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New species of the spring flat moths of the genera *Semioscopis* Hübner and *Luquetia* Leraut (Lepidoptera: Depressariidae) from Far East of Russia with notes on related species

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Abstract

Two new species (*Semioscopis fareastenica* **sp. nov.** and *Luquetia tigrina* **sp. nov.**) of the spring flat moths from Far East of Russia are described. The type specimen of *Semioscopis japonicella* Saito is revised. The molecular analysis based on a fragment of the mtCOI gene for *Semioscopis* spp. and *Luquetia* spp. was done for estimation of their genetic divergence. The interspecific genetic distances in these genera and minimal threshold for delimitation of species are discussed. The illustrations of the adults and the genitalia of both sexes of spring flat moths are provided. All available data on each taxon of the spring depressariid moths represented in East Asia are summarized and specified. *Semioscopis strigulana* is recorded for Primorskii Krai (Far East of Russia) for the first time. A checklist for East Asia species from genera *Semioscopis* and *Luquetia* is compiled.

Key words: depressariid moths, new taxa, molecular analysis, interspecific genetic distances, East Asia

Introduction

Two genera of the depressariid moths, *Semioscopis* Hübner, [1825] and *Luquetia* Leraut, 1991, include species with overwintering pupae and adults emerging in spring or early summer. The genus *Semioscopis* has trans-Holarctic distribution and to date has included six Palearctic and the same number Nearctic species, whose adults fly in spring in mixed and deciduous forests (Hodges 1974, 1983; Hanneman 1996; Sakamaki 2013; Pohl & Landry 2018; Lepiforum 2024). Until now, all known Palaearctic species were indicated for the fauna of Russia, three of which (*S. strigulana* ([Denis et Schiffermüller]), *S. japonicella* Saito and *S. similis* Saito) were reported in the Far East of Russia (Lvovsky 2019). The genus *Luquetia* currently includes five Palaearctic species, of which only *L. lobella* ([Denis et Schiffermüller]) has a large range with a disjunction in Western and Eastern Siberia, inhabiting Europe and East Asia. The remaining species are distributed locally: *L. orientella* (Rebel) known from south of Western Europe, Caucasus and Transcaucasia, *L. osthelderi* (Rebel)—from Turkey, *L. gissarella* (Lvovsky)—from Central Asia, and *L. largimacularis* Wang et Zheng—from NW China (Lvovsky 1990, 1995, 2016, 2019; Wang & Zheng 1999; Lvovsky & Nedoshivina 2023; Buchner & Corley 2024; Lepiforum 2024). Hitherto only two species were reported for Russia: *L. lobella* and *L. orientella* (Lvovsky 2019), and only the first of them was known from the Russian Far East.

Examination of specimens collected in the spring from the southern Far East of Russia resulted in the identification of two new species. Although both new species exhibit a pattern of forewings with elements similar to most *Semioscopis* species, only one of them belongs to the latter genus by the morphology of the male genitalia, and the other species is similar to the type species of the genus *Luquetia*. The discovered species is the third species of the genus *Luquetia* from two previously known (*L. lobella* ([Denis et Schiffermüller]) and *L. largimacularis* Wang

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et Zheng) in the fauna of East Asia. This new species is the first in the genus *Luquetia*, which flies in early May in the Far East, that is earlier than adults of other congeneric species. The discovery of a new species possessing a complex of characters combining external similarity to species from the genus *Semioscopis* and genitalia generally similar to those of the species of the genus *Luquetia* motivates a comparison of the genetic distances between species of these two genera. Besides, the presence of pairs of species similar in appearance and genitalia in the genus *Semioscopis* and distributed in different parts of the Old and New Worlds prompted a molecular analysis to estimate the genetic distances between species of this genus. During the revision of species inhabiting the Russian Far East, the holotype of *Semioscopis japonicella* described from Japan was studied, which led to a clarification of identification and the ranges of East Asian species.

Material and methods

Material. Specimens of *Semioscopis* and *Luquetia* were attracted to the light of mercury-vapour lamps 250 W and 400 W in different regions in south of Far East of Russia: Evreiskaya Avtonomnaya Oblast, Khabarovskii Krai and Primorskii Krai in April and May. The collected specimens were processed as dry material for morphological study. The studied specimens, including holotypes and paratypes of the new species, are deposited in the Bioresource collection (registration number 2797657) of Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far Eastern Branch of Russian Academy of Sciences (Vladivostok).

Morphological study. The male and female genitalia were prepared by a standard technique suggested by Falkovitsh & Stekolnikov (1978), the essence of which is maceration of the soft tissue in 10–15% KOH. The membranous parts in the male and female genitalia were stained by chlorazol black. The structures of external morphology and genitalia were studied using a Nikon SMZ–10 stereomicroscope. After examination of genitalia in glycerol, the genitalia of both sexes were slide-mounted using Euparal following the technique described by Robinson (1976). Photographs of the adults and genitalia slides 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. Identification of specimens was carried out by comparative analysis of morphological characters. In the descriptions of morphological characters, the terminology of genital structures follows Klots (1970).

Molecular analysis. To specify the identification of species distributed in Far East of Russia, a comparative molecular genetic analysis was carried out on the basis of the barcoding fragment of the mitochondrial gene COI. The interspecific genetic distances were detected to substantiate the threshold for delimitation of taxa. The data on nucleotide sequences of the fragment of COI gene for depressariid moths were taken from GenBank (NCBI) and from The Barcode of Life Data Systems (BOLD Systems) (Ratnasingham & Hebert 2007). From 13 species of the genus *Semioscopis* currently known in the world fauna, 12 species (with the exception of the *S. japonicella*) were included in the comparative genetic analysis based on the barcoding fragment of the COI gene. Three previously known species of the genus *Luquetia* were used in the genetic analysis, including the recently transferred to this genus *L. osthelderi* (Rebel) (Buchner & Corley 2024), with the exception of the new species, described in the present paper, samples of which were unsuitable for DNA extraction. The type species of related genera, *Depressaria* Haworth, *Exaeretia* Stainton and *Agonopterix* Hübner, were selected for this analysis as outgroups. Only high-quality sequences of the target COI fragment from the NCBI and BOLD System international bases were selected for analysis. The GenBank Accession Nos. and BOLD Sequence ID of these sequences are indicated in Table 1. Genetic analysis was performed using MEGA–7 software packages. The tree with inferred relationships between *Semioscopis* and *Luquetia* species based on the mtCOI gene fragment was constructed using the Neighbor–Joining statistical method and the Kimura 2–parameter model.

The following abbreviations were used in the text:

FSCB—Federal Scientific Center of the East Asia Terrestrial Biodiversity, Vladivostok, Russia, the center where the material is stored; GS—genital slide; MP—slide prepared by M.G. Ponomarenko; OMU—Osaka Metropolitan University, Osaka, Japan.

TABLE 1. List of sequences of COI gene fragment of the depressariid moths taken from GenBank (NCBI) and BOLD System for molecular analysis.

Name of species (as identified in GenBank and BOLD)	**Country and locality of sample origin**	**Voucher number**	**GenBank Accession Nos.**	**BOLD Sequence ID**
Semioscopis avellanella (Hübner)	Switzerland, Graubünden	TLMF Lep 04866	KX042492	DEEUR076-11.COI-5P
Semioscopis avellanella (Hübner)	Germany, Bavaria	BC ZSM Lep 70309	-	FGMLA383-12.COI-5P
Semioscopis avellanella (Hübner)	Finland, South Karelia	MM01136	HM396508	LEFIA162-10.COI-5P
Semioscopis aurorella Dyar	United States, Minnesota	BIOUG01046-A05	-	LMDH020-11.COI-5P
Semioscopis aurorella Dyar	Canada, Ontario	jflandry1759	GU096581	MECB777-05.COI-5P
Semioscopis inornata Walsingham	Canada, Ontario	BIOUG24422-C07	-	KSLEP316-15.COI-5P
Semioscopis inornata Walsingham	United States, Minnesota	BIOUG01046-C03	-	LMDH042-11.COI-5P
Semioscopis "japonicella"	Russia, Blagoveshchensk	TLMF Lep 23492	-	DEEUR1654-18.COI-5P
Semioscopis "japonicella"	South Korea	CBNUPM000029	OQ573703	GBCAB37519-24.COI-5P
Semioscopis mcdunnoughi Clarke	United States	122096261Apr2011	-	EHL668-12.COI-5P
Semioscopis mcdunnoughi Clarke	Canada, British Columbia	NFRC-2011-000001	-	MNAO1067-11.COI-5P
Semioscopis megamicrella Dyar	United States, Minnesota	BIOUG01046-A04	-	LMDH019-11.COI-5P
Semioscopis megamicrella Dyar	Canada, Ontario	HBL008901	GU092137	XAF085-05.COI-5P
Semioscopis merriccella Dyar	Canada, Ontario	CNCLEP00025075	-	MNAC014-07.COI-5P
Semioscopis merriccella Dyar	United States, Tennessee	BGS03315	-	LGSMG667-07.COI-5P
Semioscopis oculella (Thunberg)	Austria, Tyrol	TLMF Lep 16284	-	ABOLA597-14.COI-5P
Semioscopis oculella (Thunberg)	Finland, South Karelia	MM01137	HM396509	LEFIA163-10.COI-5P
Semioscopis packardella (Clemens)	Canada, Alberta	AMMVN5D	-	AMM009-09.COI-5P
Semioscopis packardella (Clemens)	Canada, Ontario	BL0014	-	BLTIB014-08.COI-5P
Semioscopis similis Saito	Russia, Blagoveshchensk	TLMF Lep 23493	-	DEEUR1655-18.COI-5P
Semioscopis steinkellneriana ([Denis et Schiffermüller])	Switzerland, Neuchatel	TLMF Lep 04797	KX042129	DEEUR007-11.COI-5P
Semioscopis steinkellneriana ([Denis et Schiffermüller])	Austria, Vorarlberg	TLMF Lep 14816	KP253600	LASTS364-14.COI-5P
Semioscopis steinkellneriana ([Denis et Schiffermüller])	Finland, South Karelia	MM00464	JF818789	LEFIA1363-10.COI-5P
Semioscopis strigulana ([Denis et Schiffermüller])	Finland, South Karelia	MM00451	HQ963147	LEFIA048-10.COI-5P

.....continued on the next page

TABLE 1. (continued)

Name of species (as identified in GenBank and BOLD)	**Country and locality of sample origin**	**Voucher number**	**GenBank Accession Nos.**	**BOLD Sequence ID**
Semioscopis strigulana ([Denis et Schiffermüller])	Italy, South Tyrol	TLMF Lep 11672	-	LEATE260-13.COI-5P
Semioscopis strigulana ([Denis et Schiffermüller])	Austria, Vorarlberg	TLMF Lep 14763	KP253444	LASTS311-14.COI-5P
Luquetia lobella ([Denis et Schiffermüller])	Austria, Carinthia	KLM Lep 15386	-	LEASW1840-21.COI-5P
Luquetia lobella ([Denis et Schiffermüller])	Germany, Bavaria	BC ZSM Lep 61991	-	FGMLA095-12.COI-5P
Luquetia orientella (Rebel)	Georgia, Zaridzeebi	MM24153	-	LEFIJ2610-15.COI-5P
Luquetia osthelderi (Rebel)	Turkey	NHMW2.Lep. 0028	-	DEEUR1073-17.COI-5P
Exaeretia allisella Stainton	Finland, South Karelia	MM02223	HM871451	LEFIB569-10.COI-5P
Agonopterix ocellana (Fabricius)	Germany, Bavaria	BC ZSM Lep 70311	-	FGMLA385-12.COI-5P
Agonopterix ocellana (Fabricius)	Austria, Vorarlberg	TLMF Lep 07987	KM572704	PHLAV168-12.COI-5P
Depressaria radiella (Goeze)	Finland, Dragsfjaerd	MM13203	HM875532	LEFIF849-10.COI-5P
Depressaria radiella (Goeze)	Austria, Lower Austria	TLMF Lep 04948	KX042381	DEEUR158-11.COI-5P
Depressaria radiella (Goeze)	United States, Washington	RWWA-1591	HQ971813-SUPPRESSED	RWWB592-10.COI-5P

Description of new species

Semioscopis fareastenica **Ponomarenko et Koshkin sp. nov.**
Figs 1–3, 11–14, 23–25, 37–40.

Semioscopis japonicella auct. (nec Saito, 1989): Lvovsky (1999: 59); Lvovsky & Dubatolov (2007: 56); Lvovsky (2016: 76, 2019: 53); Koo *et al*. (2023: 514).

