

Materials on the Lepidoptera of Uzbekistan. Part I. Family Geometridae Leach, 1815

Artem E. Naydenov¹, Ilya A. Makhov², Vladimir G.
Mironov², Mukhammadtuychi R. Rakhimov³,
Fazlitdin Z. Khalimov³, Roman V. Yakovlev^{1, 3, 4}

1 Altai State University, 61 Lenin Ave., Barnaul, 656049, Russia

2 Zoological Institute of the Russian Academy of Sciences, 1 Universitetskaya embankment, St. Petersburg, 199034, Russia

3 Samarkand State University named after Sharof Rashidov, 15 University Boulevard, Samarkand, 140100, Uzbekistan

4 Biological Institute, Tomsk State University, 36 Lenina Ave., Tomsk, 634050, Russia

Corresponding author: Artem E. Naydenov (naydenov.24@mail.ru)

Academic editor: R. Yakovlev | Received 3 April 2025 | Accepted 21 April 2025 | Published 26 April 2025

<http://zoobank.org/C1C46C79-8C14-424B-B208-C327A9F68D12>

Citation: Naydenov AE, Makhov IA, Mironov VG, Rakhimov MR, Khalimov FZ, Yakovlev RV (2025) Materials on the Lepidoptera of Uzbekistan. Part I. Family Geometridae Leach, 1815. Acta Biologica Sibirica 11: 589–611. <https://doi.org/10.5281/zenodo.15274938>

Abstract

The article provides a list of seventy-four collected species of geometrid moths from the territory of Uzbekistan based on the results of four expeditions in 2022–2024 in Andizhan, Namangan, Fergana, Tashkent, Jizzakh, Samarkand, Bukhara, Qashqadaryo and Surxondaryo regions. Twenty-three species recorded for the first time for the fauna of the country are indicated and illustrated.

Keywords

Biodiversity, Central Asia, fauna, geometrid moths, Hisar, insects, Kugitang, new records

Introduction

With this article we begin a series of publications on the poorly studied Lepidoptera fauna of Uzbekistan. Currently, Uzbekistan is the least studied region in Cen-

tral Asia. It is difficult to talk about the reasons for the poor study of the fauna in Uzbekistan. Most likely, the researchers, when planning their field studies in the Central Asian countries of the former USSR, preferred “more interesting regions” (from their point of view) of the Tian Shan and Pamir-Alai within Kyrgyzstan or Tajikistan. Perhaps the factor of greater (than in other republics, and then countries in the region) anthropogenic influence on natural complexes had an effect. The vast desert (and relatively poor) areas in the central and western parts of the country were also not so attractive to researchers. At the same time, the richer mountainous territories are often difficult to access. The study of the Uzbekistan fauna is extremely promising since the following ecoregions are partially located on its territory: Alai-Western Tian Shan steppe ecoregion (WWF ID: PA0801) and Hissar-Alai open woodlands ecoregion (WWF ID: PA0808), they belong to the Mountains of Central Asia biodiversity hotspots (Myers 1988; Myers et al. 2000). To study Lepi-doptera (and other elements of the entomofauna) of Uzbekistan, a joint laboratory for the study of mountain and arid ecosystems of Central Asia was created at the Altai State University (Russia) and the Samarkand State University (Uzbekistan).

Let us briefly dwell on the history of the Lepidoptera study in Uzbekistan. Attributing old collections and works to Uzbekistan is not always easy, since several geographically inaccurate toponyms were often given in geographical labels and names of typical localities, such as “Kirgisensteppen, Turkestan, etc.” Let us immediately make a reservation that our brief review deliberately does not include any works on agricultural topics.

The first information about Lepidoptera of Uzbekistan was published by entomologists who made a significant contribution to the study of the southern borders of the Russian Empire (Eversmann 1854; Erschoff 1874; Staudinger 1886, 1889; Grum-Grshimailo 1887; Groum-Grshimailo 1890 etc.). The Soviet period of study was mainly devoted to economically important species of Lepidoptera. However, it was during these years that the volumes of Fauna of the USSR were published, they included the faunal information known at that time on the territory under study, including the Uzbek SSR (Kozhantshikov 1956; Zaguljaev 1960, 1964, 1973, 1975, 1979, 1988). The faunal work by Gerasimov (1930) was devoted to Microlepidop-tera of southern Uzbekistan. M. Falkovitsh was purposefully engaged in the study of the fauna of the Kyzylkum desert and the Syr Darya River valley. His work included both faunal studies and descriptions of new species, as well as a thorough study of the desert Lepidoptera biology (Falkovitsh 1972, 1973, 1979, 1986 etc.). Data on the fauna of Uzbekistan appeared in many works of the same period and in later years; we will only indicate the most important summaries: (Bleszynski 1965; Razowski 1966, 1970, 1984; Sattler 1967; Roesler 1973, 1993; Derzhavets 1984; Diakonoff 1986; Sinev 1986; Puplesis 1994; Arenberger 1995, 2002; Dubatolov 1996, 2010; Puplesis et al. 1996; Gozmany 2000; Dubatolov and Zolotuhin 2002; Dubatolov et al. 2003; Puplesis and Diškus 2003; Schitlmeister 2008; Bekchanov and Yavkachev 2009; Khamraev et al. 2009; de Freina and Geck 2014; Zolotuhin 2015; Yakovlev and Witt 2017a, 2017b; Zolotuhin and Evdoshenko 2019; Bekchanov and Bekchanova

2020a, 2020b; Zolotuhin and Nedoshivina 2021; Patzold et al. 2023; Ustjuzhanin and Kovtunovich 2025, etc.). Due to the popularity of Butterflies, the bibliography of Papilionoidea is very extensive (Weiss 1991, 1992, 1999, 2005; Tuzov et al. 1997, 2000; Bozano 2000; Bozano and Weidenhoffer 2001; Della Bruna et al. 2004; Toropov and Zhdanko 2006, 2009; Weiss and Rose 2011; Grieshuber et al. 2012; Grieshuber 2014; Korb and Bolshakov 2016 etc.). However, as can be seen from the list provided, there are no special general reports on the fauna of Uzbekistan. There are really only two of them: a beautifully published iconographic summary of Butterflies (Tshikilovets 2000) and a list of Pterophoridae, published even without indication of specific locations of findings (Ustjuzhanin and Kovtunovich 2018). The publications of our colleagues from Uzbekistan are mostly about pest species (Suleymanov et al. 2021; Mukhammedov and Shermatov 2022; Shermatov 2023; Shermatov et al. 2024 etc.). This review does not claim to be complete (since this is the topic of a separate special study) but only reflects the main milestones in the study of the taxonomy and fauna of this region. Detailed literature reviews will be given later when considering individual families.

The Geometridae fauna of Central Asia is studied very fragmentarily. The most important milestone in the study of geometrid moths of the Central Asian countries were the monographs of Viidalepp (1988, 1996), where an attempt was made to summarize all the faunal information available at that time. Nevertheless, the Geometridae fauna of Uzbekistan, as well as for the other Lepidoptera of this country, are the least studied in comparison with other Central Asian republics of the post-Soviet space. According to Viidalepp (1996), there were 149 Geometridae species reported for Uzbekistan, while for Turkmenistan they are 217, for Tajikistan – 241, Kyrgyzstan – 245, and Kazakhstan – 367 species. Despite the later additions to the Central Asian fauna (Kaila et al. 1996; Beljaev and Vasilenko 1998; Hausmann and László 1999; Gorbunov 2011; Vasilenko 2019; Mironov et al. 2021; Vasilenko and Belousov 2021; Vasilenko and Mironov 2021; Vasilenko and Dubatolov 2022; Vasilenko et al. 2022; Korb 2023), and a series of reviews on the Palaearctic Geometridae genera (Weisert 2002; Rajaei et al. 2012, 2017, 2022; Erlacher and Erlacher 2016; Erlacher et al. 2017; Wanke et al. 2019, 2023; Werner et al. 2023), the geometrid moths fauna in Uzbekistan remains the least studied in the region.

This article is the first in a series of works aimed at studying the biodiversity of Lepidoptera in the Republic of Uzbekistan based on the results of a number of expeditions by Russian and Uzbek entomologists.

Materials and methods

The materials for the article were collected during four expeditions in 2022–2024 in Andizhan, Namangan, Fergana, Tashkent, Jizzakh, Samarkand, Bukhara, Qashqadaryo and Surxondaryo regions in 22 localities (Fig. 1) from April to early June. The specimens were collected manually, using an entomological net during daylight

hours and using a light source (mercury-tungsten arc lamp and ENTOSPHINX lamp UV LED 12 V/19.2W with diodes 240 UV LED) during dark hours.

The images were taken with the camera of Canon EOS 6D Marl II. The examined material is kept in the personal collection of Artem E. Naydenov (Barnaul, Russia). Photos were enhanced and arranged to plates with Adobe Photoshop software.



Figure 1. Collecting sites in Uzbekistan.

List of collecting localities

A1 – Andizhan Region, near Imom-Ata village, Tash-Ata Mts., h=900 m, 40.538611N, 72.617222E, 20–21.V.2024, R.V. Yakovlev leg.

A2 – Andizhan Region, Ulugnar distr., Akaltyn village, h=420 m, 40.770556N, 71.702500E, 22.V.2024, R.V. Yakovlev leg.

N1 – Namangan Region, Minbulak sands, h=360 m, 40.725000N, 71.384722E, 19.V.2024, R.V. Yakovlev leg.

N2 – Namangan Region, Pop distr., W. Tian Shan, Chatkal Range, Parda-Tur-sun village, h=1600 m, 41.075556N, 70.861389E, 23–24.V.2024, R.V. Yakovlev leg. (Fig. 2)

F1 – Fergana Region, near Chinabad village, Kokand sands, h=370 m, 40.629444N, 70.857778E, 17.V.2024, R.V. Yakovlev leg.

F2 – Fergana Region, near Shorsu village, h=650 m, 40.255000N, 70.816667E, 18.V.2024, R.V. Yakovlev leg.

T1 – Tashkent Region, near Yangiabad, h=1420 m, 41.133889N, 70.115278E, 16–17.V.2024, R.V. Yakovlev leg.

