SHILAP Revista de lepidopterología, 50 (200) diciembre 2022: 689-703 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.260

Two new species of the genus *Klimeschiopsis* Povolný, 1967 from southern Siberia discovered as a result of study cryptic diversity in *K. discontinuella* (Rebel, 1899) (Lepidoptera: Gelechiidae)

Jan Šumpich & Oleksiy Bidzilya

Abstract

Klimeschiopsis varia Šumpich & Bidzilya, sp. n. and *Klimeschiopsis confusella* Šumpich & Bidzilya, sp. n. are described as new species for science based on differences from congeners in external appearance, genitalia of both sexes and genetic data. *Klimeschiopsis varia* is most similar to *Klimeschiopsis discontinuella* (Rebel, 1899) and *Klimeschiopsis maritimaealpina* Nel & Varenne, 2011 but can be distinguished by the genitalia characters. *Klimeschiopsis confusella* resembles *Klimeschiopsis kiningerella* (Duponchel, [1843]) and *Klimeschiopsis terroris* (Hartig, 1938) by absence of yellowish suffusion on forewings, but the coloration of new species is not so much contrasting, and the species is unmistakable according to the genitalia. Both new species occur sympatricaly in Russian Altai Mountains, Tuva and Buryatia.
Keywords: Lepidoptera, Gelechiidae, *Klimeschiopsis varia*, *Klimeschiopsis confusella*, checklist, barcoding, Russia.

Dos nuevas especies del género *Klimeschiopsis* Povolný, 1967 del sur de Siberia descubiertas como resultado del estudio de la diversidad críptica en *K. discontinuella* (Rebel, 1899) (Lepidoptera: Gelechiidae)

Resumen

Se describen como nuevas especies para la ciencia *Klimeschiopsis varia* Šumpich & Bidzilya, sp. n. y *Klimeschiopsis confusella* Šumpich & Bidzilya, sp. n., basándose en las diferencias con sus congéneres en cuanto al aspecto externo, la genitalia de ambos sexos y los datos genéticos. *Klimeschiopsis varia* es más similar a *Klimeschiopsis discontinuella* (Rebel, 1899) y *Klimeschiopsis maritimaealpina* Nel & Varenne, 2011, pero se puede distinguir por los caracteres de la genitalia. *Klimeschiopsis confusella* se parece a *Klimeschiopsis kiningerella* (Duponchel, [1843]) y a *Klimeschiopsis terroris* (Hartig, 1938) por la ausencia de espolvoreado amarillento en las alas anteriores, pero la coloración de las nuevas especies no es tan contrastada y la especie es inconfundible según la genitalia. Las dos nuevas especies se encuentran simpáticamente en las montañas rusas del Altai, Tuva y Buriatia.
Palabras clave: Lepidoptera, Gelechiidae, *Klimeschiopsis varia*, *Klimeschiopsis confusella*, lista, código de barras, Rusia.

Introduction

The genus *Klimeschiopsis* Povolný, 1967 has so far included six species, exclusively from the

Palearctic region (Povolný, 1968; Huemer & Karsholt, 2010, 2020; Nel & Varenne, 2011; Bidzilya, 2012). Adults of *Klimeschiopsis* are often variable in external appearance, and the genitalia of most of species are very similar to each other that resulted in underestimated species diversity. A detailed study of morphological characters as well as barcoding of the available material yielded in the recent description of an Alpine endemic *K. maritimaealpina* Nel & Varenne, 2011. However, additional taxa displayed in the BOLD differing genetically remain formally undescribed so far (one BIN from Pakistan and two BINs even from North America). The aim of this paper is to summarize the existing information on the already described species of the genus and to describe two additional new species from southern Siberia of Russia. Both new species can be distinguished by unique combination of external and genitalia characters, and their separate status is supported by molecular data.

