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New data on Microlepidoptera (Lepidoptera: Micropterigidae, Adelidae, Glyphipterigidae, and Yponomeutidae) from the Far East of Russia

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Abstract

A new species *Cauchas storozhenkoi* **sp. nov.** (Adelidae) is described from the Far East of Russia. The fauna of Russia was replenished by one genus and one species due to the find of *Metanomeuta fulvicrinis* Meyrick (Yponomeutidae) in Primorskii Krai for the first time. The problems associated with the valid designation of the lectotype of *M. fulvicrinis* and the species composition in the genus *Metanomeuta* Meyrick are discussed. *Kessleria fasciapennela* (Yponomeutidae) is first reported from the Far East of Russia. The diagnostic characters of the *Micropterix sikhotealinensis* Ponomarenko & Beljaev (Micropterigidae) were revised considering the morphology of the female genitalia. The female genitalia of the *Glyphipterix maritima* Diakonoff (Glyphipterigidae) is described for the first time. Photographs of adults and genitalia are given for the new species and taxa for which new data were obtained.

Key words: micromoths, new species, morphology of genitalia, *Micropterix*, *Cauchas*, *Kessleria*, *Metanomeuta*, *Glyphipterix*

Introduction

The exploration of microlepidopteran fauna in the Far East of Russia began more than one and half century ago. The first paper that included species of Lepidoptera distributed in the Far East was an annotated list by Ménétriès (1859). Among the reported lepidopterans three species of micromoths only were indicated (one gelechiid and two pyralid species). Soon, the work by Bremer (1864) was published, which contained the data of faunistic studies in Eastern Siberia and Amur region, and revised data on the distribution of the species mentioned in the paper by Ménétriès. The number of recorded species of Microlepidoptera increased to 44 species, and 31 species of them were pyralid moths. At the end of 19th century, Christoph described 111 species of micromoths (1881a, 1881b, 1882). By now, more than 2600 species from 708 genera and 63 families have been recorded from the Far East of Russia (Lelej 2016; Sinev 2019, 2024). However, despite such a long period of studying of Microlepidoptera, faunistic investigation on the Far East of Russia is far from over. New species and faunistic records of Microlepidoptera continue to be discovered (Ponomarenko 2020, 2022; Wikström *et al*. 2020; Gaedike 2021; Streltzov 2022, 2023; Gorbunov & Koshkin 2023; Ponomarenko & Beljaev 2023; Ponomarenko & Sinev 2024c; Tarasova & Ponomarenko 2025). The present work continues the series of papers devoted to new taxonomic, faunistic and morphological data of Microlepidoptera of the Russian Far East. New data were obtained for moths from the families Micropterigidae, Adelidae, Yponomeutidae, and Glyphipterigidae.

Material and methods

This study is based on the material collected on the south of the Russian Far East mainly by second author. For identification of specimens a standard lepidopterological technique was used (Falkovitsh & Stekolnikov 1978),

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including maceration of soft tissue in 10–15% KOH. The membranous parts in the genitalia were stained by chlorazol black. The genitalia were examined in glycerol using a Nikon SMZ-10 stereomicroscope. The genital slides were made using Euparal as an embedding medium (Robinson 1976). Photographs of the genitalia were made with an Olympus SZX16 microscope with an incorporated digital camera DP74 Nikon. Some photographs of genital structures at higher magnification were taken using a Zeiss Axioskop 40 microscope equipped with a digital camera AxioCam HRc. General morphological terminology follows Klots (1970). The specific terms for morphostructures in Micropterigidae were used after Zeller-Lukashort *et al*. (2007), in Adelidae follows Davis (1975) and Nielsen (1985) and in Yponomeutidae follows Moriuti (1977). To identify the adelid specimen and compare its eye size with that in related species the interocular index was calculated according to Davis (1975): the ratio of the vertical eye diameter to minimum distance between the eyes across the frons. The holotype of the new species and examined specimens are deposited in the Bioresource collection (registration number 2797657) in the Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far Eastern Branch of Russian Academy of Sciences (Vladivostok).

The following abbreviations were used in the text: AT—A.A. Tarasova, who prepared the slides; FSCB—Federal Scientific Center of the East Asia Terrestrial Biodiversity, abbreviation of the Center, where the material is stored; GS—genital slide; ICZN—International Commission on Zoological Nomenclature; md—minimum distance between the eyes across the frons; MP—M.G. Ponomarenko, who prepared the slides; NHM—Natural History Museum, London, Great Britain; vd—vertical eye diameter.

Description of a new species

Family Adelidae Bruand

The family Adelidae includes five genera and almost 450 described species and is distributed worldwide except Antarctica and New Zealand; more than 300 species are known from Eastern Hemisphere (van Nieukerken *et al.* 2011; Hirowatari *et al*. 2012, 2024; Kozlov 2013, 2016a, 2016c, 2020, 2023a, 2023b, 2024a, 2024b; Agassiz & Kozlov 2015; Korb 2016; Bryner & Huemer 2019; Koo & Cho 2022; Sun *et al.* 2022; Davis & Medeiros 2023; Ko *et al.* 2023; Liao *et al.* 2023; Sun & Li 2023; Ko *et al.* 2025). In Russia, 63 species from four genera are distributed, of which 39 species are distributed in the European part, which is a third less than in Europe. 37 species from four genera inhabit the Russian Far East, which is comparable to the number of species known from Japan, and slightly more than half of the species recorded in China (Kozlov 2016b, 2024c; Liao *et al.* 2023; Hirowatari *et al.* 2024).

Genus *Cauchas* Zeller

Type species. *Tinea fibulella* ([Denis & Schiffermüller], 1775), by subsequent designation by Fletcher (1929).

Distribution. Palaearctic: Europe; Russia (European part, south of West Siberia, Far East); West (Turkey, Armenia) and Central (Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan) Asia; Nearctic: Canada, USA (Nielsen & Johansson 1980; Kozlov 1994, 1997, 2024c; Kuprijanov 1994; Korb 2016; Bryner 2020; Davis & Medeiros 2023).

Remarks. The world fauna of the genus includes 32 species, half of which are distributed in the Old World with the greatest species diversity in Europe (nine species), and the other half are found in the New World, where the *Cauchas* spp. inhabit the North America. The fauna of Russia includes seven species, three species of which known from European part only (*Cauchas florella* (Staudinger), *C. leucocerella* (Scopoli), *C. rufifrontella* (Treitschke)), two species reach the south of West Siberia (*C. fibulella* ([Denis & Schiffermüller]), *C. rufimitrella* (Scopoli)), one species was described from Altai Republic and so far known only from this locality (*C. mikkolai* Kozlov) and one species (*C. breviantennella* Nielsen & Johansson) has been reported from arctic (Murmanskaya oblast' and Yamalo-Nenetskii Avtomnyi Okrug) and subarctic (Magadanskaya oblast') geographic zones. The species of the genus *Cauchas* so far remain unknown from East Asia and south of the Russian Far East, thus the new species is the first one described from this territory.

***Cauchas storozhenkoi* Tarasova & Ponomarenko, sp. nov.**
(Figs 1, 11–13, 18–21)

Type material. Holotype: ♂, **Russia**, Primorskii Krai, Vladivostok, 1 km NNW of "Sputnik" railway station, 43°14'57" N, 132°02'00" E, 19.vii 2021 (leg. M. Ponomarenko), GS 345 MP, FSCB.

Diagnosis. The new species is similar to *C. florella*, *C. rufifrontella*, and *C. terskella* Kuprijanov by unpatterned forewing. It is also similar to *C. terskella* and *C. fibulella* by the male genitalia with relatively large socii, length of which exceeds half of the uncus width, W-shaped plate of transtilla and large anterior part of juxta. The new species differs by the monochrome wings without metallic shine, by the valva smoothly tapering towards apex, and juxta with rectangular shade-shaped anterior part in the male genitalia.

