

Review of the Palaearctic species of the genera *Aneuropria* Kieffer, 1905 and *Labolips* Förster, 1856 (Hymenoptera, Diapriidae) with description of a new species from South Korea and Japan

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Abstract

Five Palaearctic species of the genera *Aneuropria* Kieffer, 1905 and *Labolips* Förster, 1856 are reviewed. The generic name *Valia* Alekseev, 1979 is recognised as a junior synonym of *Aneuropria* Kieffer, 1905, and the new combination *Aneuropria dentata* (Alekseev, 1979), **comb. nov.** is established. The hitherto unknown male of *Aneuropria dentata* is described. A new species *Labolips storozhenkoi* Chemyreva, Kolyada & Ku, **sp. nov.** is described from Japan and South Korea. New data on the distribution of the *Labolips innupta* Haliday, 1857, *Aneuropria dentata* and *A. foersteri* (Kieffer, 1910) species are provided. All Palaearctic species of *Aneuropria* are keyed and illustrated. The diagnoses of the genera *Aneuropria* and *Labolips* are clarified, and a new combination, *Coptera nilgiriensis* (Sharma, 1979), **comb. nov.** is proposed.

Key words: taxonomy, Palaearctic region, diapriid wasps, tribe Psilini, new records, new synonymy

Introduction

The genera *Aneuropria* Kieffer, 1905, *Labolips* Förster, 1856 and *Valia* Alekseev, 1979 together with four other genera (*Aneurhynchus* Westwood, 1832, *Ortona* Masner & García, 2002, *Coptera* Say, 1836 and *Psilus* Panzer, 1801) belong to the tribe Psilini. Despite differing interpretations of this tribe, its members can be easily recognized by: the presence of seven terga and five sterna in the female gaster (six terga and five sterna in other Diapriinae) and seven terga and sterna in male gaster (six/seven in other Diapriinae); the venation does not reach the front margin of the fore wing (Masner & García 2002; Notton 2004). However, the position of this tribe within the family is questionable. It can be related to the subfamily Belytinae because it has seven terga, like most Belytinae, or to the subfamily Diapriinae because its venation is extremely reduced. However the both characters are equally insignificant since, the female gaster with seven terga is probably the plesiomorphic state for Diapriinae in general and cannot be used to define Psilini (Notton 2004). Furthermore, the similarities in venation, which may have been acquired through simplification, could be the result of parallelisms in diapriid morphology. Unfortunately, the preliminary results on the phylogeny of diapriids are controversial (Yoder 2007), while the history of Psilini remains unknown. In addition to the characters listed for the tribe, most species in the Psilini (excluding the *Aneurhynchus*) have an exposed, sclerotised labrum (Figs 2D, 6B, 8A, 9E), and members of some genera (e.g. *Aneuropria*, *Coptera*, *Psilus* and *Valia*) have mandibles with altered condyle positions (Figs 2D, 6B, 8A). However, these characters are also found in diapriids from other taxa.

This study focuses on the monotypic genera *Labolips* and *Valia*, which were described from Europe, as well as the species-poor genus *Aneuropria*. The genus *Aneuropria* Kieffer currently comprises five small, usually wingless

wasps in the world fauna. Two of these species, *A. kairali* Rajmohana & Narendran and *A. nilgiriensis* Sharma, are known from India and southern China (Sharma 1979; Rajmohana & Narendran 2000; Liu *et al.* 2011); *A. kilimandjaroi* (Kieffer) is only known from Africa (Kieffer 1913; Notton 2004); and two species, *A. bifurcata* (Dodd) and *A. foersteri* (Kieffer), are found in the Palaearctic region (Johnson 1992; Notton 2014). The former is only found on the Madeira Islands (Dodd 1920; Notton 2014), while the latter is widely distributed across Europe, Central Asia, and Africa (Masner & Sundholm 1959; Notton 1992; Izadzadeh *et al.* 2020). According to Masner & Sundholm (1959), *A. foersteri* is a morphologically variable species, as it includes specimens that are alate, brachypterous, and almost wingless.

Very few know about the biology of these wasps. The only recorded host is *Rhagoletis cerasi* (Linnaeus)—the cherry fruit fly from the family Tephritidae. *Aneuopria* determined as *A. foersteri* was reared from pupa of this fly probably in Germany (Masner & Sundholm 1959).

Material and methods

Material observed in this study originates from the collection of the National Institute of Biological Resources (Incheon, South Korea; NIBR), the Science Museum of Natural Enemies (Geochang, South Korea; SMNE), Zoological Museum of the Moscow State University (ZMUM) and Zoological Institute of the Russian Academy of Sciences, St Petersburg, Russia (ZISP), and Kanagawa Prefectural Museum of Natural History (KMNH). Type material was sourced from the Natural History Museum, London, UK (NHML), the Museo Civico di Storia Naturale “Giacomo Doria”, Genoa, Italy (MCSN). Specimens were collected using Malaise traps (MT) and sweep nets.

Images of the specimens from Genoa were taken with a camera Olympus E-M5 Mark II and objective lens M.Zuiko 60 mm 1:2.8 combined with a Raynox MSN-505. The photographs of the paratypes of *Mantara bifurcata* were obtained using a Leica M165 stereomicroscope with a Leica DFC450 camera. Other photographs were taken using a combination of an Olympus SZX10 stereomicroscope and an Olympus OM-D digital camera. Final images were stacked using Helicon Focus 7.7.4 Pro.

The morphological terminology, abbreviations and measurements follow Masner & García (2002), Yoder (2004), Lanes *et al.* (2020) and the Hymenoptera Anatomy Ontology (Yoder *et al.* 2010). Measurements primarily follow Yoder (2004). The terminology for surface sculpture follows Eady (1968) and Harris (1979). The terms denoting the relative positions of morphological structures are derived from Goulet & Huber (1993).

New regional and country records are indicated with an asterisk (*).

Taxonomy

Order Hymenoptera

Family Diapriidae

Subfamily Diapriinae

Tribe Psilini

Genus *Aneuopria* Kieffer, 1905

Aneuopria Kieffer, 1905: 35.

Pezopria Kieffer, 1910: 697. Synonymized by Masner & Sundholm (1959).

Mantara Dodd, 1920: 379. Synonymized by Notton (2014).

Valia Alekseev, 1979: 617. **Syn. nov.**

Type species *Aneuopria clavata* Kieffer, 1911 (= *Polypeza foersteri* Kieffer, 1910), first included species.

Genus diagnosis. Small to medium-sized (1–3 mm) individuals; body color predominantly deep black with appendages lighter, predominantly smooth, highly shining, with relatively little pilosity (but with dense silvery

pilosity on petiole and propodeum, with some hairy cushions, but without foamy structures); labrum subtriangular, exposed, sclerotized; oral carina strongly developed permitting movement of mandible only along vertical axis; mandible long, almost flat, bidentate, distinctly projecting backward (opisthognathous), its upper condyles much closer to each other than the lower ones and axes connected the upper and lower condyles of each mandibles not parallel (Figs 2D, 6B, 8A); A1 unarmed, without apical flaps; A4 in male not modified; median keel of propodeum simple (Fig. 1A) to reduced; plica strongly developed, projecting posteriorly, almost bladelike; posterior margin of propodeum between plicae deeply excavate; anterior margin of T2 not notched medially or laterally and bare; anterior margin of S2 with grooves like depression laterally and median depression with short notch at the bottom (Figs 2G, 7B, D); belytoid line absent.

Remarks. In 2014, Notton proposed to consider the monotypic genus *Mantara* as a junior synonym of the genus *Aneuopria*. Unfortunately, he did not provide any evidence to support this suggestion. Nevertheless, *M. dentata* is indeed extremely similar to the species of the genus *Aneuopria* and differs from the latter mainly in its more pronounced reductions (complete fusion of the mesonotum and scutellum with each other, reduction of tegulae and all structures on the mesonotum and scutellum). However, if we accept Notton's proposal, then the monotypic genus *Valia*, with the single species *V. dentata*, should also be considered a junior synonym of *Aneuopria*, since it also differs from the genus *Aneuopria* only in the reduction of some features and is extremely similar to the species *Mantara bifurcata*.

The diagnosis of *Aneuopria* suggested above is a modified and supplemented version of that given by Masner & García (2002). All the additions made are mainly related to the proposed generic synonymy and, consequently, a broader interpretation of the genus. All species currently considered to be part of the genus *Aneuopria*, as well as *Valia dentata* correspond to the proposed diagnosis, with the exception of the species *Aneuopria nilgiriensis* Sharma, 1979 (Fig. 1). Many features mentioned in the original description (frons between eyes with sharp projections, apical rim of A1 with sharp flaps and additional sharp projection medially, median propodeal carina replaced by inverted V-shaped carina, T2 with deep and long median cleft (Fig. 1B)) and confirmed by studying the type material do not agreed with the *Aneuopria* characters but correspond with diagnosis of *Coptera* Say, which was given by Masner & García (2002). Thereby the new combination *Coptera nilgiriensis* (Sharma, 1979) **comb. nov.** is proposed here.