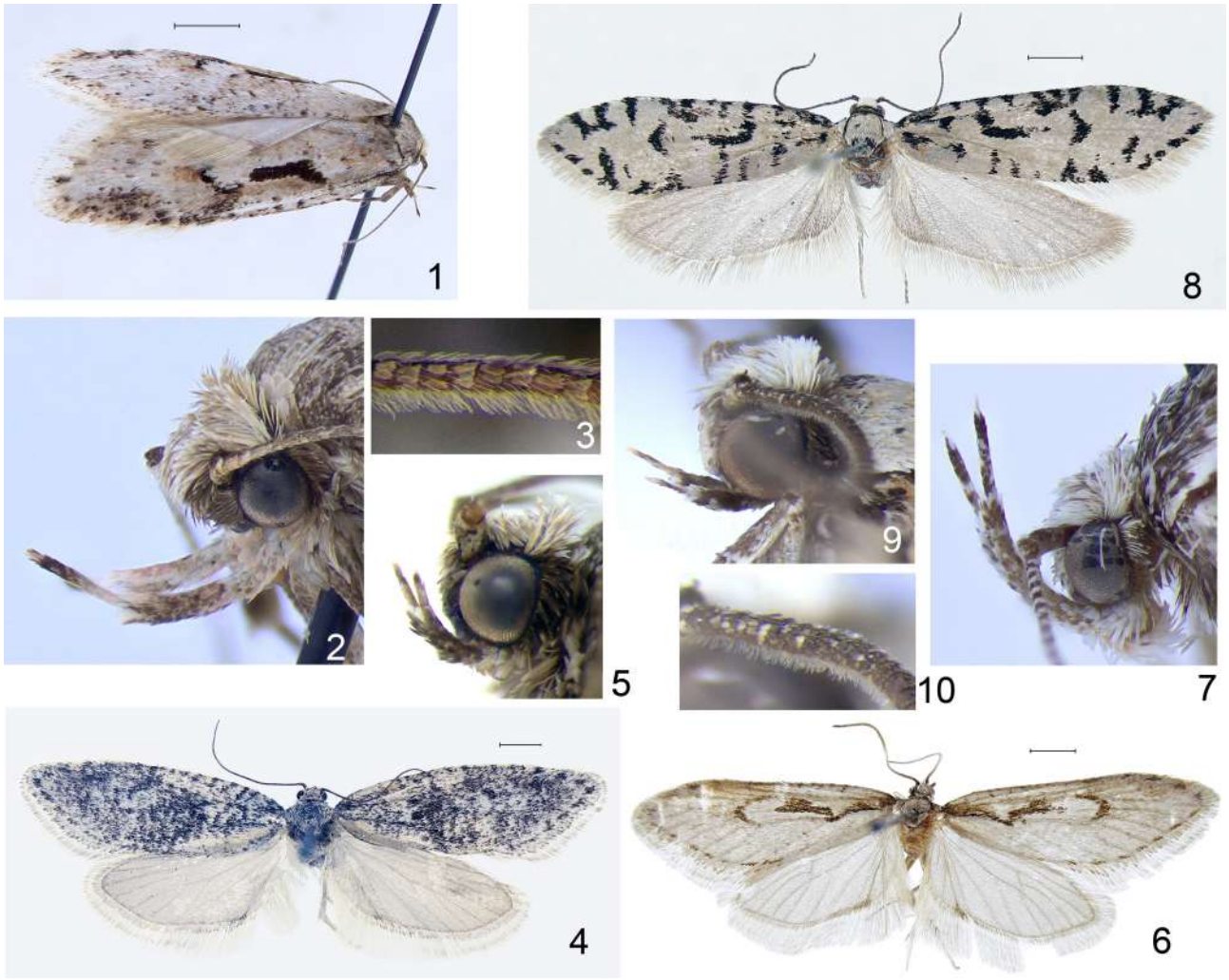
Type material. Holotype (red label with species name and authors): ♂, labeled: "**Russia, Khabarovskii Krai,** Verkhnebureinskii district, Bureinskii Nature Reserve, Bureya River, 3 km SW of confluence of Levaya Bureya and Pravaya Bureya rivers, cordon "Strelka", 51°38'39" N 134°15'45" E; 570 m a.s.l., 19.05.2021 (E.S. Koshkin leg.)", GS 309 MP, FSCB.

Paratypes: **Russia, Khabarovskii Krai:** 1♀, same collecting data as for holotype (E.S. Koshkin leg.), GS 298 MP; 1♂, 2♀♀; same locality and collector, 19.v 2016, GS 302 (♂) MP, 303 (♀) MP, 311 (♀) MP; 1♂, Bikinskii district, 8 km SE Boitsovo village, upper reaches of Shivki river, vicinity of "Shivki" scientific station, 46°55'06" N 134°23'04" E, 165 m a.s.l., 24.iv 2021 (E.S. Koshkin leg.), GS 299 MP. **Primorskii Krai:** 1♀, Ussuriiskii district, "Suputinskii" [Ussuriiskii] Nature Reserve, 17.v 1948 (A.I. Kurentsov leg.), GS 310 MP; 1♂, 1♀, Ussuriiskii district, 20 km SE Ussuriisk, Gornotajezhnoe village, 28.iv, 08.v 1995 (M.G. Ponomarenko leg.); 2♀♀, Shkotovskii district, 13 km E Novaya Moskva village, 43°20'32" N, 132°54'39" E; 420 m a.s.l., 28, 29.iv 2009 (M.G. Ponomarenko leg.), GS 297 MP, 304 MP; all in FSCB.

Diagnosis. The new species differs from all congeneric species by socius rectangular in shape and shorter than half width of tegumen in distal part, saccular process (cuiller) 2.2 times shorter than width of valva in place of its arising, aedeagus 7 times longer than cornutus and almost equal to valva in length, and by right digitiform process on anellus in the male genitalia.

Description. **Adult** (Figs 1–2, 11). Head with grey frons and vertex and dark-grey scales around eyes. Ocelli present. Antenna dark grey with scattered light-grey scales, with short cilia on ventral side in male; scape without pecten. Labial palpus with first segment 2 times shorter than second one, second segment 1.5 times longer than third one; first segment with alternating whitish and greyish-orange scales; second segment whitish in proximal part and brownish grey in distal part with white scales distally on outer side, and whitish on inner side; third segment whitish in proximal part and apically and dark brown in distal part on outer side, and light grey on inner side, darker distally. Ratio of eye diameter along anterior-posterior line and length of the labial palpus 1:4. Tegulae and thorax brownish grey. Forewing length 13.8–14.2 (♂), 10.7–13 (♀) mm, wingspan 29.2–30 (♂), 23–27.6 (♀). Forewing groundcolour pale beige with cross-hatching of short dark brownish and blackish strokes; pattern formed by longitudinal sinuous black thick streak from base of costa, which extending through part of cell, and a curved mark at end of cell; costal margin with blackish spot beyond middle and at 4/5 wing length; termen with 4–5 small blackish dots; brownish orange blurry and indistinct spots beyond discal cell and 4/5 wing length; fringe light grey, darker at base. Hindwing greyish beige; fringe light grey, darker at base. Forewing with Sc to costa beyond middle of wing length; R1–R5 to costa, R1, R2 and R3 separate at base, R4 and R5 stalked basally, diverging at distal third; M1–CuA1 to termen and CuA2 to tornus; M1– M3 free basally; CuA1 and CuA2 close basally, CuP reduced in basal part; 1A and 2A merged in distal 4/5 length. Hindwing with Sc to costa near 4/5 of wing length, Rs to costa before apex; M1–CuA1 to termen, M1 and M2 separate basally, M3 and CuA1 connate basally, CuA2 to tornus; A1–A3 separate basally, to dorsal margin.

Male genitalia (Figs 12–14, 23–25). Uncus almost equal to tegumen in length, with rounded notch on posterior margin, with rectangular socii. Gnathos with triangular lateral arms and rounded pineal median sclerite. Valva almost parallel-sided in basal 2/3, gradually narrowed towards rounded apex; saccular process (cuiller) slightly shorter than half width of valva in place of its arising, with pointed apex; saccular sclerotisation with narrowing at middle and significantly extended in distal part (Figs 12, 23). Anellus surrounding distal part of aedeagus, with right digitiform process on posterior margin (Fig. 25); juxta with lateral setaceous lobe and wedge-shaped cut on each side of anterior part. Aedeagus almost equal to valva in length, cylindrical and blindly closed basally, curved at 2/5 length, with inflated basal 2/5 and truncated apex; cornutus 7 times shorter than aedeagus; opening for ejaculatory ductus shifted on left side of basal part (Fig. 24).



FIGURES 1–10. *Semioscopis* spp. and *Luquetia tigrina* **sp. nov.**, adults and heads with appendages. 1–3—*Semioscopis fareastenica* **sp. nov.**, paratype male; 4, 5—*S. strigulana*; 6, 7—*S. similis*; 8–10—*Luquetia tigrina* **sp. nov.**, holotype male. Figs 1, 4, 6, 8—adult; 2, 5, 7, 9—head with labial palpi, enlarged; 3, 10—flagellum with ciliation on ventral side, enlarged. Scale bar for figures 1, 4, 6, 8—2 mm.

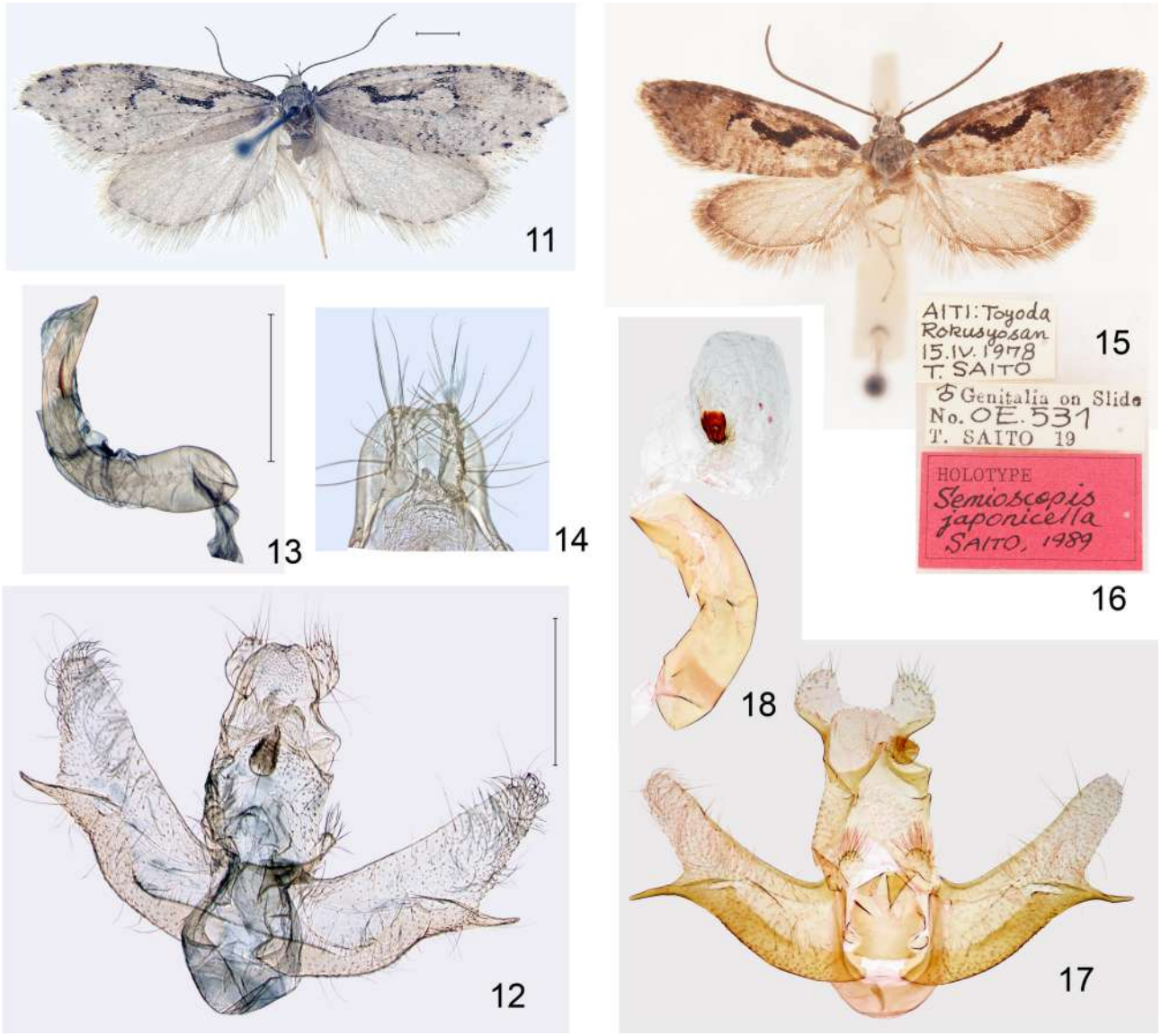
Female genitalia (Figs 37–40). Ovipositor short, membrane between 8th and 9th segments 2.6–3 times shorter than papillae analis; the latter sclerotised laterally. Apophysis posterioris 2.8 times longer than apophysis anterioris (Fig. 37). Sternal part of segment 8 with trapezoidal notch on posterior margin and extended anterior margin, cup–shaped vaginal sinus with rounded ostium submerged under posterior edge of segment 7, ostium surrounded by granular area extended caudally (Fig. 38). Antrum weakly sclerotised, with hard fold shortly beyond ostium and with thorned walls (Figs 38, 39); ductus seminalis arising beyond antrum. Ductus bursae wrinkled, spirally twisted, slightly widened towards corpus bursae. Corpus bursae membranous, oval, with rhomboid gutter-shaped signum placed approximately at half of its length (Fig. 40).

