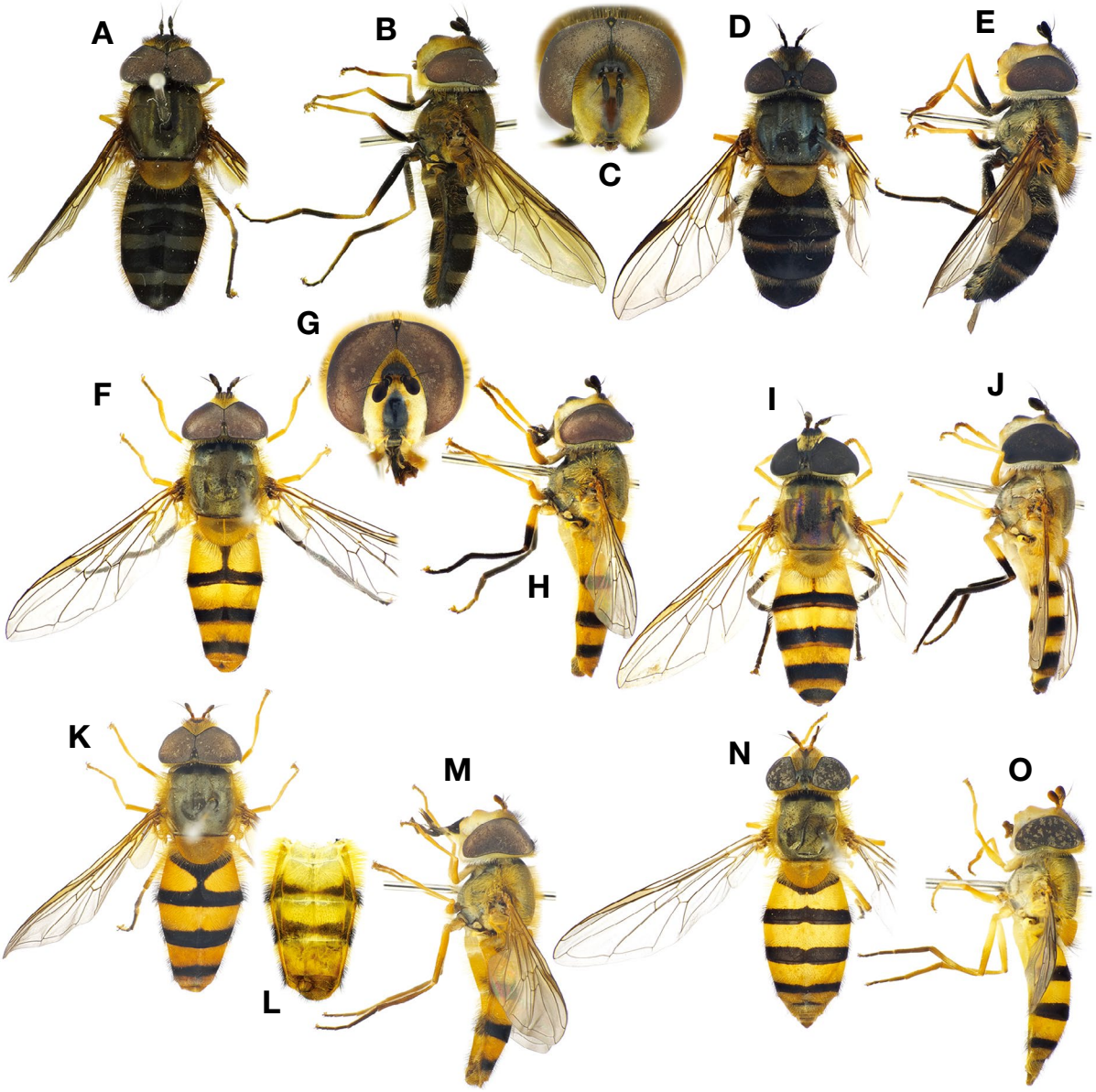


Fig. 2. A–E. *Epistrophe griseofasciata* (Matsumura, 1918): (A, B) male body, dorsal and lateral view; (C) male head, frontal view; (D, E) female body, dorsal and lateral view. F–J. *Epistrophe sasayamana* (Matsumura, 1918): (F, H) male body, dorsal and lateral view; (G) male head, frontal view; (I, J) female body, dorsal and lateral view. K–O. *Epistrophe shibakawae* (Matsumura, 1917): (K, M) male body, dorsal and lateral view; (L) male abdomen, ventral view; (N, O) female body, dorsal and lateral view. Voucher specimen codes: A–C - EpiGri_M6; D, E - EpiGri_F2; F–H - EpiSas_M1; I, J - EpiSas_F1; K, M - EpiShi_M1; L - EpiShi_M4; N, O - EpiShi_F1.

ventral processes (Fig. 5C-a, -b, D), each process basally significantly widened in ventral view (Fig. 5D). Female. Similar to male except for the following characteristics. Lengths and ratios: body length 11.4–13.8 mm; wing length 10.1–12.1 mm; head ratio 0.64–0.74; face ratio 0.51–0.54; eye ratio 0.45–0.53; gena-eye ratio 0.13–0.16; antenna-head ratio 0.46–0.53; postpedicel-pedicel ratio 2.38–2.50; arista-antenna ratio 1.02–1.11; wing ratio 3.46–3.53; wing-thorax ratio 2.31–2.46; vein M ratio 1.61–2.18; vein R_{4+5} ratio 2.71–3.43. Head dichoptic with vertex about 0.17× as wide as head in dorsal view (Fig. 2D); lateral margins of frons heavily with yellowish grey to grey pruinosity, each of about 1/2 of shortest width of frons, except for median and posterior 1/3 areas. Thorax (Fig. 2D): scutal pruinose stripes with more bluish tinge. Abdominal tergites: transverse bands on tergites 2–4 slightly narrower than that of male (Fig. 2A vs. D); sternite 3 posteriorly only with short black hairs; hairs on sternite 4 unwavy.

Material examined. KOREA: Chungcheongnam-do:

Seosan-si, Daesan-eup, Daesan-ri, Mt. Mangilsan, 13.V.2009, H.-Y. Han, 1♂; Gangwon-do: Hoengseong-gun, Dunnae-myeon, Sapgyo-ri, Mt. Cheongtaesan, N37°30′40″ E128°18′01″, 20.IX.2003, D.-S. Choi *et al*., 1♀; Hongcheon-gun, Nae-myeon, Gwangwon-ri, Woldoon-gol, N37°50′52″ E128°25′24″, 15.IX.2017, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♀; ditto, 16.IX.2017, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♂, 2♀ (1♀ in KNA); Hongcheon-gun, Nae-myeon, Mt. Gyebangsan, Unduryeong, N37°43′41″ E128°27′55″, 25.VIII.2002, H.-W. Byun, O.-Y. Lim, 2♂; Inje-gun, Girin-myeon, Seo-ri, Mt. Maebongsan, N37°56′43.1″ E128°13′40″, 4.X.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♀; Jeongseon-gun, Gohan-eup, Mt. Hambaeksan, Manhang-jae, N37°8′53″ E128°54′14″, 27.IX.2006, H.-W. Byun, H.-S. Lee, 1♀; Jeongseon-gun, Nam-myeon, Yupyeong-ri, Mt. Mindungsan, N37°16′10″ E128°46′49″, 18.VIII.2001, D.-S. Choi *et al*., 1♂; ditto, 2.IX.2009, S.-W. Suk, Y.-B. Lee, 1♂; ditto, 15.IX.2013, H.-Y. Han *et al*., 1♂ (NIBR); Pyeongchang-gun, Jinbu-myeon, Jangjeon Valley, N37°27′59.2″ E128°32′18.7″, 5.VI.2019, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♂; ditto, 26.IX.2021, S.-S. Euo, C.-O. Kim, 1♀; Wonju-si, Heungeop-myeon, Maeji-ri, Hwae-chon, 7.IX.1997, H.-Y. Han, 1♂; Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Mirae Campus, N37°17′10″ E127°54′01″, 6.X.2016, S.-S. Euo, 1♀; Wonju-si, Panbu-myeon, Seogok-ri, Mt. Baegunsan, N37°14′59″ E127°57′46″, 7.VII.1999, H.-Y. Han *et al*., 2♂; ditto, 2.VIII.2000, D.-S. Choi *et al*., 1♂; ditto, 17.V.2006, D.-S. Choi, H.-W. Byun, 1♂; ditto, 17.V.2011, S.-W. Suk *et al*., 1♂, 1♀; ditto, 14.V.2016, S.-S. Euo, C.-O. Kim, 1♂; ditto, 1.IX.2017, S.-S. Euo, C.-O. Kim, J.-H. Choi, 17♂ (1♂ in KNA); ditto, 23.VI.2017, C.-O. Kim, J.-H. Choi, 35♂ (2♂ in KNA; 1♂ in NIBR); ditto, 27.VI.2017, S.-S. Euo, C.-O. Kim, J.-H. Choi, 5♂; ditto, 13.VI.2018, C.-O. Kim, J.-H. Choi, 6♂ (1♂ in KNA); Gyeongsangnam-do: Uiryeong-gun, Chilgok-myeon, Naejo-ri, Mt. Jagulsan, N35°22′38″ E128°12′13″, 15.IX.2016, W.-R. Ha, 1♂.

Distribution. Japan, Korea, Russia, widespread in Europe.

Biology. Matsumura (1918) collected this species on the leaves of *Abies sachalinensis* (F. Schmidt) feeding on the juices secreted by an aphid species, *Mindarus abietinus* Koch, 1857. In Korea, its flight period extends from May to October with the peak in June. Male flies have been often observed while hovering over mountain tops. On the other hand, females have been often observed visiting flowers of Apiaceae spp.

Remarks. The examined Korean specimens agree well with the female holotype in NIAES. The male genitalia of the Korean specimens agree well with those provided by Violovitsh (1983; as *E. angustifasciata*). The new Korean name of this species refers to its dark coloration.

5. *Epistrophe sasayamana* (Matsumura, 1918)
검정종아리여리꽃등에 (신칭) (Figs. 2F–J, 5E–H)

Syrphus (*Macrosyrphus*) *sasayamanus* Matsumura, 1918: 22 (type locality - Japan, Shikoku, Mt. Sasa; holotype ♂, HUS).

Metasyrphus (*Metasyrphus*) *sasayamnus*: Peck, 1988: 37 (in Palaearctic catalog); Ôhara, 1989: 785 (in Japanese checklist).

Epistrophe sasayamana: Sakuratani, 1977: 292 (biology in Japan); Iwai, 2003: 29 (in Nansei Islands records with key); Rojo *et al*., 2003: 41 (in world review of aphidophagous syrphids); Ôhara *et al*., 2014: 469 (in Japanese catalog).

Diagnosis. *Epistrophe sasayamana* can be distinguished from Korean congeners by the following the combination of characteristics: 1) face with brownish black to black vertical facial stripe (Fig. 2G); 2) frons entirely black (Fig. 2F, I); 3) antenna largely brownish black to black except for variably brownish basal area of scape (Fig. 2G); 4) hind femur about basal half brownish yellow, about apical half brownish black to black (Fig. 2H, J); 5) basiphallus with 2 pairs of ventral processes (Fig. 5G-a, -b, H); 6) basiphallic apico-ventral processes wide, with serrated apex in ventral view (Fig. 5H-a); and 7) basiphallic baso-ventral processes with irregularly serrated posterior side in lateral view (Fig. 5G-b).

Description of Korean material. Male. Lengths and ratios: body length 10.0–11.8 mm; wing length 8.9–10.1 mm; head ratio 0.68–0.73; face ratio 0.44–0.47; eye ratio 0.51–0.57; gena-eye ratio 0.06–0.08; antenna-head ratio 0.40–0.45; postpedicel-pedicel ratio 2.10–2.30; arista-antenna ratio 1.09–1.13; wing ratio 3.43–3.62; wing-thorax ratio 2.19–2.50; vein M ratio 1.80–2.06; vein R_{4+5} ratio 3.28–3.56. Head holoptic with eye contiguity about 0.7× as long as vertical triangle (Fig. 2F); compound eye dark brown with slight purplish tinge, bare (Fig. 2G); vertex black postero-marginally with yellowish pruinosity, anteriorly with wavy black hairs, posteriorly with wavy brownish-yellow hairs (sometimes posteriorly mixed with a few black hairs) (Fig. 2F); frons entirely black, about posterior 2/3 with yellow to yellowish-grey pruinosity, posteriorly with wavy brownish-yellow hairs, anteriorly with wavy black hairs (sometimes anteriorly variably mixed with wavy brownish-yellow hairs); lunule largely brownish black to black except for brownish medial and lateral margins, bare; antenna largely brownish black to black except for variably brownish basal area of scape (Fig. 2G); face brownish-yellow ground color with yellowish-grey to whitish pruinosity, with pale yellow hairs, and with wide brownish-black to black vertical facial stripe from lower facial anterior margin up to area below antennal sockets, about 0.34× as wide as facial width; facial knob round-