Description. Adult, male. Head covered with raised yellow and brown elongated hair-like scales (Fig. 11). Antennal scape dark brown, flagellum dark brown basally and lighter distally, with ventral ciliation (Fig. 12); antennal sockets well separated. Eyes small, frontoclypeus broad, interocular index (vd/md) 0.47 (Fig. 13). Maxillar palpi rudimentary. Labial palpus dark brown with elongated hair-like scales on ventral margin; weakly curved upwards, first segment 3/5 of second segment length, third segment 1.6 times longer than second one.

Thorax dark brown. Wingspan 10.5 mm, forewing length 4.5 mm. Tegula and forewing brownish gold, the latter without pattern and metallic shine; fringe concolorous with them basally and lighter distally (Fig. 1). Hindwing greyish brown, fringe slightly darker. In hindwing veins M_1 and M_2 separated basally. Fore- and midlegs greyish brown; hindlegs with femur dark brown dorsally and greyish brown ventrally, tibia and tarsus light greyish brown; hind tibia with long hair-like scales.

Genitalia (Figs 18–21). Tegumen short, fused with rudimentary uncus. Socius bean-shaped and relatively long, exceeds half of uncus width. Vinculum wide, in ventral part two times longer than valva, with rounded anterior part, joined with tegumen dorso-laterally. Valva broad basally, smoothly tapering towards rounded apex. Transtilla consists of two curved band-like sclerites arising from dorso-basal valval angles and fused into W-shaped plate with rounded sublateral lobes and medial process elongated caudally and pointed at apex (Fig. 19). Aedeagus 2.5 times longer than valva, tubular, narrowed at basal 1/4 and at near 3/5 of its length, with ventral more or less trapezoid plate at the base; its apical part with two asymmetric lobes, both with more or less long spines: left lobes slightly shorter and more sclerotised, its base forms latero-ventral side of aedeagus apical part; right lobe longer, semi-sclerotised, its base forms dorso-lateral side of aedeagus apical part (Fig. 21). Anellus with large spines in distal part and granulated in proximal part; juxta with rectangular shade-shaped anterior part bearing single left thorn (Fig. 20).

Female. Unknown.

Host plant. Unknown.

Distribution. Russia (south of the Far East: Primorskii Krai).

Etymology. The species is named after Dr. Sergei Yuryevich Storozhenko, a famous entomologist who made a great contribution to the study of orthopteroid insects. A noun in the genitive case.

New faunistic and morphological data

Family Yponomeutidae Stephens

The world fauna of the family Yponomeutidae numbers 340 species from 30 genera and 4/5 of the generic diversity and almost half of all known species are in the Palaearctic region (Huemer & Mutanen 2015; Lewis & Sohn 2015; Cepeda 2016, 2018; Sohn 2016, 2018, 2021, 2023; Agassiz 2019, 2020; Lou *et al.* 2019; Na *et al.* 2019; Liu & Wang 2023a, 2023b; Lu *et al.* 2023; Ponomarenko & Beljaev 2023; Ruiz-Galvan & Sohn 2023; Ponomarenko & Sinev 2024c; Tokár *et al.* 2024; Tarasova & Ponomarenko 2025). The fauna of Russia includes 70 species from 15 genera, most of which, 41 species from 11 genera, inhabit the Far East (Ponomarenko 2016; Ponomarenko & Sinev 2024b, Tarasova & Ponomarenko 2025).

Genus *Kessleria* Nowicki

Type species. *Kessleria zimmermannii* Nowicki, 1864, by monotypy.

Distribution. Palaearctic region: Europe; Russia (European part, North Caucasus, south of West Siberia, Irkutskaya Oblast', Zabaikalskii Krai [Transbaikalia], Primorskii Krai, **first record**); Japan (Honshu, Kyushu); Oriental region: China (Hunan, Zhejiang, Yunnan, Taiwan); Japan (Ryukyu); India (Assam, Mumbai, Punjab); Nearctic region: Canada; USA; Australasian region: New Guinea; New Zealand (Friese 1960; Moriuti 1977, 1981; Huemer & Tarmann 1991, 1993; Lewis & Sohn 2015; Huemer & Mutanen 2015; Ponomarenko & Sinev 2024b).

Remarks. The genus *Kessleria* Nowicki includes 35 species (Huemer & Mutanen 2015; Lewis & Sohn 2015), most of which are Palaearctic: more than 2/3 species are distributed in Europe, and two species are known from Japan. Six species have been recorded in the Oriental region and two more from the Australasian region. In Russia, only five species have been indicated, all of which have fragmented or narrow local ranges (Ponomarenko & Sinev 2024b). In Russia the easternmost locality where *Kessleria* spp. are known is the Zabaikalskii Krai [Transbaikalia]. Before this study, this genus was not recorded in the fauna of the Russian Far East.

Kessleria fasciapennella (Stainton, 1849)

(Figs 2, 14, 28, 29)

Material examined. 2 ♀♀, Russia, Primorskii Krai, Khasanskii district, Gamov Peninsula, 27 km SW of Slavyanka, Srednyaya Inlet, 42°35'18" N, 131°12'48" E, 25.vii 1997 (leg. M. Ponomarenko), GS 344 AT, FSCB.

Diagnosis. This species is similar to *K. saxifragae* (Stainton) by pattern of forewing and female genitalia with transverse sclerotisation in sternal area of 8th segment formed by extended ventral arms of apophyses anteriores, antrum with sclerotised ring and corpus bursae without signum. It differs by narrower transverse sclerotisation in sternal part of 8th segment, a ratio of sclerotisation length to its width is 0.2, by smaller and flattened setaceous lobes of postvaginal plate and shorter granular part of ductus bursae, which does not exceed 1/5 of total ductus length in the female genitalia (Figs 28, 29). The related species possesses wider transverse sclerotisation in sternal part of 8th segment, a ratio of length of this sclerotisation to its width is 0.6, larger and rounded setaceous lobes of postvaginal plate and ductus bursae with continuous granular sculpture in the female genitalia.

Remarks. The specimens collected in the south of the Russian Far East differ from European specimens by relatively smaller size (wingspan 12.7 mm), groundcolour of forewing beige, wing pattern without a distinct dark brown oblique stripe extending, which in European moths extends from about 1/4 of the dorsal margin to about 2/5 of the costal margin, and without stripe from 1/3 wing length to apex. Instead of these stripes there are scattered dark brown scales located exactly in the same place; forewing with four rows of black dots running from near base: five dots in subcostal row to 1/3 of wing length, nine ones in radial row to 2/3 wing length, six-seven ones in submedian row and ten ones in subdorsal row both to a little beyond middle of wing (Fig. 2). In the female genitalia, Far Eastern specimens differ by a relatively longer unbranched part of apophyses anteriores, which is 1.2 times longer than the posterior branch (Fig. 28). According to the photographs, the European specimens of *K. fasciapennella* have distinct oblique stripe on the forewings and shorter unbranched part of apophyses anteriores, which is only 0.7 of posterior branch length (Huemer & Tarmann 1991: figs 52, 53, 237). The exception is the specimen from Komi Republic (Huemer & Tarmann 1991: fig. 54), which also lacks an oblique stripe on the forewing, and its wing pattern is similar to that of specimens from the south of the Far East.

Distribution. Europe; Russia (N, NW and NE of European part, south of West Siberia, Irkutskaya Oblast', south of Far East: Primorskii Krai, **first record**).