T2 – Tashkent Region, W. Tian Shan, Kuraminskiy Range, Angren distr., near Lashkarak village, h=1500 m, 40.903722N, 70.2176942E, 26–27.V.2024, R.V. Yakovlev leg.

J1 – Jizzakh Region, Golodnaya Steppe desert, 57 km N Jizzakh, h=240 m, 40.686550N, 67.722633E, 11–12.V.2022, R.V. Yakovlev leg.

J2 – Jizzakh Region, Turkestan Range, 26 km S Zaamin, near Yettykechi village, h=1200–1300 m, 39.728389N, 68.391528E, 24–25.V.2023, Naydenov A.E. leg.

J3 – Jizzakh Region, Turkestan Range, 39 km S Zaamin, near Suffa plateau, h=2200 m, 39.615222N, 68.435028E, 23–24.V.2023, Naydenov A.E. leg. (Fig. 3)

Sm1 – Samarkand Region, riparian zone of Zeravshan river, tugai, near Urakli village, h=750 m, 39.633139N, 67.175556E, 02–03.VI.2023, Naydenov A.E. leg.

Sm2 – Samarkand region, Zarafshan Range, 16 km S Samarkand, h=1145 m, 39.436129N, 66.968432E, 22–23.V.2023, Naydenov A.E. leg.

B1 – Bukhara Region, Alat district, Kesakli village, h=120 m, 39.361111N, 63.886667E, 30.III.2023, R.V. Yakovlev leg.

B2 – Bukhara Region, ecological centre Geiron, h=220 m, 39.566111N, 64.702222E, 31.III.2023, R.V. Yakovlev leg. (Fig. 4)

Q1 – Qashqadaryo Region, Hisar Mountains, Tankhizidarya river valley, 9 km NW Qamar village, cordon of the Hisar Reserve, h=1540–1700 m, 38.887361N, 67.290500E, 31.V.–02.VI.2023, Naydenov A.E. leg. (Fig. 5)

S1 – Surxondaryo Region, 4 km NW Termez, Khakim-at-Termezi Mausoleum, h=300 m, 37.275806N, 67.196250E, 2.IV.2023, R.V. Yakovlev leg.

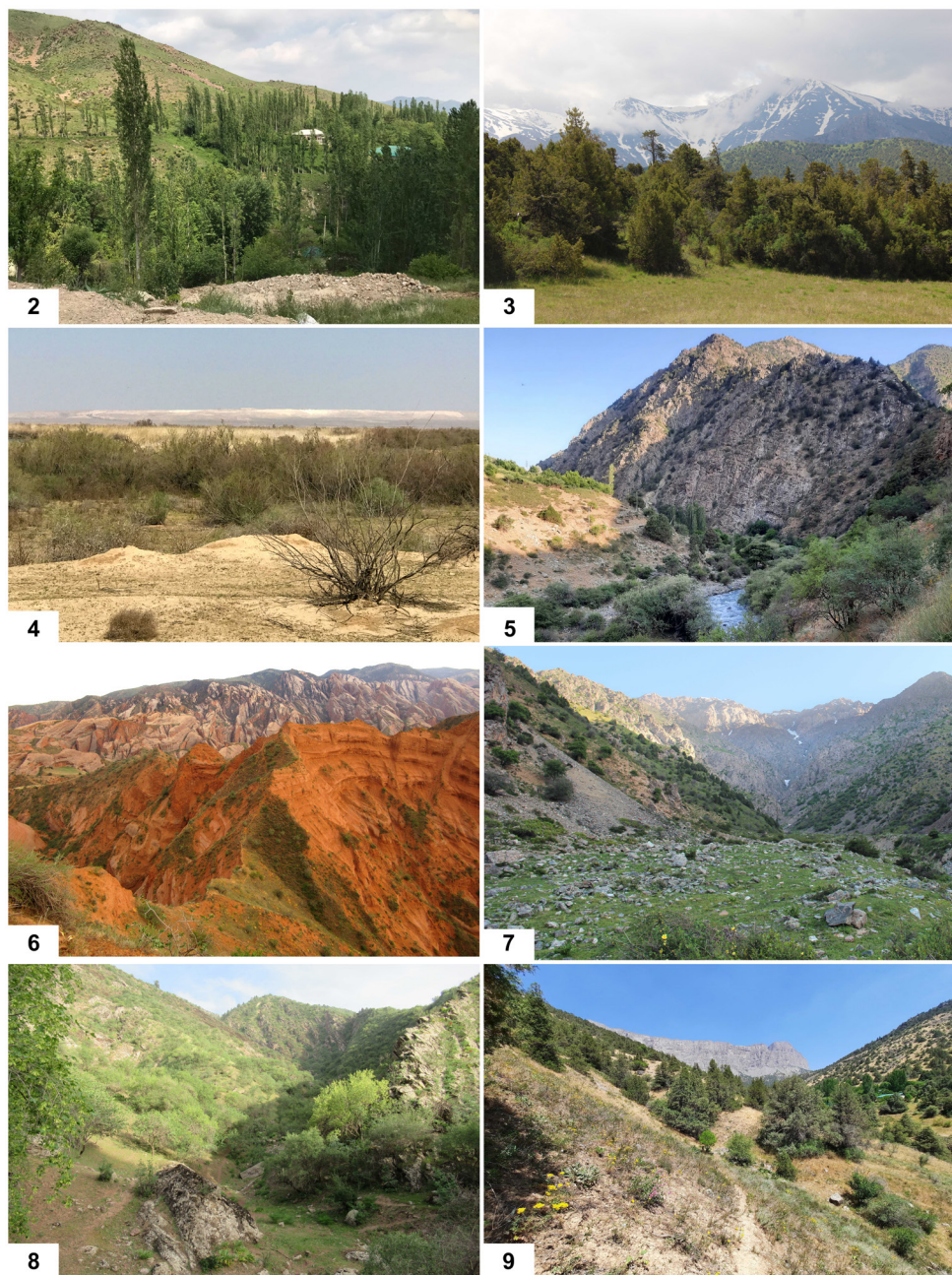
S2 – Surxondaryo Region, Babatag Range, 28 km SE Denau, h=1200 m, 38.112450N, 68.191550E, 29.IV–01.V.2022, R.V. Yakovlev leg. (Fig. 6)

S3 – Surxondaryo Region, Hisar Mountains, Baisuntau Range, 5 km N Derbent village, h=1150 m, 38.262933N, 67.025900E, 05–06.V.2022, R.V. Yakovlev leg.

S4 – Surxondaryo Region, Hisar Mountains, near mountain Husantak, 5 km N Sangardak village, h=1990–2100 m, 38.598222N, 67.545972E, 27–29.V.2023, Naydenov A.E. leg. (Fig. 7)

S5 – Surxondaryo Region, Hisar Mountains, Tupalangdarya river valley, 6 km NNE Gisarak village, h=1000 m, 38.633017N, 67.825200E, 01–03.V.2022, R.V. Yakovlev leg. (Fig. 8) (a); 26–27.V.2023, Naydenov A.E. leg. (b).

S6 – Surxondaryo Region, Kugitang Range, h=1700 m, 37.858983N, 66.634467E, 06–08.V.2022, R.V. Yakovlev leg. (a); 29–31.V.2023, Naydenov A.E. leg. (Fig. 9) (b).



Figures 2–9. Collecting localities in Uzbekistan: **2.** W. Tian Shan, Parda-Tursun vill., 1600 m (photo by R. Yakovlev); **3.** Turkestan Range, near Suffa plateau, 2200 m (photo by A. Naydenov); **4.** Bukhara Region, ecological centre Geiron, 220 m (photo by R. Yakovlev); **5.** Hisar Mountains, Tankhizidarya river valley, 1540 m (photo by A. Naydenov); **6.** Babatag Range, 1200 m (photo by A. Fomichev); **7.** Hisar Mountains, near mountain Husantak, 1990 m (photo by A. Naydenov); **8.** Hisar Mountains, Tupalangdarya river valley, 1000 m (photo by A. Fomichev); **9.** Kugitang Range, 1700 m (photo by A. Naydenov).

Results

I. The species list of geometrid moths collected in Uzbekistan

(* – new for Uzbekistan)

Subfamily ENNOMINAE

1. *Eilicrinia subcordaria* (Herrich-Schäffer, [1852]) – T2, S6a
2. *Ramitia obliquelineata* Viidalepp, 1988 – S2, S3, S4, S5a, S6a
3. *Odontopera muscularia* (Staudinger, 1892) – J3
4. * *Artemidora andrea* Weisert, 2002 – Q1, S4, S5a, S5b, S6a, S6b
5. *Artemidora maracandaria* (Erschoff, 1874) – N2
6. * *Ottia ochraceata* (Viidalepp, 1988) – S5a
7. *Opisthograptis luteolata* (Linnaeus, 1758) – S4, S5a
8. *Ourapteryx purissima* Thierry-Mieg, 1905 – Q1, S6b
9. * *Charissa (Dysgnophos) difficilis* (Alphéraky, 1883) – N2
10. * *Charissa (Cnestrognophos) zaprjagaevi* (Viidalepp, 1988) – S4, S6a
11. *Synopsia sociaria unitaria* (Staudinger, 1870) – Q1
12. *Dyscia malatyana* Wehrli, 1934 – B2
13. * *Habermania oxygonaria* (Püngeler, 1900) – Q1, S4, S6b
14. * *Afriberina nobilitaria* (Staudinger, 1892) – S6b
15. *Nychiodes antiquaria* Staudinger, 1892 – A1, Sm2, Q1, S2, S5a, S5b
16. *Phaselia serrularia* (Eversmann, 1847) – J2, Q1, S2, S5a, S5b, S6b
17. *Stegania dalmataria* (Guenée, 1858) – Q1, S6b
18. *Digrammia rippertaria* (Duponchel, 1830) – Q1, S5a, S6a, S6b
19. *Gnopharmia cocandaria* (Erschoff, 1874) – A1, N2, J2, J3, Sm2, Q1, S2, S4, S5a, S5b, S6b
20. *Chiasmia aestimaria* (Hübner, [1809]) – N1, F1, J1, B1, B2, S1
21. * *Chiasmia kuhitangiensis* (Vasilenko, 1996) – S2, S5b