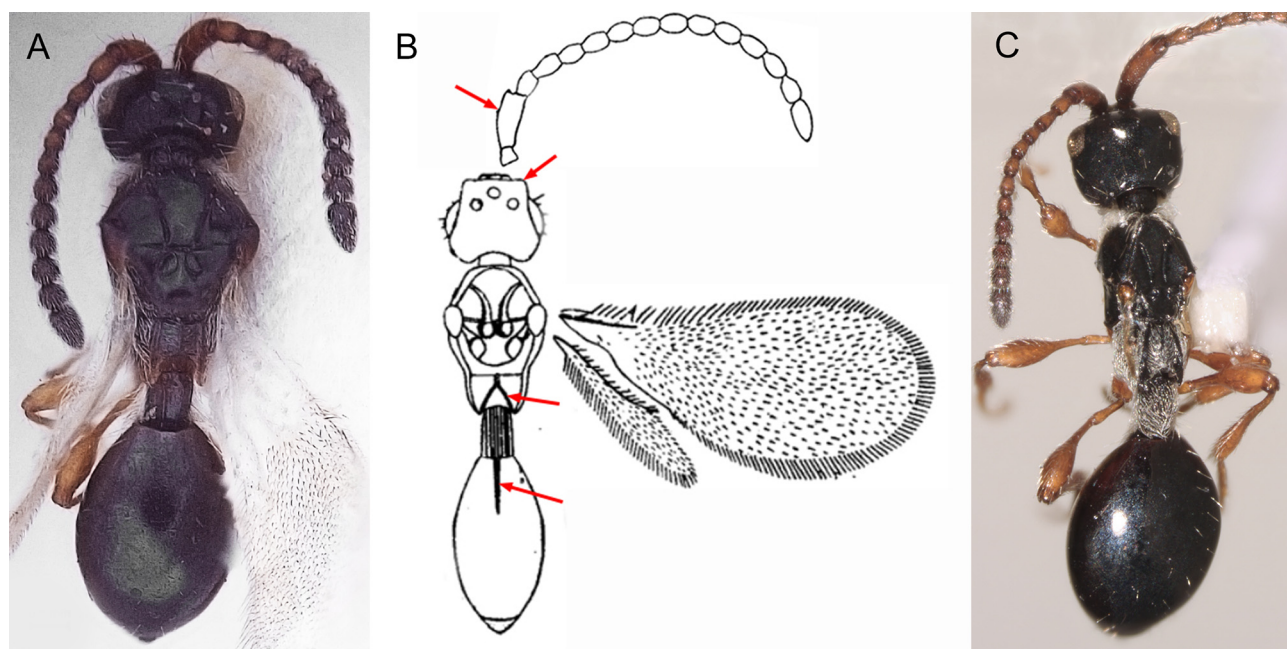


FIGURE 1. Non-palaeartic *Aneuopria* species; A—*A. kairali* Rajmohana et Narendran, female (available at <https://databases.nbair.res.in/Diapiinae/Aneuopria.php>); B—*A. nilgiriensis* Sharma, male; C—*A. kilimandjaroi* Kieffer, female (photo by Claire Villemant). Red arrows—features are not agreed with the diagnosis of *Aneuopria*.

Key to the Palearctic *Aneuropria* Kieffer species

1. Notauli absent; median carina of propodeum totally absent (Figs 2F, 3C, 5B, 6C); tegula strongly reduced and tiny (Figs 5B, F, 6A, E) 2
- Notauli present, deep and complete; median carina of propodeum present (as in Fig. 12A, B, E) at least at base of it (Fig. 8C); tegula large even in most brachypterous forms (Fig. 8D) *A. foersteri* (Kieffer)
2. Transscutal suture weakly defined, shallow anterior scutellar pits present (Figs 2F, 3C); small ocelli present; all antennomeres of female antennae elongate in dorsal view (Fig. 2A); S2 with a bunch of white setae medially at distal margin (Fig. 2G); mesopleuron with few weight setae under tegula (Fig. 2E) *A. bifurcata* (Dodd)
- Transscutal suture and anterior scutellar pits totally absent (Figs 5B, 6A); ocelli absent; A4–A11 subquadrate in dorsal view (Fig. 5E); S2 without a bunch of setae at distal margin (Fig. 7B); mesopleuron with dense weight setose under tegula (Fig. 5F) *A. dentata* (Alekseev)

Aneuropria bifurcata (Dodd, 1920)

(Figs 2, 3)

Mantara bifurcata Dodd, 1920: 380.

Aneuropria bifurcata: Notton 2014: 38.

Material examined. Paratypes: *Mantara bifurcata* Dodd, 1920, 1♀ and 1♂, “Madeira./ Wolfaston./ 55.7” (NHML). The other labels are shown in Fig. 2B.

Diagnosis. Wingless specimens; all antennomeres of female antennae elongate in dorsal view (Fig. 2A); female A12 (?) without ventral pit; male antennae gradually widened apically, with A10 as wide as long in dorsal view, while all other antennomeres elongate (Fig. 3D); antennomeres with almost equal width in dorsal and lateral view; small ocelli present (Fig. 2F); notauli absent; transscutal suture weak but present (Figs 2F, 3C); scutellar disc with two shallow depression anteriorly separated with wide distance (Fig. 2F); mesopleuron with scanty weight pubescence under tegula (Fig. 2E); median carina of propodeum totally absent; S2 with a bunch of weight setae medially at distal margin (Fig. 2G).

Distribution. Portugal (Madeira).

Aneuropria dentata (Alekseev, 1979), comb. nov.

(Figs 4–6, 7A, B)

Valia dentata Alekseev, 1979: 617.

Material examined. Holotype, female: “Crimea/ Nikita park near/ Yalta/ on Quercus sp./ 1.10.1964/ K. Arnoldi” (Fig. 4B). Non-type material. Russia: 1♀, Crimea, Bakhchisaray Distr., Kayas-Dzhilga 1 km S of Sel’bukhra town, 2.VIII.1995, M. Mostovski leg.; 1♂, Crimea, vicinity of Alushta, 11.VIII.2011, A. Reshchikov leg.; *Abkhazia: 1♂, Bzipi River, 43.2190°N, 40.2937°E, YPT, 9–11.VIII.2015, V. Chemyreva leg. (all in ZISP).

Diagnosis. Wingless specimens; female A4–A11 subquadrate in dorsal view (Fig. 5E); female A12 with ventral pit medially; male antennae gradually and slightly widened apically, A7–A13 subquadrate, antennomeres with almost equal width in dorsal and lateral view (Fig. 7A); ocelli absent; occipital flange foveolate; notauli absent; transscutal suture and anterior scutellar pits absent (Figs 4D, 5B); mesopleuron with dense weight setose under tegula (Fig. 5F); median carina of propodeum totally absent; S2 without a bunch of setae at distal margin (Fig. 7B).

Description. Male (hitherto unknown). Body length 2.4 mm; antenna length 1.8 mm. Body black, mandible and antennae dark brown, legs reddish brown, palpi yellow.

Head smooth only with rare and sparse not deep setigerous punctures; pubescence upstanding, long and scattered, postgenal cushion dense, frons laterally from antennal shelf finely and shortly setose; head in dorsal view elongate 1.2 times as long as wide, and 1.5 times as wide as mesosoma; in lateral view about as high as long. Clypeus transverse and slightly convex but epistomal sulcus indistinct. Tentorial pit present, distance between them distinctly shorter than pleurostomal distance. Labrum semicircular, setose and covered with deep setigerous punctures. Head width 1.65 times of pleurostomal distance, last one as long as distance between eyes. Mandibles

slightly overlapping, bidentate, with lower tooth slightly wider. Height of head 2.5x of eye height and malar space as long as height of eye. Eyes with few long setae. Ocelli totally absent.

Antenna. A1 distinctly cylindrical, curved, covered with coriaceous sculpture and scattered long setae; its apical rim simple; A2 conical (attenuate at base) in lateral view and subquadrate in dorsal views; A4 not modified and shorter than A3; A12 longest flagellomere and slightly longer than A3, with ventral pit medially. In lateral view, ratios of length to width of antennomeres as in Fig. 7A; length and width of flagellomeres same in dorsal and lateral views.