Distribution. Russia (Far East: Khabarovskii Krai and Primorskii Krai), South Korea.

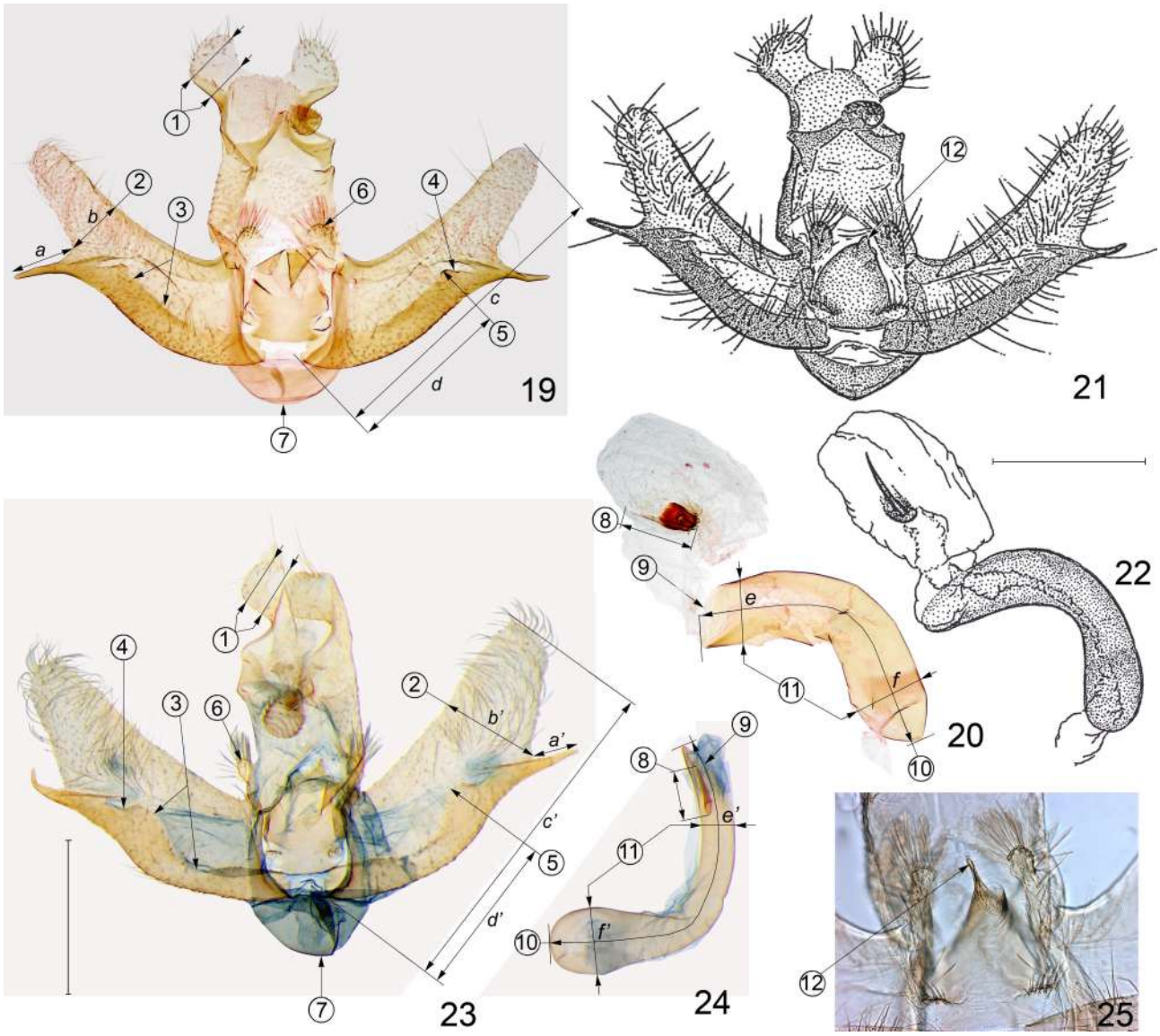
Etymology. The specific name is derived from the name of Far Eastern region, where it was discovered. Treated as a noun in the nominative singular standing in apposition to the generic name.

Remarks. The new species is most similar to *S. japonicella* Saito, 1989 and *S. steinkellneriana* ([Denis et Schiffermüller], 1775) in appearance by a longitudinal black sinuous streak on the proximal part of the forewing, which outlines the discal cell distally. The study of the holotype of *S. japonicella* allowed to clarify the differences in the appearance and the male genitalia between the type-specimen described from Japan and *S. fareastenica* **sp. nov.** The new species can be distinguished from *S. japonicella* by light grey forewing with thinner sinuous

streak and semi-oval arc outlining discal cell, whereas *S. japonicella* has brownish forewing with relatively thick sinuous streak and semi-circle arc outlining discal cell (Fig. 15). The most significant differences of the new species from *S. japonicella* in the male genitalia: saccular process (cuiller) shorter than width of valva in the place of its arising, socius rectangular in shape and less than half width of tegumen in distal part, aedeagus with distal part 2 times narrower than its basal part, cornutus 7 times shorter than total aedeagus length (Figs 23–25). *S. japonicella* possesses a saccular process (cuiller) almost equal to width of valva in the place of its arising; socius trapezoidal and extended distally, longer than half width of tegumen in distal part; aedeagus slightly narrowed in distal part; cornutus 4 times shorter than total aedeagus length (Figs 19–22). Main characters by which these two similar species can be distinguished are included in Table 2.



FIGURES 11–18. *Semioscopis fareastenica* **sp. nov.** and *S. japonicella* Saito, adults and male genitalia, holotypes. 11–14—*S. fareastenica* **sp. nov.**: 11—adult, 12–14—male genitalia, GS 309, 12—ventral view, aedeagus removed; 13—aedeagus, lateral view; 14—uncus with socii in natural position in glycerin, enlarged; 15–18—*S. japonicella* Saito: 15—adult, 16—labels under holotype, 17—male genitalia, ventral view, aedeagus removed; 18—aedeagus, lateral view. Scale bar for figure 11—2 mm, figures 12–14—0.5 mm. Photographs 15–18 made by Dr. Yoshitsugu Nasu (Osaka Metropolitan University, Japan).



FIGURES 19–25. *Semioscopis fareastenica* **sp. nov.** and *S. japonicella* Saito, male genitalia, comparison of morphology. 19–22—*S. japonicella* Saito, holotype: 19, 21—male genitalia, ventral view, aedeagus removed; 20, 22—aedeagus, lateral view; 23–25—*S. fareastenica* **sp. nov.**, paratype, GS 302: 23—male genitalia, ventral view, aedeagus removed; 24—aedeagus, lateral view; 25—juxta and lobes of transtilla in natural position in glycerin, enlarged. Scale bar—0.5 mm. The characters shown in Figs 19–25 under the numbers in circles correspond to the character numbers in Table 2. Photographs 19 and 20 made by Dr. Yoshitsugu Nasu (Osaka Metropolitan University, Japan), and drawings 21 and 22 are reproductions from the original description by Saito (1989).

The similarity in appearance between *S. japonicella* and *S. fareastenica* **sp. nov.** actually contributed to the incorrect identification of the material from the south of the Russian Far East and South Korea as *S. japonicella* (Lvovsky 1999; Koo *et al*. 2023). The illustrated male genitalia of the specimen from south of Russian Far East (Lvovsky 1999: Fig. 19, 6) are quite corresponding with those in the holotype of *S. fareastenica* **sp. nov.** and differ from the male genitalia of the holotype of *S. japonicella* by the characters listed above and in Table 2. The only specimen (female) from South Korea was found to be conspecific with *S. fareastenica* **sp. nov.** by the morphology of female genitalia (Koo *et al*. 2023: Fig. 4). Besides, the genetic distance between the same sample from South Korea and the sample from southern Far East of Russia (Amurskaya Oblast', Blagoveshchensk) is 0.2% on COI fragment (Fig. 52), which also indicates that they belong to the same species. Since the samples from South Korea and Far East of Russia (Amurskaya Oblast', Blagoveshchensk) posted to the GenBank (NCBI) and BOLD System

databases were erroneously identified, their sequences in molecular analysis and in Table 1 are used under specific name in quotes *S.* "*japonicella*".

TABLE 2. Diagnostic characters for *S. japonicella* and *S. fareastenica* **sp. nov.** on the base of male genitalia. The character numbers in this table correspond to the numbers of the characters in circles in Figures 19–21, 23–25.

Number	Character	*S. japonicella*	*S. fareastenica* **sp. nov.**
1	shape of socius	trapezoidal, extended distally	rectangular
2	ratio of the valval width to the length of the saccular process (cuiller) at the place of its arising	b/a—1.1	b'/a'—2.2
3	shape of sclerotised saccular area	almost same width along the length, slightly extended in distal part	with narrowing at the middle and significantly extended in distal part
4	outer margin of saccular extension	almost straight	with a notch
5	position of the saccular extension relative to the length of the valva	c/d—1.8, saccular extension beyond the middle of valval length	c'/d'—2.1, saccular extension almost at the middle of valval length
6	shape of transtilla lobe	broadly rounded	digital
7	vinculum	relatively narrow, almost parallel-sided	relatively wider, expanded ventrally
8/10	ratio of the cornutus length (8) to the aedeagus length (10)	1:4	1:7
9	apex of aedeagus	cylindrical, slightly truncated	an extended apex, strongly truncated
11	ratio of the aedeagus width in distal part and in basal part	e/f—0.9	e'/f '– 0.5
12	process of anellus	small, tubercula-shaped	relatively long, digital