Subfamily GEOMETRINAE

22. *Thetidia fulminaria* (Lederer, 1870) – N2, J2, S2, S5b, S6b
23. *Thetidia smaragdaria volgaria* (Guenée, [1858]) – A1, F1, Sm1
24. *Phaiogramma etruscaria* (Zeller, 1849) – N2, F1, Sm2, Q1, S1, S4, S6b
25. *Heliothea iliensis* (Alphéraky, 1883) – J2, Sm2

Subfamily LARENTIINAE

26. *Aplocera plagiata* (Linnaeus, 1758) – N2, T1, T2, J2, J3, Q1, S4, S5b, S6a
27. *Lithostegia excelsata* (Erschoff, 1874) – B2, J1
28. * *Scotopteryx sartata* (Alphéraky, 1883) – T2
29. * *Cataclysme festinata* (Staudinger, 1893) – T1, T2

30. *Orthonama obstipata* (Fabricius, 1794) – F2
31. * *Catarhoe arachne* Wiltshire, 1967 – S5b
32. *Catarhoe rubidata fumata* (Eversmann, 1844) – T1
33. *Costaconvexa polygrammata* (Borkhausen, 1794) – A1
34. * *Protorhoe tadjikaria* Stshetkin, 1956 – Q1
35. *Protorhoe unicata centralisata* (Staudinger, 1892) – A1, N1, N2, T2, Q1, S2, S5b, S6a
36. *Cidaria distinctata* Staudinger, 1892 – Q1, S6b
37. * *Philereme instabilis* (Alphéraky, 1883) – N2
38. *Hydria incertata* (Staudinger, 1882) – Q1
39. * *Martania seriata* (Moore, 1888) – T2, Q1
40. *Gymnoscelis rufifasciata* (Haworth, 1809) – A1, Q1, S2, S5b
41. *Eupithecia centaureata centralisata* Staudinger, 1892 – N2, Q1
42. *Eupithecia gratiosata* Herrich-Schäffer, 1861 – S2, S5a
43. *Eupithecia hilaritata* Dietze, 1908 – S5a, S5b, S6b
44. *Eupithecia kruusi* Viidalepp, 1988 – S2, S5a, S6b
45. *Eupithecia minusculata* Alphéraky, 1883 – S5a
46. *Eupithecia opistographata* Dietze, 1906 – F1
47. *Eupithecia parallelaria* Bohatsch, 1893 – T1, N2, B1, Q1, S4, S6a, S6b
48. *Eupithecia rebeli* Bohatsch, 1893 – Q1
49. *Eupithecia remmi* Viidalepp, 1988 – J2, S2, S6b
50. *Eupithecia subpulchrata* Alpheraky, 1883 – S5a
51. *Eupithecia usbeca* Viidalepp, 1992 – B1, B2
52. * *Horisme nigrovittata* (Warren, 1888) – Q1

Subfamily STERRHINAE

53. * *Rhodostrophia abscisaria* Brandt, 1941 – J2, Q1, S2, S4, S5b, S6b
54. * *Rhodostrophia terrestraria pellowaria* Christoph, 1885 – S2, S5a
55. *Idaea degeneraria erschoffi* (Christoph, 1872) – A1, Sm1, S5b
56. * *Idaea elongaria* (Rambur, 1833) – N1
57. *Idaea rusticata* ([Denis & Schiffermüller], 1775) – Sm1
58. *Idaea descitaria* (Christoph, 1893) – B1, B2
59. * *Idaea straminata* (Borkhausen, 1794) – S6b
60. *Idaea rufaria* (Hübner, [1799]) – S6b
61. *Idaea mancipiata* (Staudinger, 1871) – F1, F2
62. * *Brachyglossina chaspia talvei* Viidalepp, 1988 – S2, S5a, S5b
63. * *Cinglis benigna* (Brandt, 1941) – S2
64. * *Scopuloides origalis* (Brandt, 1941) – J2, Q1, S2, S4, S5a, S5b
65. * *Scopula sacraria* (Bang-Haas, 1910) – Q1, S2, S5a, S5b
66. *Scopula adulteraria* (Erschoff, 1874) – Sm2
67. * *Scopula nigrociliata* Ebert, 1965 – J2
68. *Scopula decorata* ([Denis & Schiffermüller], 1775) – Q1, S4, S6a, S6b

69. *Scopula ornata* (Scopoli, 1763) – T1
70. *Scopula beckeraria assimilaria* (Staudinger, 1897) – A1, B2, S5b, S6b
71. *Scopula marginepunctata* (Goeze, 1781) – N2, J2, Sm2, S4, S6b
72. *Ochodontia adustaria* (Fischer von Waldheim, 1840) – J2, Q1, S5b
73. *Lythria purpuraria* (Linnaeus, 1758) – A2
74. *Casilda consecraria* (Staudinger, 1871) – B2, F1, F2

II. New records for Uzbekistan

1. *Artemidora andrea* Weisert, 2002 (Figs 10, 11, 37, 55)

Distribution. South-West Kazakhstan, Turkmenistan, Tajikistan (Vasilenko et al. 2022; Weisert 2002). Finding of the species in Uzbekistan closes a ‘gap’ in the area of this species.

2. *Ottia ochraceata* (Viidalepp, 1988) (Figs 12, 56)

Distribution. Hisar range in Tajikistan (Viidalepp and Lindt 2023). The new record extends the view of the area of this species westwards within the Hisar range of Uzbekistan.

3. *Charissa (Dysgnophos) difficilis* (Alphéraky, 1883) (Figs 13, 38)

Distribution. Russia (Caucasus, S. Ural), Armenia, Kazakhstan, Kyrgyzstan, Mongolia, N.W. China (Makhov et al. 2023). The new record in the Western Tian Shan in Uzbekistan clarifies the southern border of area of the species.

4. *Charissa (Cnestrognophos) zaprjagaevi* (Viidalepp, 1980) (Figs 14, 39)

Distribution. Tajikistan (Hisar-Darwaz and Western Pamirs) (Viidalepp 1996). The finding of this species in Uzbekistan extends the view of its distribution westwards within the Kugitang and Hisar Mountains.

5. *Habermania oxygonaria* (Püngeler, 1900) (Figs 15, 40)

Distribution. Tajikistan (Alai Mts., Hisar-Darwaz), N. Afghanistan (Viidalepp 1996), and Kyrgyzstan (Korb 2023). The new record in the Hisar and Kugitang Mountains in Uzbekistan clarifies the western border of area of the species.

6. *Afriberina nobilitaria* (Staudinger, 1892) (Figs 16, 57)

Distribution. Tian Shan to Pamirs: S. Kazakhstan, Kyrgyzstan, Tajikistan (Viidalepp 1996). The finding of the species on the Kugitang Range in Uzbekistan expands the view of its area to the southwest.

7. *Chiasmia kuhitangiensis* (Vasilenko, 1996) (Figs 17, 41)

Distribution. Turkmenistan and Tajikistan (Vasilenko 1996; Vasilenko and Mironov 2021). The new record of the species in Uzbekistan closes a ‘gap’ in the area of this species.

8. *Scotopteryx sartata* (Alphéraky, 1883) (Figs 18, 42)

Distribution. Tian Shan: S. Kazakhstan, Kyrgyzstan, Tajikistan (Pamiro-Alai, N.W. Pamirs, N.W. China) (Viidalepp 1996). The finding of the species on the territory of Uzbekistan is logical and clarifies its area of the Tian Shan Mountains.

9. *Cataclysmes festinata* (Staudinger, 1893) (Figs 19, 43)

Distribution. Turkmenistan, Tajikistan, S. Kazakhstan, Kyrgyzstan, N. Iran, N. Afghanistan (Viidalepp 1996). The new record of the species in Uzbekistan closes a ‘gap’ in the area of this species.

10. *Catarhoe arachne* Wiltshire, 1967 (Figs 20, 58)

Distribution. Transcaucasia (Armenia), Turkmenistan, Tajikistan, N. Iran (Viidalepp 1996). The new record closes a ‘gap’ in Central Asian area of this species.

11. *Protorhoe tadzhikaria* Stshetkin, 1956 (Figs 21, 59)

Distribution. Tajikistan (Viidalepp 1996). The new record of the species in Uzbekistan is the most western.

12. *Philereme instabilis* (Alphéraky, 1883) (Figs 22, 60)

Distribution. Tian Shan: S. Kazakhstan, Kyrgyzstan, Tajikistan (Hisar range), N.W. China (Viidalepp 1996). The new record in the Uzbekistan Tian Shan is logical and clarifies its distribution in this mountain system.

13. *Martania seriata* (Moore, 1888) (Figs 23, 61)

Distribution. Nepal, W. China, Tajikistan. The new finding of the species in Uzbekistan is the western most point of its area.