ed, almost bare; gena brownish-yellow to yellow with whitish pruinosity, with pale yellow to whitish hairs (Fig. 2H). Thorax largely blackish with yellowish grey pruinosity, with wavy brownish yellow to pale yellow hairs (Fig. 2F); scutum with subshiny yellowish-grey to grey pruinosity; medial scutal area with pair of longitudinal greyish pruinose stripes (can be observed under appropriate lighting) interrupted at anterior 3/4; lateral margins of scutum matte yellow (Fig. 2F, H); scutellum brownish yellow, anteriorly with wavy brownish-yellow hairs, posteriorly with wavy black hairs; pleura largely blackish except for variable colored metasterum (pale yellow to brownish black), mostly with pale yellow to yellowish-grey pruinosity (Fig. 2H); anterior anepisternum, anterior 1/3 of posterior anepisternum, dorsomedial anepimeron, posterior anepimeron, meron, anatergite, mediotergite and metasternum bare; katepisternum with upper and lower wavy pale yellow hair patches, narrowly connected on posterior margin; halter with stem brownish yellow to pale yellow, knob pale yellow to yellow. Legs with variable colored coxae and trochanters (brownish yellow to brownish black) with brownish-yellow hairs (Fig. 2H); fore and mid femora brownish yellow with wavy brownish-yellow hairs (sometimes apically mixed with a few black hairs); hind femur about basal half brownish yellow with wavy brownish-yellow hairs, about apical half brownish black to black with black hairs; fore and mid tibiae brownish yellow with short brownish-yellow hairs (sometimes sparsely mixed with a few short black hairs); hind tibia brownish black with short black hairs; fore and mid tarsi basally brownish yellow, apically brown to dark brown, with short brownish-yellow hairs (sometimes sparsely mixed with a few short black hairs); hind tarsus dorsally brownish black to black with short black hairs, ventrally pale brown with short brown hairs. Wing largely hyaline with slight pale brownish tinge (Fig. 2F); veins pale brown to brownish black; pterostigma pale brown; cell sc before pterostigma yellowish; wing membrane largely covered with microtrichiae except for basal bare areas; upper and lower calypters yellow to brownish yellow with long brownish-yellow marginal hairs. Abdominal tergites unmargined, brownish yellow ground color with black markings, with wavy brownish-yellow and black hairs (wave getting weaker towards apex) (Fig. 2F); tergite 1 largely brownish yellow except for partially blackish posterior margin; tergite 2 with black antero- and postero-marginal bands connected with narrow longitudinal mid-stripe (stripe occasionally interrupted); tergite 3 with black transverse postero-marginal band, medio-posterior margin often narrowly pale brown to brownish yellow; tergite 4 with black subposterior band; tergite 5 brownish yellow to pale brown, medially with variable sized triangular black spot of less than 1/3 of tergite width; sternites 1 and 2 pale yellow with wavy pale yellow hairs; sternites 3 and 4 pale yellow to brownish yellow (sometimes posteriorly slightly darkened), largely with wavy pale yellow to brownish-yellow hairs, but posteriorly mixed with some short black and brownish-yellow hairs; sternite 5 brownish yellow to brown, anteriorly with brownish yellow hairs, posteriorly with black hairs; sternites 6 and 7 pale brown to brownish black, largely with black hairs but a few brownish-yellow hairs mixed; sternite 8 pale brown to brown, medially with rounded blackish spot of about 2/3−4/5 of sternite width, medially with black hairs, marginally with brownish-yellow hairs. Male genitalia (Fig. 5E−H) with epandrium slightly longer than height in lateral view (Fig. 5F); surstylus longer than width in caudal view (middle width about 3/5 of length when oriented to show broadest area) (Fig. 5E), slightly curved anteriorly with rounded apex in lateral view, basally with long brownish-yellow hairs, apically with short hairs (Fig. 5F); hypandrium with slightly up-curved lingula (Fig. 5F); lateral protuberance of hypandrium about 1.4× as long as lingula, with widely rounded apex, with a few brownish-black hairs on ventral side; distiphallus apically slightly widened in lateral view (Fig. 5G); about apico-ventral 2/3 of distiphallus densely with short spiny hairs; basiphallus with 2 pairs of ventral processes (Fig. 5G-a, -b, H); apico-ventral processes wide, with serrated apex in ventral view (Fig. 5H-a); baso-ventral processes with irregularly serrated posterior side in lateral view (Fig. 5G-b). Female. Similar to male except for the following characteristics. Lengths and ratios: body length 10.8−12.5 mm; wing length 9.1−10.6 mm; head ratio 0.70−0.72; face ratio 0.43−0.46; eye ratio 0.52−0.56; gena-eye ratio 0.06−0.09; antenna-head ratio 0.47−0.51; postpedicel-pedicel ratio 2.64−3.00; arista-antenna ratio 1.04−1.16; wing ratio 3.31−3.49; wing-thorax ratio 2.03−2.39; vein M ratio 1.89−2.27; vein R_{4+5} ratio 3.21−3.76. Head dichoptic with vertex about 0.12× as wide as head in dorsal view (Fig. 2I); frons heavily with yellowish-white to yellow pruinosity except for posterior 1/3 and antero-marginal areas, with black and brownish-yellow hairs. Thorax (Fig. 2I): scutal pruinosity partially with slight purplish to bluish tinge (sometimes similar to male). Abdominal tergites: narrow black antero-marginal band on tergite 2 distinctly narrowly connected to black postero-marginal band (these bands sometimes separated) (Fig. 2F vs. I); black bands on tergites 3 and 4 larger than that of male (Fig. 2F vs. I); tergite 5 largely black except for brownish yellow antero-lateral and posterior margins; sternite 6 dark brown to pale brown only with black hairs.

Material examined. KOREA: Chungcheongbuk-do: Jecheon-si, Songhak-myeon, Mt. Songhaksan, N37° 12′29″ E128°16′7″, 3.IX.2017, S.-S. Euo, C.-O. Kim, J.-H. Choi, 4♂ (2♂ in KNA); ditto, 19.V.2017, S.-S. Euo,

C.-O. Kim, W.-R. Ha, 1♂; Chungcheongnam-do: Geumsan-gun, Nami-myeon, Bohyeonsa Temple, N36°03.494′ E127°27.225′, 14.V−1.VI.2005, P. Tripotin, 1♀; ditto, 1−8.VI.2005, P. Tripotin, 1♀; ditto, 8−24.VI.2005, P. Tripotin, 1♂, 3♀; Daejeon-si: Dong-gu, Sinha-dong, Mt. Baekgolsan, N36°21′48″ E127°30′43″, 22.VII.2016, S.-S. Euo, C.-O. Kim, W.-R. Ha, 9♂ (1♂ in KNA; 1♂ in NIBR); Gangwon-do: Hongcheon-gun, Nae-myeon, Gwangwon-ri, Woldoon-gol, N37°50′52″ E128°25′24″, 26.VII.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♀; Jeongseon-gun, Nam-myeon, Yupyeong-ri, Mt. Mindungsan, N37°16′10″ E128°46′49″, 30.VIII.2000, H.-Y. Han *et al*., 1♂; Pyeongchang-gun, Yongpyeong-myeon, Nodong-ri, Nodong Valley (900 m), N37°42.08′ E128°28.89′, 31.V−5.VI.2006, P. Tripotin, 1♀; Samcheok-si, Geunsan-dong, Mt. Geunsan, N37°24′48″ E129°08′29″, 6.V.2017, S.-S. Euo *et al*., 1♂; ditto, 27.VII.2017, S.-S. Euo *et al*., 6♂ (1♂ in KNA); Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Mirae Campus, N37°17′10″ E127°54′01″, 5.VII.2004, D.-S. Choi, H.-W. Byun, J.-S. Soh, 1♀; ditto, 1.VI.2012, H.-S. Lee, K.-H. Lee, 1♂ (NIBR); ditto, 20.V.2016, C.-O. Kim, W.-R. Ha, 1♂; ditto, 17.V.2017, C.-O. Kim, 2♂; ditto, 26.V.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 2♂; Wonju-si, Panbu-myeon, Seogok-ri, Mt. Baegunsan, N37°14′59″ E127°57′46″, 23.VI.2017, C.-O. Kim, J.-H. Choi, 1♀; Yeongwol-gun, Yeongwol-eup, Heungwol-ri, Mt. Taehwasan, N37°07′03.3″ E128°29′07.4″, 1.VIII.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♀; Gyeonggi-do: Gwangju-si, Opo-myeon, Yangbeol-ri, Mt. Baengmasan from Geungnaksa to 448 m peak, 27.V.2001, D.-S. Choi *et al*., 1♂; Gyeongsangnam-do: Hamyang-gun, Hamyang-eup, Jungnim-ri, Mt. Sambongsan, N35°26′50″ E127°40′10″, 16.VII.2020, S.-S. Euo, C.-O. Kim, J.-H. Choi, 17♂; Hamyang-gun, Hyucheon-myeon, Songjeon-ri, Mt. Jirisan, Munsusa Temple (400 m), N35°24.739′ E127°43.818′, 6−27.VI.2004, P. Tripotin, 2♀; ditto, 4−19.VI.2005, P. Tripotin, 2♀; Hamyang-gun, Macheon-myeon, Samjeong-ri, Mt. Jirisan (700 m), N35°20.930′ E127°38.503′, 6.V−5.VI.2004, P. Tripotin, 1♀; ditto, 8.V−5.VI.2004, P. Tripotin, 1♀; ditto, 6−27.VI.2004, P. Tripotin, 2♀; Ulju-gun, Samnam-myeon, Gacheon-ri, Mt. Yeongchuksan (1,059 m), 29.VI.2003, H.-Y. Han *et al*., 1♀; Incheon-si: Gyeyang-gu, Gyesan-dong, Mt. Gyeyangsan, N37°32′24″ E126°41′57″, 15.IX.2016, C.-O. Kim, 6♂; Jeju-do: Jeju-si, Aewol-eup, Bongseong-ri, Handae Oreum, N33°21′23″ E126°25′29″, 13.VI.2018, H.-Y. Han, K.-E. Ro, S.-S. Euo, 14♂; Jeju-si, Bonggae-dong, Min Oreum, N33°26′15″ E126°38′15″, 22.VI.2017, H.-Y. Han, K.-E. Ro, S.-S. Euo, 1♂; ditto, 12.VI.2018, H.-Y. Han, K.-E. Ro, S.-S. Euo, 3♂ (1♂ in KNA); Jeollanam-do: Gwangyang-si, Ongnyong-myeon, from Baegunsa Temple to Mt. Baegunsan, N35°6′23″ E127°37′17″, 3.VI.2017, S.-S. Euo, W.-R. Ha, J.-H. Choi, 1♀; Gwangyang-si, Ongnyong-myeon, Mt. Baegunsan from Hanjae Hill, N35°6′23″ E 127°37′17″, 6.V.2020, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♂; Wando-gun, Wando-eup, from Sosepo Port to Sanghwangbong, N34°20′02″ E126°40′19″, 28.V.2017, S.-S. Euo *et al*., 4♂.

Distribution. Japan, Korea.

Biology. Sakuratani (1977) recognized the following three prey aphid species in corn fields: *Rhopalosiphum maidis* (Fitch, 1856), *Rhopalosiphum padi* (Linnaeus, 1758), and *Sitobion avenae* (Fabricius, 1775). In Korea, male flies were observed while hovering over the mountain ridge near the top.

Remarks. The examined Korean specimens of *E. sasayamana* agree well with the holotype in HUS. The male genitalia of this species are very similar to that of *E. aino* (Figs. 4E−H vs. 5E−H), despite obvious differences in external characters. Our DNA barcoding analysis (in preparation; not included here) clearly indicated their close relationship (proportional genetic distance = 0.0289−0.0381). The new Korean name of this species refers to its entirely blackish hind tibia.

6. *Epistrophe shibakawae* (Matsumura, 1917)
이마끝점여리꽃등에 (신칭) (Figs. 2K−O, 5I−L)

Syrphus shibakwae Matsumura and Adachi, 1917: 36 (type locality - Japan, Hokkaido Sapporo and Honshu; syntypes 1♂1♀, HUS); Shiraki, 1930: 374 (redescription).

Syrphus horishana Matsumura and Adachi, 1917: 24 (type locality - Taiwan; holotype ♂, HUS).

Syrphus koannania Matsumura and Adachi, 1917: 25 (type locality - Taiwan; holotype ♂, HUS).

Syrphus quinquevittatus Brunetti, 1923: 81 (type locality - India, Darjeeling, Kalimpong; holotype ♂, ZSI).

Metasyrphus shibakawae: Peck, 1988: 32 [as a synonym of *Metasyrphus aino* (Matsumura, 1917) - error].

Epistrophe horishana: Vockeroth, 1969: 61 (in Syrphini generic revision); Knutson *et al*., 1975: 314 (in Oriental catalog); Peck, 1988: 22 (in Palaearctic catalog); Ôhara, 1989: 783 (in Japanese checklist); Hua, 2006: 73 (in Chinese checklist).

Epistrophe shibakawae: Mutin and Barkalov, 1999: 382 (in Russian Far East key); Ôhara *et al*., 2014: 469 (in Japanese catalog); Barkalov and Mutin, 2018: 495 (in Russian checklist).

Diagnosis. *Epistrophe shibakawae* can be distinguished from Korean congeners by the following combination of characteristics: 1) frons largely black except for variably brownish-yellow antero-lateral areas, with black hairs (Fig. 2K, N); 2) lunule dorsally brownish black to black, ventrally brownish yellow; 3) antenna largely pale brown to brownish yellow except for variably

darkened dorsal area of postpedicel and brownish black arista (Fig. 2M, O); 4) wing entirely microtrichose; 5) in males, sternites 2 and 3 each with brownish-black to pale brown transverse subposterior band (band medially shortened or interrupted) (Fig. 2L); and 6) basiphallus with 2 pairs of pointed ventral processes, each pair relatively narrow and almost parallel in ventral view (Fig. 5K-a, -b, L). This species superficially resembles *E. aino*, and that is probably why Peck (1988) synonymized them. However, the black area on tergite 2 is distinctly larger in *E. shibakawae*. Moreover, *E. shibakawae* male has a brownish-black to pale brown transverse band on each of sternites 2 and 3 (see above characteristic 5).