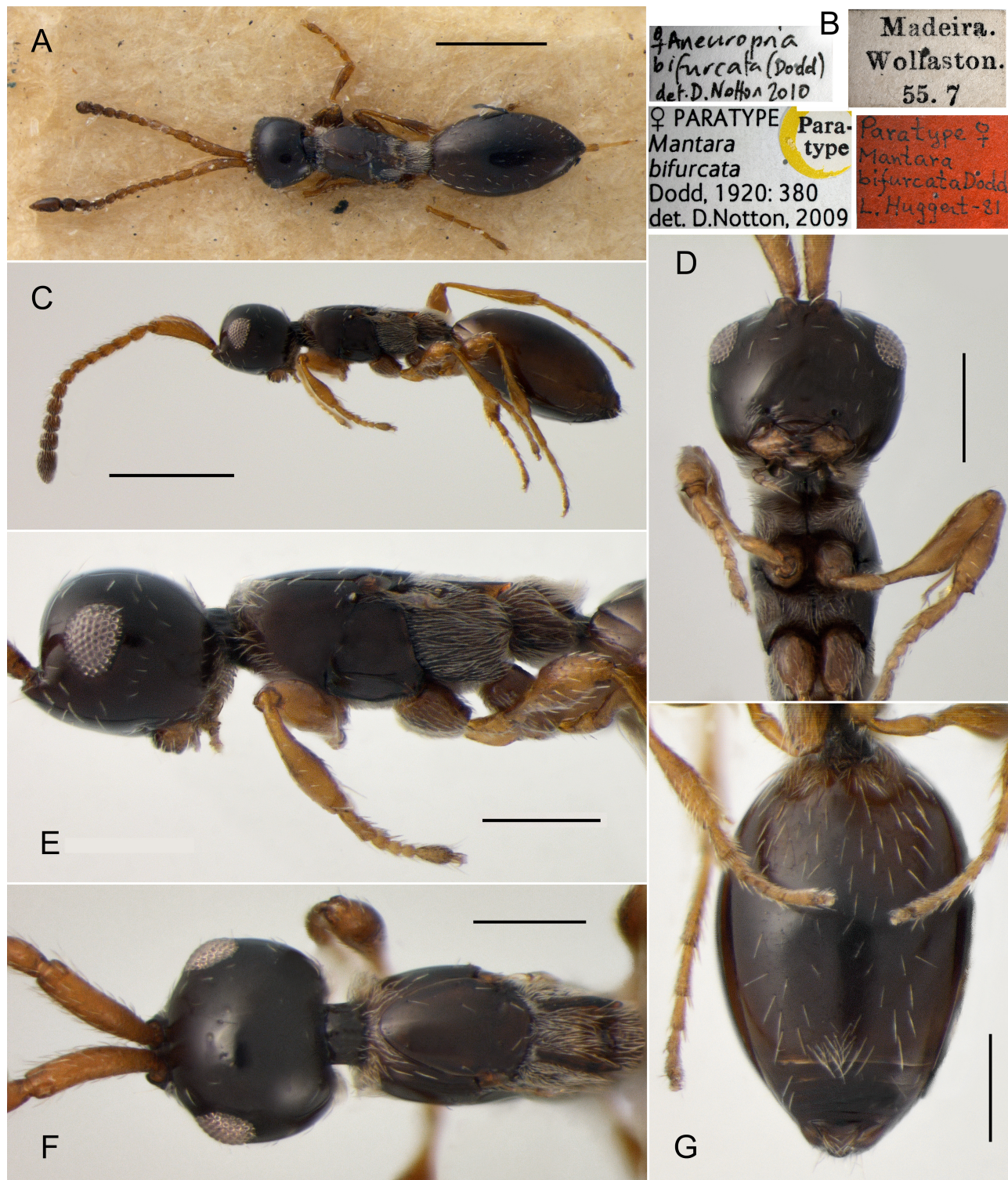


FIGURE 2. *Aneuropria bifurcata* (Dodd), female, paratype. A, C—whole wasp in dorsal (A) and lateral (C) views; B—paratype labels; D–F—head and mesosoma in ventral (D), lateral (E) and dorsal (F) views; G—metasoma in ventral view. Scale bars: 0.5 mm (A, C); 0.2 mm (D–G).



FIGURE 3. *Aneuropria bifurcata* (Dodd), female (A, C) and male (B, D), paratypes; A, B, D—antenna in lateral (A, B) and ventral (D) views; C—mesosoma in dorsal view. Scale bars: 0.2 mm.

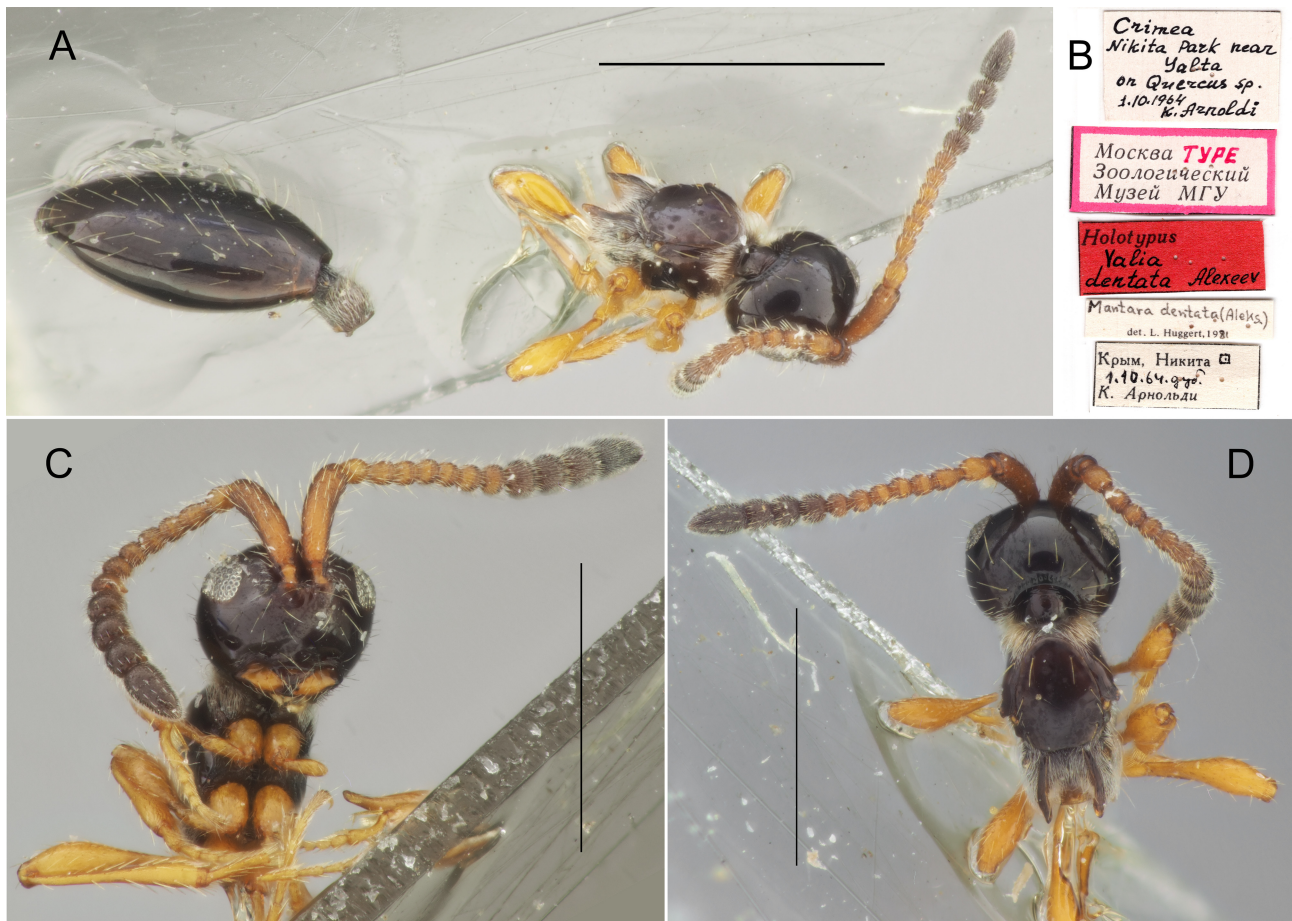


FIGURE 4. *Aneuropria dentata* (Alekseev), female, holotype; A—whole body in dorso-lateral view; C—head and mesosoma in ventral view; D—head and mesosoma in dorsal view. Scale bars: 1.0 mm (A); 0.5 mm (C, D).

Mesosoma. Neck bare and perfectly smooth. Cervical pronotal area short and almost vertical, densely pubescent (pubescence heterogeneous in length); pronotal shoulders not projecting, smooth and pubescent; lateral sides of pronotum mainly smooth and bare with only fine transverse striation ventrally and dense lateral pronotal cushion

anteriorly. Propleuron at least partly with fine elongate striation, densely pubescent in posterior half and almost bare anteriorly. Mesoscutum fused with scutellum, flat and mainly smooth, with only scattered setigerous puncture and setae on the periphery; axillar depression and all kind of scutellar pits absent. Upper part of mesopleuron with densely pubescent and quite large subalar impression, which separated from smooth and bare median part of mesopleuron with distinct carina; epicnemial pit distinct, moderately large and pubescent inside; sternaulus present as distinct carina with a row of stout setae along it; mesopleuron ventrally with ventral longitudinal carina of mesopleuron, that extending from anterior to median coxae (Fig. 6E), area between it and sternaulus smooth bare and



FIGURE 5. *Aneuopria dentata* (Aleksseev), non-type (A–C, E, F) and holotype (D) females; A—whole body in lateral view; B—head and mesosoma in dorsal view; C—antennae in lateral and ventral views; D—metasoma in lateral view; E—antenna in dorsal view; F—head and mesosoma in lateral view. Scale bars: 1.0 mm (A); 0.5 mm (B–D); 0.3 mm (E, F).

slightly depressed; ventral area of mesopleuron between right and left ventral longitudinal carinae of mesopleuron densely pubescent, with only mesodiscrimen visible as deeply foveolate suture. Metanotum strongly reduce, visible as small semicircular sclerites laterally. Propodeum rugulose and punctulate, mainly pubescent except plicae; dorsal surface of propodeum between plicae not separated from nucha posteriorly and distinctly shorter than lateral side of propodeum; plical process and metapleural carinae process expands beyond anterior margin of petiole; metapleuron and lateral side of propodeum densely pubescent. All legs slender, without trochantellus, without peculiarities in pubescence. Fore wing totally absent, tegulae strongly reduced.