14. *Horisme nigrovittata* (Warren, 1888) (Figs 24, 44)

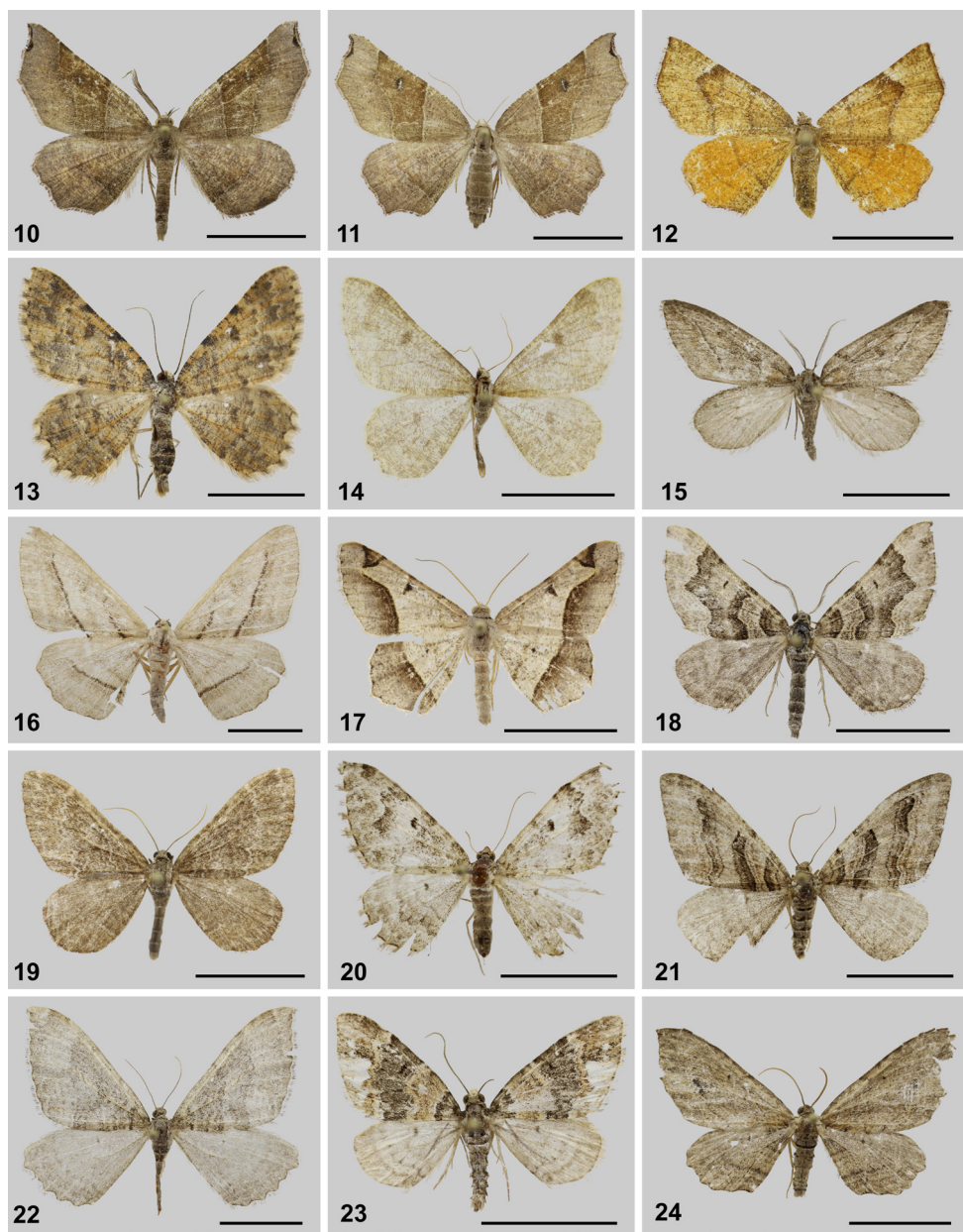
Distribution. Tajikistan, N. India (Viidalepp 1996). The new record extends the view of the area of this species westwards within the Hisar range of Uzbekistan.

15. *Rhodostrophia abscisaria* Brandt, 1941 (Figs 25, 45)

Distribution. Tajikistan, Afghanistan and north-eastern Iran (Rajaei et al. 2022). The new record in Uzbekistan expands the view of the northern part of the species area.

16. *Rhodostrophia terrestraria pellowaria* Christoph, 1885 (Figs 26, 27, 46, 62)

Distribution. The species is distributed from north-eastern Iran across Turkmenistan to Uzbekistan and northern Afghanistan (Rajaei et al. 2022). Our record confirms the presence of this species in Uzbekistan. *Rhodostrophia terrestraria* (Lederer, 1869) was reported for Kyrgyzstan (without specifying subspecies) (Korb 2023).



Figures 10–24. Geometrid moths new for Uzbekistan fauna, imagoes (scale bar – 10 mm): **10.** *Artemidora andrea* Weisert, 2002, male, Tankhizidarya river valley; **11.** *Artemidora andrea* Weisert, 2002, female, Tankhizidarya river valley; **12.** *Ottia ochraceata* (Viidalepp, 1988), female, Tupalangdarya river valley; **13.** *Charissa (Dysgnophos) difficilis* (Alphéraky, 1883), male, W. Tian-Shan, Parda-Tursun vill.; **14.** *Charissa (Cnestrognophos) zaprjagaevi* (Viidalepp, 1980), male, Kugitang Range; **15.** *Habermania oxygonaria* (Püngeler, 1900), male, Hisar Mountains, near Husantak; **16.** *Afriberina nobilitaria* (Staudinger, 1892), female, Kugitang Range. The description continues on the next page.

Figures 10–24. Continued from previous page. **17.** *Chiasmia kuhitangiensis* (Vasilenko, 1996), male, Tupalangdarya river valley; **18.** *Scotopteryx sartata* (Alphéraky, 1883), male, W. Tian-Shan, near Lashkarak vill.; **19.** *Cataclysmes festinata* (Staudinger, 1893), male, W. Tian-Shan, near Lashkarak vill.; **20.** *Catarhoe arachne* Wiltshire, 1967, female, Tupalangdarya river valley; **21.** *Protorhoe tadjikaria* Stshetkin, 1956, female, Tankhizidarya river valley; **22.** *Philereme instabilis* (Alphéraky, 1883), female, W. Tian-Shan, Parda-Tursun vill.; **23.** *Martania seriata* (Moore, 1888), female, W. Tian-Shan, near Lashkarak vill.; **24.** *Horisme nigrovittata* (Warren, 1888), male, Tankhizidarya river valley.

17. *Idaea elongaria* (Rambur, 1833) (Figs 28, 47)

Distribution. Southern Europe (from Iberian Peninsula across southern France, Italy to Balkan Peninsula), Mediterranean islands, Southern European Russia. Western and northern Hungary, and southern Slovakia (subspecies *pecharia*). North Africa (from Morocco to Egypt), Levant, Turkey, Transcaucasia, Northern Iran, Turkmenistan, Southwestern Mongolia (Viidalepp 1996; Hausmann 2004; Kn-yazev et al. 2022). The new record in Uzbekistan is the most southeastern and clarifies the distribution of the species in Central Asia.

18. *Idaea straminata* (Borkhausen, 1794) (Figs 29, 48)

Distribution. A widespread Palearctic species. In Central Asia, it is recorded in Mongolia, Kazakhstan, Kyrgyzstan, Tajikistan, as well as in northern Iran and Afghanistan (Viidalepp 1996; Hausmann 2004). The finding in Uzbekistan provides further insight into the distribution of this species in Central Asia.

19. *Brachyglossina chaspia talvei* Viidalepp, 1988 (Figs 30, 31, 49–51)

Distribution. The species is found in Turkmenistan, Tajikistan and Iran (Hausmann and László 1999; Vasilenko and Dubatolov 2022). The subspecies *talvei* is known from Hisar in Tajikistan (Viidalepp 1988). The finding in Uzbekistan clarifies the distribution of the species in the eastern part of its area.

Remarks. Specimens from the Babatag Range have more orangish coloration of wings in comparison with specimens from the Hisar Range in Uzbekistan. In addition, one specimen from the series occurring from the Hisar Range has three cornuti on the vesica. Probably, the difference in wing coloration and the number of cornuti in the aedeagus is polymorphism and cannot serve as clear diagnostic characters to distinguish subspecies.

20. *Cinglis benigna* (Brandt, 1941) (Figs 32, 52)

Distribution. The species is known from Iran (Wanke et al. 2023). The new record in Uzbekistan extends the area of the species to the north-east in Central Asia.

21. *Scopuloides origalis* (Brandt, 1941) (Figs 33, 34, 53, 63)

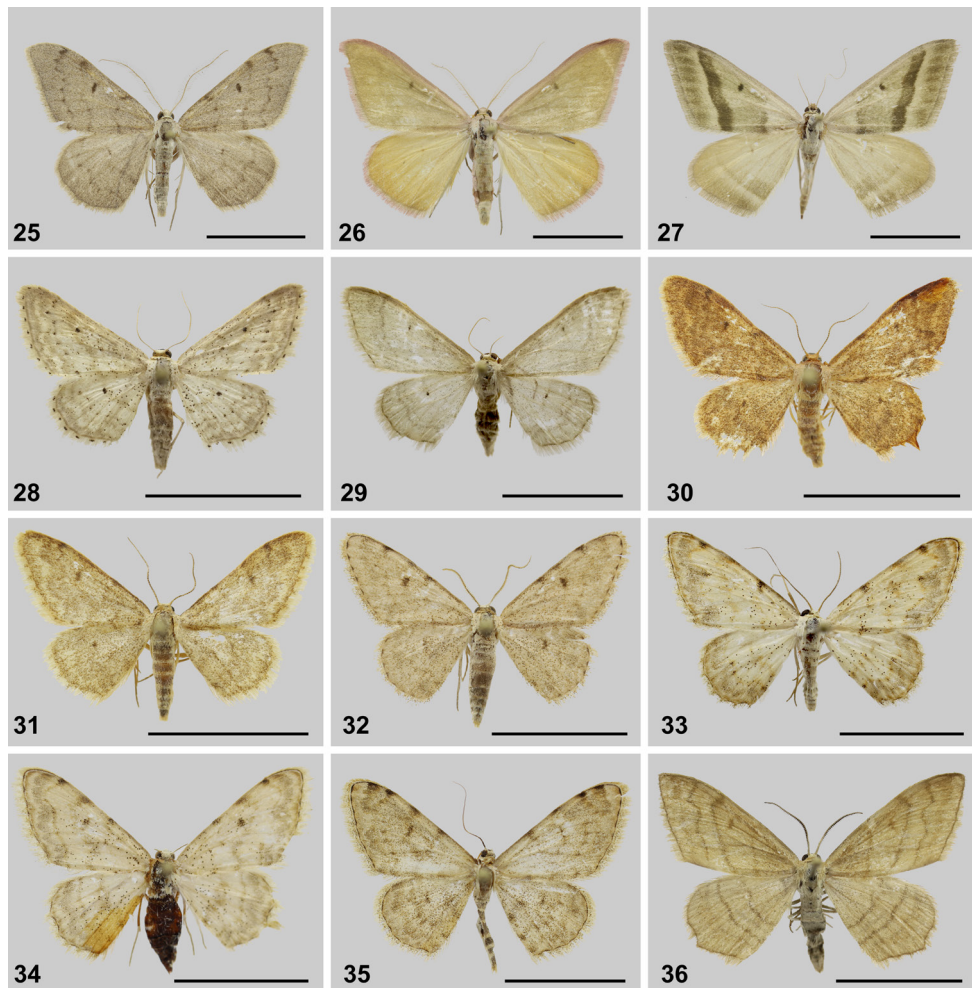
Distribution. Tajikistan, Afghanistan and Iran (Wanke et al. 2023). The new record in Uzbekistan clarifies the distribution of the species in the northern part of its area.