Description of Korean material. Male. Lengths and ratios: body length 10.6−12.4 mm; wing length 9.2−10.9 mm; head ratio 0.65−0.73; face ratio 0.45−0.49; eye ratio 0.52−0.55; gena-eye ratio 0.09−0.12; antenna-head ratio 0.40−0.43; postpedicel-pedicel ratio 2.00−2.30; arista-antenna ratio 1.06−1.29; wing ratio 3.55−3.83; wing-thorax ratio 2.33−2.48; vein M ratio 2.06−2.92; vein R_{4+5} ratio 3.30−4.06. Head holoptic with eye contiguity about 0.7× as long as vertical triangle (Fig. 2K); compound eye dark brown with slight purplish tinge, bare; vertex black, anteriorly with wavy black hairs (sometimes anteriorly mixed with a few brownish-yellow hairs), posteriorly with wavy brownish-yellow hairs; frons largely black except for variably brownish yellow antero-lateral areas, with yellow to yellowish-grey pruinosity, with black hairs; lunule dorsally brownish black to black, ventrally brownish yellow, bare; antenna largely pale brown to brownish yellow except for variably darkened dorsal area of postpedicel and brownish-black arista (Fig. 2M); face brownish yellow ground color with yellowish-grey to grey pruinosity, with brownish-yellow hairs; gena yellow with greyish pruinosity, with brownish-yellow to pale yellow hairs. Thorax largely blackish with yellowish-grey pruinosity, with wavy brownish-yellow to pale yellow hairs (Fig. 2K); scutum with subshiny yellowish-grey pruinosity; medial scutal area with pair of longitudinal greyish pruinose stripes (can be observed appropriate lighting) interrupted at anterior 3/4; lateral margins of scutum matte yellow (Fig. 2K, M); scutellum brownish yellow (occasionally baso-ventral corners narrowly darkened), anteriorly with wavy brownish-yellow hairs, posteriorly with wavy black hairs; pleura largely blackish except for variable colored metasternum (pale yellow to brownish black), mostly with yellowish grey pruinosity (Fig. 2M); anterior anepisternum, anterior 1/3 of posterior anepisternum, dorsomedial anepimeron, posterior anepimeron, meron, anatergite, mediotergite and metasternum bare; katepisternum with upper and lower wavy brownish yellow to pale yellow hair patches, narrowly connected on posterior margin; halter with stem pale brown to brownish yellow, knob yellow to brownish yellow. Legs with variable colored coxae and trochanters (yellow to brownish black) with brownish-yellow hairs (sometimes mixed with a few black hairs) (Fig. 2M); fore and mid femora brownish yellow with brownish-yellow hairs (sometimes apically mixed with some black hairs); hind femur brownish yellow, basally with brownish-yellow hairs, apically with black hairs; fore and mid tibiae brownish yellow with short brownish-yellow hairs; hind tibia largely brownish yellow to pale brown, but irregularly slightly darkened, largely with short black hairs but apico-ventrally with brownish-yellow hairs; fore and mid tarsi basally brownish yellow, apically pale brown, with short brownish-yellow hairs; hind tarsus dorsally dark brown to brownish black with short black hairs, ventrally pale brown to brown with short pale brown hairs. Wing largely hyaline with slight pale brownish tinge (Fig. 2K); veins pale brown to brownish black; pterostigma pale brown; cell sc before pterostigma yellowish; wing membrane entirely microtrichose; upper and lower calypters pale yellow to brownish yellow with long brownish-yellow marginal hairs. Abdominal tergites unmargined, brownish-yellow ground color with black markings, with wavy brownish-yellow and black hairs (wave getting weaker towards apex) (Fig. 2K); tergite 1 largely subshiny black except for brownish yellow antero-lateral areas (occasionally brownish-yellow areas covering half or more area); tergite 2 with black antero- and postero-marginal bands connected with narrow longitudinal mid-stripe; tergite 3 with postero-marginally with black transverse band, antero-medially slightly protruded; tergite 4 with black transverse subposterior band, antero-medially slightly protruded; tergite 5 brownish yellow to pale brown, medially with variable sized triangular black spot of less than 1/5 of tergite width (occasionally invisible); sternite 1 pale yellow with wavy pale yellow hairs; sternites 2 and 3 pale yellow to brownish yellow, each with brownish black to pale brown transverse subposterior band, medially shortened or interrupted (Fig. 2L) (occasionally bands too faint to be observed), largely with wavy brownish-yellow hairs but posteriorly mixed with some black hairs (black hairs more on sternite 3 than on sternite 2); sternite 4 yellow to brownish yellow, largely with wavy brownish-yellow and short brownish-yellow hairs but posteriorly mixed with short black hairs; sternites 5−7 brownish yellow to pale brown, anteriorly with brownish-yellow hairs, posteriorly with black hairs; sternite 8 pale brown to brown, medially with rounded blackish spot of about 2/3−4/5 of sternite width, medially with black hairs, marginally with brownish yellow hairs. Male genitalia (Fig. 6I−L) with epandrium slightly longer than height in lateral view (Fig. 5J); surstylus longer than width in caudal view (middle width about 3/5 of

length when oriented to show broadest area) (Fig. 5I), slightly curved anteriorly with rounded apex in lateral view, basally with long brownish-yellow hairs, apically with short hairs (Fig. 5J); hypandrium with short and slightly up-curved lingula (Fig. 5J); lateral protuberance of hypandrium about 3× as long as lingula, with rounded apex; distiphallus apically widened as trumpet shape in lateral view (Fig. 5K); about apico-ventral 1/2 of distiphallus densely with short spiny hairs; basiphallus with 2 pairs of pointed ventral processes, each pair relatively narrow and almost parallel in ventral view (Fig. 5K-a, -b, L); baso-ventral processes with irregularly serrated posterior side in lateral view (Fig. 5K-b). Female. Similar to male except for the following characteristics. Lengths and ratios: body length 9.8–12.2 mm; wing length 9.3–10.9 mm; head ratio 0.67–0.71; face ratio 0.43–0.50; eye ratio 0.50–0.55; gena-eye ratio 0.10–0.13; antenna-head ratio 0.48–0.51; postpedicel-pedicel ratio 2.36–2.70; arista-antenna ratio 0.98–1.17; wing ratio 3.48–3.66; wing-thorax ratio 2.49–2.65; vein M ratio 2.30–2.80; vein R_{4+5} ratio 3.43–3.65. Head dichoptic with vertex about 0.18× as wide as head in dorsal view (Fig. 2N); lateral margins of frons heavily with yellow to yellowish grey pruinosity of variable width (each of at least 1/2 of shortest width of frons), except for narrow median and posterior 1/3 areas (Fig. 2N). Abdominal tergites: black antero- and postero-marginal bands on tergite 2 distinctly separated (these bands occasionally slightly connected) (Fig. 2N); black bands on tergites 3 and 4 almost straight; sternites without brownish-black to pale brown bands.

Material examined. KOREA: Chungcheongbuk-do: Danyang-gun, Maepo-eup, Yeongcheon-ri, N37°4′22″ E128°18′18″, 25.IX.2012, S.-W. Suk, H.-S. Lee, 1♀; ditto, 23.V.2012, S.-W. Suk, Y.-B. Lee, 1♀; Jecheon-si, Baegun-myeon, Hwadang-ri, N37°10′38″ E127°56′28″, 7.V.2012, S.-W. Suk, D.-H. Kim, H.-S. Lee, 1♀; Jecheon-si, Geumseong-myeon, Yanghwa-ri, N37°4′6″ E128°12′10″, 27.IX.2012, S.-W. Suk, H.-S. Lee, 3♀; Yeongdong-gun, Sangchon-myeon, Goja-ri, Mt. Sambongsan, N35°26′50″ E127°40′10″, 3.V.2019, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♂; Chungcheongnam-do: Geumsan-gun, Nami-myeon, Bohyeonsa Temple, N36°03.494′ E127°27.225′, 26.VIII–14.IX.2005, P. Tripotin, 1♂, 1♀; ditto, 27.IV–14.V.2005, P. Tripotin, 1♀; ditto, 4.IX–15.X.2005, P. Tripotin, 1♂; ditto, 14.IX–16.X.2005, P. Tripotin, 1♀; Gangwon-do: Goseong-gun, Goseong-eup, Sottongnyeong, N38°18′06″ E126°21′53″, 24.IX.2016, 3♀ (1♀ in KNA); Hoengseong-gun, Anheung-myeon, Jigu-ri, 24.IX.2010, S.-W. Suk, Y.-B. Lee, H.-S. Lee, 1♀ (NIBR); Hongcheon-gun, Nae-myeon, Bangnae-ri, N37°51′11″ E128°16′52″, 5.X.2012, S.-W. Suk, Y.-B. Lee, H.-S. Lee, 1♀; ditto, 9.IX.2016, S.-S. Euo, C.-O. Kim, W.-R. Ha, 2♂; Hongcheon-gun, Nae-myeon, Changchon-ri, north valley of Mt. Gyebangsan, N37°44′39″ E128°26′58″, 15.IX.2017, S.-S. Euo, C.-O. Kim, J.-H. Choi, 2♀; Hongcheon-gun, Nae-myeon, Gwangwon-ri, Woldoon-gol, N37°50′52″ E128°25′24″, S.-S. Euo, C.-O. Kim, J.-H. Choi, 3♂, 6♀ (1♀ in KNA); ditto, 16.IX.2021, S.-S. Euo, C.-O. Kim, 3♂, 1♀; Hongcheon-gun, Nae-myeon, Mt. Gachilbong from Sambongyaksu to 1,240 m peak, N37°52′04″ E128°27′43″, 25.VIII.2016, Y.-B. Lee *et al.*, 1♂; Hongcheon-gun, Nae-myeon, Mt. Odaesan, from Myeonggae-ri to Sangwangbong (1,491 m), N37°49′30″ E128°33′52″, 4.IX.2013, H.-S. Lee *et al.*, 1♀; Hongcheon-gun, Seo-myeon, Magok-ri, along Hongcheon River (70 m), N37°43.786′ E127°34.589′, 14–26.IX.2004, P. Tripotin, 1♀; ditto, 26.IX–31.X.2004, P. Tripotin, 1♀; Inje-gun, Sangnam-myeon, Misan-ri, Gaein Mineral Spring, N37°52′05″ E128°22′10″, 16.IX.2017, S.-S. Euo, C.-O. Kim, J.-H. Choi, 2♀; Jeongseon-gun, Nam-myeon, Yupyeong-ri, Mt. Mindungsan, N37°16′10″ E128°46′49″, 30.VIII.2000, H.-Y. Han *et al.*, 1♂; Pyeongchang-gun, Jinbu-myeon, Jangjeon-ri, Jangjeon Valley, N37°27′59.2″ E128°32′18.7″, 31.VIII.2019, S.-S. Euo, C.-O. Kim, 1♂; ditto, 22.IX.2021, S.-S. Euo, C.-O. Kim, 1♂, 2♀; Pyeongchang-gun, Jinbu-myeon, Mt. Odaesan, near Dongdaesa (800 m), N37°44.31′ E128°35.71′, 15.V–3.VI.2006, P. Tripotin, 1♀; Samcheok-si, Dogye-eup, Mugeon-ri, Moss waterfall, N37°15′32.6″ E129°06′34.8″, 17.IX.2019, S.-S. Euo, C.-O. Kim, 1♂; Samcheok-si, Geunsan-dong, Mt. Geunsan, N37°24′48″ E129°08′29″, 8.X.2012, S.-W. Suk, Y.-B. Lee, D.-H. Kim, 1♀; Wonju-si, Heungeop-myeon, Daean-ri, N37°16′24″ E127°53′11″, S.-S. Euo, C.-O. Kim, 1♀; Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Mirae Campus, N37°17′10″ E127°54′01″, 17.IX.2018, S.-S. Euo, 1♂, 1♀; Yeongwol-gun, Jungdong-myeon, Hwawon-ri, N37°09′40.1″ E128°38′11.2″, 29.IX.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♂; Yeongwol-gun, Kim Satgat-myeon, Nae-ri, N37°6′8″ E128°41′3″, 20.IX.2012, S.-W. Suk, H.-S. Lee, 1♀; Gyeongsangnam-do: Geochang-gun, Gajo-myeon, Mt. Ohdosan, N35°41′23″ E128°4′31″, 23.V.2014, 1♂; Hamyang-gun, Hyucheon-myeon, Songjeon-ri, Mt. Jirisan, Munsusa Temple (400 m), N35°24.739′ E127°43.818′, 6.IX–24.X.2004, P. Tripotin, 1♀; ditto, 12.IV–5.V.2005, P. Tripotin, 1♂. RUSSIA: Sakhalin, Korsakov, Chapayevo-2, N46°51′31.1″ E142°52′59.1″, 18.VII.2008, H.-Y. Han, H.-S. Lee, 1♀.

Distribution. Japan, Korea, Russian Far East, China.

Biology. In Korea, the flight period of this species extends from May to October with a peak in September. Male flies have often been observed hovering over slopes near streams in mountain valleys. On the other hand, females have often been observed on the flowers of Apiaceae spp. or flying low at the slopes where males were hovering.

Remarks. Both the examined Korean specimens and

one Russian specimen of *E. shibakawae* agree well with the syntypes in HUS. The new Korean name of this species refers to its blackish area on anterior part of frons.

Genus *Fagisyrphus* Dušek and Láska, 1967
좁은얼굴꽃등에속 (신칭)

7. *Fagisyrphus cinctus* (Fallén, 1817)
좁은얼굴꽃등에 (신칭) (Figs. 3A–F, 6A–C)

Scaeva cincta Fallén, 1817: 45 (type locality - Sweden, Scaniae, Skane; lectotype ♂, MNHNP).

Syrphus placidus Meigen, 1822: 322 (type locality - Germany; lectotype ♂, MNHNP).