FIGURE 6. *Aneuropria dentata* (Alekseev), male; A—head and mesosoma in dorsal view; B—face; C—metasoma in dorsal view; D—apex of metasoma in lateral view; E—head and mesosoma in lateral view; F—whole body in lateral view. Scale bars: 1.0 mm (F); 0.5 mm (A, C, E); 0.3 mm (D); 0.2 mm (B).

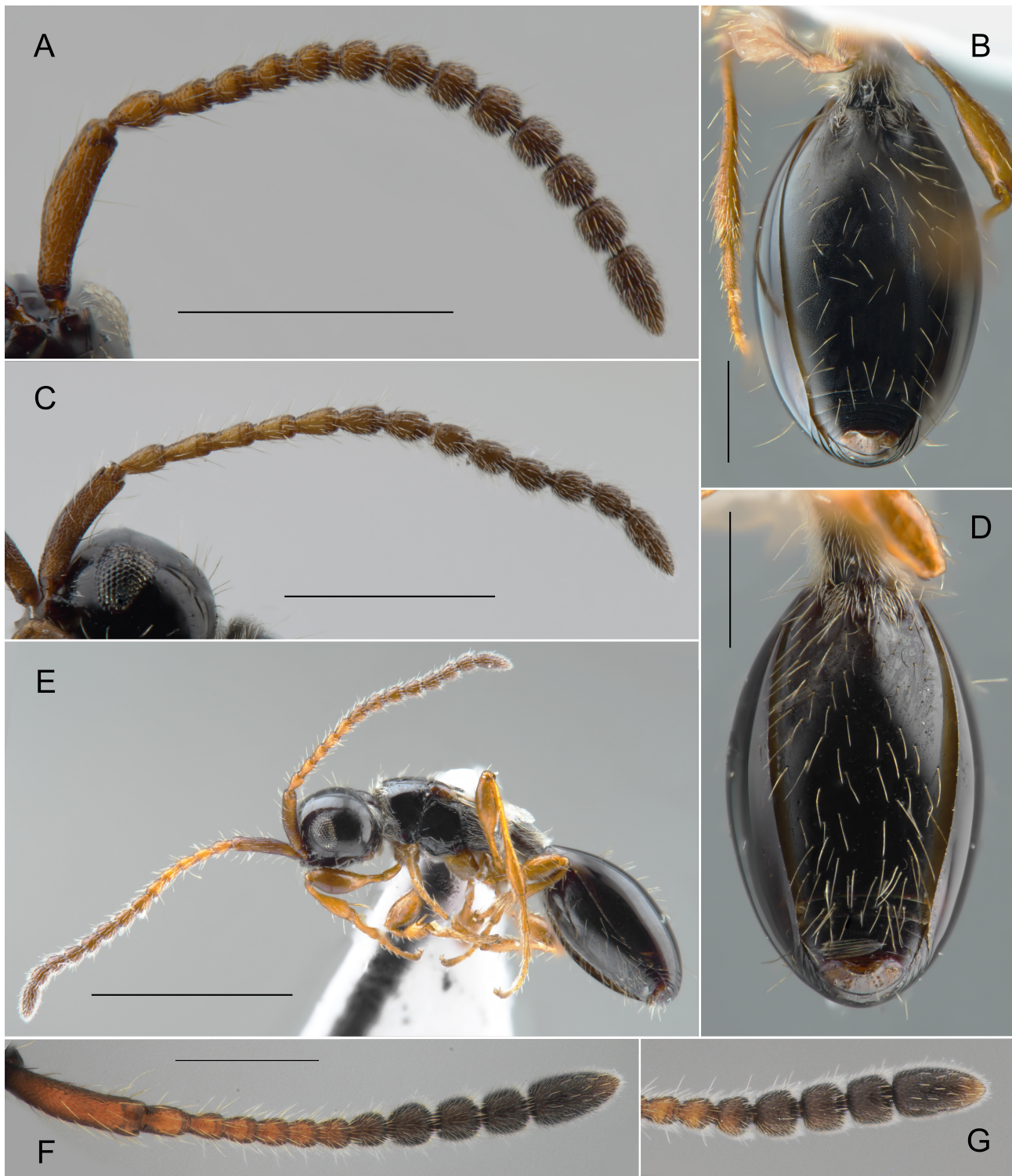


FIGURE 7. *Aneuropria dentata* (Aleksseev) (A, B) and *A. foersteri* (Kieffer) (C–G), males (A–D) and female (F, G); A, C—antennae in lateral view; B, D—metasoma in ventral view; E—habitus in lateral view; F, G—female antenna in dorsal (F) and lateral (G) views. Scale bars: 1.0 mm (E); 0.5 mm (A, C); 0.3 mm (B, D, F).

Metasoma. Petiole cylindrical, entirely rugose and densely pubescent (Fig. 6C); T2 smooth, covered with scattered, stout and long semi-erect setae; T3–T6 very short, totally smooth and bare (Fig. 6D); T7 as long as T4–T6 measured together, micropunctured, with only several strong setae and setigerous punctures; T8 about as long as T7, micropunctured, with several strong setae and setigerous punctures, without trace of cerci. Base of S2 with grooves

like depression laterally which moderately short and wide and densely pubescent inside; median depression with short notch at the bottom, scarcely pubescent; posterior surface of S2 smooth, with few sparse setae and setigerous punctures; S3–S7 with transverse line of micropunctuation and very few setigerous punctures with strong setae; S8 semicircular smooth and shining, with only several setigerous punctures and long setae (Fig. 7B).

Distribution. The Black Sea region (Crimea and the western Caucasus).

Aneuropria foersteri (Kieffer, 1910)

(Figs 7C–E, 8)

Polypeza foersteri Kieffer, 1910: 718.

Polypeza gastroi Kieffer, 1910: 719 (Fig. 11C, D).

Pezopria fuscicornis Kieffer, 1911: 886. Synonymized by Masner & Sundholm (1959).

Aneuropria clavata Kieffer, 1911: 898. Synonymized by Masner & Sundholm (1959).

Glyptonota subpilosa Kieffer, 1911: 900. Synonymized by Masner & Sundholm (1959).

Material examined. Holotype *Polypeza gastroi* Kieffer, 1910 (Fig. 12C, D) (MCSN). Non-type material. Ukraine: 1♂, Kharkiv Province, Krasnokutsk, dendropark, 11.IX.1992, N. Storozheva (ZISP). Russia: 1♂, Crimea, Kara-Dag N.P., 4–8.VI.1990, D. Kasparyan; 1♂, Krasnodar Territory, Sochy, Lazarevskoe Vill., 17–20.IX.1981, V. Tobias; 1♂, Adygeya, Dakhovskaya env., Belaya River valley, 44.199°N 40.170°E, 465m, 18–31.VIII.2009, K. Tomkovich; 1♀, Chechnya, Grozny city, 25.VI.1968, presumed from puparium Cloropidae, probably of *Thaumatomyia glabra* Mg.; 1♂, Orenburg Province, Sol'-Iletsk District, Bukabay River, 7–10.IX.1996, M. Mostovski (all in ZISP). *Kazakhstan: 1♀, near Almaty city, 19.VI.1985, M. Kozlov (ZISP). *Turkmenistan: 1♀, Kara-Kala, El-Dere canyon, 4–7.V.1981, G. Dlusskiy (ZISP). *Israel: 1♀, Nort Galilee, 23.V.1966, V. Tryapitsyn & Gusev (ZISP). *South Korea: 3♀ Jeju-si, Bonggae-dong, San78-1, Jeolmul Natural Reservation Forest, 15–31.V.2023, MT Deokseo Ku, Muncheon Kwon legs. (NIBR, SMNE); ♀ Gangwon-do, Mt Jeombong, Jindong-ri, Girin-meon, Inge-gun, 38°2'58"N 128°28'52"E, 13.V–22.VI.2017, MT, Hyung-Geun Lee leg. (ZISP).

Diagnosis. Wingless to alate specimens; all flagellomeres of female elongate in dorsal view except A8–A11 or A9–A11 sunquadrate and A9–A11 sometimes slightly transverse (Fig. 7F, G); female A12 with ventral pit medially; male antennae gradually and very slightly widened apically, all antennomeres elongate in dorsal view; ocelli absent or only tiny frontal one present (Fig. 8B); occipital flange foveolate to almost smooth; notauli present, complete and deep; transscutal suture and anterior scutellar pits distinct (Fig. 8C); mesopleuron bare under tegula (Fig. 8D); median carina of propodeum distinct at least at base of it (Fig. 8C); S2 without a bunch of setae at distal margin (Fig. 7D).