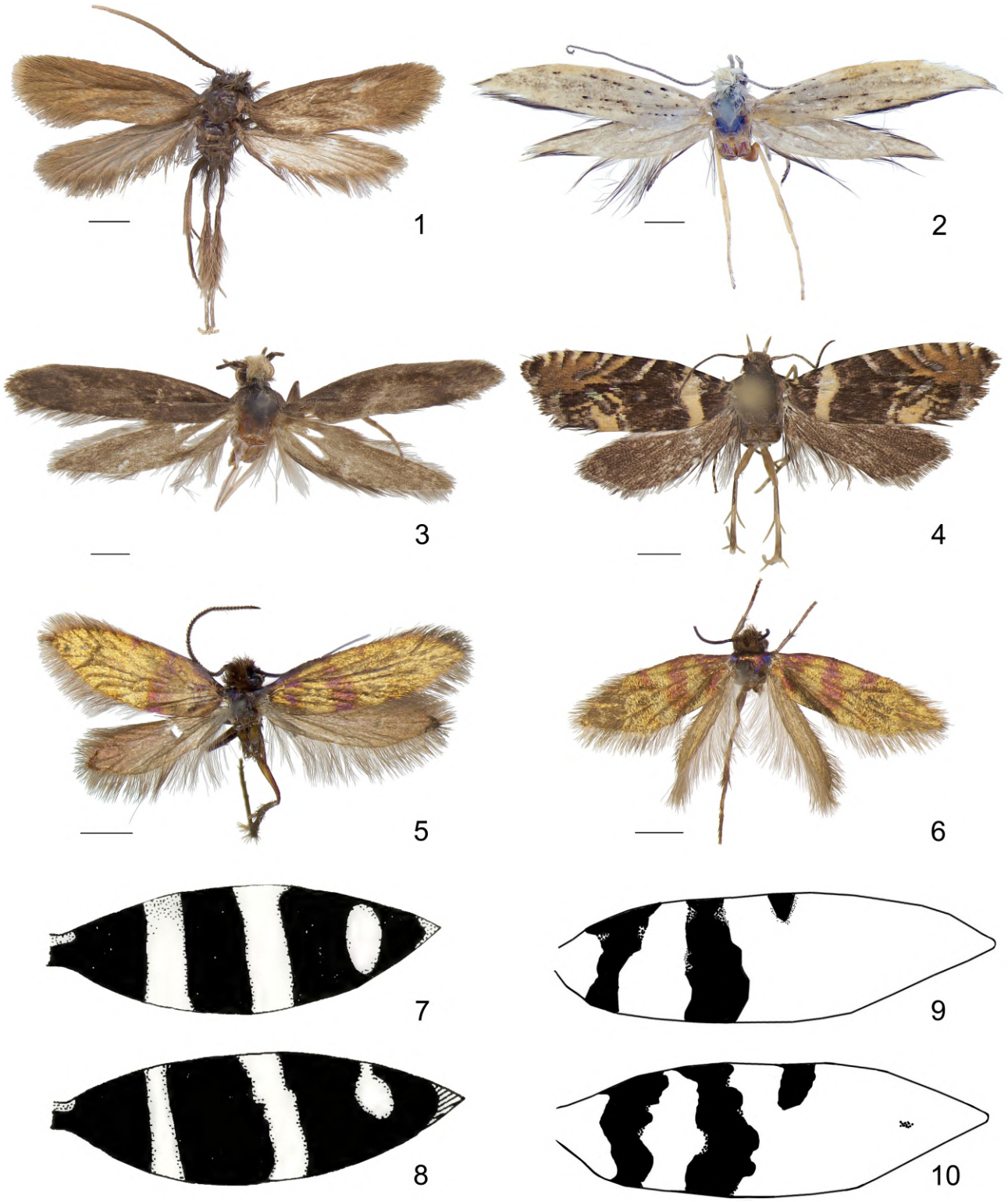
Host plant. *Parnassia palustris* L. (*Celastraceae*) in Europe (Huemer & Tarmann 1991).

Genus *Metanomeuta* Meyrick

Type species. *Metanomeuta fulvicrinis* Meyrick, 1935, by subsequent designation by Friese (1962).

Distribution. Russia (south of Far East: Primorskii Krai), **first record**; South Korea; China (Henan, Sichuan, Hubei, Anhui, Zhejiang, Jiangxi, Hunan, Guizhou, Fujian, Guangxi); Japan (Honshu, Shikoku, Kyushu) (Moriuti 1977; Jin & Wang 2008; Lewis & Sohn 2015).

Remarks. Genus *Metanomeuta* was described for two species, *M. fulvicrinis* and *M. zonoceros* Meyrick, 1935 based on a series of specimens from H. Höne collection. The *M. fulvicrinis* was collected in two localities of Central and East China: Tienmushan (Zhejiang Province) and Hoengshan (Hunan Province), and *M. zonoceros* was collected in Hoengshan only (Meyrick 1935).



FIGURES 1–10. Adults (1–6) and schemes of forewing pattern (7–10). 1—*Cauchas storozhenkoi* **sp. nov.**, male, holotype; 2—*Kessleria fasciapennella*, female; 3—*Metanomeuta fulvicrinis*, male; 4—*Glyphipterix maritima*, female; 5, 6—*Micropterix sikhotealinensis*: 5—male, holotype; 6—female; 7, 8—*M. aureatella*, after Zeller-Lukashort *et al.* (2007: figs 30, 32); 9, 10—*M. sikhotealinensis*: 9—male, holotype; 10—female. Scale bar 1 mm.

Meyrick in the preface for his paper indicated that he "indebted to the great generosity of Prince Aristide Caradja and H. Höne for permission to retain 58 type-specimens" in his collection in British Museum, and only "the co-types and para-types of those when such exist, are deposited in their collections. 29 type-specimens remained in the coll. Caradja, which I especially indicate" (Meyrick 1935: 45). Meyrick, describing new taxa, indicated that the type series of *M. fulvicrinis* includes five specimens and the type series of *M. zonoceros* includes three specimens. Friese (1962), examining the specimens from the Caradja's collection (National Museum of Natural History "Grigore Antipa", Bucharest, Romania), indicated totally 15 specimens belonging to both species, synonymising them, and 11 specimens of them associated with *M. fulvicrinis.* He did not indicate whether he had the specimens studied by Meyrick and mentioned in his descriptions of each species. It is not clear from work by Friese whether the specimen he designated as the lectotype was originally one of the few syntypes with which Meyrick worked. The number of specimens listed by Friese (1962) is twice the number of the type series.

According to the International Code of Zoological Nomenclature if specimens were not mentioned in the description, they are not syntypes and specimen which was not originally among syntypes and later designed as lectotype lost its status (ICZN 1999: Arts 74.2, 72.4.1). Moreover, if the specimens from the National Museum of Natural History "Grigore Antipa" were not originally part of the syntype series, they are not also paralectotypes, as erroneously claimed by Friese (1962) and Moriuti (1977).

Lewis & Sohn (2015) statement that "prior to Clarke (1965), Friese (1962) had designated a lectotype of *fulvicrinis*, as reported by Popescu-Gorj (1992), invalidating Clarke's designation" is erroneous, since all the discussed specimens in the Caradja's collection, examined by Friese, in number much more than it was included in the type series, and cannot be syntypes (at least, that part which exceeds the number of probable syntypes). Furthermore, Popescu-Gorj could not validate designation of the lectotype for *fulvicrinis* by Friese, because he indicated different locality for the Friese's lectotype of *M. fulvicrinis*: "West Tien-Mu-shan (1600 m)" (Popescu-Gorj 1992: 152), whereas "China, Prov. Hunan, Hoeng-Shan (900 m)" in Friese (1962: 323). Based on the above, the type locality of the species is also undefined, since it is determined by the place of lectotype origin (ICZN 1999: Art. 76.2).

Clarke designated lectotypes for *M. fulvicrinis* and *M. zonoceros* later (Clarke 1965), without mention of the Friese's designation. However, just this designation may be valid, as it fully complies with the requirements of ICZN (1999), since at least part of true syntypes of *M. fulvicrinis* and *M. zonoceros* undoubtedly are stored in the NHM, and since Meyrick did not indicate that he passed the type(s) of these species to the Caradja's collection.