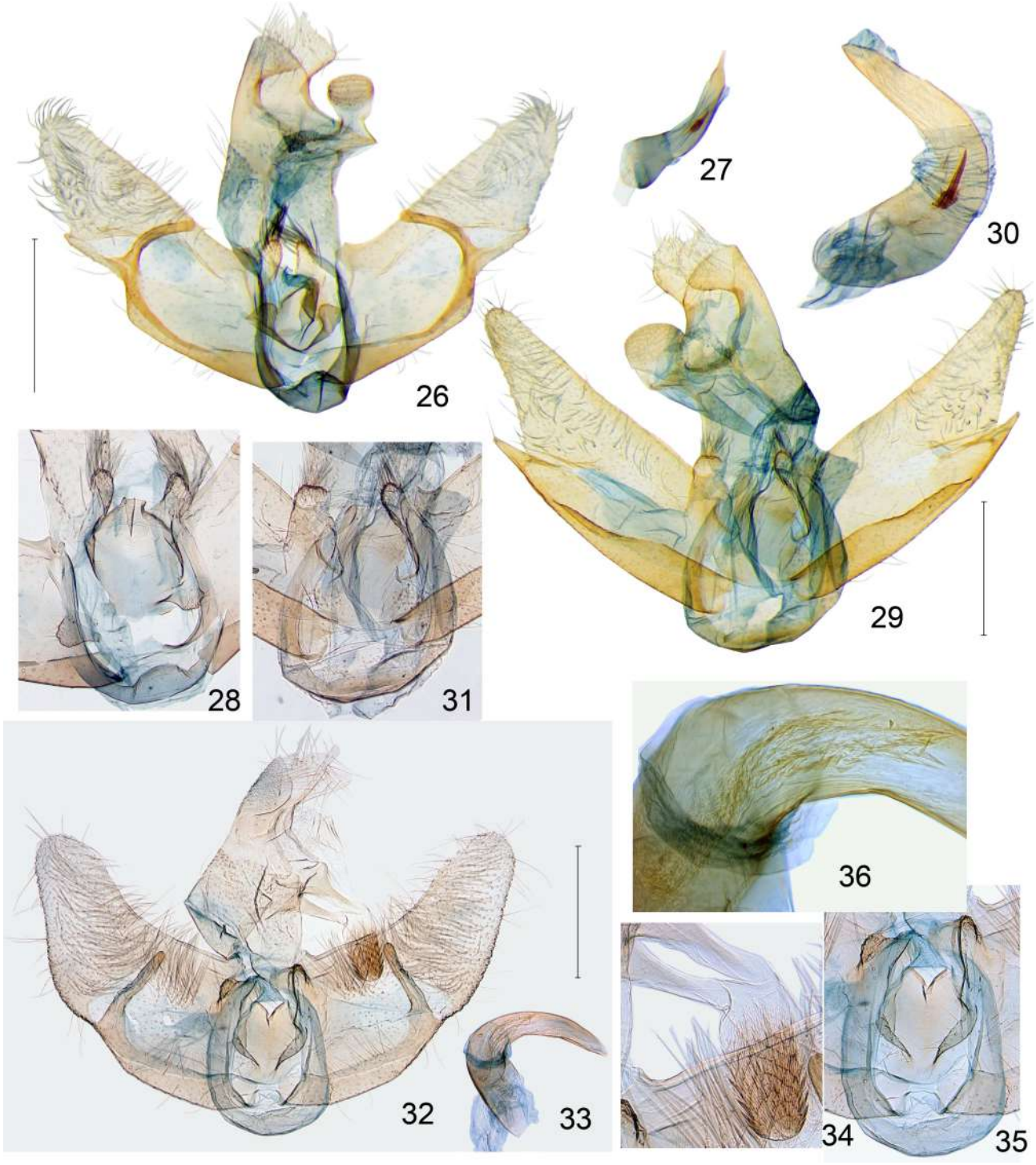
***Luquetia tigrina* Ponomarenko et Koshkin sp. nov.**
Figs 8–10, 32–36, 41–43.

Type material. Holotype (red label with species name and authors): ♂, "**Russia, Evreiskaya Avtonomnaya Oblast** [Jewish Autonomous Region], Obluchenskii district, Bastak Nature Reserve, cordon "39th km", 49°05'25" N 133°05'21" E, 150 m a.s.l., 07.05.2022 (E.S. Koshkin leg.)", GS 290 MP, FSCB.

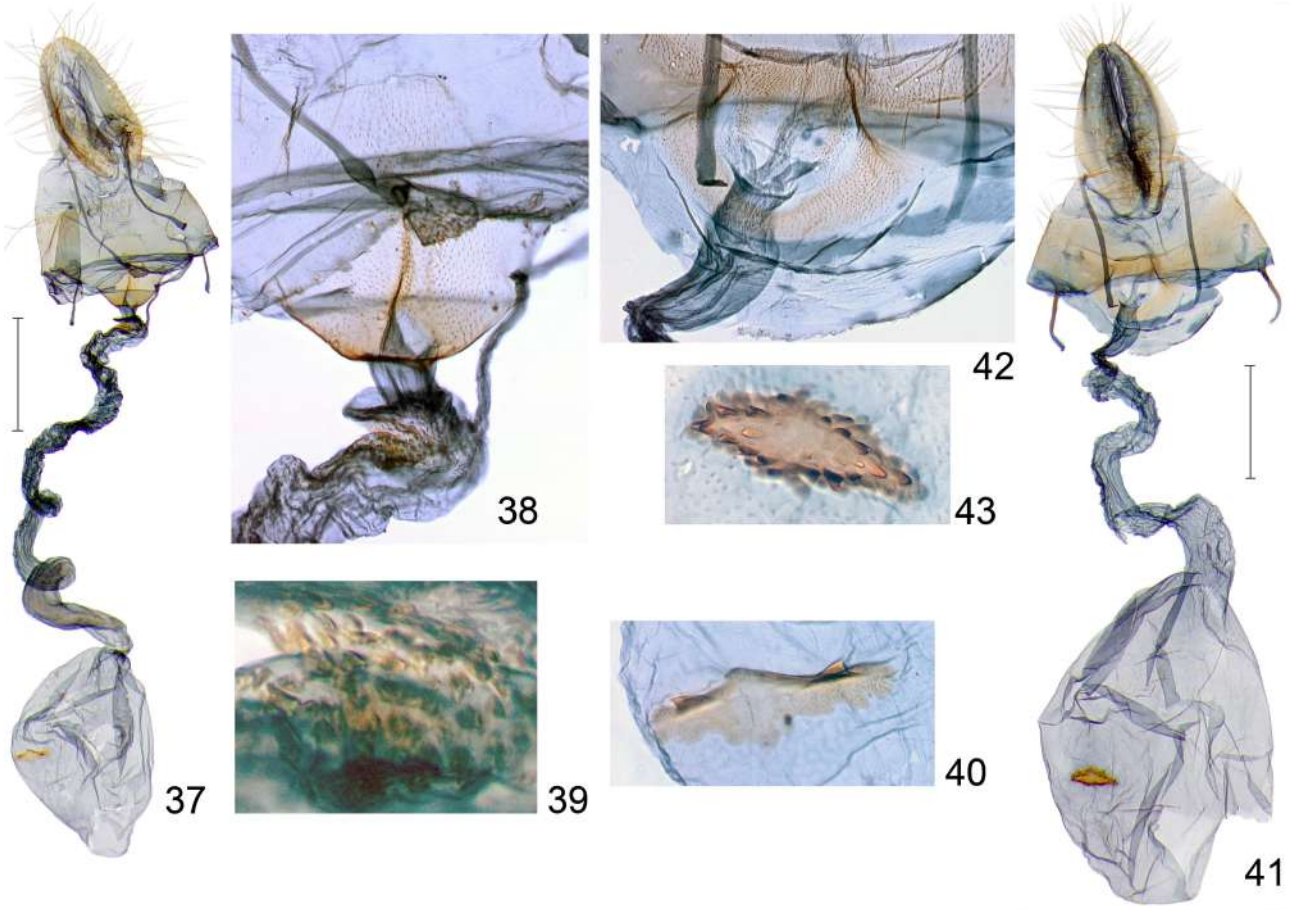
Paratype: 1♀, **Russia, Evreiskaya Avtonomnaya Oblast,** same locality and collector, 09.v 2022; GS 291 MP, FSCB.

Description. **Adult** (Figs 8–10). Head with whitish frons and vertex and dark brown scales around eyes. Ocelli absent. Antennal scape without pecten, greyish brown on upper side and whitish on under side, pedicellus and flagellum greyish brown, with short cilia on ventral side in male. Labial palpus with first segment about 2.5 times shorter than second one, second segment 2 times longer than third one; first segment with alternating white and brown scales, second segment dark brown with white distal ring and spot of white scales on underside, third segment dark brown on outer surface and with white inner surface and apex. Ratio of eye diameter along anterior-posterior line and length of labial palpus about 1:1.5. Tegulae and thorax greyish beige, with dark-brown scales anteriorly, thorax with two dark-brown spots in posterior part. Forewing length 12.8 (♂) mm, 11.7 (♀) mm, wingspan 25.4–27 mm. Forewing without scale tufts, greyish beige, with black thick transverse strokes: 11–12 ones along costal edge, 4–5 ones along dorsal edge and 4 short strokes along termen; one small spot near wing base and another two spots at 1/6 length of wing; black stripe curved at an angle on proximal part of discal cell and black arcuate stripe at end

of discal cell; fringe greyish beige. Hindwing greyish beige, darker distally; fringe greyish beige. Forewing with Sc to costa beyond middle of wing length; R1–R5 to costa, R1, R2 and R3 separate at base, R4 and R5 stalked basally, diverging at near 2/3; M1–CuA1 to termen and CuA2 to tornus; M1– M3 free basally; CuA1 and CuA2 connate basally, CuP reduced in basal part; 1A and 2A merged distally. Hindwing with Sc to costa near 4/5 of wing length, Rs to costa before apex; M1–CuA1 to termen, M1 and M2 separate basally, M3 and CuA1 connate basally, CuA2 to tornus; A1–A3 separate basally, to dorsal margin, A1, A2 closely spaced basally.



FIGURES 26–36. *Semioscopis* spp. and *Luquetia tigrina* **sp. nov.**, male genitalia. 26–28—*S. similis*, GS 307, 308; 29–31—*S. strigulana*, GS 300; 32–36—*Luquetia tigrina* **sp. nov.**, holotype, GS 290. Figs 26, 29, 32—male genitalia, ventral view, aedeagus removed; 27, 30, 33—aedeagus, lateral view; 28, 31, 35—juxta and lobes of transtilla, enlarged; 34—gnathos, enlarged; 36—cornuti, enlarged. Scale bar for figures 26, 27, 29, 30, 32, 33,—0.5 mm.



FIGURES 37–43. *Semioscopis fareastenica* **sp. nov.** and *Luquetia tigrina* **sp. nov.**, female genitalia. 37–40—*Semioscopis fareastenica* **sp. nov.**, paratype, GS 303; 41–43—*Luquetia tigrina* **sp. nov.**, paratype, GS 291. Figs 37, 41—ventral view; 38—ostial area (ostium, vaginal sinus, postvaginal plate, antrum); 39—inner side of antrum with thorns; 40, 43—signum; 42—ostial area (ostium, antevaginal and postvaginal plates, antrum). Figures 38–40, 42, 43 enlarged. Scale bar for figures 37 and 41—0.5 mm.

Diagnosis. New species with forewing pale beige, with black thick strokes and stripes. Male genitalia with elongated pineal median sclerite of gnathos, valva about twice wider in basal part than in distal part, saccular process (cuiller) 5/6 of valval width in place of its arising, aedeagus spirally twisted and strongly curved ventrally in the middle. Female genitalia with semi-oval flat antevaginal plate and rhomboid gutter-shaped signum.

Male genitalia (Figs 32–36). Uncus almost equal to tegumen in length, with rounded notch on posterior margin, with rounded lateral lobes. Gnathos with elongated lateral arms and longitudinally elongated pineal median sclerite (Fig. 34). Valva widened towards base, about 2 times wider in basal part than in distal part, distal part gradually narrowed towards rounded apex; saccular process (cuiller) 5/6 width of valva in place of its arising, with rounded apex (Fig. 32). Juxta with triangular notch on posterior margin (Fig. 35). Aedeagus about 3/5 length of valva, cylindrical, widened towards base, spirally twisted, strongly curved ventrally in middle, with truncated apex, with small needle-shaped cornuti, arranged in 2 elongated spirally twisted bands (Figs 33, 36).

Female genitalia (Figs 41–43). Ovipositor short, membrane between 8th and 9th segments about 1/3 length of papillae analis; the latter sclerotised laterally. Apophysis posterioris 2.6 times longer than apophysis anterioris. Sternal part of segment 8 with broadly rounded notch on posterior margin. Ostium large, oval, placed on level of posterior margin of segment 7, anteriorly surrounded by flat semi-oval antevaginal plate. This plate and sternal part of segment 8 densely covered with small spines (Fig. 42). Antrum narrowed and semi-sclerotised, ductus bursae membranous, wrinkled, spirally twisted, widened towards corpus bursae. Ductus seminalis arising beyond vaginal part of ductus bursae. Corpus bursae oval and membranous, signum rhomboid gutter-shaped with small teeth on periphery and placed approximately at level of anterior 1/3 length (Figs 41, 43).

Distribution. Russia (Far East: Evreiskaya Avtonomnaya Oblast [Jewish Autonomous Region]).

Etymology. The specific name is derived from Latin word *tigrinus* meaning stripy or similar to animal, tiger, in transverse striations in the pattern of its skin. An adjective in the nominative singular. Feminine.