22. *Scopula sacraria* (Bang-Haas, 1910) (Figs 35, 64)

Distribution. Greece, Turkey, Levant, Iraq, Syria, Transcaucasia, Iran, Turkmenistan, Kazakhstan and Afghanistan (Wanke et al. 2023). The finding in Uzbekistan clarifies the distribution of the species in Central Asia.

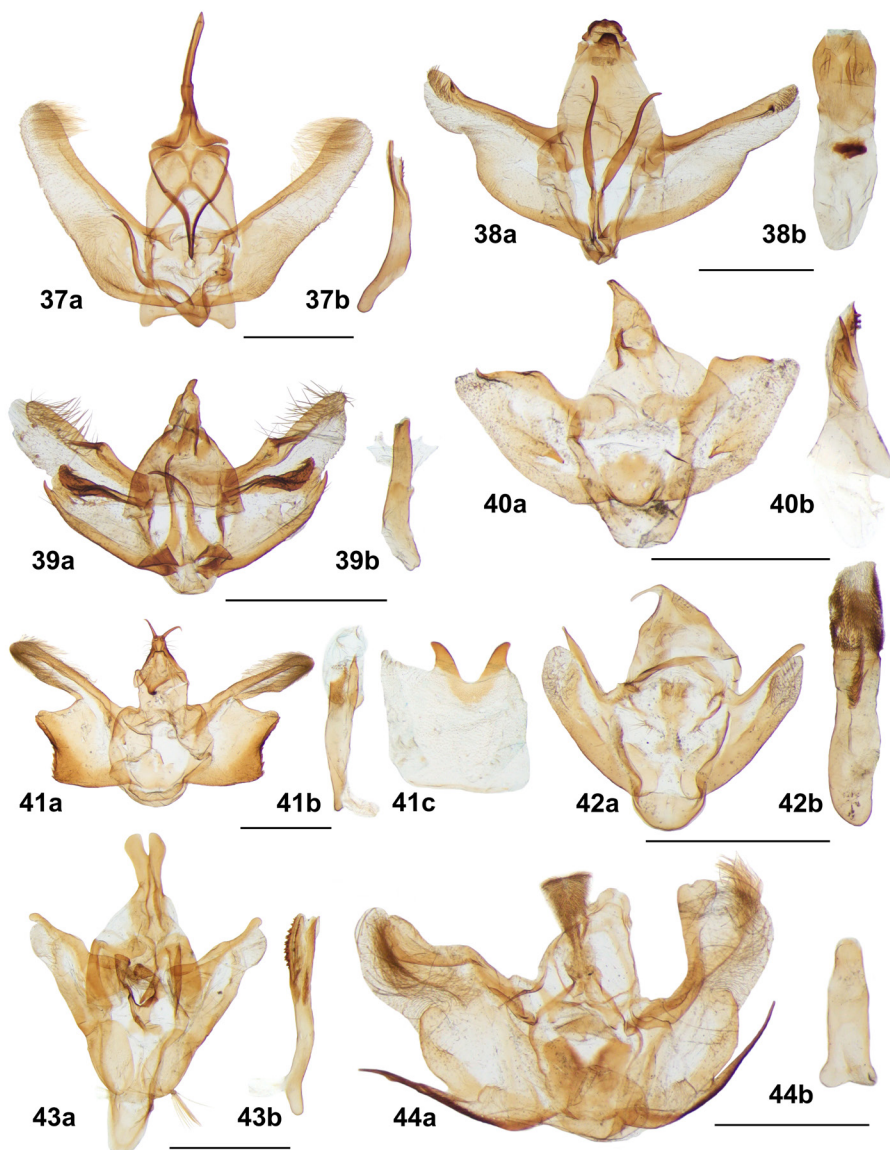
23. *Scopula nigrociliata* Ebert, 1965 (Figs 36, 54)

Distribution. Tajikistan (Darwaz Mts.), Afghanistan (Viidalepp 1996). The new record extends the view of the area of this species to the north-west in Uzbekistan.



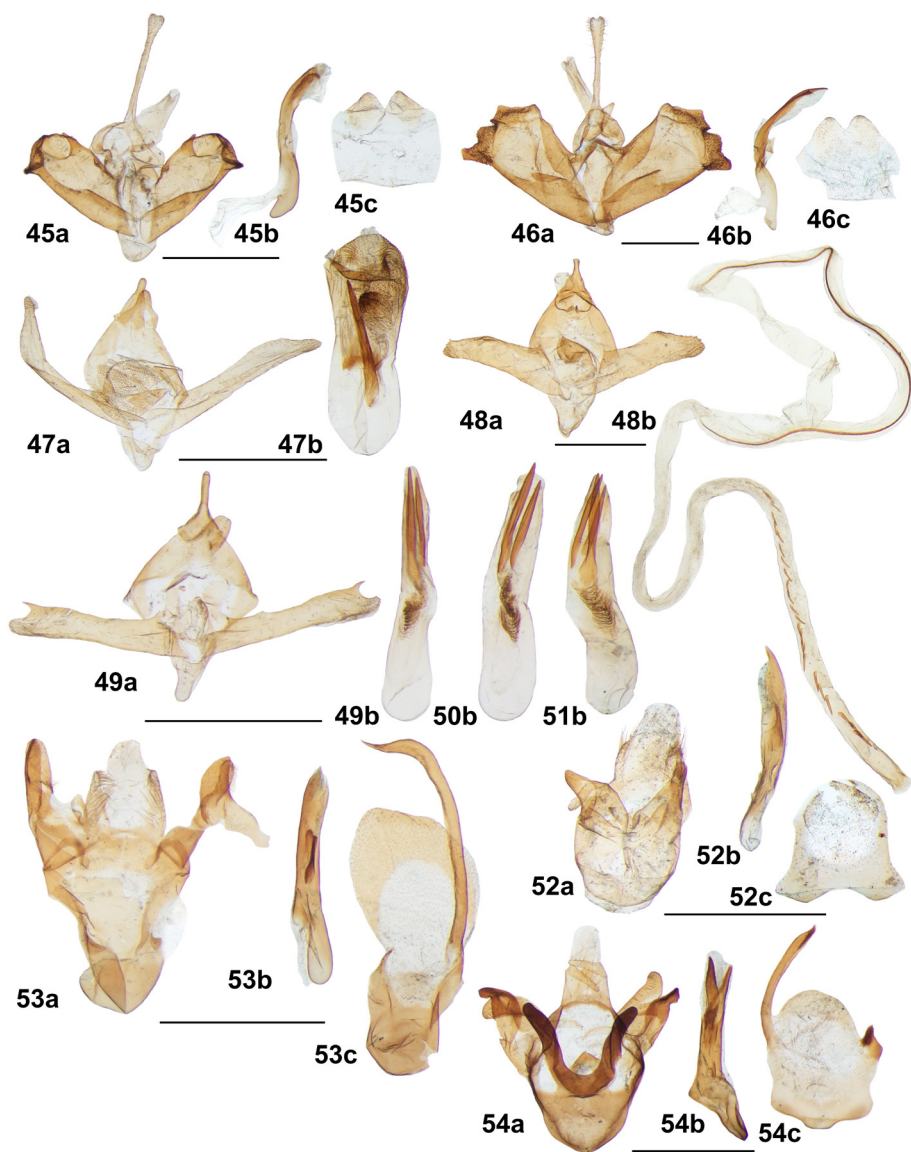
Figures 25–36. Geometrid moths new for Uzbekistan fauna, imagoes (scale bar – 10 mm): 25. *Rhodostrophia abscisaria* Brandt, 1941, male, Babatag Range; 26. *Rhodostrophia terrestraria pellonearia* Christoph, 1885, male, Babatag Range; 27. *Rhodostrophia terrestraria pellonearia* Christoph, 1885, female, Babatag Range; 28. *Idaea elongaria* (Rambur, 1833), male, Minbulak sands; 29. *Idaea straminata* (Borkhausen, 1794), male, Kugitang Range; 30. *Brachyglossina chaspia talvei* Viidalepp, 1988, male, Babatag Range. The description continues on the next page.

Figures 25–36. Continued from previous page. **30.** *Brachyglossina chaspia talvei* Viidalepp, 1988, male, Babatag Range; **31.** *Brachyglossina chaspia talvei* Viidalepp, 1988, male, Tupalangdarya river valley; **32.** *Cinglis benigna* (Brandt, 1941), male, Babatag Range; **33.** *Scopuloides origalis* (Brandt, 1941), male, Turkestan Range, near Yettykechi vill.; **34.** *Scopuloides origalis* (Brandt, 1941), female, Babatag Range; **35.** *Scopula sacraria* (Bang-Haas, 1910), female, Tupalangdarya river valley; **36.** *Scopula nigrociliata* Ebert, 1965, male, Turkestan Range, near Yettykechi vill.