Thus, the questions about priority of lectotype designation for *M. fulvicrinis* and *M. zonoceros*, and about the type locality for the first of them are open until the location of the true syntypes of *M. fulvicrinis* and *M. zonoceros* is established and whether the true syntypes are designated as lectotypes of these species by Friese (1962).

Metanomeuta fulvicrinis was designed as a type species of the genus *Metanomeuta* by Friese (1962), who was a first reviser (ICZN 1999: Art. 24.2.1). He also proposed to treat *M. zonoceros* as junior synonym of *M. fulvicrinis*. Later Clarke (1965), designating lectotypes for both species, illustrated them and confirmed their synonymy.

Despite of large similarity in the male genitalia, *M. fulvicrinis* differs from *M. zonoceros* by larger size, more arched costa of forewing and different ratio of length and maximal width of forewing: the last species has narrower forewing. Besides, according to original descriptions *M. fulvicrinis* without distinct wing pattern and these species collected in different months: *M. fulvicrinis* in May-July and October, and *M. zonoceros* in July-August.

Jin and Wang (2008), studying numerous specimens collected in China and associated with *M. fulvicrinis*, showed the variation in shape and pattern of forewing (in the original description forewing without pattern), variation in shape of gnathos and valva, in width of sacculus in the male genitalia and variation in shape of antevaginal and postvaginal plates in the female genitalia. The genus was monotypic until Jin and Wang described two more species: *M. spinisparsula* Jin & Wang, 2008 and *M. yuexiensis* Jin & Wang, 2008. Thus, currently the genus includes three species. The generic composition and status of described taxa within this genus need to be revised not only by morphological comparison but also molecular study.

Considering the great morphological diversity in the current interpretation of *M. fulvicrinis*, which may be a complex of related species, the specimen from the southern Russian Far East is tentatively identified as *M. fulvicrinis*, which is first recorded in Russia as well as the genus *Metanomeuta* Meyrick.

***Metanomeuta fulvicrinis* Meyrick, 1935**
(Figs 3, 15, 22–25)

Material examined. 1 ♂, Russia, Primorskii Krai, Ussuriiskii district, 20 km SE of Ussuriisk, Gornotajezhnoe village, 43°41’44” N, 132°09’26” E, 05.vii 1995, (leg. M. Ponomarenko), GS 343 AT, FSCB.

Diagnosis. *M. fulvicrinis* is similar to *M. yuexiensis* and *M. spinisparsula* in the male genitalia by relatively wide socius tapering towards pointed apex, which is curved ventrally and bearing small thorn, valva wide in basal part, sacculus as sclerotised thorned plate and aedeagus with cornuti as spines packed in bunches. *M. fulvicrinis* differs from related species by male genitalia with socius wider in basal part and smoothly tapering towards the pointed apex, valva with large ventro-basal lobe rounded at apex and with sacculus bearing strong thorns on the relatively wide band-like sclerotisation, and aedeagus sinuous in basal 2/3 and curved at distal 1/3, with spiny cornuti packed into two bunches, about 1/5 of aedeagus length (Figs 22–25).

Comparative morphological notes. Generally, specimen collected in the Russian Far East and identified as *M. fulvicrinis* Meyrick, is similar to related species by characters of external morphology. However, its wingspan 12.5 mm, which is corresponding to smaller parameters of wingspan indicated for *M. fulvicrinis* from China and similar to that in *M. yuexiensis.* Labial palpus lighter, first segment light brown, second and third segments greyish brown on outer side and lighter on inner side (Fig. 15). Tegulae and thorax brown, that lighter than in related species. Forewing greyish brown, with indistinct lightened spots: large one beyond basal 1/3 on dorsal half and smaller ones at 4/5 of costal margin and at apex (Fig. 3), that is similar to forewing illustrated for lectotype of *M. zonoceros* in Clarke (1965: plate 173, fig. 2) and for some specimens collected in China and identified as *M. fulvicrinis.*

Host plant. Unknown.

Distribution. Russia (south of Far East: Primorskii Krai), **first record**; South Korea; China (Henan, Sichuan, Anhui, Hubei, Zhejiang, Jiangxi, Hunan, Guizhou, Fujian, Guangxi); Japan (Honshu, Shikoku, Kyushu).

Family Micropterigidae Herrich-Schäffer

The family Micropterigidae comprises 25 genera and more than 170 species (van Nieukerken 2011; Davis & Landry 2012; Zeller & Huemer 2015; Zeller-Lukashort *et al.* 2013; Gibbs 2014; Zeller *et al.* 2016; Ngô-Muller *et al.* 2020; Zhang *et al.* 2020; Han *et al.* 2024) with the highest generic diversity in East Asian region of North Hemisphere (Hashimoto 2006), where seven genera were recognized, and in Australasian region of South Hemisphere, where this family is represented by six genera (Gibbs 2010, 2014). In the Palaearctic, the largest number of genera is represented in Japan, where, in addition to *Micropterix* Hübner four genera more (*Paramartyria* Issiki, *Issikiomartyria* Hashimoto, *Kurokopteryx* Hashimoto and *Neomicropteryx* Issiki) are known, currently including 17 species (Hashimoto 2013). In Europe micropterigid moths are represented by the type genus only which includes more than 50 species with greatest species diversity in the Mediterranean region (Zeller & Huemer 2015, Lepiforum 2025). In Russia, only the genus *Micropterix* is represented, but its species diversity is four times less than in Europe.

Genus *Micropterix* Hübner

Type species. *Tinea podevinella* Hübner, [1813], by subsequent designation by Meyrick (1912).

Distribution. Palaearctic region: Europe; Russia (European part, south of West and East Siberia, Far East); North Africa; West (Lebanon, Syria, Israel) and Central (Turkmenistan) Asia, Japan (Hokkaido, Honshu); Indomalayan region: Northeast and East India (Heath 1986, 1996; Ponomarenko & Beljaev 2000; Corley 2007; Zeller-Lukashort *et al.* 2007; Zeller-Lukashort *et al.* 2009; Lees *et al.* 2010; Hashimoto 2013; Zeller *et al.* 2016; Das & Singh 2022; Sinev & Kozlov 2024; Lepiforum 2025).

Remarks. World fauna of the genus *Micropterix* Hübner includes 80 extant and 2 extinct species, and the greatest biodiversity the genus reaches in South Europe (Staudinger 1879–1880; Kuznetsov 1960; Zaguljaev 1983, 1987, 1993; Heath 1986; Kurz *et al.* 1997; Ponomarenko & Beljaev 2000; Hashimoto 2006; Corley 2007; Zeller-Lukashort *et al.* 2007; Zeller-Lukashort *et al.* 2009; Kurz & Kurz 2010; Lees *et al.* 2010; Zeller & Huemer 2015; Zeller *et al.* 2016; Das & Singh 2022; Sinev & Kozlov 2024). To date 11 species of the genus are known in the