Remarks. The described species *L. tigrina* **sp. nov.** is similar to some species from the *Semioscopis* (*S. avellanella* Hübner, *S. steinkellneriana* ([Den. et Schiff.]), *S. japonicella* Saito, *S. similis* Saito, *S. packardella* Clemens, *S. merriccella* Dyar, *S. aurorella* Dyar and *S. mcdunnoughi* Clarke) in appearance by some elements of forewing pattern, namely black stripe on the proximal part of discal cell and especially black arcuate stripe at end of discal cell. Also *L. tigrina* **sp. nov.** is similar to *S. fareastenica* **sp. nov.** and *S. steinkellneriana* by long labial palpi. *Luquetia tigrina* **sp. nov.**, as *Semioscopis* spp., has no pecten on the antennal scape and tufts of raised scales on the forewings. The last character differs *L. tigrina* **sp. nov.** from the type species of the genus *Luquetia*, which cannot be said about other species of this genus, since this feature was not mentioned in their description. However, *L. tigrina* **sp. nov.** is similar to the type species of the genus *Luquetia*, *L. lobella*, by the genitalia of both sexes, which was the main reason for determining the taxonomic position of this species. Besides, the new species possesses flat, rounded and relatively wide antevaginal plate in the ostial area of the female genitalia, which is similar to that in *Semioscopis merriccella* Dyar (Moth Photographers Group 2024). The new species differs by unique pattern of forewing from all known species from both mentioned genera. Also, it can be identified by the saccular process (cuiller) arising exactly from the middle of the valval ventral margin, an aedeagus curved ventrally and spirally twisted in the male genitalia; and by a relatively wide, rounded antevaginal plate in the female genitalia. The related species *L. lobella* bears the saccular process (cuiller) arising beyond the middle of the valval ventral margin, aedeagus short, stout and slightly curved ventrally in the male genitalia; and with a very narrow, rounded antevaginal plate in the female genitalia.

Comparative molecular genetic analysis of sequences of COI gene fragment in *Semioscopis* spp. and *Luquetia* spp.

The main goal of the molecular analysis was to test the taxonomic independence of the species, which are similar in appearance and/or in genital morphology and to assess the genetic divergence between genera *Semioscopis* and *Luquetia*.

On the built neighbor-joining tree, the samples from *Semioscopis* spp. of the Old and New Worlds and *Luquetia* spp. are united in one clade with the highest bootstrap support (99%) (Fig. 51). Within this clade, the cluster (**5**) with *S. oculella* Thunberg is the only one opposed to the others. The rest species of the genus are combined into four clusters numbered as **1**, **2**, **3** and **4**.

Cluster **1** joined two pairs of species European *S. steinkellneriana* + East Asian *S.* "*japonicella*" (= *fareastenica* **sp. nov.**) and Nearctic *S. merriccella* + *S. packardella* with bootstrap support 93%. The minimal interspecific genetic distance between *S. steinkellneriana* and *S.* "*japonicella*" (= *fareastenica* **sp. nov.**)—4.8% and between *S. merriccella* and *S. packardella*—3.1% (Table 3).

Cluster **2** united three species distributed in North America (*S. megamicrella* Dyar (*S. aurorella* + *S. mcdunnoughi*)). The interspecific genetic distances between the last two of them are smallest among Nearctic species and minimal in the genus (2.5%), and their cluster has bootstrap support 99%.

Cluster **3** included East Asian *S. similis* and European *S. avellanella* (bootstrap support 62%). These species also have the minimal interspecific genetic distance in the genus in Palaearctic—2.5%.

Cluster **4** (bootstrap support 70%) represented by two species—Nearctic *S. inornata* Walsingham and Transpalaearctic *S. strigulana*, interspecific genetic distance—3.6%.

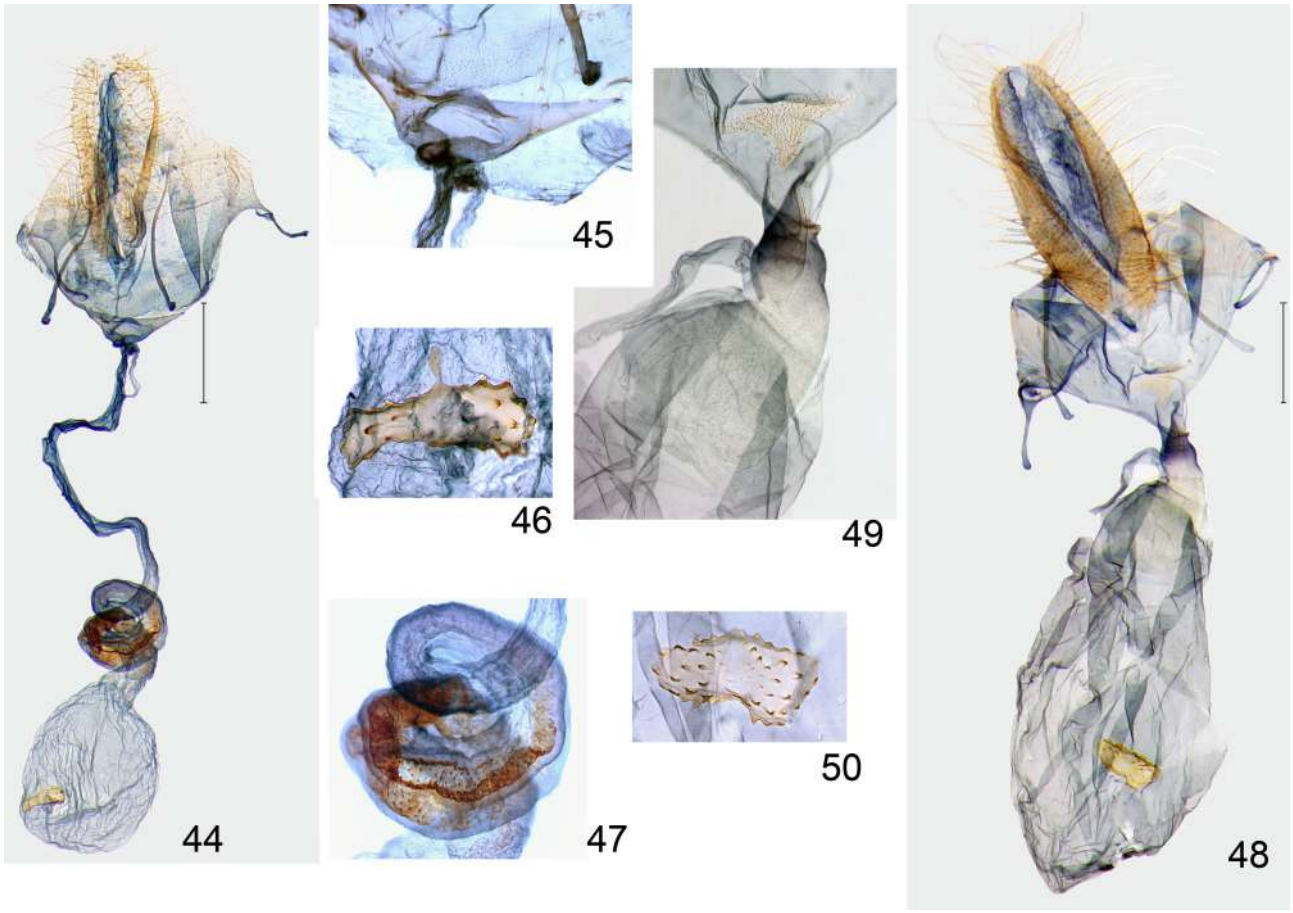
Analysing the clustering of the *Semioscopis* spp. in the tree on the base of fragment of COI gene, all pairs of species similar in appearance and/or genitalia cluster together in the tree, and their sequences of target fragment have minimal genetic distances: *S. steinkellneriana—S.* "*japonicella*" (= *fareastenica* **sp. nov.**), *S. similis—S. avellanella*, *S. inornata—S. strigulana.* Two clusters **3** and **4** only composed of the species similar in appearance and genitalia. Two other clusters (**1** and **2**) additionally included species that strongly differ in genital structures and secondary transformed, which is typical for Nearctic species.

TABLE 3. Minimal interspecific genetic distances in/ between the genera *Semioscopis* and *Luquetia*

No	Species	Minimal interspecific genetic distance	Nearest species
Palearctic species		**with Palearctic species / Nearctic species**	**Palearctic species/ Nearctic species**
1	*Semioscopis avellanella*	0.025 / 0.04	*S. similis* / *S. megamicrella*
2	*S.* "*japonicella*" (=*S. fareastenica* **sp. n.**)	0.048 / 0.046	*S. steinkellneriana* / *S. merriccella*
3	*S. oculella*	0.045 / 0.061	*S. strigulana* / *S. megamicrella*
4	*S. similis*	0.025 / 0.036	*S. avellanella* / *S. packardella*
5	*S. steinkellneriana*	0.044 / 0.046	*S. similis* / *S. merriccella*
6	*S. strigulana*	0.031 / 0.036	*S. similis* / *S. inornata*, *S. mcdunnoughi*
7	*Luquetia lobella*	0.061 / 0.069	*L. orientella*, *L. osthelderi*, *S. avellanella*, *S. similis* / *S. packardella*
8	*L. orientella*	0.038 / 0.072	*L. osthelderi* / *S. mcdunnoughi*, *S. packardella*
9	*L. osthelderi*	0.038 / 0.064	*L. osthelderi* / *S. megamicrella*
Nearctic species		**with Nearctic species / Palearctic species**	**Nearctic / Palearctic**
10	*S. aurorella*	0.025 / 0.052	*S. mcdunnoughi* / *S. similis*
11	*S. inornata*	0.053 / 0.036	*S. mcdunnoughi* / *S. strigulana*
12	*S. mcdunnoughi*	0.025 / 0.036	*S. aurorella* / *S. strigulana*
13	*S. megamicrella*	0.044 / 0.04	*S. mcdunnoughi*, *S. packardella* / *S. avellanella*, *S. similis*
14	*S. merriccella*	0.031 / 0.042	*S. packardella* / *S. similis*
15	*S. packardella*	0.031 /0.036	*S. merriccella* / *S. similis*

Thus, the pairs species, which were of interest as similar in appearance and/or genitalia, pairwise united into one cluster: *S. steinkellneriana—S.* "*japonicella"* (= *fareastenica* **sp. nov.**), *S. aurorella—S. mcdunnoughi*, *S. similis—S. avellanella* and *S. inornata—S. strigulana*. The interspecific genetic distances between them are comparable to that between congeneric species, which are clearly distinguished by characters of external morphology and genitalia. The minimal interspecific genetic distance, 0.025, in the genus was found between *S. inornata—S. strigulana* and *S. aurorella—S. mcdunnoughi*. Considering that the latter have distinct differences in the male genitalia, this parameter of genetic distance on the barcoding fragment of the COI gene can be accepted as threshold of species delimitation in the genus *Semioscopis*. The minimal interspecific genetic distances for all analysed species from *Semioscopis* and *Luquetia* with indication of the closest species are given in Table 3.

The interval of interspecific genetic distances in the genus *Semioscopis* is 0.025–0.083 (2.5%–8.3%), and in the genus *Luquetia* is 0.038–0.063 (3.8%–6.3%) (Fig. 52). The interval of interspecific genetic distances between species from genera *Semioscopis* and *Luquetia* is 0.055–0.1 (5.5%–10%). The minimal distance between the type species of *Luquetia* and species of *Semioscopis* is 0.061 (*L. lobella* and *S. avellanella*, *L. lobella* and *S. similis*). The interspecific distances are less between *L. osthelderi* and *S. similis* (0.055); and slightly higher between *L. osthelderi* and *S. steinkellneriana* (0.061), *L. osthelderi* and *S. avellanella* (0.063), *L. osthelderi* and *S. strigulana* (0.064), *L. orientella* (Rebel) and *S. similis*, *S. strigulana* (0.066) (Table 3, Fig. 52). The species within the genus *Semioscopis* have the same parameters of interspecific genetic distances. The minimal genetic distances between the type species of other related depressariid genera (*Agonopterix*, *Depressaria* and *Exaeretia*) and species from discussed above genera are much higher: 0.09 (*A. ocellana* (Fabricius) and *S. avellanella*, *D. radiella* (Goeze) and *S. strigulana*, *D. radiella* and *L. osthelderi*) and 0.11 (*E. allisella* Stainton and *S. oculella*).



FIGURES 44–50. *Semioscopis* spp., female genitalia. 44–47—*S. strigulana*, GS 301; 48–50—*S. similis*, GS 306. Figs 44, 48—ventral view; 45—ostial area (vaginal sinus); 46, 50—signum; 47—sclerotisation with micro thorns in anterior part of ductus; 49—ostium, postvaginal plate, ductus and posterior part of corpus bursae. Figures 45–47, 49 and 50 enlarged. Scale bar for figures 44 and 48—0.5 mm.