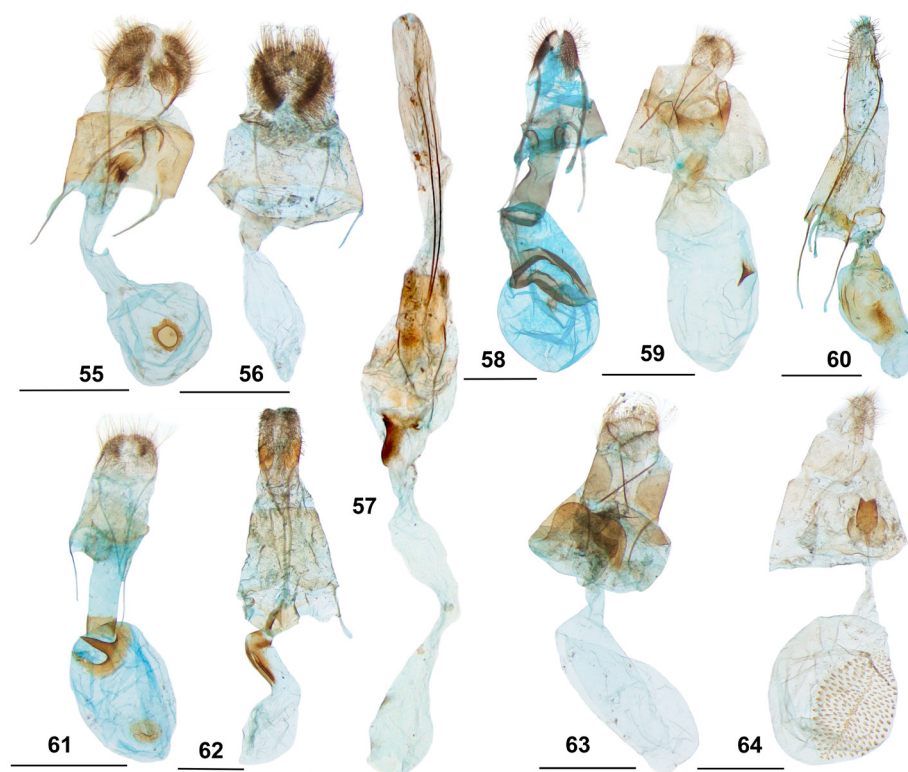
Figures 37–44. The description is on the next page.

Figures 37–44. Geometrid moths new for Uzbekistan fauna, male genitalia (**a** – genital segment; **b** – phallos; **c** – 8th abdominal sternite; scale bar – 1 mm): **37.** *Artemidora andrea* Weisert, 2002, Tankhizidarya river valley; **38.** *Charissa (Dysgnophos) difficilis* (Alphéraky, 1883), W. Tian Shan, Parda-Tursun vill.; **39.** *Charissa (Cnestrognophos) zaprjagaevi* (Viidallepp, 1980), Kugitang Range; **40.** *Habermania oxygonaria* (Püngeler, 1900), Hisar Mountains, near Husantak; **41.** *Chiasmia kuhitangiensis* (Vasilenko, 1996), Tupalangdarya river valley; **42.** *Scotopteryx sartata* (Alphéraky, 1883), W. Tian Shan, near Lashkarak vill.; **43.** *Cataclysmes festinata* (Staudinger, 1893), W. Tian Shan, near Lashkarak vill.; **44.** *Horisme nigrovittata* (Warren, 1888), Tankhizidarya river valley.



Figures 45–54. The description is on the next page.

Figures 45–54. Geometrid moths new for Uzbekistan fauna, male genitalia (**a** – genital segment; **b** – phallos; **c** – 8th abdominal sternite; scale bar – 1 mm): **45.** *Rhodostrophia abscisaria* Brandt, 1941, Babatag Range; **46.** *Rhodostrophia terrestraria pellonearia* Christoph, 1885, Babatag Range; **47.** *Idaea elongaria* (Rambur, 1833), Minbulak sands; **48.** *Idaea stramineata* (Borkhausen, 1794), Kugitang Range; **49.** *Brachyglossina chaspia talvei* Viidalepp, 1988, Babatag Range; **50–51.** *Brachyglossina chaspia talvei* Viidalepp, 1988, Tupalangdarya river valley; **52.** *Cinglis benigna* (Brandt, 1941), Babatag Range; **53.** *Scopuloides origalis* (Brandt, 1941), Turkestan Range, near Yettykechi vill.; **54.** *Scopula nigrociliata* Ebert, 1965, Turkestan Range, near Yettykechi vill.



Figures 55–64. Geometrid moths new for Uzbekistan fauna, female genitalia (scale bar – 1 mm): **55.** *Artemidora andrea* Weisert, 2002, Tankhizidarya river valley; **56.** *Ottia ochraceata* (Viidalepp, 1988), Tupalangdarya river valley; **57.** *Afriberina nobilitaria* (Staudinger, 1892), Kugitang Range; **58.** *Catarhoe arachne* Wiltshire, 1967, Tupalangdarya river valley; **59.** *Protorhoe tadjikaria* Stshetkin, 1956, Tankhizidarya river valley; **60.** *Philereme instabilis* (Alphéraky, 1883), female, W. Tian Shan, Parda-Tursun vill.; **61.** *Martania seriata* (Moore, 1888), Tankhizidarya river valley; **62.** *Rhodostrophia terrestraria pellonearia* Christoph, 1885, Babatag Range; **63.** *Scopuloides origalis* (Brandt, 1941), Babatag Range; **64.** *Scopula sacraria* (Bang-Haas, 1910), Tupalangdarya river valley.

Conclusions

Thus, the present work constitutes the initial phase in the acquisition of knowledge concerning the Lepidoptera fauna of Uzbekistan, with a particular emphasis on the fauna of geometrid moths. Despite the new findings, the species composition of the family is still poorly represented for the country, given the number of species currently known from neighboring regions and countries. Further researches planned in other seasons, as well as in western Uzbekistan, and the highlands of Hisar and Tian Shan, will undoubtedly provide further data.

Acknowledgements

The authors express their gratitude to Yury Dyachkov and Aleksandr Fomichev (both from Barnaul, Russia), Abdurashid Jabborov, Muhtor Nasirov, and Feruz Shodmonov (Samarkand, Uzbekistan) for their help in organizing expeditions to Uzbekistan, and Pavel Gorbunov (Yekaterinburg, Russia) for assistance in identifying species.

The study of A.E. Naydenov and R.V. Yakovlev was funded by state assignment of the Ministry of Science and Higher Education of the Russian Federation (project FZMW-2023-0006 “Endemic, local and invasive arthropods (Arthropoda) of the mountains of South Siberia and Central Asia: a unique gene pool of a biodiversity hotspot”).

The work by I.A. Makhov and V.G. Mironov was carried out within the framework of state project no. 125012901042-9 “Systematization of insect diversity in taxonomic, ecophysiological and evolutionary aspects”.

References

- Arenberger E (1995) *Microlepidoptera Palaearctica* 9: Pterophoridae 1. G. Braun, Karlsruhe, 258 pp.
- Arenberger E (2002) *Microlepidoptera Palaearctica* 11: Pterophoridae 2: Deuterocopinae, Platyptiliinae: Trichoptilini, Oxyptilini, Tetrascalini. Goecke & Evers, 287 pp.
- Bekchanov KhU, Bekchanova MKh (2020a) Carpenter-Moths (Cossidae) of Karakalpakstan Republic. *Polish Science Journal* 2(23): 6–10. [In Russian]
- Bekchanov KhU, Bekchanova MKh (2020b) fauna of Noctuid Moths (Lepidoptera, Noctuoidea) of Northern Kyzylkum Desert. *Veles* 1–1(79): 20–25. [In Russian]
- Bekchanov KhU, Yavkachev DA (2009) Some information on the owl moths of the subfamily Catocalinae (Noctuidae, Lepidoptera) of the Kashkadarya Vilayat. *Natural and Technical Sciences* 3(41): 90–91. [In Russian]
- Beljaev EA, Vasilenko SV (1998) New and little known Ennominae from Turkmenistan with the description of two new species (Lepidoptera, Geometridae). *Atalanta* 28(3/4): 315–326.

- Bozano GC (2002) Guide to the butterflies of the palaearctic region. Satyrinae part III. Tribe Satyrini. Subtribes Melanargiina and Coenonymphina. Omnes Artes, Milano, 62 pp.
- Bozano GC, Weidenhoffer Z (2001) Guide to the butterflies of the palaearctic region. Lycaenidae part I. Subfamily Lycaeninae. Omnes Artes, Milano, 62 pp.
- Bleszynski S (1965) Microlepidoptera Palaearctica 1: Crambinae. Georg Fromme, Vienna, 554 pp.
- Della Bruna C, Gallo E, Sbordoni V (2004) Guide to the butterflies of the Palaearctic region. Pieridae part I. Subfamily Pierinae Tribe Pierini (partim). Delias, Aporia, Mesapia, Baltia, Pontia, Belenois, Talbotia. Omnes Artes, Milano, 80 pp.
- Derzhavets YA (1984) A review of the classification of the sphinx moths (Lepidoptera, Sphingidae) with a list of the species of the fauna of the USSR. Entomologicheskoe Obozrenie 63(3): 604–620. [In Russian]
- Diakonoff A (1986) Microlepidoptera Palaearctica 7: Glyphipterigidae (sensu Meyrick) containing: Tortricidae: Hilarographini, Choreutidae, Brachodidae (partim), Immidae and Glyphipterigidae. G. Braun, Karlsruhe, 436 pp.
- Dubatolov VV (1996) 3. A list of the Arctiinae of the territory of the former U.S.S.R. (Lepidoptera, Arctiidae). Neue Entomologische Nachrichten 37: 39–87.
- Dubatolov VV (2010) Tiger-moths of Eurasia (Lepidoptera, Arctiidae) (Nyctemerini by Rob de Vos & Vladimir V. Dubatolov). Neue Entomologische Nachrichten 65: 1–106.
- Dubatolov VV, Tshistjakov YuA, Viidalepp J (1993) A list of the Lithosiinae of the territory of the former USSR (Lepidoptera, Arctiidae). Atalanta 24(1/2): 165–175.
- Dubatolov VV, Zolotuhin VV (1992) A list of the Lasiocampidae from the territory of the former USSR (Insecta, Lepidoptera). Atalanta 23(3/4): 531–548.
- Erlacher S, Erlacher J (2016) A systematic revision of the genus *Gnophopsodos* Wehrli, 1945, with description of two new species (Lepidoptera: Geometridae). Zootaxa 4169(3): 435–456. <https://doi.org/10.11646/zootaxa.4169.3.2>
- Erlacher S, Palma LM, Erlacher J (2017) A systematic revision of *Charissa*, subgenus *Pterygnophos* Wehrli, 1951, with description of a new species (Lepidoptera: Geometridae). Zootaxa 4341(3): 400–418. <https://doi.org/10.11646/zootaxa.4341.3.4>
- Erschoff NG (1874) Lepidoptera. In: Fedchenko AP (Ed.) Reise in Turkestan. Mémoires de la Société des amis de sciences naturelles, Moscou 11(2), 127 pp. [In Russian]
- Eversmann E (1854) Beiträge zur Lepidopterologie Russlands, und Beschreibung einiger anderer Insecten aus den südlichen Kirgisensteppen, den nördlichen Ufern des Aralsees und des Sir-Darja's. Bulletin de la Société impériale des naturalistes de Moscou 27(2), 174–205.
- Falkovitsh MI (1972) New species of casebearers (Lepidoptera, Coleophoridae) bred from larvae in the Kisilkum Desert. Trudy Vsesoyuznogo entomologicheskogo obschestva 55: 66–92. [In Russian]
- Falkovitsh MI (1973) Contribution of the knowledge of casebearers (Lepidoptera, Coleophoridae) of the Kisilkum Desert. Trudy Vsesoyuznogo entomologicheskogo obschestva 56:199–233. [In Russian]
- Falkovitsh MI (1979) Two new species of casebearer moths (Lepidoptera, Coleophoridae) from Kisilkum Desert. Trudy Zoologicheskogo Instituta (Leningrad) 88: 89–94. [In Russian]