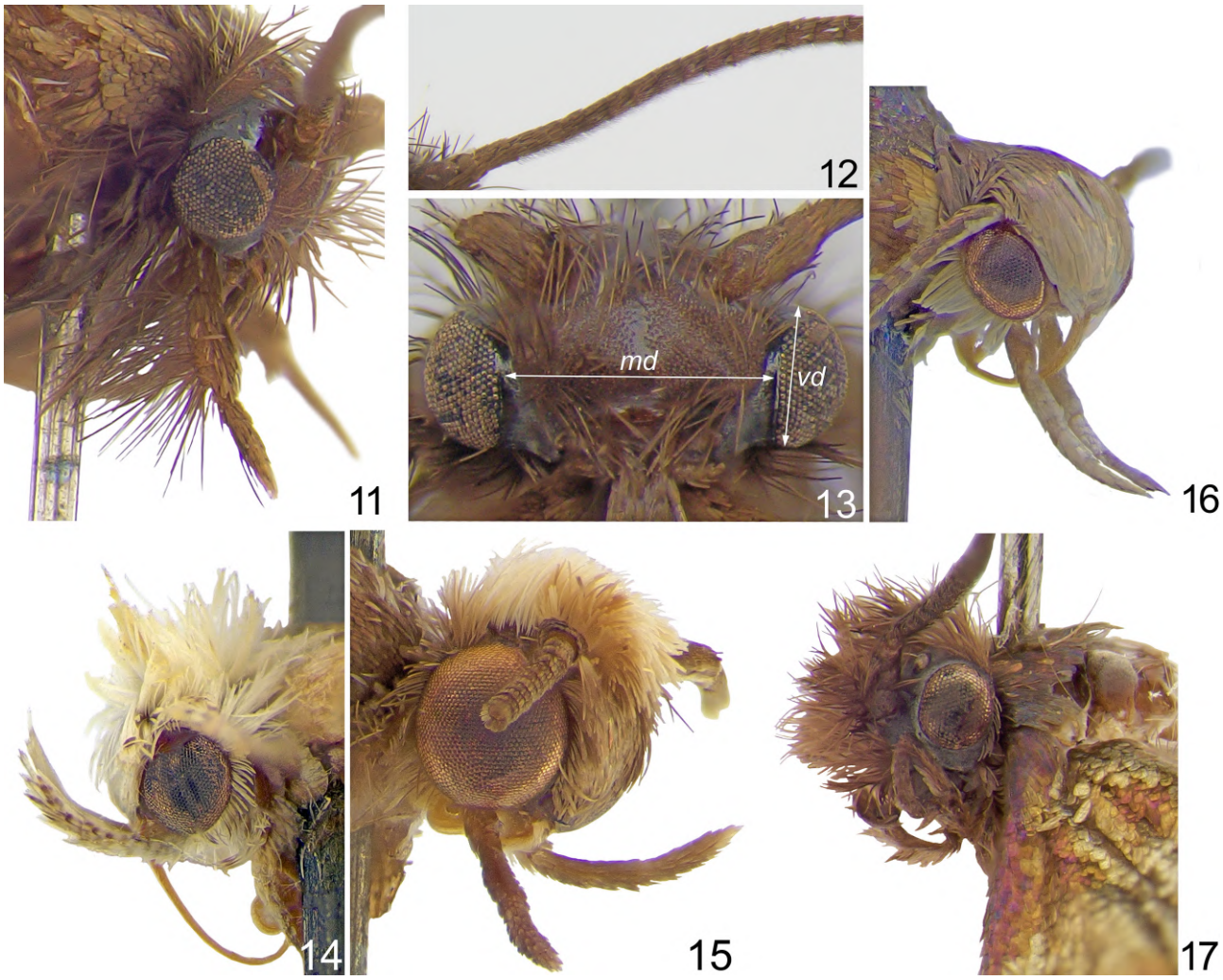
fauna of Russia, the European part and North Caucasus. Of these, only *M. aureatella* (Scopoli) has a large range, extending from Europe through Western and Eastern Siberia with disjunctions to East Asia, including the south of the Russian Far East. The second species, *M. sikhotealinensis* Ponomarenko & Beljaev, is known so far only from the south of the Far East. It was described on the base of three specimens, all males, collected in mountain coniferous forest in the southern part of the Sikhote-Alin Range (Primorskii Krai). Until now, the morphology of female was unknown. Processing of dry specimens in the collection of FSCB allowed to find female of this species, the morphology of which is described below.

Micropterix sikhotealinensis Ponomarenko & Beljaev, 2000

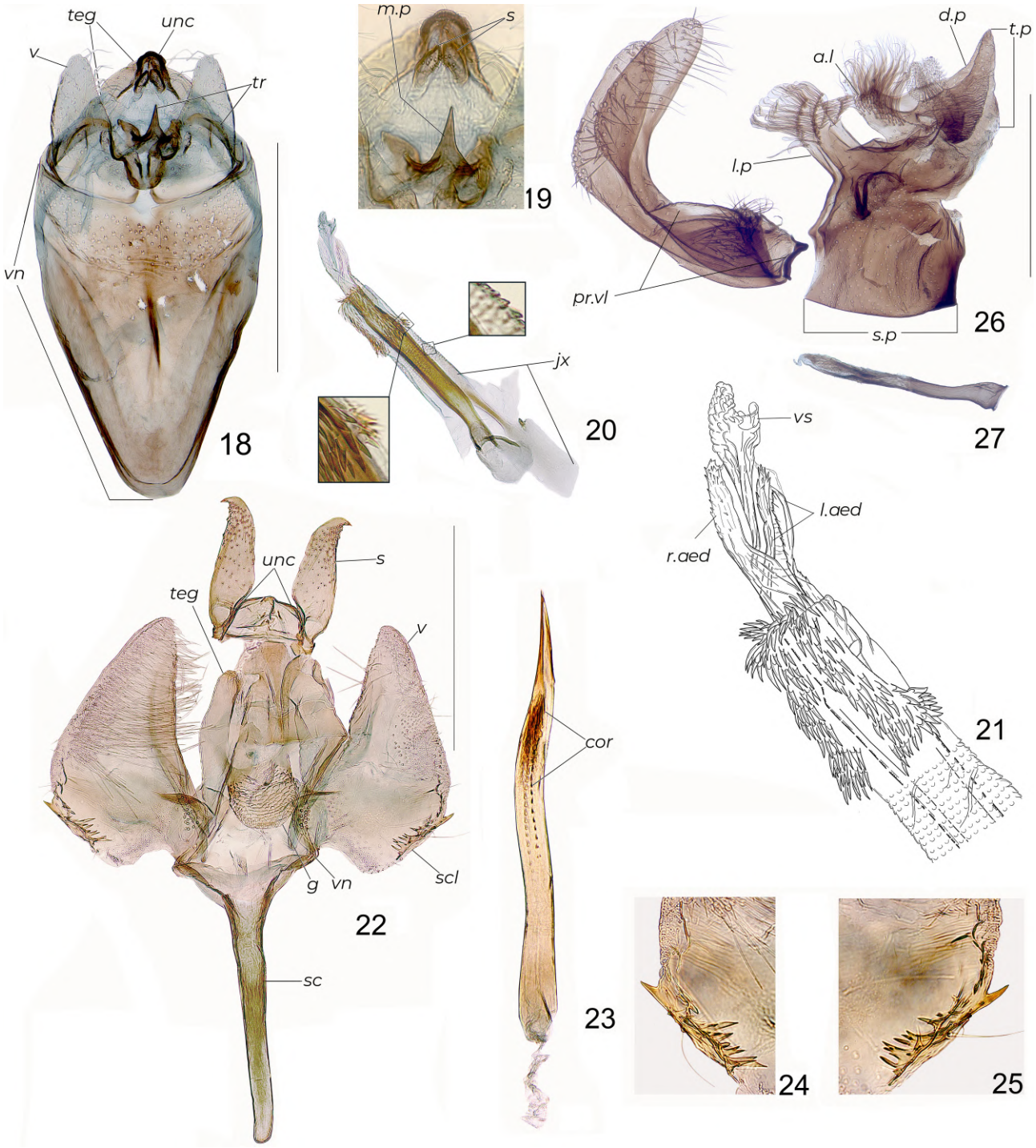
(Figs 5, 6, 9, 10, 17, 26, 27, 30, 33, 34)

Material examined. Type material. Holotype, 1 ♂, Russia, Primorskii Krai, Chuguevskii district, 16 km SSE Yasnoe village, Sister stream, 1000 m a.s.l., 43°33’48” N, 134°04’01” E, 17.vi 1998 (leg. E. Beljaev), GS 350 MP. Paratypes: 1 ♂, same locality, date and collector; 1 ♂, Russia, Primorskii Krai, 16 km SE Yasnoe village, valley of Ussuri river, 43°36’05” N, 134°06’46” E, 20.vi 1998 (leg. E. Beljaev), GS 351 MP, all in FSCB.