Melangyna cincta: Vockeroth, 1969: 85 (in Syrphini generic revision); Nielsen, 1971: 65 (biology in Norway); Peck, 1988: 28 (in Palaearctic catalog); Rotheray and Gilbert, 1989: 59 (suppression of monotypic genus *Fagisyrphus*); Gilbert, 2005: 328 (biology); Huo and Ren, 2007: 324 (in Chinese *Melangyna* key); Huang and Cheng, 2012: 232 (redescription); Ôhara *et al*., 2014: 475 (in Japanese catalog); Huo in Yang *et al*., 2020: 166 (in Chinese catalog).

Meligramma cincta: Rojo *et al*., 2003: 109 (in world review of aphidophagous syrphids); Groot and Govedič, 2008: 74 (in Slovene checklist); Saribiyik, 2014: 576 (in Turkish checklist); Speight, 2014: 135 (in European checklist with biological data); Speight and Sarthou, 2017: 38 (in European identification key); Ricarte and Marcos-García, 2017: 416 (in Spanish and Andorran checklist).

Fagisyrphus cinctus: Dušek and Láska, 1967: 369 (type species of *Fagisyrphus*); Torp, 1984: 72 (in larval key for Danish species); Ssymank *et al*., 1999: 195 (in German checklist); Mengual *et al*., 2008: 3 (in Syrphinae molecular phylogenetic analysis); Láska *et al*., 2013: 200 (in European Syrphinae key); Haarto and Kerppola, 2014: 238 (in Finnish checklist); Mengual, 2015: 405 (in Syrphinae molecular phylogenetic analysis); Mengual *et al*., 2018: 160 (in Syrphinae molecular phylogenetic analysis); Krpač, 2021: 87 (in Sharr Mountains checklist with biological data).

Fagisyrphus cincta: Rotheray and Gilbert, 1989: 59 (treated as *Melangyna cincta*); Barkalov and Mutin, 2018: 496 (in Russian checklist).

Diagnosis. Genus *Fagisyrphus* is a monotypic taxon including *F. cinctus*. This species can be distinguished from other members of the tribe Syrphini by the following combination of characteristics [modified from Dušek and Láska (1967), and Vockeroth (1969)]: 1) face relatively narrow (Fig. 3D); 2) gena distinctly narrow, almost invisible in lateral view (Fig. 3C, F); 3) hind margin of wing with stripe of numerous tiny black dots (should be observed under microscope) (Fig. 3F-a); 4) abdomen more or less parallel-sided (Fig. 3A, E); 5) tergite 2 antero-medially with large inverted triangular black area widely connected to black transverse postero-marginal band (Fig. 3A, E); and 6) bands on tergites 3 and 4 uninterrupted and straight (Fig. 3A, E).

Description of Korean material. Male. Lengths and ratios: body length 8.1–10.0 mm; wing length 6.6–8.4 mm; head ratio 0.71–0.77; face ratio 0.33–0.35; eye ratio 0.56–0.61; gena-eye ratio 0.001–0.013; antenna-head ratio 0.31–0.34; postpedicel-pedicel ratio 2.10–2.90; arista-antenna ratio 1.08–1.35; wing ratio 3.28–3.52; wing-thorax ratio 2.38–2.61; vein M ratio 2.80–3.82; vein R_{4+5} ratio 3.56–4.26. Head holoptic with eye contiguity about as long as vertical triangle (Fig. 3A); compound eye dark brown with slight reddish to purplish tinge, bare (Fig. 3D); vertex black postero-marginally with slight brownish-yellow pruinosity, anteriorly with black hairs, posteriorly with brownish-yellow hairs (occasionally almost entirely with brownish-yellow hairs, but anteriorly mixed with a few black hairs) (Fig. 1A); frons yellow to brownish yellow with yellowish pruinosity, with black hairs except for antero-marginal bare area (Fig. 1A); lunule yellow to brownish yellow, bare (Fig. 1D); antenna largely yellow to pale brown except for brownish black arista (occasionally postpedicel with variably slight darkened dorsal area) (Fig. 3C, D); face almost entirely yellow ground color except for pair of small brownish-black lateral spots on lower facial margin, with yellowish-grey pruinosity (sometimes facial pruinosity with more brownish tinge), with yellowish hairs (occasionally sparsely mixed with some black hairs) (Fig. 3C, D); gena distinctly narrow, almost invisible in lateral view, largely brownish black except for partially yellowish posterior margin, with yellowish-grey pruinosity, with brownish-yellow to pale yellow hairs (Fig. 3C). Thorax largely blackish with yellowish-grey pruinosity, with wavy brownish yellow to pale yellow hairs (Fig. 3A); scutum with subshiny yellowish grey pruinosity; lateral margins of scutum matte yellow (Fig. 3A, C); scutellum largely brownish yellow except for brownish-black baso-ventral corners, with wavy brownish yellow hairs (sometimes posteriorly mixed with a few black hairs); pleura blackish, mostly with yellowish grey pruinosity (Fig. 3C); anterior anepisternum, anterior 2/5 of posterior anepisternum, dorsomedial anepimeron, posterior anepimeron, meron, anatergite, mediotergite and metasternum bare; katepisternum with separated upper and lower wavy yellowish hair patches; halter with stem yellow to pale brown, knob yellow. Legs with coxae brown to brownish black with pale brown hairs (Fig. 3C); trochanters basally brown to brownish black, apically yellow to brown, with pale brown hairs; fore and mid femora largely yellow with brownish base, largely with pale brown to brown-

ish-yellow hairs but apically mixed with some black hairs (fore femur usually covered only with pale brown to brownish yellow hairs); hind femur about basal 1/2−3/5 brownish black to dark brown except for narrowly brownish yellow basal margin with brownish yellow hairs, about apical 2/5−1/2 brownish yellow with shorter black hairs; fore and mid tibiae yellow with short pale brown hairs; hind tibia largely brownish yellow to pale brown but irregularly slightly darkened, largely with short black hairs but apico-ventrally with short pale brown hairs; fore and mid tarsi yellow with short pale brown to brownish-yellow hairs; hind tarsus dorsally brownish yellow to dark brown with short black hairs, ventrally brownish yellow with short pale brown hairs. Wing largely hyaline with slight pale brownish tinge (Fig. 3A), with stripe of numerous tiny black dots on the hind margin (should be observed under microscope) (Fig. 3F-a); veins pale brown to brownish black; pterostigma pale brown; cell sc before pterostigma yellowish; wing membrane largely covered with microtrichiae except for basal bare areas; upper and lower calypters pale yellow to brownish yellow with long brownish-yellow marginal hairs. Abdominal tergites unmargined, more or less parallel-sided, yellow to brownish-yellow ground color with black markings, with wavy brownish-yellow and black hairs (wave getting weaker towards apex) (Fig. 3A); tergite 1 largely subshiny black except for brownish-yellow antero-lateral margins; tergite 2 antero-medially with large inverted triangular black area widely connected to black transverse postero-marginal band; tergite 3 with black transverse postero-marginal band of about 1/3−2/5 length of tergite; tergite 4 with black transverse subposterior band of about 2/5 length of tergite; tergite 5 brownish yellow to pale brown, medially with variable sized triangular black spot of less than 2/5 of tergite width (occasionally spot too small to be observed); sternite 1 largely pale yellow except for medio-anterior and lateral brownish-black margins (occasionally black area large, covering anterior to lateral margins), with slightly wavy yellow to brownish-yellow hairs (Fig. 3B); sternites 2−4 pale yellow to pale brown, each with pair of narrow semicircular black spots on lateral margins, largely with brownish-yellow hairs but posteriorly variably mixed with shorter black hairs, sternites 5−7 brownish yellow to dark brown with black hairs (sometimes mixed with a few brownish-yellow hairs); sternite 8 brownish yellow to dark brown with large rounded blackish spot of covering most of sternite, almost entirely with black hairs but marginally with some brownish-yellow hairs. Male genitalia (Fig. 6A−C) with epandrium about 1.5× as long as height in lateral view (Fig. 6B); surstylus slightly longer than width in caudal view (middle width about 2/5 of length when oriented to show broadest area) (Fig. 6A), baso-lateral part swelling outwardly (Fig. 6A-a, B-a), basally with long brownish-yellow hairs, apically with short hairs (Fig. 6B); hypandrium with almost straight lingula (Fig. 6B); lateral protuberance of hypandrium as long as lingula with widely rounded apex; dorsal side of distiphallus flat and widened (Fig. 6A, C); basal 3/4 of distiphallus parallel-sided in lateral view (Fig. 6C) with extended baso-dorsal process (6C-b), apical 1/4 significantly widened (Fig. 6C-c); basiphallus with 2 pairs of distinctly small ventral processes (Fig. 6C); baso-ventral processes shorter than apico-ventral processes. Female. Similar to male except for the following characteristics. Lengths and ratios: body length 6.6−9.4 mm; wing length 5.7−7.9 mm; head ratio 0.71−0.75; face ratio 0.28−0.34; eye ratio 0.54−0.61; gena-eye ratio 0.001−0.017; antenna-head ratio 0.38−0.42; postpedicel-pedicel ratio 2.07−2.46; arista-antenna ratio 1.11−1.20; wing ratio 3.15−3.47; wing-thorax ratio 2.45−2.74; vein M ratio 2.90−3.36; vein R_{4+5} ratio 3.41−3.72. Head dichoptic with vertex about 0.16× as wide as head in dorsal view (Fig. 3E); frons largely black except for anterior U-shaped brownish-yellow to yellow area (Fig. 3E); lateral margins of frons heavily with yellowish pruinosity, each of about 1/2 of shortest width of frons, except for median and posterior 3/5 areas; frons anteriorly with brownish-yellow hairs, posteriorly with black hairs. Wing membrane with larger basal bare areas than that of male. Abdominal tergites: antero-medial black area on tergite 2 distinctly narrowly connected to black transverse postero-marginal band (sometimes separated) (Fig. 3A vs. E); black bands on tergites 3 and 4 slightly larger than that of male (Fig. 3A vs. E); triangular black spot on tergite 5 larger than that of male (about 1/2 of tergite width) (Fig. 3A vs. E); sternite 5 with pair of narrow semicircular black spots on lateral margins (sometimes spots too faint to be observed).

Material examined. KOREA: Chungcheongbuk-do: Yeongdong-gun, Yonghwa-myeon, Jodong-ri, Mt. Gakhosan, N36°04′08.6″ E127°50′07.1″, 25.VII.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♀; Geumsan-gun, Nami-myeon, Bohyeonsa Temple, N36°03.494′ E127°27.225′, 14.V−1.VI.2005, P. Tripotin, 1♂; Gangwon-do: Hoengseong-gun, Anheung-myeon, Mt. Chiaksan, from Gangrim4-ri to Cheonjibong (1,086 m), N37°23′51″ E128°05′23″, 17.VII.2018, 1♂, 1♀; Hongcheon-gun, Nae-myeon, Gwangwon-ri, Woldoon-gol, N37°50′52″ E128°25′24″, 26.VII.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 2♂; Samcheok-si, Geunsan-dong, Mt. Geunsan, N37°24′48″ E129°08′29″, 13.V.2020, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♀; Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Mirae Campus, N37°17′10″ E127°54′01″, 27.IV.2005, D.-S. Choi *et al*., 1♂; ditto, 26.V.2005, S.-W. Suk, S.-M.-R. Hwang, 1♂; ditto, 30.IV.2006, D.-J. Cha, 1♂; ditto, 3.V.2009, Y.-B. Lee, 1♀ (NIBR); ditto, 5.V.2015, S.-H. Jeong, 1♂; ditto, 17.V.2017, C.-O. Kim,