- Falkovitsh MI (1986) Lepidoptera of the Kuljuktai Outcrop Mountains and the Adjacent Plain (Southwest Kyzyl Kum). Trudy Vsesoyuznogo entomologicheskogo obshchestva 67: 131–186. [In Russian]
- Freina JJ de, Geck M (2014) Beitrag zur *Hyles centralasiae-siehei*-Artengruppe. Zur Biologie, Ökologie, Verbreitung und geographischen Variabilität von *H. siehei* (Püngeler, 1903) und Reinterpretation von *Hyles svetlana* Shovkoon, 2010 (Lepidoptera: Sphingidae). Entomologische Zeitschrift, Stuttgart 124(2): 67–95.
- Gerasimov AM (1930) Zur Lepidopteren-Fauna Mittel-Asiens. I. Microheterocera aus dem Distrikt Kaschka-Darja (SO-Buchara). Annuaire du Musée Zoologique de l'Académie des Sciences de l'URSS 31 (1): 21–48.
- Gorbunov PYu (2011) Higher moths (Macrolepidoptera) of deserts and southern steppes of Western Kazakhstan. Review of the fauna. I.P. Lisitsyna, Yekaterinburg, 192 pp. [In Russian]
- Gozmany L (2000) Microlepidoptera Palaearctica 10: Holcopogonidae. Goecke & Evers, 176 pp.
- Grieshuber J (2014) Guide to the butterflies of Palaearctic region. Pieridae II. Coliadinae. Omnes Artes, Milano, 86 pp.
- Grieshuber J, Worthy B, Lamas G (2012) The genus *Colias* Fabricius, 1807. Jan Haugum's annotated catalogue of the Old World *Colias* (Lepidoptera, Pieridae). Tshikolovets Publications, Pardubice-Bad Griesbach-Caretham-Lima, 438 pp.
- Groum-Grshimailo G (1890) Le Pamir and sa faune lépidoptérologique. Mémoires sur les Lépidoptères 4: 1–9, 1–557.
- Grum-Grshimailo GE (1887) Bericht über meine Reise in das östliche Buchara. Mémoires sur les Lépidoptères 3: 357–402.
- Hausmann A (2004) Sterrhinae. In: Hausmann A (Ed.) The Geometrid Moths of Europe. Vol. 2. Apollo Books, Stenstrup, 1–600.
- Hausmann A, László GyM (1999) Taxonomic and faunistic studies on Turkmenian Sterrhinae (Lepidoptera: Geometridae). Folia Entomologica Hungarica 60: 317–324.
- Kaila L, Viidalepp J, Mikkola K, Mironov V (1996) Geometridae (Lepidoptera) from the Tian-Shan Mountains in Kazakhstan and Kyrgyzstan, with descriptions of three new species and one new subspecies. Acta Zoologica Fennica 200: 57–82.
- Khamraev ASH, Bekchanov KhU, Bekchanov MKh, Bekchanov MKh (2009) Butterflies Nymphalids of Baday-Tugay State Reserve. Natural and Technical Sciences 3(41): 92–93. [In Russian]
- Knyazev SA, Makhov IA, Matov AY, Yakovlev RV (2020) Check-list of Macroheterocera (Insecta, Lepidoptera) collected in 2019 in Mongolia by Russian entomological expeditions. Ecologica Montenegrina 38: 186–204. <https://doi.org/10.37828/em.2020.38.27>
- Korb SK (2023) A checklist of Lepidoptera of Kyrgyzstan. Proceedings of the Mordovia State Nature Reserve 33: 5–117.
- Korb SK, Bolshakov LV (2016) A systematic catalogue of butterflies of the former Soviet Union (Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kyrgyzstan, Kazakhstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan) with special account to their type specimens (Lepidoptera: Hesperioidea, Papilionoidea). Zootaxa 4160(1): 1–324. <http://doi.org/10.11646/zootaxa.4160.1.1>

- Kozhantshikov IV (1956) Bagworm moths (Fam. Psychidae). Fauna of the USSR. Insecta Lepidoptera 3(2). Academy of Sciences of the USSR Publ., Moscow–Leningrad, 516 pp. [In Russian]
- Makhov IA, Lukhtanov VA, Vishnevskaya MS (2023) Lepidoptera collected in S. W. Mongolia during expedition in Mongolian Altai in 2022 (Lepidoptera: Geometridae). SHILAP Revista de lepidopterología 51(204): 681–707. <https://doi.org/10.57065/shilap.789>
- Mironov VG, Knyazev SA, Gorbunov PYu (2021) Species of geometrid moths of the tribe Eupitheciini (Lepidoptera, Geometridae) new to the fauna of Kazakhstan. Entomological Review 101(8): 1173–1177. [In Russian]
- Mukhammedov M, Shermatov MR (2022) Morphological description Sunflower moth (*Homoeosoma nebulella* Denis & Schiffermüller, 1775). Scientific Bulletin of Namangan State University 11: 59–66.
- Myers N (1988) Threatened biotas: "hot spots" in tropical forests. Environmentalist 8: 187–208. <https://doi.org/10.1007/BF02240252>
- Myers N, Mittermeier RA, Mittermeier CG, da Fonseca GAB, Kent J (2000) Biodiversity hotspots for conservation priorities. Nature 403(6772): 853–858. <https://doi.org/10.1038/35002501>
- Patzold F, Amirov I, Turgunboye O, Kholmatov B, Hundsdoerfer AK (2023) Rediscovery of *Hyles svetlana* Shovkoon, 2010 (Lepidoptera: Sphingidae) from Kyzyl-Kum desert, Uzbekistan. Bonn Zoological Bulletin 72(1): 63–66.
- Puplesis R (1994) The Nepticulidae of Eastern Europe and Asia: western, central and eastern parts. Backhuys Publishers, Leiden, 552 pp.
- Puplesis R, Diškus A (2003) The Nepticuloidea & Tischerioidea (Lepidoptera) – a global review, with strategic regional revisions. Lututė Publishers, Kaunas, 512 pp.
- Puplesis R, Diškus A, Noreika R, Saparmamedova N (1996) Revised check-list of mining Lepidoptera (Nepticuloidea, Tischerioidea and Gracillarioidea) from Central Asia. Tijdschrift voor Entomologie 139 (2): 191–200.
- Rajaei H, Hausmann A, Trusch R (2022) Taxonomic review of the genus *Rhodostrophia* Hübner, 1823 (Geometridae: Sterrhinae) in Iran. Zootaxa 5118(1): 1–64. <https://doi.org/10.11646/zootaxa.5118.1.1>
- Rajaei H, Stadie D, Hausmann A (2017) Taxonomic revision of the genus *Protorhoe* Herbulot, 1951 (Lepidoptera, Geometridae, Larentiinae), new taxonomic changes and description of two new species. Zootaxa 4282(2): 269–291. <https://doi.org/10.11646/zootaxa.4282.2.3>
- Rajaei H, Stünig D, Trusch R (2012) Taxonomic revision and zoogeographical patterns of the species of *Gnopharmia* Staudinger, 1892 (Geometridae, Ennomiinae). Zootaxa 3360(1): 1–52. <https://doi.org/10.11646/zootaxa.3360.1.1>
- Razowski J (1966) World Fauna of the Tortricini (Lepidoptera Tortricidae). Zakład Zoologii Systematycznej w Krakowie Polskiej Akademii Nauk. Państwowe Wydawn. Naukowe, Kraków, 576 pp.
- Razowski J (1970) Microlepidoptera Palaearctica 3: Cochylidae. Georg Fromme, Vienna, 528 pp.
- Razowski J (1984) Microlepidoptera Palaearctica 6: Tortricini. G. Braun, Karlsruhe, 376 pp.