Discussion and conclusion

As a result of the study, the genera *Semioscopis* and *Luquetia* include 13 and six species in the world fauna, respectively. Four species of the genus *Semioscopis* inhabit East Asia (see Checklist of the species below), and three of them are reliably distributed in Far East of Russia. Two species of the genus *Luquetia* are now in the fauna of the latter. The representatives of both genera have similar life cycles and overwinter in the stage of pupa. The adults usually emerged in the spring and at the beginning of summer, from the beginning of April in the south of Far East of Russia. The described species *Luquetia tigrina* **sp. nov.** is similar to the *Semioscopis* spp. in some elements of forewing pattern, to *S. fareastenica* **sp. nov.** and *S. steinkellneriana* by long labial palpi, which are more than twice

the head diameter and to *S. merriccella* by ostial area in the female genitalia. The male genitalia of the *Luquetia tigrina* **sp. nov.** have common characters with the type species of the genus, *L. lobella*, and related species. The flight time of *L. tigrina* **sp. nov.** is early May, which is similar to that of species of the genus *Semioscopis* and differs from other species of the genus *Luquetia*, which fly from the end of May to the beginning of July in the Russian Far East. Thus, the *L. tigrina* **sp. nov.** occupies an intermediate position between the genera *Semioscopis* and *Luquetia*, filling the morphological hiatus between these genera.

According to comparative molecular analysis on the base of barcoding fragment of mtCOI gene, the interval of interspecific genetic distances between species from genera *Semioscopis* and *Luquetia* is 0.055–0.1 (5.5%–10%), with minimal parameters are 0.055 (*L. osthelderi* and *S. similis*), 0.061 (*L. lobella* and *S. avellanella*, *L. lobella* and *S. similis*, *L. osthelderi* and *S. steinkellneriana*), 0.063 (*L. osthelderi* and *S. avellanella*), 0.064 (*L. osthelderi* and *S. strigulana*) and 0.066 (*L. orientella* and *S. similis*, *S. strigulana*). These parameters fit into the interval of interspecies genetic distances in the genus *Semioscopis* (0.025–0.083). The genera *Semioscopis* and *Luquetia* are undoubtedly closely related groups with weak morphological and genetic (on the barcoding fragment of mtCOI gene) divergence. Obviously, for this reason, species of both genera have many parallelisms among morphological characters. The close relationships of these genera *Semioscopis* and *Luquetia* also confirmed by similar life cycles.

Annotated checklist of the *Semioscopis* spp. and *Luquetia* spp. from East Asia

(the order of species taxa corresponds to the historical sequence of their description)

Genus *Semioscopis* Hübner, [1825]

Semioscopis Hübner, [1825], *Verzeichniss bekannter Schmettlinge* [sic!]: 402.
Type species: *Tortrix steinkellneriana* [Denis et Schiffermüller], 1775 (by subsequent designation by Westwood (1840: 111)).

Distribution. Palaearctic: West and East Europe, Russia (European part, West and East Siberia, Far East), South Korea, Japan; Nearctic: Canada, USA.

Host plants. *Populus*, *Salix* (Salicaceae), *Betula*, *Carpinus* (Betulaceae), *Crataegus*, *Prunus*, *Sorbus* (Rosaceae), *Tilia* (Malvaceae) (Hodges 1974; Robinson *et al*. 2023; Lepiforum e.V. 2024).

Species included. The genus includes 13 species of the world fauna: seven Palearctic species and six Nearctic species; four species of them are distributed in East Asia (*S. japonicella*, *S. strigulana*, *S. similis* and *S. fareastenica* **sp. nov.**) and the last three species are reliably inhabited in Far East of Russia.

Semioscopis strigulana ([Denis et Schiffermüller], 1775)

Figs 4, 5, 29–31, 44–47.

Tortrix strigulana [Denis et Schiffermüller], 1775; *Ank. syst. Schmett. Wienergegend*: 130.
Semioscopis strigulana: Lvovsky & Dubatolov (2007: 56); Lvovsky (2008: 53, 2016: 76, 2019: 53).

Material examined. Russia, Primorskii Krai: 2♀♀, Ussuriiskii district, 20 km SE of Ussuriisk, Gornotajezhnoe village, 26, 27.iv 1995 (M.G. Ponomarenko leg.), GS 301 MP, 305 MP; 1♂, Shkotovskii district, 7 km S of Anisimovka village; 03.v 1998 (M.G. Ponomarenko leg.), GS 300 MP; all in FSCB.

Distribution. Europe, Russia (European part, south of West Siberia, south of Krasnoyarskii Krai, south of Khabarovskii Krai, Primorskii Krai, **first record**) (Lvovsky 2019, Lepiforum e.V. 2024).

Host plants. In Europe, larvae feed on aspen (*Populus tremula*) and poplar (*Populus* sp.) (Salicaceae) (Lvovsky 1981, 2016; Lepiforum e.V. 2024).

Remarks. The species is first recorded from Primorskii Krai (Far East of Russia).

***Semioscopis japonicella* Saito, 1989**
Figs 15–22.

Semioscopis japonicella Saito, 1989; *Japanese Journal of Entomology*, 57 (4): 705.

Type material. Holotype (examined using photographs taken by Dr. Yoshitsugu Nasu): ♂, **Japan, Honshu**, "AITI: Toyoda Rokusyosan" [Aichi Prefecture, Rokushosan (Toyota)]; 15.iv 1978 (T. Saito leg.), GS OE. 531 T. Saito, OMU.

Distribution. Japan (Honshu (south of Iwate Prefecture), Shikoku, Kyushu) (Sakamaki 2013).

Host plant. Unknown.

Remarks. This species was listed in the fauna of southern Far East of Russia (Lvovsky & Dubatolov 2007; Lvovsky 2008, 2016, 2019) without illustrations. The male genitalia, figured for a specimen from the Russian Far East, identified as *S. japonicella* (Lvovsky 1999: Fig. 19: 6), fully correspond to those of the described *S. fareastenica* **sp. nov.** The specimen, collected in Russian Far East (Amurskaya Oblast') and in South Korea, which were posted to International NCBI and BOLD System databases as samples of *S. japonicella,* were found to be conspecific with *S. fareastenica* **sp. nov.** on the base of molecular analysis and morphology of female genitalia. Therefore, the distribution of this species in Russian Far East and South Korea requires confirmation.

***Semioscopis similis* Saito, 1989**
Figs 6, 7, 26–28, 48–50.

Semioscopis similis Saito, 1989; *Japanese Journal of Entomology*, 57 (4): 710.
Semioscopis similis: Lvovsky (1999: 59); Lvovsky & Dubatolov (2007: 56); Lvovsky (2008: 53, 2016: 76; 2019: 53).

Material examined. Russia, Khabarovskii Krai: 1♂, 1♀, Verkhnebureinskii district, Bureinskii Nature Reserve, Bureya river, 3 km SW of confluence of Levaya Bureya and Pravaya Bureya rivers, cordon "Strelka", 51°38'39" N 134°15'45" E, 570 m a.s.l., 19.v 2010, 23.v 2021 (E.S. Koshkin leg.), GS 306 (♀) MP; **Evreiskaya Avtonomnaya Oblast** [Jewish Autonomous Region]: 8♂♂, 4♀♀, Obluchenskii district, Bastak Nature reserve, cordon "39th km", 49°05'25" N 133°05'21" E, 150 m a.s.l., 06–10.v 2022 (E.S. Koshkin leg.), GS 307 (♂) MP; 1♀, same district and reserve, 1 km NE of cordon "39th km", 49°05'50" N 133°04'46" E, 236 m a.s.l., 07–08.v 2022 (E.S. Koshkin leg.); 1♂, same district and reserve, 1.5 km NE of cordon "39th km", 49°05'53" N 133°04'21" E, 316 m a.s.l., 09–10.v 2022 (E.S. Koshkin leg.); **Primorskii Krai**: 1♀, Khasanskii district, Kedrovaya pad Nature Reserve, 29–30.iv 1975 (V.S. Kononenko leg.); 4♂♂, 5♀♀, Vladivostok, Botanical Garden, 01.iv 1979, 17.iv 1996 (E.A. Beljaev leg.); 2♂♂, Vladivostok, Chaika railway station, 04.iv, 07.iv 1995 (M.G. Ponomarenko leg.), GS 308 MP; 4♂♂, 1♀, Vladivostok, source of Bolshaya Sedanka river, 43°11'30" N, 132°03'05" E, 250 m a.s.l., 08.iv 2009 (M.G. Ponomarenko leg.); 2♂♂, 8♀♀, Shkotovskii district, 13 km E of Novaya Moskva village, 43°20'32" N, 132°54'39" E, 420 m a.s.l., 28, 29.iv 2009 (M.G. Ponomarenko leg.); 2♂♂, 1♀, Vladivostok, 5 km SEE of Okeanskaya station, Shamorovskii pass, 43°13'01" N, 132°03'48" E, 240 m a.s.l., 07.iv, 14.iv 2024 (M.G. Ponomarenko leg.); 2♂♂, 3♀♀, Shkotovskii district, 4.8 km S of Anisimovka village, Prostokvashino tourist base, 01.v, 02.v 2024 (M.G. Ponomarenko leg.); all in FSCB.

Distribution. Russia (Irkutskaya Oblast', Zabaikalskii Krai, Amurskaya Oblast', south of Khabarovskii Krai, Primorskii Krai); Japan (Hokkaido, Honshu) (Sakamaki 2013; Lvovsky 2019).

Host plant. Unknown.

***Semioscopis fareastenica* Ponomarenko et Koshkin sp. nov.**
Figs 1–3, 11–14, 23–25, 37–40.

Semioscopis japonicella auct. (nec Saito, 1989): Lvovsky (1999: 59); Lvovsky & Dubatolov (2007: 56); Lvovsky (2016: 76, 2019: 53); Koo *et al*. (2023: 514).

Type material see above.

Distribution. Russia (Far East: Amurskaya Oblast', Khabarovskii Krai and Primorskii Krai), South Korea.

Host plant. Unknown.

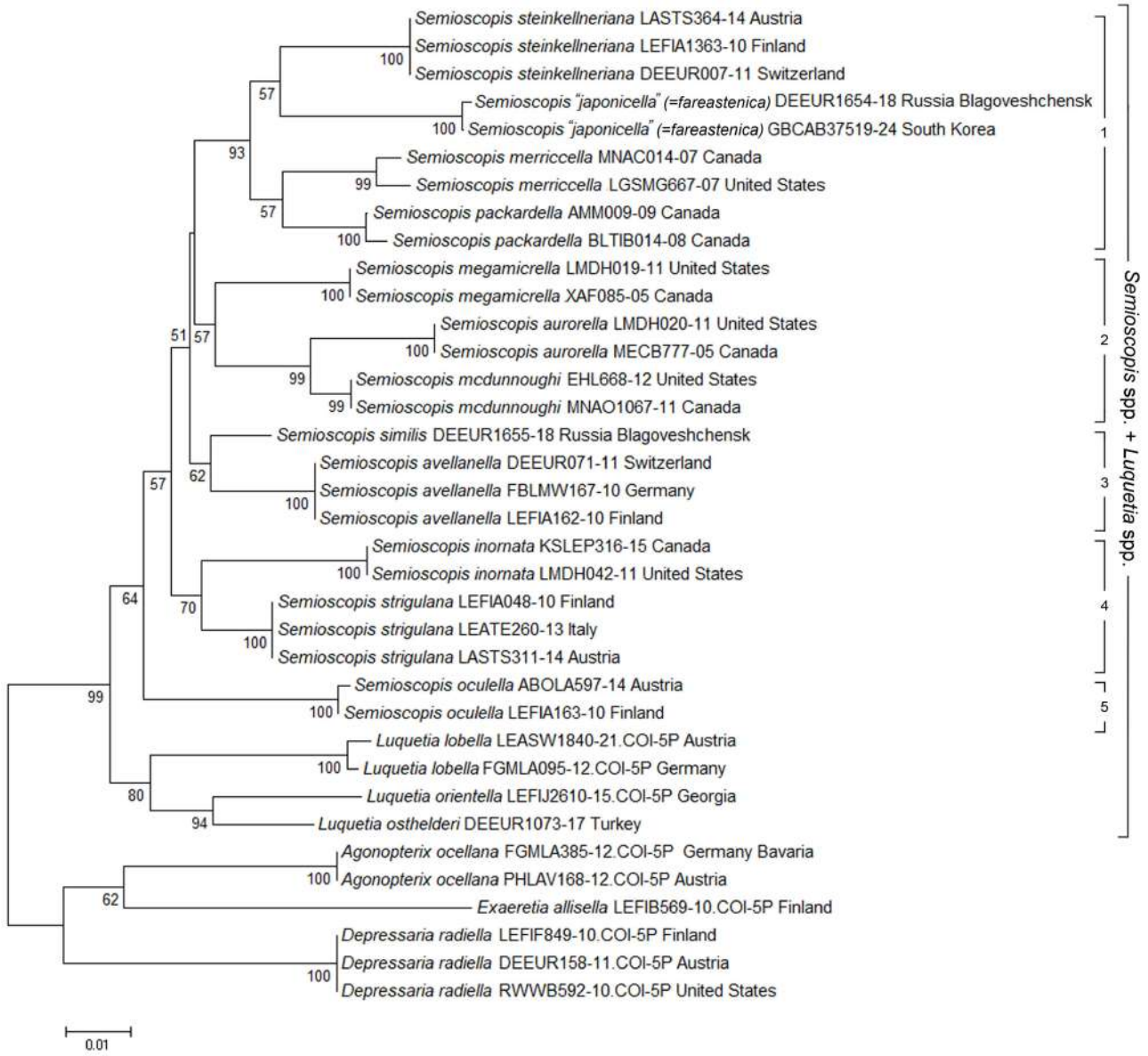


FIGURE 51. Neighbor–Joining tree of *Semioscopis* spp. and *Luquetia* spp. on the base of sequences of the fragment of COI gene. The percentage of replicate trees in which the associated taxa clustered together in the bootstrap test (1000 replicates) is given for those greater than 50%.