Additional material. 1 ♀, Russia, Primorskii Krai, 30 km NW Lazo, Lazovskii pass, 896 m a.s.l., 43°33’08” N, 133°34’57” E, 11.vii 2001 (leg. M. Ponomarenko), GS 346 MP, FSCB.



FIGURES 11–17. Heads with appendages. 11–13—*Cauchas storozhenkoi* **sp. nov**., male, holotype: 11—head, lateral view; 12—flagellum with ventral ciliation; 13—head, frontal view, measurements for calculation of interocular index, shown by arrows; 14—*Kessleria fasciapennella*, head of female, lateral view; 15—*Metanomeuta fulvicrinis*, head of male, lateral view; 16—*Glyphipterix maritima*, head of female, latero-frontal view; 17—*Micropterix sikhotealinensis*, head of male, holotype, lateral view. Abbreviations: md—minimum distance between the eyes across the frons, vd—vertical eye diameter.



FIGURES 18–27. Male genitalia. 18–21—*Cauchas storozhenkoi* **sp. nov.**, holotype, GS 345 MP: 18—genitalia, ventral view, aedeagus removed; 19—uncus, socii and medial sclerite of transtilla, ventral view; 20—aedeagus, dorsal view; 21—apex of aedeagus, dorsal view. 22–25—*Metanomeuta fulvicrinis*, GS 343 AT: 22—genitalia, ventral view, aedeagus removed; 23—aedeagus, lateral view; 24—sacculus of left valva with thorns; 25—sacculus of right valva with thorns. 26, 27—*Micropterix sikhotealinensis*, holotype, GS 350 MP: 26—genitalia, lateral view, aedeagus removed; 27—aedeagus, lateral view. Abbreviations: a.l—accessory lobe, cor—cornuti, d.p—dorsal tegminal process, g—medial sclerite of gnatos, jx—juxta, l.aed—left lobe of aedeagus apical part; l.p—lateral tegminal process, m.p—medial process of W-shaped plate of transtilla, pr.vl—inflated proximal part of valva, r.aed—right lobe of aedeagus apical part; s—socii, sc—saccus, scl—sacculus, t.p—tegminal part of annulus, teg—tegumen, tr—transtilla, s.p—sternal part of annulus, unc—uncus, v—valva, vs—vesica, vn—vinculum. Scale bar 0.5 mm with the exception of enlarged figures 19, 24, 25.

Diagnosis. *M. sikhotealinensis* is similar to *M. aureatella* (Scopoli, 1763) by cucullus curved dorsally almost at a right angle and significantly expanded in the distal part, by dorsal and lateral processes having similar shape and position on annulus in the male genitalia. It differs by a forewing with an inverted groundcolour and pattern of forewing (Figs 5, 6, 9, 10). It can be also distinguished by dorsal process of annulus, which wider basally, proximal part of valva with longer inflated part, which about 3/5 of total valval length in the male genitalia (Fig. 26). *M. aureatella* has dorsal process of annulus narrower basally and proximal part of valva with shorter inflated part, about half of total valval length in the male genitalia. In the female genitalia, *M. sikhotealinensis* differs from the related species by narrower sternal sclerotisation of 9th segment, split in two more or less equal lobes, with smoothly sloped lateral edge in the female genitalia (Figs 30, 33, 34).

Adult. Wingspan 9.1–9.5 (♂) and 8.9 mm (♀); length of forewing 4.2–4.5 (♂) and 4.1 mm (♀) (Figs 5, 6). Head with raised brown hair-like scales (Fig. 17). Antenna brown and monochromatic. Thorax and tegula dark brown, covered by iridescent violet and bronze scales. Forewing golden-yellow with violet two transverse fasciae at 1/8 and 1/3 of wing length, and one costal spot at half of wing length, two indistinct spots formed by accumulated iridescent violet scales before tornus and at the end of cell; fringe brown. Hindwing brown, slightly darker distally, with iridescent violet and bronze shine; fringe brown (Figs 5, 6).

Comparative morphological notes. The forewing of *M. sikhotealinensis* has golden groundcolour and pattern formed by violet two transverse fasciae at 1/8 and 1/3 and one small costal spot at half of wing length (Figs 5, 6, 9, 10). *M. aureatella* has violet groundcolour and two golden fasciae at 1/3 and about half of wing length and more or less costal spot sometimes almost reaches dorsal edge of wing (Figs 7, 8). In the male genitalia both species differ by width of basal part of dorsal process of annulus: *M. sikhotealinensis* has wider dorsal process compared to that in *M. aureatella.* The subspecies *M. aureatella shikotanica* Kozlov described from the Far East of Russia has not only narrower dorsal process of annulus but smaller and shorter one than that in the nominotypical subspecies. The inflated proximal part of valva in this subspecies about half of total valval length (after Kozlov 1988: fig. 2), which corresponds to that in European *M. aureatella* illustrated by Zeller-Lukashort *et al.* (2007), but longer than in *M. aureatella* from Japan (Hashimoto 2006). *M. sikhotealinensis* has longest inflated proximal part of valva, exceeding half of total valval length (Fig. 26). Females of *M. aureatella* from Europe and Japan, and *M. sikhotealinensis* from the Russian Far East have different shape of sternal sclerotisation of 9th segment. *M. sikhotealinensis* has shorter (along to longitudinal body axis) sclerotisation split in two more or less equal lobes (Figs 33, 34), European *M. aureatella* with longer sclerotisation split in two lobes different in size (Figs 35, 36), Japanese specimen of the same species with slightly longer sclerotisation than in European one and without distinct split (Figs 37, 38).

Host plant. Unknown.

Distribution. Russia (south of Far East: Primorskii Krai).

Family Glyphipterigidae Stainton

The family of Sedge moths (Glyphipterigidae) includes about 400 species from 25 genera, of which more than 20 genera are monotypical and about three-fourth of species are included into subcosmopolitan genus *Glyphipterix* (Heppner 1982, 1985; Arita 1979, 1983, 1985, 1987, 1995; Diakonoff 1986; Dugdale 1988; Mey 1991; Arita & Heppner 1992; Edwards 1996; Dugdale *et al.* 1999; Arita & Owada 2006; Liu & Li 2014; Sohn & Heppner 2015; Pohl & Nanz 2023). The greatest generic diversity of the glyphipterigid moths is in the Neotropical region, where 11 genera were described, and most species richness is in the Indomalayan and Australian-New Zealand regions with a slight difference in quantity. The taxonomic diversity in the North Hemisphere is much lower: 48 species from three genera are recorded in the Palaearctic and 41 species from five genera are known in the Nearctic (Heppner 1982; Arita 1995; Diakonoff 1986; Dugdale 1988; Mey 1991; Arita & Owada 2006; Liu & Li 2014; Sohn & Heppner 2015; Ponomarenko 2016; Pohl & Nanz 2023; Jeong *et al.* 2024; Ponomarenko & Sinev 2024a). 23 species from three genera were registered for the fauna of Russia and more than half of them are distributed in the Far East (Ponomarenko 2016; Ponomarenko & Sinev 2024a).

Genus *Glyphipterix* Hübner

Type species. *Tinea bergstraesserella* Fabricius, 1781, by subsequent designation by ICZN (1986).