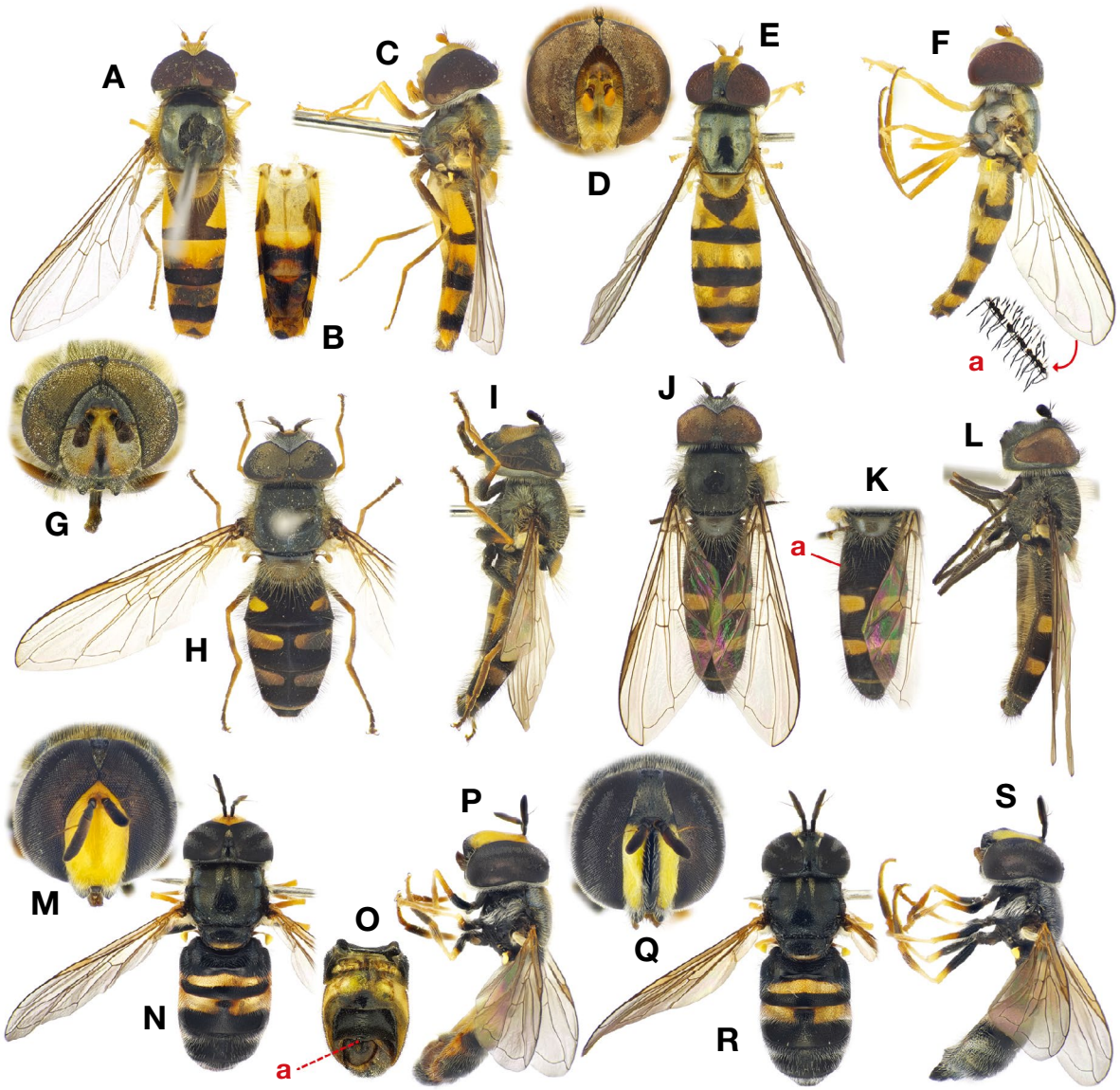


Fig. 3. A–F. *Fagisyrphus cinctus* (Fallén, 1817): (A, C) male body, dorsal and lateral view; (B) male abdomen, ventral view; (D) male head, frontal view; (E, F) female body, dorsal and lateral view (F-a: hind margin of wing, about 100× of original figure). G–I. *Melangyna olsufjevi* (Violovitsh, 1956): (G) male head, frontal view; (H, I) male body, dorsal and lateral view. J–L. *Melangyna pavlovskyi* (Violovitsh, 1956): (J, L) male body, dorsal and lateral view; (K) male abdomen, dorsal view. M–S. *Paragus clausseni* Mutin, 1999: (M) male head, frontal view; (N, P) male body, dorsal and lateral view; (O) male abdomen, ventral view; (Q) female head, frontal view; (R, S) female body, dorsal and lateral view. Voucher specimen codes: A–C - FagCin_M2; D - FagCin_M1; E, F - FagCin_F1; G - MlnOls_M2; H, I - MlnOls_M1; J–L - MlnPav_M1; M, N, P - PagCla_M1; O - PagCla_M2; Q–S - PagCla_F1.

1♀; Yeongwol-gun, Yeongwol-eup, Heungwol-ri, Mt. Taehwasan, N37°07′03.3″ E128°29′07.4″, 2.VII.2020, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♀; Gyeonggi-do: Gwacheon-si, Makgye-dong, Mt. Cheonggyesan, N37°24′51″ E127°02′29″, 13.V.2021, S.-S. Euo, C.-O. Kim, 1♀; Gwangju-si, Docheok-myeon, Sangnim-ri, Mt. Taehwasan, N37°18′44″ E127°18′36″, 14.IX.2012, H.-Y. Han *et al*., 1♂; Gyeongsangbuk-do: Gunwi-gun, Bugye-myeon, Mt. Palgongsan, from Hanti Reststop to Pagyebong, N36°0′60″ E128°39′25″, 27.VI.2014, Y.-B. Lee, S.-S. Euo, S.-H. Jeong, 1♂.

Distribution. Widespread in Europe including European part of Russia, Russian Far East, China, Korea, Japan.

Biology. To date, the following six aphid and one aleyrodid species are recognized as its prey: Aphidae: *Drepanosiphum platanoidis* (Schrank, 1801), *Eriosoma gillettei* (Maxson and Hottes, 1926), *Mindarus abietinus* Koch, 1857, *Myzus persicae* (Sulzer, 1776), *Phyllaphis fagi* (Lin-

naeus, 1761), and *Tuberculatus annulatus* (Hartig, 1841). Aleyrodidae: *Aleyrodes proletella* (Linnaeus, 1758) (Rojo *et al*., 2003). There is also a record as unidentified aphid species on *Tilia* plant in UK (Rotheray and Gilbert, 1989). This species is known to prefer *Fagus* L. and *Quercus* L. forests and visit flowers of the following 11 plant species: *Acer pseudoplatanus* L., *Crataegus* spp., *Ligustrum* spp., *Malus sylvestris* Mill., *Prunus spinosa* L., *Rubus idaeus* L., *Salix* spp., *Sambucus nigra*, *Sorbus aucuparia* L., *Urtica dioica* L., and *Viburnum opulus* L. (Speight, 2014).

Remarks. The monotypic genus *Fagisyrphus* Dušek and Láska, 1967, was established based on the type species, *Scaeva cincta* Fallén, 1817. Since then, this species has been treated as such, in *Melangyna* Verrall, 1901 (e.g., Rotheray and Gilbert, 1989), or in *Meligramma* Frey, 1946 (e.g., Speight and Sarthou, 2017). According to recent molecular studies (Mengual *et al*., 2008; Mengual, 2015), *F. cinctus* appears to be the sister group of the genus *Meligramma*. On the other hand, *Melangyna* species show a rather distant genetic relationship to *Fagisyrphus*. Furthermore, our unpublished DNA barcode analysis of all known *Fagisyrphus* and *Meligramma* species, as well as *Melangyna* and other related genera, also shows similar results (in preparation; not included in the present study). Therefore, we believe that the genus *Fagisyrphus* should be regarded as the sister group of *Meligramma*.

Currently, this species shows an interesting disjunct distribution between Europe and East Asia. We are not sure if this simply is a result of insufficient sampling or due to their natural distributional pattern. Furthermore, there is a possibility that the European and Asian populations represent different species. The examined Korean specimens agree fairly well with the original description (Fallén, 1817) and redescriptions (Dušek and Láska, 1967; Huang and Cheng, 2012), but they show some morphological and genetic differences. The examined Korean specimens have narrower abdominal black markings than holotype in MNHNP. In addition, our unpublished DNA barcode distances between Korean and European samples are 0.0152–0.0183 (in preparation). Nevertheless, we do not know whether such differences represent intra- or interspecific distinction. An additional study based on sampling of more widely distributed localities is needed to determine their species status. The Korean name of this species refers to its narrow face.

Genus *Melangyna* Verrall, 1901
매끈꽃등에속 (신칭)

8. *Melangyna olsufjevi* (Violovitsh, 1956)
작은두점매끈꽃등에 (신칭) (Figs. 3G–I, 6D–F)

Syrphus olsufjevi Violovitsh, 1956: 742 (type locality - Russia, south Sakhalin; holotype ♂, ZISP).
Syrphus (*Melangyna*) *olsufjevi*: Violovitsh, 1976: 328 (in Siberian catalog); Violovitsh, 1983: 40 (in Siberian key).
Melangyna olsufjevi: Hippa, 1968: 18 (n. comb. from *Syrphus*, redescription); Nielsen, 1971: 66 (redescription); Peck, 1988: 28 (in Palaearctic catalog); Mutin and Barkalov, 1997: 190 (in review of Sakhalin and Kuril Islands syrphids); Mutin and Barkalov, 1999: 390 (in Russian Far East key); Ôhara *et al*., 2014: 474 (in Japanese catalog); Mutin *et al*., 2016: 21 (in list of Tumnin River area, Russia); Barkalov and Mutin, 2018: 497 (in Russian checklist); Barkalov and Tridrikh, 2021: 310 (in checklist of Magadanskaya, Russia).
Melangyna lasiophthalma [misidentification]: Han and Choi, 2001: 48 (in Korean checklist); Choi *et al*., 2018: 77 (in Korean checklist).

Diagnosis. *Melangyna olsufjevi* can be distinguished from East Asian congeners by the following combination of characteristics [modified from Mutin and Barkalov (1999)]: 1) compound eye densely covered with relatively long brownish-yellow hairs (Fig. 3G); 2) face brownish yellow with brownish-black vertical facial stripe (Fig. 3G); 3) tibiae almost entirely brownish yellow (Fig. 3I); and 4) tergite 2 laterally with pair of small transversely ovate brownish yellow spots, each of less than 1/4 of tergite width (Fig. 3H).

Description of Korean material. Male. Lengths and ratios: body length 9.9–10.4 mm; wing length 9.1–9.6 mm; head ratio 0.71–0.73; face ratio 0.51–0.57; eye ratio 0.57–0.59; gena-eye ratio 0.15–0.18; antenna-head ratio 0.38–0.44; postpedicel-pedicel ratio 2.38–2.93; arista-antenna ratio 0.91–1.13; wing ratio 3.42–3.48; wing-thorax ratio 2.50–2.85; vein M ratio 3.14–3.79; vein R_{4+5} ratio 3.94–4.64. Head holoptic with eye contiguity about 0.75× as long as vertical triangle (Fig. 3H); compound eye dark brown with slight purplish tinge, densely covered with brownish-yellow hairs (Fig. 3G); vertex black, postero-marginally with yellowish-white pruinosity, largely with slightly wavy black hairs but postero-marginally with brownish-yellow hairs; frons black with grey pruinosity, with black hairs (some long hairs slightly wavy) (Fig. 3G, H); lunule dorsally brownish black to black, ventrally brownish yellow, bare (Fig. 3G); antenna largely brownish black; face largely brownish-yellow ground color with grey pruinosity, largely with black hairs but lower part mixed with some yellow hairs, and with brownish-black vertical facial stripe from lower facial margin up to almost adjacent to the antennal sockets, about 0.3× as wide as facial width (upwardly slightly narrowed) (Fig. 3G); facial knob rounded, almost bare; gena brownish black with grey pruinosity, anteriorly with black hairs, posteriorly with pale yellow hairs (Fig. 3G, I). Thorax largely black-

ish with yellowish-grey to grey pruinosity, with wavy brownish-yellow to pale yellow hairs (Fig. 3H); lateral margins of scutum slightly matte yellowish grey; scutellum largely brownish yellow to brown except for brownish black anterior to lateral margins (having relatively wide brownish black baso-ventral corners), largely with wavy brownish yellow to pale yellow hairs but postero-marginally mixed with a few black hairs (Fig. 3H, I); pleura blackish, mostly with yellowish grey to grey pruinosity (Fig. 3I), anterior anepisternum, anterior 1/4–1/3 of posterior anepisternum, dorsomedial anepimeron, posterior anepimeron, meron, anatergite, mediotergite and metasternum bare; katepisternum with upper and lower wavy pale yellow hair patches, narrowly connected on posterior margin; halter brownish yellow to brown. Legs with coxae and trochanters brownish black with variably mixed black and brownish-yellow hairs (Fig. 3I); fore and mid femora basally brownish black, apically brownish yellow, largely with brownish-yellow hairs but posteriorly mixed with black hairs; hind femur largely brownish black except for brownish yellow apex, largely with brownish-yellow hairs but apically with short black hairs; fore and mid tibiae almost entirely brownish yellow but subapically slightly darkened, with short brownish-yellow hairs (sometimes apically mixed with a few black hairs); hind tibia largely brownish yellow but subapically slightly darkened, largely with short black hairs but postero-ventrally with short brownish-yellow hairs; tarsi basally brownish yellow, apically dark brown, dorsally with short black hairs, ventrally with short brownish-yellow hairs. Wing largely hyaline with slight pale brownish tinge (Fig. 3H); veins pale brown to brownish black; pterostigma pale brown; cell sc before pterostigma yellowish; wing membrane entirely microtrichose (sometimes with narrow bare area on baso-anterior margin of cell br); upper and lower calypters pale yellow to brownish yellow with long brownish-yellow marginal hairs. Abdominal tergites unmargined, black ground color with brownish-yellow markings, and with wavy brownish-yellow and black hairs (wave getting weaker towards apex) (Fig. 3H); tergite 1 subshiny black; tergite 2 laterally with pair of small transversely ovate brownish-yellow spots, each of less than 1/4 of tergite width, spots separated from lateral margins; tergites 3 and 4 each antero-laterally with pair of brownish-yellow transverse stripes, each of about 2/5–3/7 width and 1/3–2/5 length of tergite, stripes separated from lateral margins; tergites 3 and 4 also with very narrow brownish-yellow posterior margins; tergite 5 largely black except for narrow brownish-yellow lateral and posterior margins; sternite 1 largely brownish black except for brownish-yellow posterior margin, with wavy pale yellow hairs; sternites 2–4 largely brownish black subanteriorly with pair of brownish-yellow to pale yellow spots, posterior margin brownish yellow, with pale yellow to brownish-yellow hairs (sometimes posteriorly mixed with some black hairs); sternites 5–8 brownish black with black hairs. Male genitalia (Fig. 6D–F) with epandrium about 1.5× as long as height, anteriorly distinctly shortened of about 1/3 of posterior height in lateral view (Fig. 6E); surstylus relatively long and narrow in caudal view (middle width about 1/3 of length when oriented to show broadest area) (Fig. 6D), slightly curved anteriorly with rounded apex in lateral view, basally with long brownish-yellow hairs, apically with short hairs (Fig. 6E); hypandrium with apically slightly down-curved lingula (Fig. 6E); lateral protuberance of hypandrium as long as lingula with rounded apex; area between lateral protuberance and lingula slightly wavy (Fig. 6E-a); distiphallus relatively narrow and short, about 1/4 as long as aedeagal complex, about basal 2/3 almost parallel-sided, apical 1/3 ventrally widened in lateral view (Fig. 6F); distiphallus apico-marginally with short spiny hairs; antero-dorsal corner of basiphallus sharply bent at 90° in lateral view (Fig. 6F); basiphallus only with single pair of pointed apico-ventral processes; apico-ventral processes distinctly close to each other, basally widened outwardly in caudal view. Female. Unavailable, but according to Mutin and Barkalov (1999), female seems to resemble male, only except for the dichoptic head.