- Roesler RU (1973) *Microlepidoptera Palaearctica 4: Phycitinae (Trifine Acrobasiina)*. Georg Fromme, Vienna, 752 pp.
- Roesler RU (1993) *Microlepidoptera Palaearctica 8: Phycitinae 2: Quadrifine Acrobasiina*. G. Braun, Karlsruhe, 328 pp.
- Sattler K (1967) *Microlepidoptera Palaearctica 2: Ethmiidae*. Georg Fromme, Vienna, 185 pp.
- Schintlmeister A (2008) *Palaearctic Macrolepidoptera 1. Notodontidae*. Apollo Books, Stenstrup, 482 pp.
- Shermatov MR (2023) Pyraloid Moths (Lepidoptera: Pyraloidea) in the agrosystems of the Fergana Valley (Uzbekistan). *Scientific Review. Biological Science* 3: 35–40. [In Russian]
- Shermatov MR, Kayumova OI, Almatova DA (2024) Features of Distribution of Lepidopterans (Insecta: Lepidoptera) across tiers of Agrolandscape (based on the example of Southern Fergana, Uzbekistan). *Scientific Review. Biological Science* 2: 52–57. [In Russian]
- Sinev SY (1986) A List of the Narrow-Winged Moths (Lepidoptera, Momphidae s.l.) in the Fauna of the USSR. *Trudy Vsesoyuznogo entomologicheskogo obschestva* 67: 19–74. [In Russian]
- Staudinger O (1886) Centralasiatische Lepidopteren. *Entomologische Zeitung* 47: 193–215.
- Staudinger O (1889) Centralasiatische Lepidopteren. *Entomologische Zeitung* 50: 16–60.
- Suleymanov BA, Jumaev RA, Abduvosiqova LA (2021) Lepidoptera Found In Cabbage Agrobiocenosis The Dominant Types Of Representatives Of The Category Are Bioecology. *The American Journal of Agriculture and Biomedical Engineering* 3(6): 125–134. <https://doi.org/10.37547/tajabe/volume03issue06-17>
- Toropov SA, Zhdanko AB (2006) The Butterflies (Lepidoptera, Papilionoidea) of Dzhungar, Tien Shan, Alai and Eastern Pamirs. Vol. 1. Papilionidae, Pieridae, Satyridae. *SatEnto*, Bishkek, 386 pp.
- Toropov SA, Zhdanko AB (2009) The butterflies (Lepidoptera, Papilionidae) of Dzhungar, Tien Shan, Alai and Eastern Pamirs. Vol. 2. Danaidae, Nymphalidae, Riodinidae, Lycaenidae. Bishkek, 380 + XV pp.
- Tshikolovets VV (2000) The Butterflies of Uzbekistan. Konvoj Ltd., Kyiv–Brno, 400 pp.
- Tuzov VK, Bogdanov PV, Devyatkin AL, Kaabak LV, Korolev VA, Murzin VS, Samodurov GD, Tarasov EA (1997) Guide to the Butterflies of Russia and adjacent territories (Lepidoptera, Rhopalocera). Vol. 1. Hesperidae, Papilionidae, Pieridae, Satyridae. Pensoft, Sofia-Moscow, 480 pp.
- Tuzov VK, Bogdanov PV, Churkin SV, Devyatkin AL, Dantsenko AV, Murzin VS, Samodurov GD, Zhdanko AB (2000) Guide to the Butterflies of Russia and adjacent territories (Lepidoptera, Rhopalocera). Vol. 2. Libytheidae, Danaidae, Nymphalidae, Riodinidae, Lycaenidae. Pensoft, Sofia-Moscow, 580 pp.
- Ustjuzhanin PYa, Kovtunovich VN (2018) The Pterophoridae fauna of Uzbekistan (Lepidoptera: Pterophoridae). *Ukrainian Journal of Ecology* 8(4): 489–491.
- Ustjuzhanin PYa, Kovtunovich VN (2025) A review of the genus *Agdistis* Hübner, [1825] (Lepidoptera: Pterophoridae) from Middle Asia. *Russian Entomological Journal* 34(1): 121–125. <https://doi.org/10.15298/rusentj.34.1.14>

- Vasilenko SV (1996) A new geometrid species of the genus *Semiothisa* (Lepidoptera, Geometridae) from South Turkmenistan. *Zoologicheskii Zhurnal* 75(10): 1592–1595. [In Russian]
- Vasilenko SV (2019) To the knowledge of geometrid moth fauna (Lepidoptera, Geometridae) of Tajikistan. *Caucasian Entomological Bulletin* 15(2): 347–354. <https://doi.org/10.23885/181433262019152-347354> [In Russian]
- Vasilenko SV, Belousov AV (2021) To the knowledge of the fauna of geometrid moths (Lepidoptera: Geometridae) of Dzungarian Alatau, Kazakhstan. *Caucasian Entomological Bulletin* 17(1): 141–153. <https://doi.org/10.23885/181433262021171-141153> [In Russian]
- Vasilenko SV, Dubatolov VV (2022) Interesting records of geometrid moths (Lepidoptera: Geometridae) in Turkmenistan. *Caucasian Entomological Bulletin* 18(2): 231–237. <https://doi.org/10.23885/181433262022182-231237> [In Russian]
- Vasilenko SV, Mironov VG (2021) To the knowledge of geometrid moth fauna (Lepidoptera, Geometridae) of Tajikistan. Part 2. *Euroasian Entomological Journal* 20 (1): 57–60. <https://doi.org/10.15298/euroasentj.20.1.10> [In Russian]
- Vasilenko SV, Mironov VG, Zinchenko VK (2022) To the knowledge of geometrid moth fauna (Lepidoptera, Geometridae) of Tajikistan. Part 3. *Caucasian Entomological Bulletin* 18(2): 171–178. <https://doi.org/10.23885/181433262022182-171178> [In Russian]
- Viidalepp J (1988) *Geometridae fauna of the central Asian mountains*. Nauka, Moscow, 231 pp. [In Russian]
- Viidalepp J (1996) *Checklist of the Geometridae (Lepidoptera) of the former U.S.S.R.* Stenstrup: Apollo Books, 111 pp.
- Viidalepp J, Lindt A (2023) *Ottia*, a new ennomine genus of moth from Tajikistan (Lepidoptera: Geometridae). *Zootaxa* 5323(4): 595–600. <https://doi.org/10.11646/zootaxa.5323.4.10>
- Wanke D, Hausmann A, Lee KM, Murillo-Ramos L, Sihvonen P, Rajaei H (2023) Systematics and integrative taxonomic revision of the tribe Scopulini Duponchel, 1845 in Iran (Lepidoptera: Geometridae: Sterrhinae). *Zootaxa* 5359(1): 1–96. <https://doi.org/10.11646/zootaxa.5359.1.1>
- Wanke D, Hausmann A, Rajaei H (2019) An integrative taxonomic revision of the genus *Triphosa* Stephens, 1829 (Geometridae: Larentiinae) in the Middle East and Central Asia, with description of two new species. *Zootaxa* 4603(1): 39–65. <https://doi.org/10.11646/zootaxa.4603.1.2>
- Weisert F (2002) Beschreibung von vier neuen Arten der Gattung *Artemidora* aus Zentralasien (Geometridae: Ennominae). *Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen* 54: 1–13.
- Weiss J-C (1991) *The Parnassiinae of the world. Part 1.* Sciences Nat, Paris, 48 pp.
- Weiss J-C (1992) *The Parnassiinae of the world. Part 2.* Sciences Nat, Paris, 87 pp.
- Weiss J-C (1999) *The Parnassiinae of the world. Part 3.* Sciences Nat, Paris, 99 pp.
- Weiss J-C (2005) *The Parnassiinae of the world. Vol. 4.* Hillside Books, Canterbury, 263 pp.
- Weiss JC, Rose K (2011) *The Parnassiinae of the world. Part 5.* Goecke et Evers, Ketlern, 119 pp.

- Werner MJ, Hausmann A, Kostjuk I, Wanke D, Rajaei H (2023) Integrative taxonomic revision of the genus *Phaselia* Guenée, [1858] (Geometridae: Ennominae) in the Middle East and Central Asia. *Zootaxa* 5326 (1): 1–66. <https://doi.org/10.11646/zootaxa.5326.1.1>
- Yakovlev RV (2011) Catalogue of the Family Cossidae of the Old World (Lepidoptera). *Neue Entomologische Nachrichten* 66: 1–130.
- Yakovlev RV, Witt ThJ (2017a) World catalogue of the genus *Cossulus* Staudinger, 1887 (Lepidoptera, Cossidae) with description of *Cossulus irtlachi* sp. nov. from Kyrgyzstan. *Zootaxa* 4311(1): 062–080. <https://doi.org/10.11646/zootaxa.4311.1.4>
- Yakovlev RV, Witt ThJ (2017b) Three new species and one new subspecies of *Deserticosus* Yakovlev, 2006 (Lepidoptera: Cossidae) from Kazakhstan, Kyrgyzstan and Russia, with world catalogue of the genus. *Zootaxa* 4269(3): 379–395. <https://doi.org/10.11646/zootaxa.4269.3.3>
- Zaguljaev AK (1960) Tineid moths (Tineidae). Part. 3. Subfamily Tineinae. Fauna of the USSR. *Insecta Lepidoptera* 4(3). Academy of Sciences of the USSR Publ., Moscow–Leningrad, 286 pp. [In Russian]
- Zaguljaev AK (1964) Tineid moths (Tineidae). Part. 2. Subfamily Nemapogoninae. Fauna of the USSR. *Insecta Lepidoptera* 4(2). Academy of Sciences of the USSR Publ., Moscow–Leningrad, 424 pp. [In Russian]
- Zaguljaev AK (1973) Tineid moths (Tineidae). Part 4. Subfamily Scardiinae. Fauna of the USSR. *Insecta Lepidoptera* 4(4). Nauka, Leningrad, 128 p. [In Russian]
- Zaguljaev AK (1975) Tineid moths (Tineidae). Part. 5. Subfamily Myrmecozelinae. Fauna of the USSR. *Insecta Lepidoptera* 4(5). Nauka, Leningrad, 429 pp. [In Russian]
- Zaguljaev AK (1979) Tineid moths (Tineidae). Part. 6. Subfamily Meessiinae. Fauna of the USSR. *Insecta Lepidoptera* 4(6). Nauka, Leningrad, 408 pp. [In Russian]
- Zaguljaev AK (1988) Families Ochsenheimeriidae and Eriocottidae. Fauna of the USSR. *Insecta Lepidoptera* 4(7). Nauka, Leningrad, 302 pp. [In Russian]
- Zolotuhin VV (2015) Lappet Moths (Lepidoptera: Lasiocampidae) of Russia and Adjacent Territories. *Korporaciya tekhnologiy prodvizheniya*, Ulyanovsk, 384 pp. [In Russian]
- Zolotuhin VV, Evdoshenko SI (2019) Hawk moths (Lepidoptera: Sphingidae) of Russia and Adjacent Territories. *Korporaciya tekhnologiy prodvizheniya*, Ulyanovsk, 408 pp. [In Russian]
- Zolotuhin VV, Nedoshivina SV (2021) Drepanoid lepidopterans (Lepidoptera: Drepanoidea) of Russia and Adjacent Territories. *Korporaciya tekhnologiy prodvizheniya*, Ulyanovsk, 480 pp. [In Russian]