Distribution. Subcosmopolitan, except for the Arctic and Antarctica (Heppner 1982, 1985; Arita 1983, 1985, 1987, 1995; Diakonoff 1986; Dugdale 1988; Mey 1991; Arita & Heppner 1992; Edwards 1996; Dugdale *et al.* 1999; Arita & Owada 2006; Liu & Li 2014; Sohn & Heppner 2015; Pohl & Nanz 2023).

Remarks. The world fauna includes more than 310 species belonging to the genus *Glyphipterix* Hübner (Heppner 1982, 1985; Arita 1979, 1983, 1985, 1995; Arita & Owada 2006; Liu & Li 2014; Sohn & Heppner 2015; Pohl & Nanz 2023) and only 21 species are recorded in Russia. Of these, 13 species inhabit the Far East (Ponomarenko 2016; Ponomarenko & Sinev 2024a). Processing of the dry specimens collected in the south of the Far East made it possible to identify the female of species *Glyphipterix maritima* Diakonoff, 1979, for which only the male was known until now (Diakonoff 1986), the female morphology is described below.

Glyphipterix maritima Diakonoff, 1979

(Figs 4, 16, 31, 32)

Material examined. 1 ♀, Russia, Primorskii Krai, Terneiskii district, 50 km W of Maximovka village, upper Maximovka river, at the issue of Bolshaya Lugovaya river, 530 m a.s.l., 46°01’45” N, 137°03’35” E, 09.vii 1998 (leg. E. Beljaev), GS 347 MP; 1 ♀, Russia, Primorskii Krai, Chuguevskii district, 31 km SE of Chuguevka village, Verkhneussuriiskii station of FSCB, 590 m a.s.l., 44°22’07” N, 134°12’10” E, 20.vii 2018 (leg. M. Ponomarenko), GS 348 MP; 1 ♀, Russia, Primorskii Krai, Chuguevskii district, 24.5 km SE of Yasnoe village, 630 m a.s.l., 43°36’01” N, 134°14’20” E, 12.vii.2010 (leg. M. Ponomarenko), all in FSCB.

Diagnosis. *G. maritima* is closely related to *G. gaudialis* Diakonoff & Arita, 1976, by similar pattern of forewing, general morphology of the male genitalia, also by setaceous rounded lobes of postvaginal plate and large funnel-shaped antrum in the female genitalia. It can be differed by narrower forewing at whole, forewing with pale yellow transverse band at 1/5 of length, which narrower overall and especially constricted in dorsal half (Fig. 4). It differs by valva somewhat longer than aedeagus, vinculum with ventrolateral angles ventrally and relatively longer saccus, about half of aedeagus length in the male genitalia. Also, it is distinguished by setaceous lobes of postvaginal plate directed medially, antrum with large triangular notch on dorsal side and small thorns in its bottom arranged in ring with two lateral aggregations, narrow and long ductus bursae, approximately equal to corpus bursae in length and by corpus bursae more or less oval, without signa in the female genitalia (Figs 31, 32).

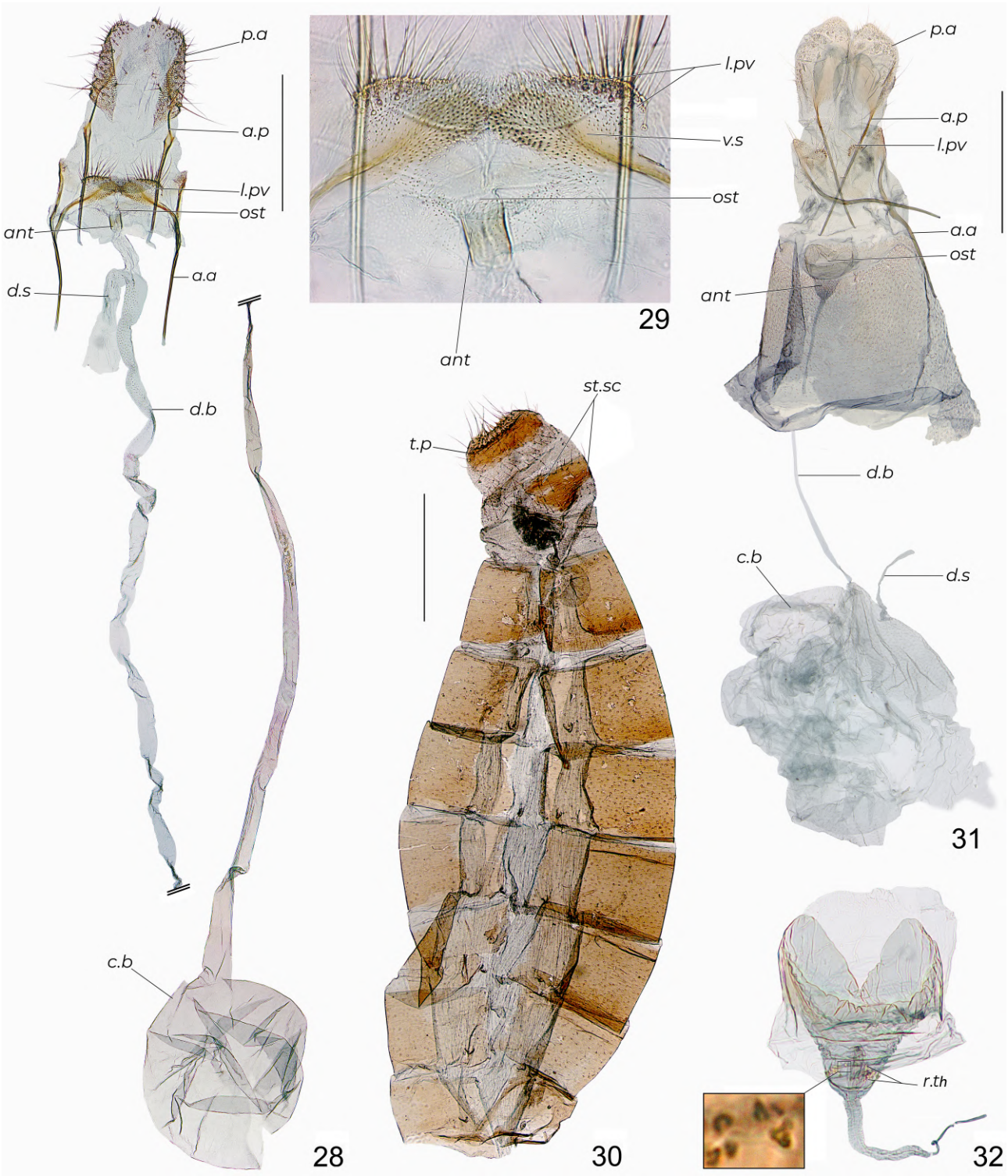
The related species *G. gaudialis* has broader forewing, which with yellow transverse band wider overall and not constricted in dorsal half. Its male genitalia with valva shorter than aedeagus, vinculum with rounded ventrolateral angles and relatively shorter saccus, 3.8 times shorter than aedeagus length in the male genitalia. Its female genitalia with lobes of postvaginal plate slightly flattened on apex and directed caudally, antrum without large notch on dorsal side, ductus bursae short, about 1/13 of corpus bursae length and corpus bursae elongated oval, with neck and two signa.

Adult, female. Wingspan 11.2 mm, forewing length 5 mm. The appearance of female corresponding to that of male described by Diakonoff (1979). The only differences in light yellow spot at 2/3 of dorsum: in female this spot Y-shaped, namely deeply emarginated similar to that in *G. gaudialis*, illustrated by Diakonoff (1986) (Figs 4, 16).