Material examined. KOREA: Gangwon-do: Hoengseong-gun, Anheung-myeon, Mt. Chiaksan, from Gangrim4-ri to Cheonjibong (1,086 m), N37°23′51″ E128°05′23″, 28.IV.2000, D.-S. Choi, S.-K. Kim, 5♂ (1♂ in NIBR); Hoengseong-gun, Dunnae-myeon, Sapgyo-ri, Mt. Cheongtaesan, N37°30′40″ E128°18′01″, 3.V.2003, H.-W. Byun, J.-S. Soh, 1♂; Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Mirae Campus, N37°17′10″ E127°54′01″, 24.III.2001, C.-H. Park, O.-Y. Lim, 1♂; ditto, 13.III.2002, H.-S. Lee, 1♂; ditto, 27.III.2002, H.-S. Lee, 1♂; 20.III.2003, D.-S. Choi, H.-S. Lee, 1♂; ditto, 15.IV.2006, D.-S. Choi, H.-W. Byun, 1♂; Jeollabuk-do: Jeonju-si, Jungin-dong, Mt. Moaksan, 5.IV.2009, H.-S. Lee *et al*., 1♂.

Distribution. Russian Far East including Sakhalin, Japan, Korea.

Biology. Female is known to visit *Salix bebbiana* Sarg. flowers in Russia (Mutin *et al*., 2016).

Remarks. The examined Korean males of *M. olsufjevi* agree well with the original description (Violovitsh, 1956) and redescriptions (Hippa, 1968; Nielsen, 1971). Female is currently not available in Korea. The new Korean name of this species translates as "*Melangyna* fly with two small spots" referring to its two small spots on tergite 2.

9. *Melangyna pavlovskyi* (Violovitsh, 1956)
네점박이매끈꽃등에 (신칭) (Figs. 3J–L, 6G–I)

Syrphus pavlovskyi Violovitsh, 1956: 741 (type locality - Russia, south Sakhalin; holotype ♂, ZISP); Violovitsh, 1983: 40 (in Siberian key).

Melangyna pavlovskyi: Hippa, 1968: 21 (n. comb. from *Syrphus*, redescription); Vockeroth, 1969: 84 (in Syrphini generic revision); Peck, 1988: 28 (in Palaearctic catalog); Mutin and Barkalov, 1997: 190 (in review of Sakhalin and Kuril Islands syrphids); Byebjerg, 2011: 144 (redescription and biology of European *Melangyna*); Ôhara *et al*., 2014: 474 (in Japanese catalog); Smit and Bree, 2014: 29 (Netherlands record); Speight, 2014: 130 (in European checklist with biological data); Mutin *et al*., 2016: 21 (in list of Tumnin river area, Russia); Barkalov and Mutin, 2018: 497 (in Russian checklist); Langlois and Speight, 2020: 165 (biology of French population).

Diagnosis. *Melangyna pavlovskyi* can be distinguished from the East Asian congeners by the following combination of characteristics [modified from Mutin and Barkalov (1999)]: 1) compound eye densely covered with relatively long yellowish hairs (Fig. 3J); 2) face entirely black in males (Fig. 3L) and largely yellowish in females; 3) abdominal tergites only with 2 pairs of brownish-yellow transverse stripes on tergites 3 and 4 in males (Fig. 3K); 4) surstylus narrow and long, distinctly curved anteriorly in lateral view (Fig. 6H); 5) distiphallus relatively narrow and short, about 1/4 as long as aedeagal complex, almost parallel-sided but apico-marginally distinctly widened of about 3× of basal width in lateral view (Fig. 6I); and 6) anterior half of aedeagal apodem ventrally straight (Fig. 6I-b).

Description of Korean material. Male. Lengths and ratios: body length 7.7–8.6 mm; wing length 7.1–7.8 mm; head ratio 0.65–0.70; face ratio 0.52–0.53; eye ratio 0.56–0.63; gena-eye ratio 0.17–0.18; antenna-head ratio 0.44–0.46; postpedicel-pedicel ratio 2.91–3.20; arista-antenna ratio 0.94–1.04; wing ratio 3.03–3.08; wing-thorax ratio 2.72–2.84; vein M ratio 3.93–4.57; vein R_{4+5} ratio 3.93–4.45. Head holoptic with eye contiguity about 0.6× as long as vertical triangle (Fig. 3J); compound eye dark brown with slight purplish to reddish tinge, densely covered with relatively long yellowish hairs (Fig. 3J); vertex black, anteriorly with slightly wavy black hairs, posteriorly with yellowish-white hairs; frons black with white to grey pruinosity, with black hairs; lunule largely brownish black to black except for dark brown medial and lateral margins, bare; antenna brownish black to black (Fig. 3L); face black with whitish pruinosity, with black hairs; facial knob rounded, almost bare; gena black with whitish pruinosity, with pale yellow and black hairs. Thorax largely blackish with yellowish-grey to whitish pruinosity, largely with wavy pale yellow hairs (Fig. 3K); lateral margins of scutum slightly matte grey, mixed with some black hairs (Fig. 3J, L); scutellum brownish yellow to dark brown except for brownish-black marginal areas (having distinctly wide brownish black baso-ventral corners), largely with wavy pale yellow to yellow hairs but postero-marginally mixed with a few black hairs (Fig. 3K, L); pleura blackish, mostly with yellowish-grey to whitish pruinosity (Fig. 3L); anterior anepisternum, anterior 1/3 of posterior anepisternum, dorsomedial anepimeron, posterior anepimeron, meron, anatergite, mediotergite and metasternum bare; katepisternum with upper and lower wavy pale yellow hair patches, narrowly connected on posterior margin; halter pale brown to brown. Legs with coxae and trochanters brownish black with pale yellow hairs (sometimes mixed with some black hairs) (Fig. 3L); femora almost entirely dark brown to brownish black except for brown apex, largely with wavy pale yellow to yellow hairs but mixed with some black hairs on posterior side of fore and mid femora and anterior side of hind femur; fore and mid tibiae dark brown to brownish black with short yellow hairs; hind tibia dark brown to brownish black, largely with short black hairs but postero-ventrally with short yellow hairs; tarsi dark brown to brownish black, dorsally with short black hairs, ventrally with short yellow hairs. Wing largely hyaline with slight pale brownish tinge (Fig. 3J); veins pale brown to brownish black; pterostigma brown; cell sc before pterostigma yellowish; wing membrane entirely microtrichose; upper and lower calypters pale yellow to brownish yellow with long brownish-yellow marginal hairs. Abdominal tergites unmargined, black ground color with partially greyish pruinose brownish yellow markings, with wavy pale yellow and black hairs (wave getting weaker towards apex) (Fig. 3K); tergite 1 subshiny black; tergite 2 latero-marginally with pair of brownish grey pruinose areas (Fig. 3K-a); tergites 3 and 4 each antero-laterally with pair of brownish yellow transverse stripes, each of about 1/3 width and 1/3 length of tergite, stripes separated from lateral margins; posterior margin of tergite 4 narrowly brownish yellow; tergite 5 entirely black; sternites 1–4 largely brownish black except for yellowish posterior margin, largely with wavy pale yellow hairs but posteriorly mixed with a few black hairs (sternite 1 only with pale yellow hairs); sterntites 5–8 brownish black with black hairs. Male genitalia (Fig. 6G–I) with epandrium slightly longer than height, anteriorly distinctly shortened of about 1/4 of posterior height in lateral view (Fig. 6H); surstylus relatively long and narrow in caudal view (middle width about 1/4 of length when oriented to show broadest area) (Fig. 6G), distinctly curved anteriorly with rounded apex in lateral view, basally with long brownish-yellow hairs,

apically with short hairs (Fig. 6H); hypandrium with apically slightly down-curved lingula (Fig. 6H); lateral protuberance of hypandrium slightly shorter than lingula with rounded apex; area between lateral protuberance and lingula slightly wavy (Fig. 6H-a); distiphallus relatively narrow and short, about 1/4 as long as aedeagal complex, almost parallel-sided but apico-marginally distinctly widened of about 3× of basal width in lateral view (Fig. 6I); antero-dorsal corner of basiphallus obtusely bent at slightly more than 90° in lateral view (Fig. 6I); basiphallus only with single pair of pointed antero-ventral processes; antero-ventral processes distinctly close to each other, basally widened outwardly in caudal view; anterior half of aedeagal apodem ventrally straight (Fig. 6I-b). Female. Unavailable, but according to Mutin and Barkalov (1999), Bygebjerg (2011), and Smit and Bree (2014), female is similar to male except for the following characteristics: Body length 7–10 mm. Head dichoptic; frons largely black with pair of narrow pruinose transverse stripes often connected on the middle forming an oblique band, with black hairs; face yellowish except for widely black lower facial margin, with black and white hairs; black vertical facial stripe from lower facial margin up to almost adjacent to the antennal sockets, about 0.33× as wide as facial width. Abdominal tergites: tergite 2 laterally with pair of very small yellow spots separated from lateral margins; yellow transverse stripes on tergites 3 and 4 narrower than that of male, stripes about 1/5 length of tergite.

Material examined. KOREA: Gangwon-do: Hongcheon-gun, Nae-myeon, Mt. Gachilbong from Sambongyaksu to 1,240 m peak, N37°52′04″ E128°27′43″, 25.IV.2011, S.-W. Suk *et al*., 2♂; Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Mirae Campus, N37°17′10″ E127°54′01″, 23.III.2005, S.-M.-R. Hwang, 1♂; ditto, 28.III.2005, D.-S. Choi, S.-M.-R. Hwang, 2♂; ditto, 19.III.2011, H.-S. Lee, 1♂; ditto, 21.III.2012, H.-S. Lee, 1♂; ditto, 28.III.2012, H.-S. Lee, 1♂; ditto, 27.III.2015, S.-S. Euo, S.-H. Jeong, 1♂.

Distribution. Russian Far East including Sakhalin, Korea, Japan, widespread in Europe.

Biology. *Melangyna pavlovskyi* is known to visit *Salix bebbiana* and *Prunus* spp. flowers in Russia and Denmark (Bygebjerg, 2011; Mutin *et al*., 2016). They were also caught on sugar baits in Denmark (Bygebjerg, 2011). This species has been observed in grasslands within 300 m in following four forest habitats in France: *Quercus pubescens* Willd., *Fagus* spp., *Pinus sylvestris* L., and *Picea* spp. trees (Langlois and Speight, 2020). And, according to Speight (2014), it also prefers humid *Betula* forest.

Remarks. The examined Korean specimens of *M. pavlovskyi* agree well with original description (Violovitsh, 1956). This East Asian species has been only recently discovered in Europe, and, therefore, is suspected to an introduced species (Smit and Bree, 2014; Langlois and Speight, 2020). The new Korean name of this species refers to its four yellowish markings on its abdominal tergites 3 and 4.

Genus *Paragus* Latreille, 1804
고려꽃등에속

10. *Paragus clausseni* Mutin, 1999
클라우슨고려꽃등에 (신칭) (Figs. 3M–S, 6J–L)

Paragus clausseni Mutin and Barkalov, 1999: 374 (type locality - Russia, southern Primorsky Territory, Blagodatnoye; holotype ♂, IBSS); Sorokina and Cheng, 2007: 12 (in Chinese *Paragus* Key); Vujić *et al*., 2008: 535 (in world revision of *Paragus*); Sorokina, 2009: 357 (key to species in Russia and adjacent countries); Ôhara *et al*., 2014: 487 (in Japanese catalog); Ichige, 2015: 39 (in Japanese *Paragus* review); Barkalov and Mutin, 2018: 489 (in Russian checklist); Huo in Yang *et al*., 2020: 127 (in Chinese catalog).

Paragus quadrifasciatus [misidentification]: Han and Choi, 2001: 104 (in Korean checklist); Choi *et al*., 2018: 47 (in Korean checklist).

Diagnosis. *Paragus clausseni* can be distinguished from Korean congeners by the following combination of characteristics [modified from Mutin and Barkalov (1999), and Sorokina (2009)]: 1) compound eye with 2 pairs of vertical whitish hairs stripes (Fig. 3M, Q); 2) lower facial margin black (Fig. 3P, S); 3) medial scutal area with pair of pale yellow to yellowish-white pruinose stripes interrupted at anterior 2/5 (Fig. 3N, R); 4) femora basally black, apically brownish yellow (Fig. 3P, S); and 5) posterior margin of sternite 4 medially with distinct but short and wide projection (Fig. 3O-a).

Description of Korean material. Male. Lengths and ratios: body length 4.9–6.1 mm; wing length 4.1–5.0 mm; head ratio 0.60–0.67; face ratio 0.34–0.37; eye ratio 0.48–0.53; gena-eye ratio (genal height extremely narrow - not measured); antenna-head ratio 0.83–0.86; postpedicel-pedicel ratio 3.14–3.33; arista-antenna ratio 0.46–0.53; wing ratio 2.76–3.04; wing-thorax ratio 2.50–2.70; vein M ratio 1.88–1.94; vein R_{4+5} ratio 2.70–3.14. Head holoptic with distinctly short eye contiguity about 0.1× as long as vertical triangle (Fig. 3M, N); compound eye dark brown with slight purplish tinge, largely with relatively short dark brown hairs, with 2 pairs of vertical whitish hairs stripes (Fig. 3M); vertex black, antero-marginally with yellowish pruinosity, anteriorly with black hairs, posteriorly with brownish-yellow hairs (sometimes largely with black hairs but postero-marginally with brownish-yellow hairs); frons yellow to brownish yellow, largely with yellow hairs but anteriorly mixed with some black hairs (Fig.