Variation. This species is highly variable since the presence of almost wingless, winged and intermediate forms. Here are only some aspects of its variation described: wings reaching to anterior margin of propodeum to slightly longer than meso- and metasoma measured together; male flagellomeres more or less elongate in dorsal view; occipital flange foveolate to almost smooth; head in dorsal view transverse to as long as wide, with temple receding to convex; head in frontal view from almost perfectly rounded to subtriangular but always about as high as wide; mesosoma almost as wide as head to strongly narrower; neck totally smooth or with fine and shallow foveolae posteriorly; notauli different in wide and deepness; anterior scutellar pits different in shape (from circular to oval) and separated with different distance from each other; lateral and posterior pits of scutellum different in size; median propodeal carina distinct throughout to shortly visible anteriorly; petiole as long as wide to distinctly elongate, partly bare dorsally to completely densely pubescent; T2 perfectly smooth to entirely granulate.

Biology. The recorded hosts are the Tephritidae *Rhagoletis ceraci* (L.) (Masner & Sundholm 1959) and the Chloropidae *Thaumatomyia glabra* (Meigen, 1830) (current data).

Distribution. Europe (Masner & Sundholm 1959), *Israel, Russia (European part), *Kazakhstan, *Turkmenistan, Iran (Izadzadeh *et al.* 2020), *South Korea.

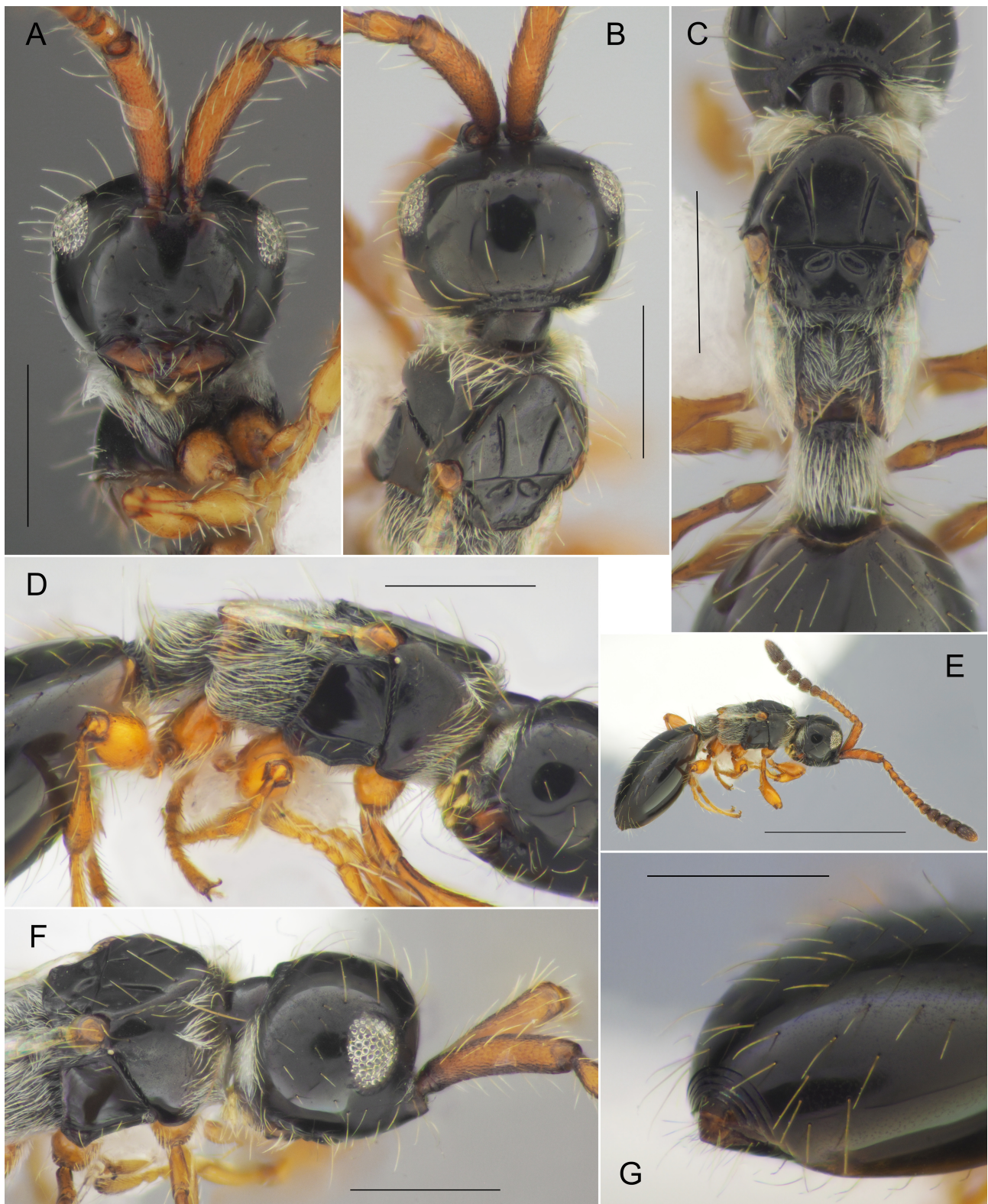


FIGURE 8. *Aneuopria foersteri* (Kieffer), female, non-type specimen: A—face; B—head and mesosoma in dorsal view; C, D—mesosoma and petiole in dorsal (C) and lateral (D) views; E—whole body in lateral view; F—head and mesosoma in lateral view; G—apex of metasoma in lateral view. Scale bars: 1.0 mm (E); 0.3 mm (A–D, F, G).

Genus *Labolips* Förster, 1856

Type species *Labolips innupta* Haliday, 1857, by monotypy.

Genus diagnosis. Body depressed; lateral pronotal cushion and epomia absent (Figs 9A, B, 10C); anterior scutellar pit replaced by arc of minute crenulae (Fig. 9C, F); mesopleuron with distinct sternaulus, mesepimeral sulcus and large epicnemial pit shortly pubescent inside (Fig. 10C); posterior margin of scutellum without trace of foveae; dorsal surface of the propodeum without median carina, bare, coarsely rugose to smooth, it separate from mesopleuron with densely setose depression (Fig. 11D, E); T2 deeply and widely hollowed out at base; lateral corners of T2 large, rounded and exposed anteriorly, sculptured (Fig. 11D); base of S2 arched, with deep lateral depression and coarsely sculptured median protrusion; betyloid line distinct in anterior half of S2 (Fig. 10B, D); antenna stout, thickened towards apex but without differentiated club; A4–A11 submoniliform and transverse; all legs robust, each without delimited trochantellus; fore wing with subcostal vein present only at base (Fig. 11C); ovipositor sheath short, stout and wide, truncate at apex and with crown of stout setae (Figs 10B, D and 11A, B). Males are still unknown.

Labolips innupta Haliday, 1857

(Figs 9A, C, D; 11A, C)

Labolips innupta Haliday, 1857: 173, 174, 293, pl. 10. Original description.

Labolips innupta: Notton & O'Connor 2004: 216, 217. Type information.

Material examined. Russia: 1♀, Kaliningrad Province, Svetlogorsk town, 1–12.VIII.1999, V. Kolyada leg.; 1♀, Kurshskaya Kosa N.R. 55°09'16"N 20°51'27"E, Rybachiy, Ornithology station of ZIN RAN, 25.VII–10.VIII.1999, V. Kolyada leg.; 1♀, vicinity of S. Petersburg, Beloostrov station., 16.VIII.1975, V. Kostjukov leg.; 18♀, Moscow Province, vicinity of Stupino town, 3.VIII–1.X.1997, V. Kolyada leg.; 1♀, Moscow City, 12 km SE from metro station "Yugo-Zapadnaya", 23.VII.1975, V. Kostjukov leg.; 3♀, Tyumen' Province, Khanty-Mansi A.O., Mukhrino, 60°53'20"N 68°42'10"E, 7–13.VIII.2010, K. Tomkovich leg. All in ZISP.

Diagnosis. Head slightly to distinctly transverse in dorsal view, more sharply tapers towards occipital carina with genae slightly to distinctly swollen in dorsal and frontal views (Fig. 9A, D); metanotum punctured along posterior margin (Fig. 9C); propodeum coarsely sculptured dorsally.

Distribution. Ireland (Haliday 1857), England (Nixon 1980), the Netherlands (Peeters 2016), Sweden (Jansson 1945), Germany (Ulrich 1999), Czech Republic (Masner 1957), Finland (Hellén 1963), Romania (Fabritius & Weiss 1985), *Russia (European part and Western Siberia).

Labolips storozhenkoi Chemyreva, Kolyada & Ku, sp. nov.

(Figs 9B, E, F; 10; 11B, D, E)

Type material. Holotype—♀, South Korea (GW) [Gangwon-do], Yeongwoi-gun, Jungdong-myeon, Hwawon2-ri, Mt. Yemisan, 37°9'6.85"N 128°38'7.03"E, 24.V–7.VI.2017, Hyeong-Keon Lee (Malaise trap) (NIBR). Paratype, ♀, Japan, Honshu, Aichi Pref., Shitaro-Cho, 26.VII–1.VIII.2015, Jimpei Imura leg. (KMNH).