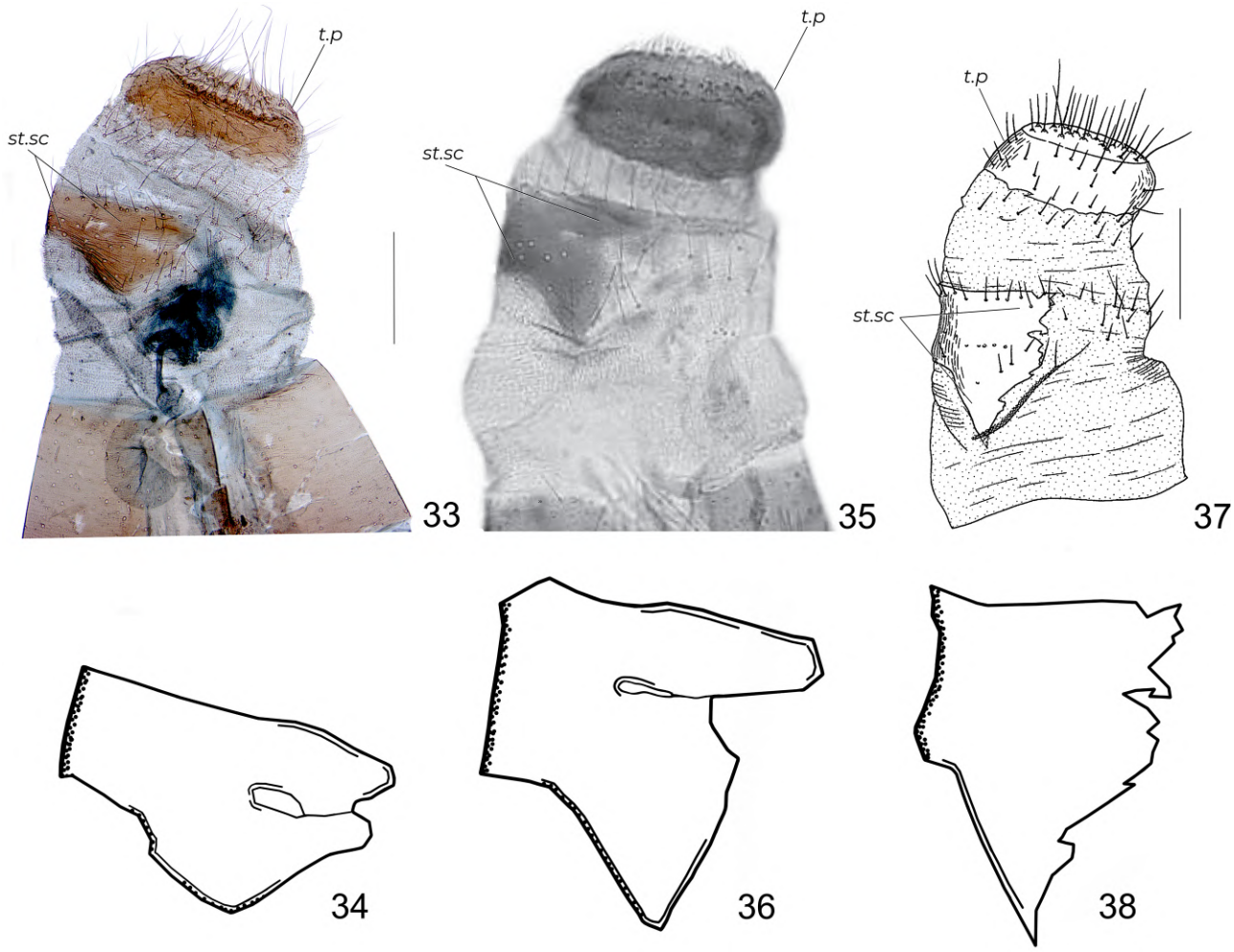
Female genitalia. Ovipositor relatively short, membrane between 9th and 8th abdominal segments about 1/3 of papillae anales length. Segment 8th with sclerotised posterior margin. Apophysis posterioris slightly shorter than apophysis anterioris; each apophysis posterioris expanding into oval basal sclerotised plate distally, apophysis anterioris curved inwards in basal half. Setaceous lobes of postvaginal plate spaced and with rounded apex directed medially. Ostium large, rounded. Antrum sclerotised, funnel-shaped, with large triangular notch on dorsal side, and with ring of mainly singly located small thorns near bottom, some of which collected in 2 small lateral groups. Ductus bursae very thin, membranous, wrinkled in posterior part, almost equal to corpus bursae in length. Corpus bursae membranous, oval, without signa (Figs 31, 32).

Host plant. Unknown.

Distribution. Russia (south of Far East: Primorskii Krai).



FIGURES 28–32. Female genitalia and female abdomen. 28, 29—*Kessleria fasciapennella*, GS 344 AT: 28—genitalia, ventral view; 29—sternal area of 8th segment and antrum. 30—*Micropterix sikhotealinensis*, GS 346 MP, lateral view. 31, 32, *Glyphipterix maritima*, GS 348 MP: 31—genitalia, ventral view; 32—antrum, fragment with thorns near its bottom is shown. Abbreviations: a.a—apophysis anterioris, ant—antrum, a.p—apophysis posterioris, c.b—corpus bursae, d.b—ductus of corpus bursae, d.s—ductus seminalis, l.pv—lobe of lamella postvaginalis, ost—ostium, p.a—papillae anales, r.th—ring of thorns near the bottom of the antrum, st.sc—sternal sclerotisation of 9th segment, t.p—terminal papillae, v.s—sclerotisation of ventral arms of apophyses anteriores. Scale bar 0.5 mm with the exception of enlarged figures 29, 32.



FIGURES 33–38. *Micropterix* spp., female terminalia (33, 35, 37) and shapes of sternal sclerotisation of segment 9 (34, 36, 38), lateral view. 33, 34—*M. sikhotealinensis*; 35, 36—*M. aureatela*, Europe; 37, 38—*M. aureatella*, Japan. 35—photo after Zeller-Lukashort *et al.* (2007: fig. 109), 37—figure after Hashimoto (2006: fig. 13). Scale bar 0.2 mm with the exception of figures 34–36, 38. Abbreviation as in Fig. 30.

Conclusion

The study of materials on micromoths stored in the FSCB (Vladivostok, Russia) revealed new taxa for the fauna of Russia and, in particular, the Far East region. The discovery of the new species *Cauchas storozhenkoi* **sp. nov**. replenished not only list of known species of the family Adelidae as a whole, but also expanded the taxonomic diversity of this group in the Russian Far East at the species level, as well as the list of genera distributed in the south of this region: the genus *Cauchas* is recorded in the south of this region for the first time. Until now, single species from the genus, *C. breviantennella*, was known only in the north of the Far East, namely in Magadanskaya Oblast' (Magadan Region), which is located in the subarctic and northern temperate zones. The genus *Kessleria* Nowicki (Yponomeutidae) is also recorded in the Russian Far East for the first time. *K. fasciapennella*, collected in the south of this territory, expanded its range to the east, previously limited with the eastern border by the Irkutskaya Oblast' (Irkutsk Region, south of Eastern Siberia). The East Asian genus *Metanomeuta* Meyrick (Yponomeutidae), previously known only from China and Japan, has now been first registered in Russia. The species *M. fulvicrinis* has been described from the provinces of Central and Eastern China and, according to the current interpretation, has a high variability in the appearance and in the morphology of the male genitalia (Jin & Wang 2008). Therefore, the specimen collected in the south of the Russian Far East and possessing characters consistent with those of the species in the current understanding, was tentatively identified as *M. fulvicrinis* before the revision of the group.

The study of specimens from families Micropterigidae and Glyphipterigidae allowed to identify females of *Micropterix sikhotealinensis* and *Glyphipterix maritima* and describe their genital morphology for the first time, as a result of which the diagnosis of both species was updated to include new diagnostic characters. The discovery of new faunistic and morphological data based on the results of present study indicates that, despite the long period of entomological research, the fauna of Microlepidoptera in the Russian Far East has not yet been sufficiently studied.

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