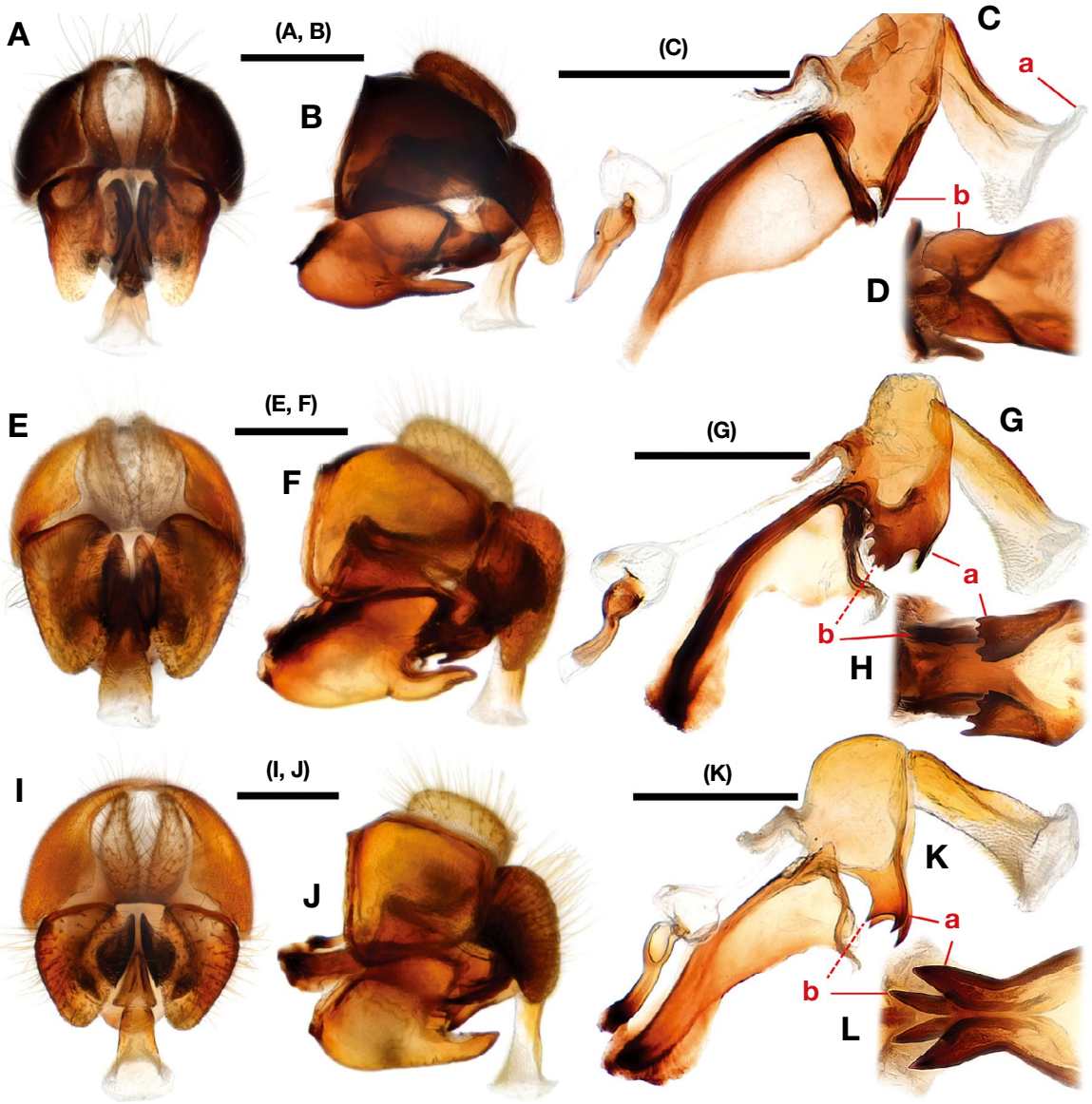


Fig. 4. Male genitalia. A–D. *Epistrophe aeka* Kimura, 1989: (A) caudal view; (B) lateral view; (C) aedeagus, lateral view; (D) basiphallic ventral processes, ventral view. E–H. *Epistrophe aino* (Matsumura, 1917): (E) caudal view; (F) lateral view; (G) aedeagus, lateral view; (H) basiphallic ventral processes, ventral view. I–L. *Epistrophe annulitarsis* (Stackelberg, 1918): (I) caudal view; (J) lateral view; (K) aedeagus, lateral view; (L) basiphallic ventral processes, ventral view. Scale bars: 0.3 mm. Voucher specimen codes: A–D - EpiAek_F1; E–H - EpiAin_M5; I–L - EpiAnn_M3.

3N); lunule yellow to brownish yellow, bare (Fig. 3M); antenna largely dark brown to brownish black except for variably brown baso-ventral area of postpedicel and brown arista (Fig. 3M); face largely yellow except for black lower facial margin, with pale yellow to yellow hairs (Fig. 3M, P); gena narrow, slightly seen in lateral view, black with yellow and greyish hairs (Fig. 3P). Thorax largely blackish, partially with greyish pruinosity, with brownish-yellow to pale yellow hairs (Fig. 3N); medial scutal area with pair of pale yellow to yellowish-white pruinose stripes interrupted at anterior 2/5; lateral margins of scutum matte grey (sometimes with slight bluish tinge); scutellum largely black except for brownish-yellow to pale brown medio-posterior margin; pleura blackish, partially with greyish pruinosity (Fig. 3P); anterior anepisternum, anterior 1/4–1/3 of posterior anepisternum, dorsomedial anepimeron, posterior anepimeron, meron, anatergite, mediotergite and metasternum bare; katepisternum with separated upper and lower pale yellow hair patches; halter with stem brown to yellow, knob yellow. Legs with caxae black with pale yellow hairs (Fig. 3P); trochanters black to brownish black

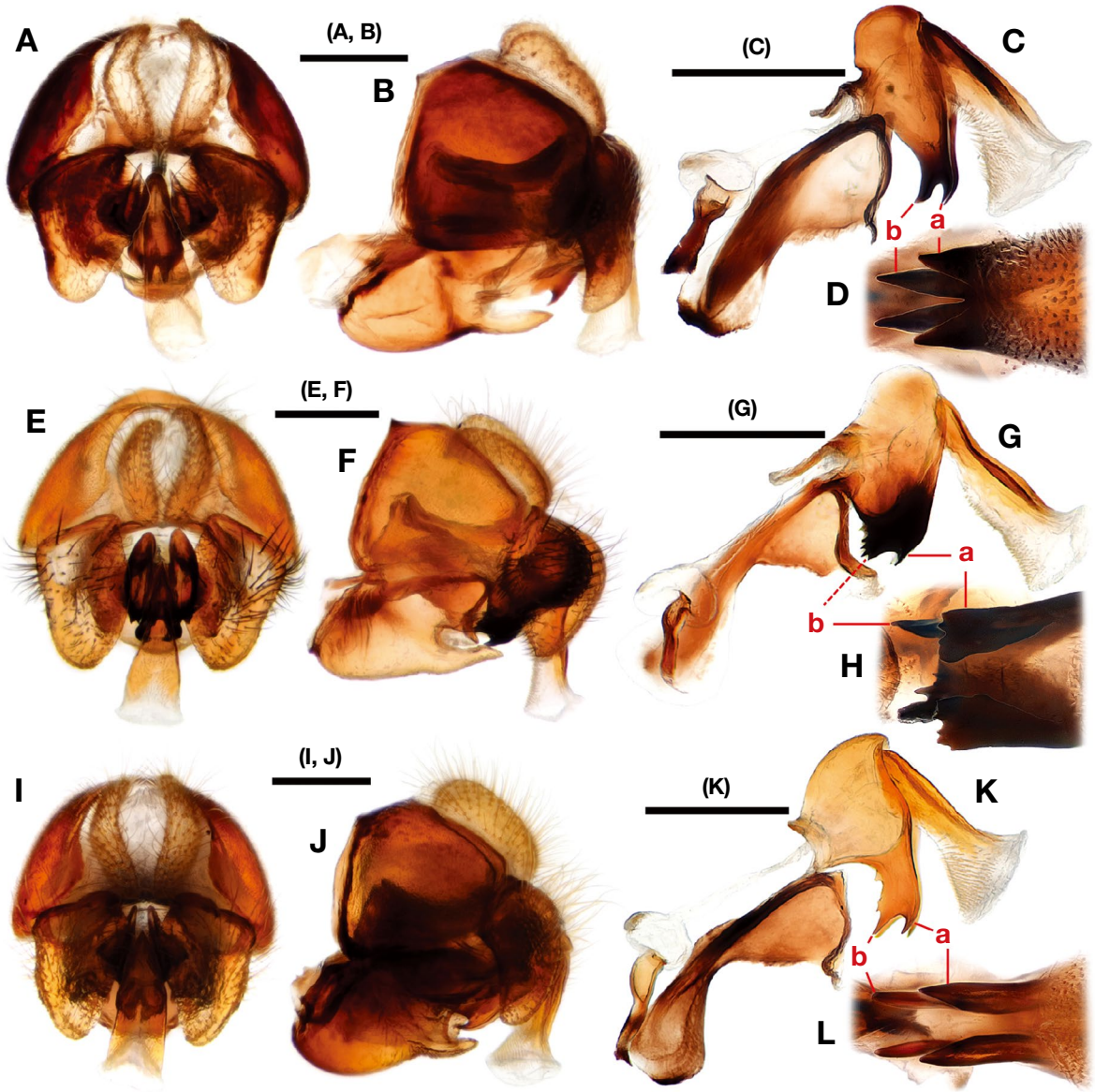


Fig. 5. Male genitalia. A–D. *Epistrophe griseofasciata* (Matsumura, 1918): (A) caudal view; (B) lateral view; (C) aedeagus, lateral view; (D) basiphallic ventral processes, ventral view. E–H. *Epistrophe sasayamana* (Matsumura, 1918): (E) caudal view; (F) lateral view; (G) aedeagus, lateral view; (H) basiphallic ventral processes, ventral view. I–L. *Epistrophe shibakawae* (Matsumura, 1917): (I) caudal view; (J) lateral view; (K) aedeagus, lateral view; (L) basiphallic ventral processes, ventral view. Scale bars: 0.3 mm. Voucher specimen codes: A–D - EpiGri_M8; E–H - EpiSas_M5; I–L - EpiShi_M4.

with pale yellow to yellow hairs; femora basally black, apically pale brown to yellow, with yellow hairs; tibiae basally pale yellow to yellow, apically pale brown (hind tibia subapically brownish black), with yellow hairs; tarsi largely brownish yellow to brown except for brownish black first segment of fore and mid tarsi, with yellow to brownish-yellow hairs. Wing largely hyaline with slight pale brownish tinge (Fig. 3N); veins pale brown to brownish black; pterostigma pale brown; cell sc before pterostigma yellowish; wing membrane largely covered with microtrichiae except for basal bare areas; upper and lower calypters pale yellow with yellow to brownish yellow marginal hairs. Abdominal tergites unmargined, black ground color with pale yellow to pale brown markings (sometimes apically variably brownish so that abdominal markings may not be well distinguished), with yellow and black hairs (Fig. 3N); tergite 1 black with yellow hairs; tergite 2 with pale yellow to yellow transverse subanterior band reaching lateral margins (sometimes separated from lateral margins); tergite 3 antero-marginally with pair of pale yellow to pale brown transverse stripes reaching lateral margins (sometimes