Genus *Luquetia* Leraut, 1991

Luquetia Leraut, 1991; *Alexanor*, *Revue française de Lépidoptérologie*: 232.
Type species: *Tinea lobella* [Denis et Schiffermüller], 1775 (by original designation).

Distribution. Palaearctic: Europe, Russia (European part, North Caucasus, Far East), Transcaucasia, Central Asia (Tajikistan), NW China.

Host plants. *Prunus spinosa*, *Sorbus* and *Crataegus* (Rosaceae) (Lvovsky & Nedoshivina 2023; Robinson *et al*. 2023; Lepiforum e.V. 2024).

Species included. The genus includes six species of the world fauna: *L. lobella* ([Denis et Schiffermüller]), *L. gissarella* (Lvovsky), *L. orientella* (Rebel) (= *abchasiella* Lvovsky), *L. osthelderi* (Rebel), *L. largimacularis* Wang et Zheng and *L. tigrina* **sp. nov.** Three of them inhabit East Asia and two species are included in the fauna of Russian Far East.

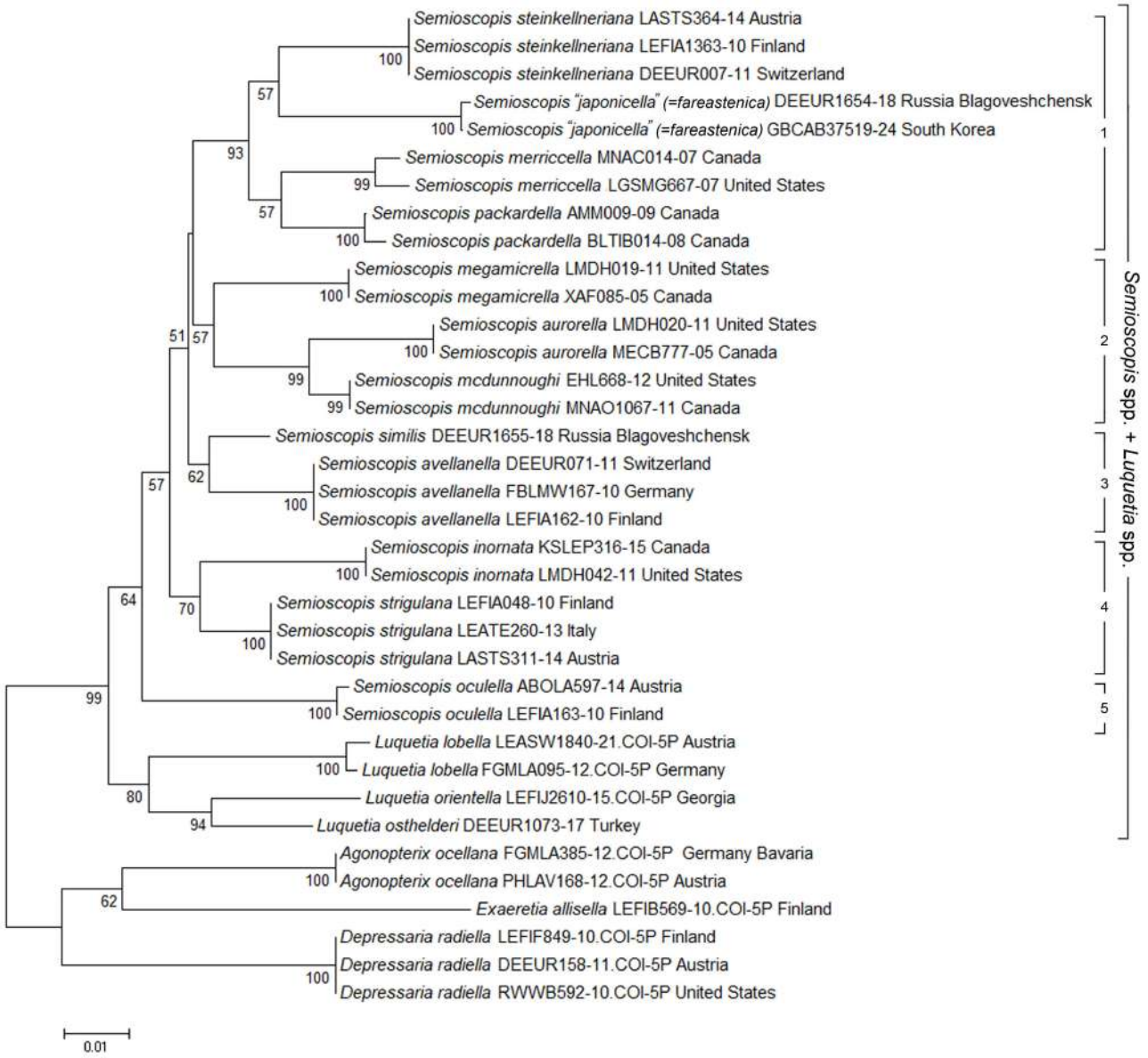


FIGURE 51. Neighbor–Joining tree of *Semioscopis* spp. and *Luquetia* spp. on the base of sequences of the fragment of COI gene. The percentage of replicate trees in which the associated taxa clustered together in the bootstrap test (1000 replicates) is given for those greater than 50%.

Luquetia lobella ([Denis et Schiffermüller], 1775)

Tinea lobella [Denis et Schiffermüller], 1775; *Ank. syst. Schmett. Wienergegend*: 138.
Enicostoma lobella: Lvovsky 1981: 604.
Luquetia lobella: Lvovsky (1999: 59); Wang & Zheng (1999: 49); Lvovsky & Dubatolov (2007: 56); Lvovsky (2008: 54, 2016: 77, 2019: 53).

Material examined. 2♀♀, **Russia, Primorskii Krai,** Ussurijskii district, 20 km SE of Ussuriisk, Gornotajezhnoe village, 28.v, 20.vi 1990 (M.G. Ponomarenko leg.), FSCB.

Distribution. Europe, Russia (European part, Far East: south of Khabarovskii Krai and south of Primorskii Krai), NW China (Ningxia) (Wang & Zheng 1999; Lvovsky 2019, Lepiforum e.V. 2024).

Host plants. *Prunus spinosa*, *Sorbus*, *Crataegus* (Rosaceae) (Lvovsky 1999, 2016; Lvovsky & Nedoshivina 2023; Robinson *et al*. 2023; Lepiforum e.V. 2024)

No	Species/ Sequence number/ Country		36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	No
1	*S. avellanella* DEEUR071-11 Switzerland			0,000	0,000	0,096	0,096	0,092	0,090	0,096	0,100	0,102	0,108	0,106	0,108	0,106	0,112	0,112	0,112	36
2	*S. avellanella* FBLMW167-10 Germany	0,000			0,000	0,096	0,096	0,092	0,090	0,096	0,100	0,102	0,108	0,106	0,108	0,106	0,112	0,112	0,112	35
3	*S. avellanella* LEFIA162-10 Finland	0,000	0,000			0,096	0,096	0,092	0,090	0,096	0,100	0,102	0,108	0,106	0,108	0,106	0,112	0,112	0,112	34
4	*S."japonicella"* DEEUR1654-18 Russia Blagoveshchensk	0,063	0,063	0,063			0,000	0,086	0,094	0,102	0,110	0,117	0,108	0,108	0,108	0,108	0,100	0,100	0,100	33
5	*S."japonicella"* GBCAB37519-24 South Korea	0,061	0,061	0,061	0,002			0,086	0,094	0,102	0,110	0,117	0,108	0,108	0,108	0,108	0,100	0,100	0,100	32
6	*S. similis* DEEUR1655-18 Russia Blagoveshchensk	0,025	0,025	0,025	0,053	0,051			0,122	0,127	0,137	0,139	0,122	0,125	0,125	0,122	0,122	0,122	0,127	31
7	*S. steinkellneriana* DEEUR007-11 Switzerland	0,057	0,057	0,057	0,050	0,048	0,044			0,038	0,061	0,063	0,068	0,065	0,072	0,070	0,064	0,064	0,068	30
8	*S. steinkellneriana* LASTS364-14 Austria	0,057	0,057	0,057	0,050	0,048	0,044	0,000			0,061	0,063	0,076	0,072	0,080	0,078	0,082	0,082	0,072	29
9	*S. steinkellneriana* LEFIA1363-10 Finland	0,057	0,057	0,057	0,050	0,048	0,044	0,000	0,000			0,005	0,074	0,071	0,078	0,080	0,078	0,078	0,070	28
10	*S. strigulana* LEFIA048-10 Finland	0,034	0,034	0,034	0,067	0,065	0,031	0,057	0,057	0,057			0,072	0,069	0,076	0,078	0,080	0,080	0,072	27
11	*S. strigulana* LEATE260-13 Italy	0,034	0,034	0,034	0,067	0,065	0,031	0,057	0,057	0,057	0,000			0,004	0,037	0,031	0,048	0,048	0,053	26
12	*S. strigulana* LASTS311-14 Austria	0,034	0,034	0,034	0,067	0,065	0,031	0,057	0,057	0,057	0,000	0,000			0,035	0,033	0,044	0,044	0,050	25
13	*S. oculella* ABOLA597-14 Austria	0,059	0,059	0,059	0,078	0,080	0,053	0,073	0,073	0,073	0,047	0,047	0,047			0,009	0,059	0,059	0,061	24
14	*S. oculella* LEFIA163-10 Finland	0,057	0,057	0,057	0,076	0,078	0,051	0,071	0,071	0,071	0,045	0,045	0,045	0,002			0,057	0,057	0,059	23
15	*S. aurorella* LMDH020-11 United States	0,055	0,055	0,055	0,083	0,081	0,052	0,069	0,069	0,069	0,055	0,055	0,055	0,080	0,078			0,000	0,044	22
16	*S. aurorella* MECB777-05 Canada	0,055	0,055	0,055	0,083	0,081	0,052	0,069	0,069	0,069	0,055	0,055	0,055	0,080	0,078	0,000			0,044	21
17	*S. inornata* KSLEP316-15 Canada	0,053	0,053	0,053	0,075	0,077	0,044	0,065	0,065	0,065	0,036	0,036	0,036	0,067	0,065	0,071	0,071			
18	*S. inornata* LMDH042-11 United States	0,053	0,053	0,053	0,075	0,077	0,044	0,065	0,065	0,065	0,036	0,036	0,036	0,067	0,065	0,071	0,071	0,000		
19	*S. mcdunnoughi* EHL668-12 United States	0,044	0,044	0,044	0,067	0,065	0,038	0,059	0,059	0,059	0,036	0,036	0,036	0,067	0,065	0,025	0,025	0,053	0,053	
20	*S. mcdunnoughi* MNAO1067-11 Canada	0,044	0,044	0,044	0,067	0,065	0,038	0,059	0,059	0,059	0,036	0,036	0,036	0,067	0,065	0,025	0,025	0,053	0,053	0,000
21	*S. megamicrella* LMDH019-11 United States	0,040	0,040	0,040	0,065	0,063	0,040	0,055	0,055	0,055	0,046	0,046	0,046	0,063	0,061	0,052	0,052	0,057	0,057	0,044
22	*S. megamicrella* XAF085-05 Canada	0,040	0,040	0,040	0,065	0,063	0,040	0,055	0,055	0,055	0,046	0,046	0,046	0,063	0,061	0,052	0,052	0,057	0,057	0,044
23	*S. merriccella* MNAC014-07 Canada	0,057	0,057	0,057	0,048	0,046	0,042	0,052	0,052	0,052	0,055	0,055	0,055	0,071	0,069	0,073	0,073	0,067	0,067	0,059
24	*S. merriccella* LGSMG667-07 United States	0,059	0,059	0,059	0,053	0,051	0,044	0,046	0,046	0,046	0,057	0,057	0,057	0,069	0,071	0,075	0,075	0,065	0,065	0,061
25	*S. packardella* AMM009-09 Canada	0,048	0,048	0,048	0,051	0,049	0,036	0,053	0,053	0,053	0,046	0,046	0,046	0,068	0,067	0,063	0,063	0,061	0,061	0,050
26	*S. packardella* BLTIB014-08 Canada	0,051	0,051	0,051	0,049	0,048	0,040	0,055	0,055	0,055	0,049	0,049	0,049	0,071	0,069	0,067	0,067	0,065	0,065	0,053
27	*L. lobella* LEASW1840-21.COI-5P Austria	0,067	0,067	0,067	0,100	0,098	0,063	0,082	0,082	0,082	0,064	0,064	0,064	0,082	0,084	0,082	0,082	0,084	0,084	0,072
28	*L. lobella* FGMLA095-12.COI-5P Germany	0,061	0,061	0,061	0,098	0,096	0,061	0,080	0,080	0,080	0,063	0,063	0,063	0,080	0,082	0,080	0,080	0,082	0,082	0,070
29	*L. orientella* LEFIJ2610-15.COI-5P Georgia	0,070	0,070	0,070	0,098	0,096	0,066	0,082	0,082	0,082	0,066	0,066	0,066	0,072	0,070	0,080	0,080	0,090	0,090	0,072
30	*L. osthelderi* DEEUR1073-17 Turkey	0,063	0,063	0,063	0,084	0,082	0,055	0,061	0,061	0,061	0,064	0,064	0,064	0,070	0,068	0,076	0,076	0,080	0,080	0,068
31	*E. allisella* LEFIB569-10.COI-5P Finland	0,129	0,129	0,129	0,139	0,141	0,116	0,129	0,129	0,129	0,118	0,118	0,118	0,110	0,112	0,122	0,122	0,114	0,114	0,127
32	*A. ocellana* Germany Bavaria FGMLA385-12.COI-5P	0,090	0,090	0,090	0,114	0,112	0,092	0,102	0,102	0,102	0,102	0,102	0,102	0,114	0,112	0,110	0,110	0,098	0,098	0,100
33	*A. ocellana* PHLAV168-12.COI-5P Austria	0,090	0,090	0,090	0,114	0,112	0,092	0,102	0,102	0,102	0,102	0,102	0,102	0,114	0,112	0,110	0,110	0,098	0,098	0,100
34	*D. radiella* LEFIF849-10.COI-5P Finland	0,102	0,102	0,102	0,122	0,120	0,094	0,104	0,104	0,104	0,090	0,090	0,090	0,096	0,094	0,114	0,114	0,100	0,100	0,112
35	*D. radiella* DEEUR158-11.COI-5P Austria	0,102	0,102	0,102	0,122	0,120	0,094	0,104	0,104	0,104	0,090	0,090	0,090	0,096	0,094	0,114	0,114	0,100	0,100	0,112
36	*D. radiella* RWWB592-10.COI-5P United States	0,102	0,102	0,102	0,122	0,120	0,094	0,104	0,104	0,104	0,090	0,090	0,090	0,096	0,094	0,114	0,114	0,100	0,100	0,112
No		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