Diagnosis. Head as long as wide in dorsal view, gradually tapers toward occipital carina with genae not swollen in dorsal and frontal views (Fig. 9B, E); metanotum smooth along posterior margin (Fig. 9F); propodeum mainly smooth dorsally and only weakly punctured along posterior margin (Fig. 9F).

Description. Female (holotype). Body length 1.3 mm; fore wing length 1.15 mm; antenna length 0.75 mm. Body and A1 dark brown; tegula, mandible and A2–A12 yellowish brown; legs yellow.

Head mainly smooth with scattered setigerous punctures and upstanding setae: in dorsal view elongate (23:22), and almost as wide as mesosoma; in lateral view 1.5 times as long as high. Clypeus transverse (about twice as long as wide) but epistomal sulcus indistinct, not convex. Tentorial pits large. Labrum narrow, semicircular, weakly visible, smooth and bare. Head 1.2 times as wide as of pleurostomal distance. Mandibles slightly overlapping, bidentate, with lower tooth slightly wider. Height of head 2.9× of eye height and malar space 1.6× of eye height. Eyes with few long setae. Ocelli tiny, frontal oculus largest, LOL 2.3 times as long as diameter of frontal oculus, POL 1.4 times as long as OOL.

Antenna. A1 cylindrical, slightly curved in lateral view, longitudinally strigose ventrally, reticulate rugose dorsally, densely setose and with simple apical rim. A2 in dorsal view sub-cylindrical, in lateral view obliquely truncated at base. Antennomeres without MGS brush and not flattened on ventral side. In lateral view, ratios of length to width of antennomeres as in Fig. 10E.

Mesosoma 1.6 times as wide as high, in dorsal view 1.4 times as long as wide. Neck bare and coarsely rugose. Cervical pronotal area with few setae, anterior part of it almost vertical, smooth and bare, posterior part of it deeply punctured along posterior margin; pronotal shoulders rounded. Lateral side of pronotum mainly smooth and bare and only dorsally and ventrally sculptured (Fig. 10C). Mesoscutum 1.7 times as wide as long, flattened with few upstanding setae on it; mesoscutal suprahumeral sulcus distinct and smoothed only medially; humeral sulcus smoothed. Scutellum flattened with foveolate scutoscutellar sulcus; axilla mainly smooth and sculptured

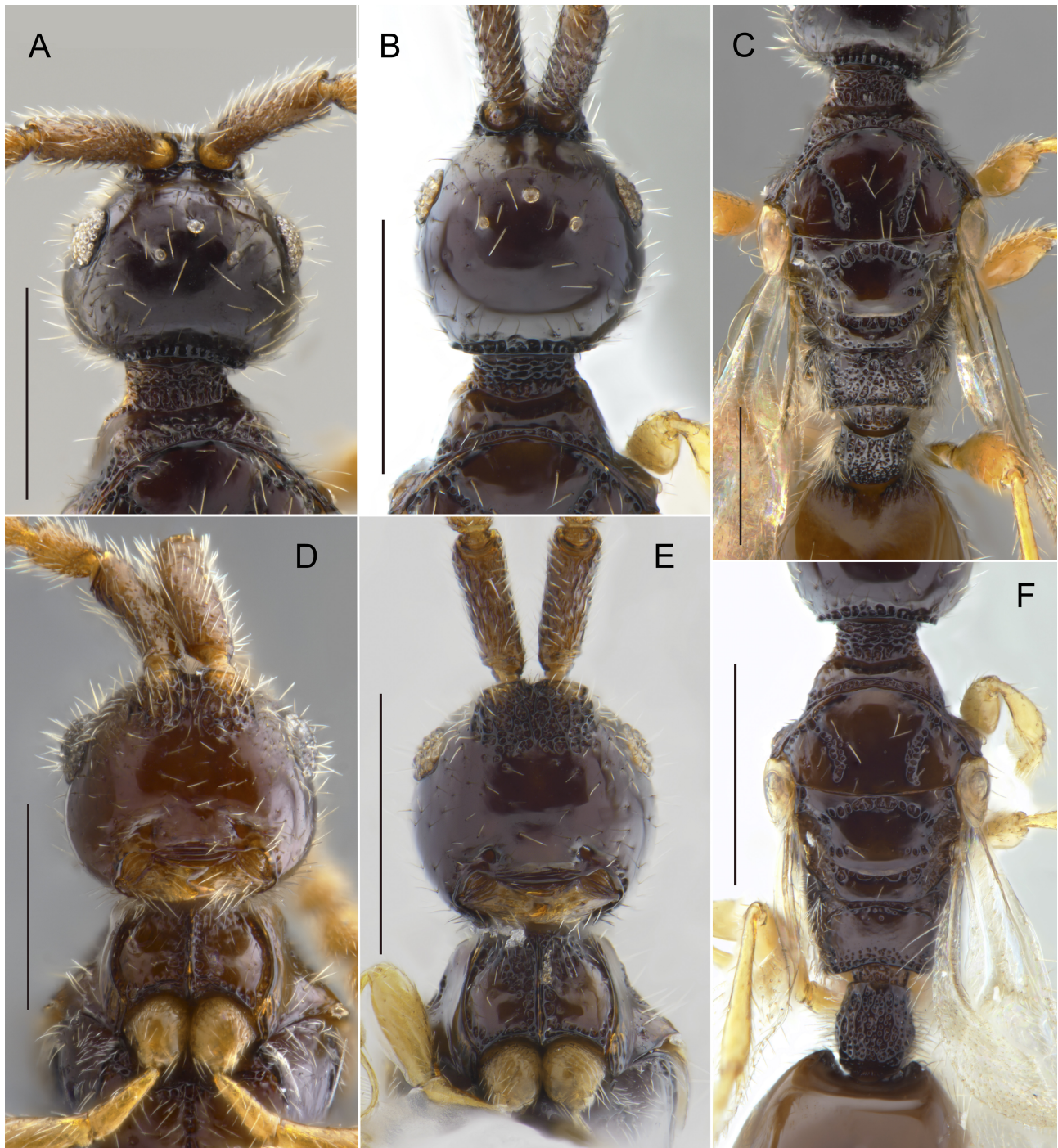


FIGURE 9. *Labolips innupta* Haliday (A, C, D), female and *L. storozhenkoi* Chemyreva, Kolyada & Ku, **sp. nov.** (B, E, F), female, holotype; A, B—head in dorsal view; C, F—mesosoma and petiole in dorsal view; D, E—face in frontal view. Scale bars: 0.3 mm.

along lateral margin; axillar depression sculptured and shortly pubescent; scutellar disk large, wide and sculptured laterally. Lateral side of mesopleuron longitudinally carinate dorsally, with distinct sternaulus and mesepimeral sulcus, epicnemial pit present as shallow depression and shortly pubescent inside. Ventral side of mesopleuron with acetabular carina and postacetabular sulcus distinct and situated close to fore coxae, foveolate mesodiscrimen, mesopleural epicoxal sulcus and carina. Metanotum with few scattered setae smooth medially but rugose laterally and foveolate along anterior margin. Dorsal side of propodeum mainly smooth but with distinct transverse anterior carina of the metapectal-propodeal complex and deep punctuation along transverse posterior carina of the metapectal-propodeal complex; posterior margin of propodeum in dorsal view not arcuate. Metapleuron smooth medially and rugose along the edges. Lateral side of propodeum between plicae and metapleural carina depressed, coarsely rugose and setose (Fig. 11D, E). Nuchal area shortly pubescent and coarsely sculptured.

All legs with tarsus about as long as tibia, both with numerous stiff setae; femora broadened, with short basal stalk.