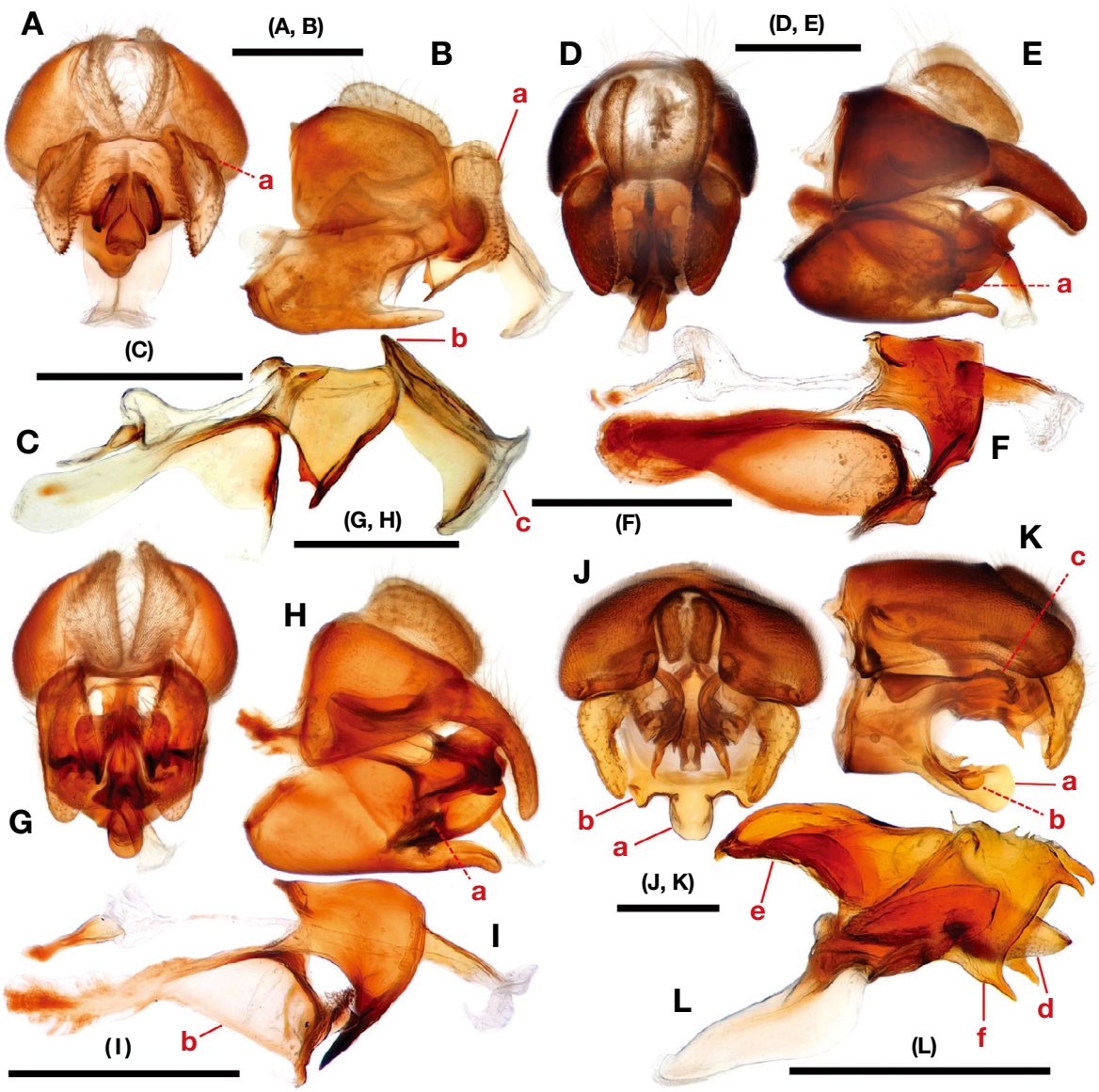


Fig. 6. Male genitalia. A–C. *Fagisyrphus cinctus* (Fallén, 1817): (A) caudal view; (B) lateral view; (C) aedeagus, lateral view. D–F. *Melangyna olsufjevi* (Violovitsh, 1956): (D) caudal view; (E) lateral view; (F) aedeagus, lateral view. G–I. *Melangyna pavlovskyi* (Violovitsh, 1956): (G) caudal view; (H) lateral view; (I) aedeagus, lateral view. J–L. *Paragus clausseni* Mutin, 1999: (J) caudal view; (K) lateral view; (L) aedeagus, lateral view. Scale bars: 0.3 mm. Voucher specimen codes: A–C - FagCin_M2; D–F - MlnOls_M2; G–I - MlnPav_M1; J–L - PagCla_M2.

stripes slightly fused in middle); tergite 4 antero-laterally with pair of small brownish yellow to pale brown spots reaching lateral margins; tergite 5 largely black except for narrow pale brown to brown lateral margins; sternite 1 largely pale yellow to yellowish grey, bare; sternite 2 similar to sternite 1, but with yellow to brownish-yellow hairs (Fig. 3O); sternite 3 largely pale yellow to pale brown except for variably darkened posterior area, with yellow to brownish-yellow hairs; posterior margin of sternite 4 medially with distinct but short and wide projection (Fig. 3O-a), brownish black to black (occasionally anteriorly pale brown), with brownish-yellow hairs; sternites 5–8 variably pale brown to brownish black, with brownish-yellow hairs. Male genitalia (Fig. 3J–L) with long epandrium about 2.2× as long as height in lateral view (Fig. 6K), dorsal side in lateral view distinctly long comparing to cerci; cerci short about 1/4 as long as epandrium in lateral view; surstylus reversed L-shape in caudal view (basal width about 3× of apical width when oriented to show broadest area) (Fig. 3J), basally with long brownish-yellow hairs, apically with short hairs (Fig. 3K); hypandrium with large and complex lingula

(large and rounded middle protuberance plus pair of smaller lateral processes (Fig. 6J-a, -b, K-a, -b); smaller lateral processes postero-dorsally with pointed hook plus several smaller teeth on inner concave corner (Fig. 6J-b, K-b); lateral protuberance of hypandrium slightly shorter than lingula, with rounded apex, and with apico-dorsal serration of several teeth and short hairs (Fig. 6K-c); distiphallus short, apico-dorsally pointed, apico-ventrally with numerous spicules (Fig. 6L-d); basiphallus distinctly extended posteriorly (Fig. 6L-e); pair of lateral lobe of aedeagus large and roughly trapezoidal shape (Fig. 6L-f), each with sharply pointed apico-dorsal and apico-ventral spines, dorsally with several teeth sparsely. Female. Similar to male except for the following characteristics. Lengths and ratios: body length 5.6–6.1 mm; wing length 4.9–5.4 mm; head ratio 0.56–0.59; face ratio 0.36–0.37; eye ratio 0.45–0.48; gena-eye ratio (genal height extremely narrow - not measured); antenna-head ratio 0.91–0.98; postpedicel-pedicel ratio 3.27–3.57; arista-antenna ratio 0.49–0.53; wing ratio 2.80–2.83; wing-thorax ratio 2.62–2.78; vein M ratio 2.00–2.11; vein R_{4+5} ratio 2.67–3.00. Head dichoptic with vertex about 0.15× as wide as head in dorsal view (Fig. 3R); frons black, about anterior 1/3 of lateral margins with narrow pale yellow pruinosity interrupted at anterior margin, with black and yellow hairs (Fig. 3Q, R); face with black vertical facial stripe from lower facial margin to antennal sockets, about 0.3× as wide as facial width (Fig. 3Q). Abdominal tergites: yellowish band on tergite 2 usually separated from lateral margins (occasionally narrowly reaching lateral margins) (Fig. 3R); tergite 4 almost entirely black except for narrow brownish yellow lateral margins (Fig. 3S); tergite 5 entirely black; sternite 2 largely yellow to brownish yellow except for brownish black antero-lateral margins; sternite 3 largely yellow to brownish yellow except for variably darkened lateral to posterior margins; sternites 4 and 5 blackish with pale yellow to yellow hairs.

Material examined. KOREA: Chungcheongbuk-do: Goesan-gun, Chengcheon-myeon, Sagimak-ri, Gomnimi-gol, N36°42′36.2″ E127°51′06.9″, 27.VI.2019, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♂; Goesan-gun, Cheongcheon-myeon, Sadam-ri, Mt. Baegagsan, N36°38′04″ E127°52′39.7″, 24.VII.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♂ (KNA); Jecheon-si, Songhak-myeon, 9.VI.2007, H.-Y. Han *et al*., 4♂, 1♀; Yeongdong-gun, Sangchon-myeon, Goja-ri, Mt. Sambongsan, N35°26′50″ E127°40′10″, 3.V.2019, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♂; ditto, 25.VI.2019, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♂, 1♀; Yeongdong-gun, Sangchon-myeon, Gungchon-ri, Chitongma village, N36°06′46.8″ E127°57′31.9″, 31.VII.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 2♂; Chungcheongnam-do: Cheonan-si, Seonggeo-eup, Cheonheung-ri, 21.V.2006, H.-W. Byun *et al*., 1♂, 1♀; Gangwon-do: Chuncheon-si, Dongsan-myeon, Bongmyeong-ri, 25.VII.1999, D.-S. Choi, 1♂; Chuncheon-si, Sindong-myeon, Palmi-ri, 4.VI.2006, D.-S. Choi *et al*., 1♂; Donghae-si, Samhwa-dong, Mt. Dutasan, 1.VI.2001, H.-W. Byun, 2♀; Donghae-si, Samhwa-dong, Mureung Valley, N37°28′02″ E129°01′53″, 20.VII.2010, S.-W. Suk, Y.-B. Lee, H.-S. Lee, 1♀; ditto, 15.IX.2011, S.-W. Suk *et al*., 1♀; Goseong-gun, Hyeonnae-myeon, Hwagok-ri, 22.V.2008, H.-Y. Han, H.-S. Lee, S.-W. Suk, 1♀; Goseong-gun, Hyeonnae-myeon, Myeongho-ri, 21.V.2008, H.-Y. Han, H.-S. Lee, S.-W. Suk, 1♀; Hoengseong-gun, Cheongil-myeon, Yupyeong-ri, Seomgang river side, 20.VIII.2002, D.-S. Choi *et al*., 1♂, 2♀; Hongcheon-gun, Dong-myeon, Worun-ri, N37°38′44.9″ E127°55′32.6″, 12.V.2019, S.-S. Euo, J.-H. Choi, 1♂ (KNA); Hongcheon-gun, Nae-myeon, Bangnae-ri, N37°51′11″ E128°16′52″, 9.IX.2016, S.-S. Euo, C.-O. Kim, W.-R. Ha, 1♂; Hongcheon-gun, Nae-myeon, Changchon-ri, 9.IX.2007, J.-S. Lim *et al*., 1♀; Jeongseon-gun, Nam-myeon, Yupyeong-ri, Mt. Mindungsan, N37°16′10″ E128°46′49″, 24.VI.2005, H.-Y. Han *et al*., 1♀; ditto, 28.VII.2010, H.-S. Lee, Y.-B. Lee, 1♀; ditto, 4.IX.2010, H.-S. Lee, Y.-B. Lee, 1♀; Pyeongchang-gun, Mitan-myeon, Sucheong-ri, N37°18′19″ E128°33′11″, 21.IX.2011, S.-W. Suk *et al*., 1♀; Samcheok-si, Geundeok-myeon, Dongmak-ri, N37°18′19″ E129°11′41″, 2.V.2011, S.-W. Suk *et al*., 1♂; Samcheok-si, Geunsan-dong, Mt. Geunsan, N37°24′48″ E129°08′29″, 6.V.2017, S.-S. Euo *et al*., 1♀; Wonju-si, Gwirae-myeon, Unnam-ri, from Inbeolgol to Mt. Sibjabong, N37°12′40″ E127°55′50″, 20.IX.1997, H.-Y. Han, H.-W. Byun, D.-S. Choi, 1♂; Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ. Mirae Campus, N37°17′10″ E127°54′01″, 10.VII.1997, H.-W. Byun, D.-S. Choi, 1♂; ditto, 14.VII.1997, H.-W. Byun, D.-S. Choi, 1♀; ditto, 24.VII.1997, H.-W. Byun, D.-S. Choi, 1♀; ditto, 21.X.1997, H.-W. Byun, D.-S. Choi, 1♂; ditto, 29.IV.1998, D.-S. Choi, 1♂; ditto, 25.VI.1999, H.-W. Byun *et al*., 1♀; ditto, 21.VII.1999, S.-K. Kim, D.-W. Kim, 1♀; ditto, 6.V.2000, D.-S. Choi, 1♀; ditto, 11.IX.2001, D.-S. Choi, 1♂; ditto, 26.IV.2002, D.-S. Choi, H.-S. Lee, 1♀ (NIBR); ditto, 22.VI.2003, O.-Y. Lim, H.-S. Lee, J.-S. Soh, 1♂; ditto, 23.VII.2009, D.-J. Cha, Y.-B. Lee, H.-S. Lee, 2♀; ditto, 19.VIII.2009, Y.-B. Lee, H.-S. Lee, 1♀; ditto, 20.VIII.2015, S.-S. Euo *et al*., 1♀ (KNA); ditto, 2.V.2017, S.-S. Euo, 1♂ (KNA); ditto, 31.V.2018, S.-S. Euo, J.-H. Choi, 1♂; ditto, 19.IV.2020, J.-H. Choi, 1♀ (KNA); Wonju-si, Munmak-eup, Bangye-ri, N37°19′28.83″ E127°46′12.01″, 20.V.2010, S.-W. Suk, H.-S. Lee, 2♀; Yeongwol-gun, Jungdong-myeon, Hwawon-ri, N37°09′40.1″ E128°38′11.2″, 29.IX.2018, S.-S. Euo, C.-O. Kim, J.-H. Choi, 1♂, 1♀; Yeongwol-gun, Seo-myeon, Ssangyong-ri, 9.VI.2007, H.-Y. Han *et al*., 2♂, 3♀; Gyeonggi-do: Pocheon-si, Sinbuk-

myeon, Yami-dong, Mt. Deokryeongsan, 2.VIII.2006, D.-S. Choi *et al*., 1♀; Suwon-si, Gwonsun-gu, Seodun-dong, Mt. Yeogisan, 26.VI.2001, H.-W. Byun, 1♀; ditto, 28.VI.2001, H.-W. Byun, 2♀; Yeoju-gun, Yeoju-eup, Sinjin-ri, Namhangang River side, 20.VIII.2002, D.-S. Choi *et al*., 1♂; Gyeongsangbuk-do: Bonghwa-gun, Myeongho-myeon, Mt. Cheongnyangsan, 30.VI. 2007, H.-Y. Han *et al*., 1♂, 1♀; Pohang-si, Buk-gu, Jukjang-myeon, Gasa-ri, N36°11′11″ E129°10′20″, 6.V. 2011, S.-W. Suk *et al*., 1♀; Uleung-gun, Is. Uleungdo, 12.VIII.1971, J.-I. Kim, 1♀; Jeollabuk-do, Sunchang-gun, Bokheung-myeon, Hwayang-ri, Mt. Hwagaesan, N35°27′42″ E128°54′8″, 12.IX.2021, S.-S. Euo, C.-O. Kim, 1♂, 1♀; Jeollanam-do: Sinan-gun, Aphae-eup, Songgong-ri, Mt. Songgongsan, N34°51′16.08″ E126° 15′38.81″, 11.IX.2021, S.-S. Euo, C.-O. Kim, 8♂, 3♀; Wando-gun, Wando-eup, Daeya-ri, Sanghwangbong, N34°20′41″ E126°41′50″, 22.IV.2017, S.-S. Euo, C.-O. Kim, W.-R. Ha, 1♀; ditto, 13.X.2020, S.-S. Euo, C.-O. Kim, 1♂.

Distribution. Russian Far East, Korea, China, Japan.

Biology. Unknown.

Remarks. The examined Korean specimens agree well with the original description (Mutin and Barkalov, 1999). The new Korean name of this species refers to its scientific name.

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