FIGURE 52. Interspecific genetic distances in the genera *Semioscopis* and *Luquetia*.

Luquetia largimacularis Wang et Zheng, 1999

Luquetia largimacularis Wang et Zheng, 1999; *Entomotaxonomia*, 21 (1): 48.

Material not examined.

Distribution. NW China (Shaanxi) (Wang & Zheng 1999).

Host plant. Unknown.

Luquetia tigrina Ponomarenko et Koshkin sp. nov.

Figs 8–10, 32–36, 41–43.

Type material see above.

Distribution. Russia (Far East: Evreiskaya Avtonomnaya Oblast [Jewish Autonomous Region]).

Host plant. Unknown.

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References

Buchner, P. & Corley, M. (2024) Depressariidae. Vol. 10. *In*: Karsholt, O. & Mutanen, M. (Eds.), *Microlepidoptera of Europe*. Brill, Leiden, pp. 1–605.

[Denis, M. & Schiffermüller, J.I.] (1775) *Ankündung eines systematischen Werkes von den Schmetterlingen der Wienergegend*. Augustin Bernardi, Wien, 322 pp.

Falkovitsh, M.I. & Stekolnikov, A.A. (1978) Introduction. *In*: Medvedev, G.S. (Ed.), *Key to the insects of European part of Russia. Vol. 4. Lepidoptera. Part 1*. Nauka, Leningrad, pp. 5–27.

Hanneman, H.-J. (1996) Depressariidae. *In*: Karsholt, O. & Razowski, J. (Eds.), *The Lepidoptera of Europe. A Distributional Checklist*. Apollo Books, Stenstrup, pp. 64–68.

Hodges, R.W. (1974) Gelechioidea, Oecophoridae. Fascicle 6.2. *In*: Dominick, R.B., Ferguson, D.C., Franclemont, J.G., Hodges, R.W. & Munroe, E.G. (Eds.), *The Moths of America North of Mexico*. E.W. Classey Ltd. and the Wedge Entomological Research Foundation, London, 142 pp.

Hodges, R.W. (1983) Oecophoridae. *In*: Hodges, R.W., Dominick, T., Davis, D.R., Ferguson, D.C., Franclemont, J.G., Munroe, E.G. & Powell, J.A. (Eds.), *Check List of the Lepidoptera of America North of Mexico*. E.W. Classey Ltd. and the Wedge Entomological Research Foundation, London, pp. 11–14.

Hübner, J. ([1825]) *Semioscopis*. *In*: Hübner, J. (1816–1827 [“1816”]), *Verzeichniß bekannter Schmettlinge* [sic!]. Augsburg, pp. 1–431.
https://doi.org/10.5962/bhl.title.48607

Klots, A.B. (1970) Lepidoptera. *In*: Tuxen, S.L. (Ed.), *Taxonomist’s glossary of genitalia in insects*. Munksgaard, Copenhagen, pp. 115–130.

Koo, J-M., Na, J-H., Paek, M. & Cho, S. (2023) First report of the genus *Semioscopis* Hübner and four species of Gelechioidea (Lepidoptera) from Korea with redescriptions. *Zootaxa*, 5325 (4), 509–528.
https://doi.org/10.11646/zootaxa.5325.4.3

Lepiforum e.V. (2024) *Semioscopis* Hübner, [1825]. *In*: Lepiforum e.V. (Ed.), *Bestimmungshilfe für die in Europa nachgewiesenen Schmetterlingsarten*. Visited on 11 November 2024. Available from: https://lepiforum.org/wiki/taxonomy/Gelechioidea/Depressariidae/Depressariinae/Depressariini/Semioscopis?view=0&regions=_meu (accessed 17 January 2025)

Leraut, P. (1991) Contribution aI'etude des Oecophoridae (s.l.). 2. Deux nouveaux noms de genres (Lepidoptera). *Alexanor. Revue française de Lépidoptérologie*, 17 (4), 232.

Lvovsky, A.L. (1981) Fam. Oecophoridae. *In*: Medvedev, G.S. (Ed.), *Key to the insects of European part of Russia. Vol. 4. Lepidoptera. Part 2*. Nauka, Leningrad, pp. 560–638.

Lvovsky, A.L. (1990) New and little known species of the Microlepidoptera (Lepidoptera: Oecophoridae, Xyloryctidae, Tortricidae) of the fauna of the USSR and neighbouring countries. *Entomologicheskoe obozrenie [Entomological Review]*, 64 (3), 638–655.

Lvovsky, A.L. (1995) New and little known genera and species of the broad-winged moths (Lepidoptera: Oecophoridae, Depressariidae) of Palaearctic fauna. *Entomologicheskoe obozrenie [Entomological Review]*, 74 (1), 138–152.

Lvovsky, A.L. (1999) Fam. Depressariidae. *In*: Lehr, P.A. (Ed.), *Key to the insects of Far East of Russia. Vol. 5. Lepidoptera. Part 2*. Dalnauka, Vladivostok, pp. 57–72.

Lvovsky, A.L. (2008) Family Depressariidae. *In*: Sinev, S.Yu. (Ed.), *Catalogue of the Lepidoptera of Russia*. KMK Scientific Press Ltd., St. Petersburg-Moscow, pp. 53–57.

Lvovsky, A.L. (2016) Fam. Depressariidae. *In*: Lelej, A.S. (Ed.), *Annotated catalogue of the insects of Russian Far East. Vol. 2. Lepidoptera*. Dalnauka, Vladivostok, pp. 76–81.

Lvovsky, A.L. (2019) Family Depressariidae. *In*: Sinev, S.Yu. (Ed.), *Catalogue of the Lepidoptera of Russia. 2nd Edition*. Zoological Institute RAS, St. Petersburg, pp. 53–57.

Lvovsky, A.L. & Dubatolov, V.V. (2007) Flat moths and some other families of the Gelechioidea complex (Lepidoptera: Depressariidae, Ethmiidae, Oecophoridae, Lecithoceridae) of the Bolshekhekhtsirskii Nature Reserve (Khabarovsk District). *In*: Streltzov, A.N. (Ed.), *Zhivotnyi mir Dalnego Vostoka [Fauna of the Far East]. Vol. 6*. Blagoveshchensk State Pedagogical University, Blagoveshchensk, pp. 56–58.

Lvovsky, A.L. & Nedoshivina, S.V. (2023) *Flat moths of the family Depressariidae (Lepidoptera) Middle and Low Volga region*. Corporation of technological advancement, Ulyanovsk, 128 pp., 2 colour pls.

Moth Photographers Group (2019) Electronic resource. Available from: http://mothphotographersgroup.msstate.edu (accessed 20 January 2025)

Pohl, G.R. & Landry, J.-F. (2018) Family Depressariidae Meyrick, 1883 (flat moths). *In*: Pohl, G.R., Landry, J.-F., Schmidt, B.Ch., Lafontaine, J.D., Troubridge, J.T., Macaulay, A.D., Nieukerken, E.J. van, deWaard, J.R., Dombroskie, J.J., Klymko, J., Nazari, V. & Sted, K. (Eds.), *Annotated Checklist of the moths and Butterflies (Lepidoptera) of Canada and Alaska*. Pensoft Publishers, Sofia, pp. 71–77.

Ratnasingham, S. & Hebert, P.D.N. (2007) BOLD: The Barcode of Life Data System (http://www.barcodinglife.org). *Molecular Ecology Notes*, 7, 355–364. https://doi.org/10.1111/j.1471-8286.2007.01678.x

Robinson, G.S. (1976) The preparation of slides of Lepidoptera genitalia with special reference to the Microlepidoptera. *Entomologist's Gazette*, 27, 127–132.

Robinson, G.S., Ackery, Ph.R., Kitching, I., Beccaloni, G.W. & Hernández, L.M. (2023) *HOSTS* (from *HOSTS - a Database of the World's Lepidopteran Hostplants*) [Data set resource]. Natural History Museum. Available from: https://data.nhm.ac.uk/dataset/hosts/resource/877f387a-36a3-486c-a0c1-b8d5fb69f85a (accessed 20 January 2025)

Sakamaki, Y. (2013) Depressariidae. *In*: Hirowatari, T., Nasu, Y., Sakamaki, Y. & Kishida, Y. (Eds.), *The Standard of Moths in Japan III*. Gakken Education Publishing, Tokyo, pp. 34–35 + 189–199.

Saito, T. (1989) Two new species of the genus *Semioscopis* (Lepidoptera, Oecophoridae) from Japan. *Japanese Journal of Entomology*, 57 (4), 703–711.

Wang, S. & Zheng, Z. (1999) The first record of *Luquetia* Leraut (Lepidoptera: Oecophoridae) in China, with description of the one new species. *Entomotaxonomia*, 21 (1), 47–50.

Westwood, J.O. (1840) *An introduction to the modern classification of insects, founded on the natural habits and corresponding organisation of the different families. Vol. 2*. Longmans, London, xi + 158 pp. https://doi.org/10.5962/bhl.title.12455