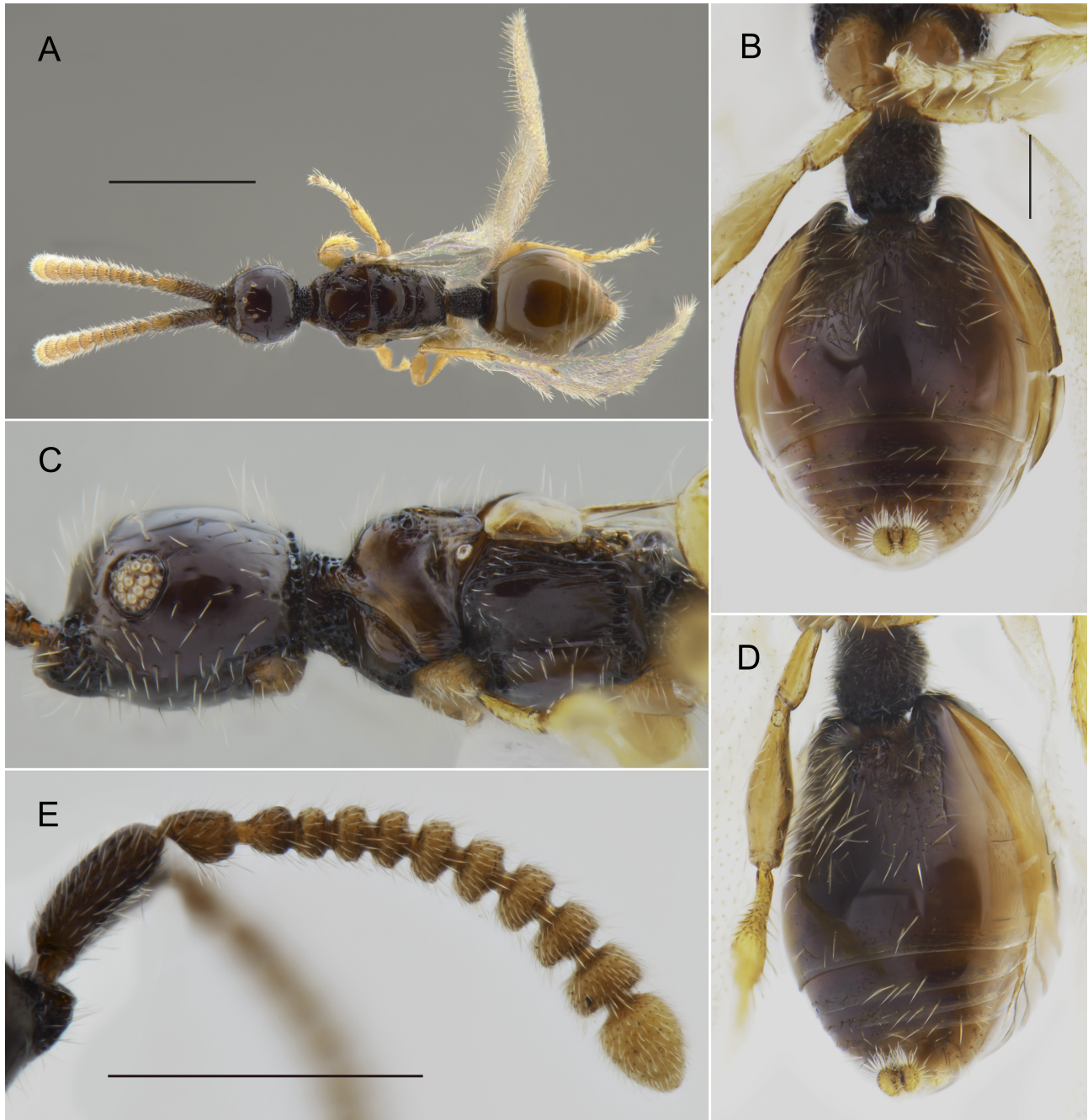


FIGURE 10. *Labolips storozhenkoi* Chemyreva, Kolyada & Ku, **sp. nov.**, female, holotype; A—habitus in dorsal view; B, D—metasoma in ventral (B) and ventro-lateral (D) views; C—head and mesosoma in lateral view; E—antenna in lateral view. Scale bars: 0.5 mm (A); 0.3 mm (E); 0.1 mm (B).

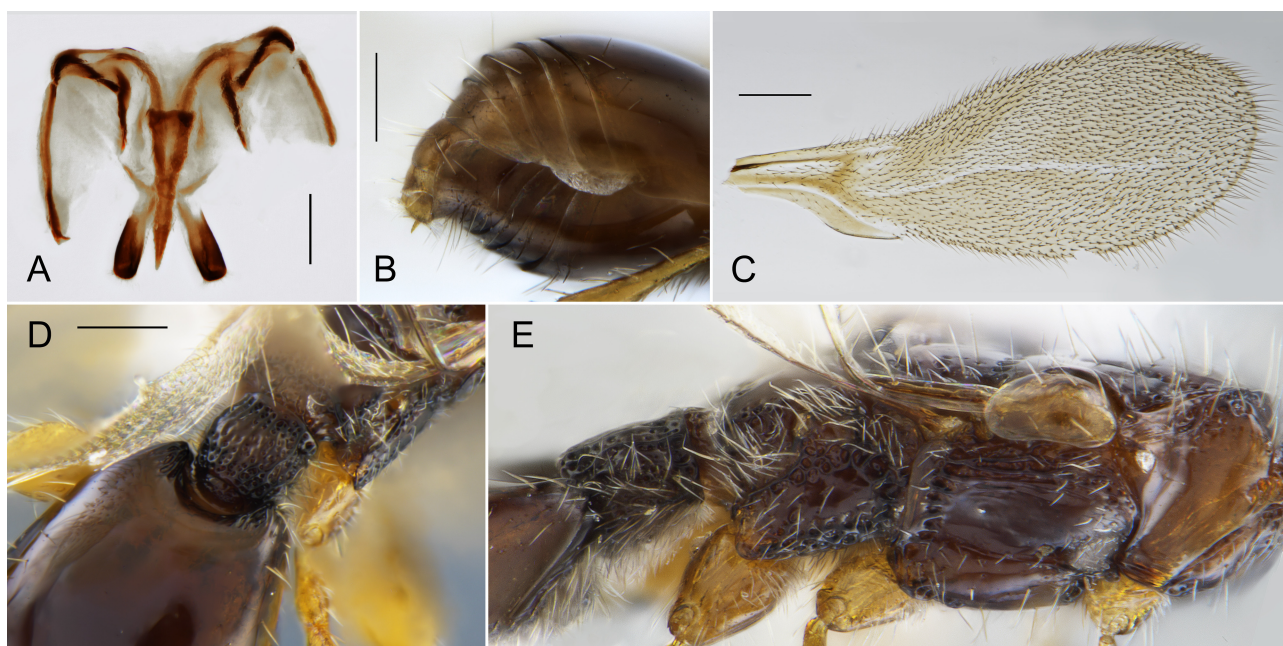


FIGURE 11. *Labolips storozhenkoi* Chemyreva, Kolyada & Ku, **sp. nov.**, female, holotype; A—ovipositor in dorsal view; B—apex of metasoma in lateral view; C—fore wing; D—petiole in dorso-lateral view; E—mesosoma and petiole in lateral view. Scale bars: 0.2 mm (C); 0.1 mm (A, B, D).

Fore wing clear, 2.8 times as long as wide and 1.5 times as long as hind wing; the single vein of the fore wing gradually disappeared, not reaching even third of fore wing length (Fig. 11C).

Metasoma. Petiole barrel-shaped, 1.1 times as long as its maximum width, deeply punctured with weakly expressed longitudinal carinae. Base of T2 arched and bare, with large lateral corners that carinate sculptured dorsally, anterior margin medially smooth; posteriorly T2 smooth with few long setae; T3–T6 short with micropunctuation and a row of setae laterally; T7 about 1.6 times as long as T6, with a row of strong setae and not exposed and not setose cerci; T8 slightly shorter than T6, micropunctured, with few strong setae. S2 sculptured and setose antero-medially, smooth posteriorly and laterally; betyloid line distinct in its anterior half; base of S2 arched, with deep lateral depression and coarsely sculptured median protrusion. S3–S5 with fine punctuation medially and few long setae. S6 with scattered setae. Ovipositor distinctly longer than T3–T8 measured together; sheaths of ovipositor short and thick, with wide smooth and flat area on the top, which surrounded with strong long setae (Fig. 10B, D).

Etymology. The new species is named in honor of the well-known entomologist and expert on Orthoptera, Prof. Sergey Yu. Storozhenko.

Distribution. Japan (Honshu), South Korea.

Discussion

This review presented new data on the species diversity and distribution of the genera *Aneuropria* and *Labolips* in the Palaearctic region, and clarified and expanded the interpretation of the genus *Aneuropria*. However, this article did not address some other important issues. In our opinion, the transpalaearctic species *A. foersteri* is characterised by too much variability. This may be due to the presence of winged and almost wingless forms within its populations and its wide range. Nevertheless, it cannot be ruled out that we are dealing with a complex of closely related species. Such an overly broad interpretation of this species could have arisen for at least two reasons: the species is rare in collections and is extremely rarely represented by long series; variability in the degree of wing development strongly correlates with the size of the mesosoma, mesosoma sculpture and some other features. These two factors make it very difficult to distinguish intraspecific and interspecific differences in specimens. Masner & Sundholm (1959) in the revision of the European species *Aneuropria* studied types of *Polypeza foersteri* Kieffer, 1910 and *Glyptonota subpilosa* Kieffer, 1911 and recognised them con-specific, while the species names *Aneuropria clavata* Kieffer, 1911,

Polypeza gestroi Kieffer, 1910 and *P. fuscicornis* Kieffer, 1911 had been synonymized based on original descriptions without type examination. Perhaps the authors' assumption that only one species of *Aneuropria* inhabits Europe was premature. The *Aneuropria* specimens from the collection of the Museo Civico di Storia Naturale “Giacomo Doria” in Genoa, suggest that *Aneuropria* species diversity is significantly greater in southern Europe (Fig. 12). For instance, the occipital flange (carina) of the holotype *Polypeza gestroi* has a completely smooth flange, unlike other holotypes (Masner & Sundholm 1959). There are some doubts about the identification of the Iranian species as *A. foersteri*, which also has a smooth occipital carina and slightly different body proportions (Izadzadeh *et al.* 2020). In this study, the variability of *A. foersteri* s.l. was mainly described for material collected in Europe, European Russia, Central Asia, Israel and South Korea. It is interesting to note that the specimens collected in South Korea are most similar to the holotype described by Masner & Sundholm (1959) (Fig. 7), while the European specimens and the specimen from Israel show significant variability, including the T2 sculptures, as detailed in the 'Variation' section. There are unpublished data on the discovery of *A. foersteri* in North America, as well as its CO1 sequence. Another unpublished CO1 sequence of *A. foersteri* from Europe showed a significant differences between these two species (available on the Barcode of Life Data System (BOLD) platform, <https://boldsystems.org/>). These and other data suggest that a separate study of this species is needed.



FIGURE 12. *Aneuropria* spp. (A, B, E) and holotype of *Polypeza gestroi* Kieffer (C). A, E—whole insects in dorso-lateral view; B, C—whole insect in dorsal view; D—labels. Scale bar: 1.0 mm.

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References

- Alekseev, V.N. (1979) New data on the parasitoids of the family Diapriidae (Hymenoptera, Proctotrupoidea) of the fauna of the USSR. *Zoologicheskii Zhurnal*, 58, 617–619. [in Russian]
- Dodd, A.P. (1920) Notes on the exotic Proctotrupoidea in the British and Oxford University Museums, with descriptions of new genera and species. *Transactions of the Entomological Society of London*, 1919, 321–382.
<https://doi.org/10.1111/j.1365-2311.1920.tb00008.x>
- Eady, R.D. (1968) Some illustrations of microsculpture in the Hymenoptera. *Proceedings of the Royal Entomological Society of London*, 43 (4–6), 66–72.
<https://doi.org/10.1111/j.1365-3032.1968.tb01029.x>
- Fabritius, K. & Weiss, I. (1985) Genul *Labolips* Haliday, 1857 (Proctotrupoidea - Diapriidae), nou pentru fauna Romaniei. *Studii si cercetari de Biologie, Seria Biologie Animala*, 37 (2), 83–84.
- Förster, A. (1856) *Hymenopterologische Studien. II. Heft. Chalcidiae und Proctotrupii*. Verlag von Ernstter Meer, Aachen, 152 pp.
- Goulet, H. & Huber, J.T. (1993) *Hymenoptera of the world: an identification guide to families*. Canada Communication Group, Ottawa, 668 pp.
- Haliday, A.H. (1857) Note on a peculiar form of the ovaries observed in a hymenopterous insect, constituting a newgenus and species to the family Diapriidae. *Natural History Review, Proceedings of Societies*, 4, 166–174 + 293, pl. 10.
- Harris, R.A. (1979) A glossary of surface sculpturing. *Occasional Papers in Entomology*, 28, 1–31.
- Hellén, W. (1963) Die Diapriinen Finnlands (Hymenoptera: Proctotrupoidea). *Fauna Fennica*, 14, 1–35.
- Izadzadeh, M., Talebi, A.A., Kolyada, V., Farahani, S. & Ameri, A. (2020) First record of two genera and species of Diapriinae (Hymenoptera: Diapriidae) from Iran. *Journal of Crop Protection*, 9 (2), 319–325.
- Jansson, A. (1945) Studier över svenska proctotrupider. 4. Ännu några för faunan nya släkten. *Opuscula Entomologica*, 10, 141–145.
- Johnson, N.F. (1992) Catalog of World species of Proctotrupoidea, exclusive of Platygasteridae (Hymenoptera). *Memoirs of the American Entomological Institute*, 51, 1–825.
- Kieffer, J.-J. (1905) Nouveaux Proctotrypides exotiques conservés au Musée Civique de Gênes. *Annali del Museo Civico di Storia Naturale Giacomo Doria, Genova*, 2 (2), 9–39.
- Kieffer, J.-J. (1910) Proctotrypidae (suite). In: André, E. (Ed.), *Species des Hyménoptères d'Europe et d'Algérie. Vol. 10*. Hermann & Fils, Paris, pp. 593–752.
- Kieffer, J.-J. (1911) Proctotrypidae (suite). In: André, E. (Ed.), *Species des Hyménoptères d'Europe et d'Algérie. Vol. 10*. Hermann & Fils, Paris, pp. 753–1015.
- Kieffer, J.-J. (1913) Proctotrupidae, Cynipidae et Evaniidae. Voyage de Ch. Alluaud et R. Jeannel en Afrique Orientale (1911–1912). *Résultats scientifiques. Hyménoptères*, 1, 1–35.
- Lanes, G.O., Kawada, R., Azevedo, C.O. & Brothers, D.J. (2020) Revisited morphology applied for systematics of flat wasps (Hymenoptera, Bethyridae). *Zootaxa*, 4752 (1), 1–127.
<https://doi.org/10.11646/zootaxa.4752.1.1>
- Liu, T.-X., Chen, H.-Y. & Xu, Z.-F. (2011) The genus *Aneuopria* Kieffer (Hymenoptera, Diapriidae), new record to China. *Acta Zootaxonomica Sinica*, 36 (4), 997–999.
- Masner, L. (1957) First preliminary report on the occurrence of genera of the group Proctotrupoidea in Czechoslovakia (Second part – Superfamily Proctotrupoidea s. str.). *Acta Faunistica Entomologica Musei Nationalis Pragae*, 2, 83–107.
- Masner, L. & García, J.L. (2002) The genera of Diapriinae (Hymenoptera: Diapriidae) in the New World. *Bulletin of the American Museum of Natural History*, 268, 1–138.
[https://doi.org/10.1206/0003-0090\(2002\)268<0001:TGOHDH>2.0.CO;2](https://doi.org/10.1206/0003-0090(2002)268<0001:TGOHDH>2.0.CO;2)
- Masner, L. & Sundholm, A. (1959) Some nomenclatoric problems in Diapriidae (Hym., Proctotrupoidea). *Acta Societatis Entomologicae Českosloveniae*, 56, 161–168.
- Nixon, G.E.J. (1980) *Diapriidae (Diapriinae). Hymenoptera, Proctotrupoidea. Handbooks for the Identification of British Insects. Vol. 8. Pt 3(di)*. Royal Entomological Society of London, London, 55 pp.
- Notton, D.G. (1992) *Aneuopria* Kieffer, 1905, and *Viennopria* Jansson, 1953 (Hymenoptera: Proctotrupoidea, Diapriidae) new to Britain. *Entomologist's Gazette*, 43 (1), 59–63.
- Notton, D.G. (2004) A catalogue of types of Diapriinae (Hymenoptera, Diapriidae) at the National Museum of Natural History, Paris, with notes on the classification of Diapriinae and a brief history of the types of Jean-Jacques Kieffer (1856–1925). *Zoosystema*, 26 (2), 315–352.
- Notton, D.G. (2014) A catalogue of the types of Diapriinae (Hymenoptera: Diapriidae) at the Natural History Museum, London. *European Journal of Taxonomy*, 75, 1–123.

<https://doi.org/10.5852/ejt.2014.75>

- Notton, D.G. & O'Connor, J.P. (2004) Type specimens of Diapriinae in the Haliday collection at the Natural History Museum, Dublin—National Museum of Ireland (Hym., Diapriidae). *Entomologist's Monthly Magazine*, 140, 215–218.
- Panzer, G.W.F. (1801) *Faunae Insectorum Germanicae Initia oder Deutschlands Insecten. Heft 83*. Felseckersche Buchhandlung, Nürnberg, 24 pp.
- Peeters, T.M.J. (2016) Bijdragen over Diapriidae 3. *Labolips innupta* nieuw voor Nederland. *HymenoVaria*, 12, 18–20.
- Rajmohana, K. & Narendran, T.C. (2000) Descriptions of a new genus *Nigropria* and a new species of *Aneuopria* Kieffer (Diapriidae: Proctotrupoidea: Hymenoptera) from India. *Entomon*, 25 (3), 193–200.
- Say, T. (1836) Descriptions of new species of North American Hymenoptera, and observations on some already described. *Boston Journal of Natural History*, 1 (3), 209–305.
- Sharma, S.K. (1979) Studies on Indian Diapriidae (Proctotrupoidea: Hymenoptera). *Memoirs of the School of Entomology St. John's College, Supplement, Agra*, 7, 1–88.
- Ulrich, W. (1999) Phenology, stratification and life cycles of the parasitic Hymenoptera of a beech forest on limestone. *Polish Journal of Entomology*, 68, 231–257.
- Westwood, J.O. (1832) Descriptions of several new British forms amongst the parasitic hymenopterous insects. *London & Edinburgh Philosophical Magazine and Journal of Science*, 1, 127–129.
<https://doi.org/10.1080/14786443208647849>
- Yoder, M.J. (2004) Revision of the North American species of the genus *Entomacis* (Hymenoptera: Diapriidae). *The Canadian Entomologist*, 136 (3), 323–405.
<https://doi.org/10.4039/n03-061>
- Yoder, M.J. (2007) *Advances in diapriid (Hymenoptera: Diapriidae) systematics, with contributions to cybertaxonomy and the analysis of rRNA sequence data. Dissertation (Doctor of Philosophy)*. Texas A & M University, College Station, Texas, ix + 185 pp.
- Yoder, M.J., Mikó, I., Seltmann, K., Bertone, M. & Deans, A. (2010) A gross anatomy ontology for Hymenoptera. *PloS One*, 5 (12), e15991.
<https://doi.org/10.1371/journal.pone.0015991>