Material and methods

The present study based on material from the following collections

MZH	Finnish Museum of Natural History, Helsinki, Finland
MNCN	Museo Nacional de Ciencias Naturales, Madrid, Spain
NHMW	Naturhistorisches Museum, Vienna, Austria
NMPC	National Museum, Prague, Czech Republic
NUPP	Research collection of Kari & Timo Nupponen, Espoo, Finland
ZIN	Zoological Institute, Russian Academy of Sciences, Sankt-Petersburg, Russia
ZMKU	Zoological Museum, Kyiv Taras Shevchenko National University, Kyiv, Ukraine

Study material collected by the first author was attracted at ultraviolet light (8W/12V tubes) installed in portable light traps. Oleksiy Bidzilya collected the specimens by attracting at light of "Petromax" gasoline lamp.

Preparations of genitalia slides followed standard techniques for Gelechiidae, and the descriptive terminology follows Huemer & Karsholt (2010). The order of species in the checklist is alphabetical. Pinned specimen were photographed with a camera Canon 750D in the combination of a Canon MP-E-65 mm lens (Jan Šumpich). Slide-mounted genitalia were photographed with a Canon EOS 200D DSLR camera mounted on an Olympus CX-31 stereomicroscope (Jan Šumpich). For each photographs sets of 10-20 images were taken at different focal planes and focused-stacked using Helicon Focus 6 with the final image edited in Adobe Photoshop CS5.

A tissue samples (dry legs) from *Klimeschiopsis* specimens were successfully processed at the Canadian Centre for DNA Barcoding (CBG, Biodiversity Institute of Ontario, University of Guelph) (DeWaard et al. 2008), resulting in a 610 -658 base-pair DNA barcode segment of the mitochondrial COI gene (cytochrome c oxidase 1). The sequences together with details of the sequenced specimens were uploaded to the Barcode of Life Data Systems (BOLD; Ratanassingham & Hebert, 2007). Degrees of intra- and interspecific variation of DNA barcode fragments were calculated under the Kimura 2-parameter model of nucleotide substitution using the analytical tools of BOLD. A neighbor-joining tree of DNA barcode data of selected taxa (Figures 42) and the group mean distance (Table 1) were constructed using MEGA 6 (Tamura et al. 2013) under the Kimura 2 parameter model for nucleotide substitutions.

Results

Klimeschiopsis varia Šumpich & Bidzilya, sp. n.

Material examined: Holotype ♂, Russia, Altai Republic, Kosh-Agach Distr., Kurai env. (15 km SW), Dzhangyskol lake (or Salagana lake), 1830 m, 50º10'49"N; 87º44'19"E, coniferous forest/steppe, 24-25-VI-2015, J. Šumpich leg. (gen. slides 17076, J. Šumpich; Barcode NMPC-Lep-0086) (NMPC).

Paratypes: RUSSIA: 1 ♀, same data as for holotype; Altai Republic, Kosh-Agach Distr., Beltir env. (16 km W), Chagan valley, 49º57'06"N; 87º53'39"E, coniferous forest / rocks, 2150 m, 3 ♂♂, 2 ♀♀, 2-3-VII-2014, J. Šumpich leg. (Barcode NMPC-Lep-0317) (gen. slide 196/21&&, O. Bidzilya); Altai Republic, Aktash vill., 50º19'12"N; 87º36'00"E, grassy steppe, rocks, 1400 m, 1 ♂, 1 ♀, 11-VII-2014, J. Šumpich leg. (gen. prep. 22098, J. Šumpich); 4 ♂♂, 2 ♀♀, same data but 21-VI-2015 (gen. prep. 17075 and 22092, J. Šumpich; Barcode NMPC-Lep-0084 and NMPC-Lep-0085); 2 ♂♂, same data but 24-VI-2019; Altai Republic, Kosh-Agach Distr., Chagan-Uzun env., Krasnaya Gorka hill, 50º05'00"N; 8825'15"E, rocky steppe, 1870 m, 1 ♂, 29-VI-2015, J. Šumpich leg.; 2 ♂♂, same data but 1-3-VII-2019 (gen. slide 22048, J. Šumpich; gen. prep. 22094, J. Šumpich); Altai Republic, Belyashi (Dzhazator) env. (25 km NW), confluence of Argut and Karagem rivers, 49º51'56"N, 87º10'22"E, rocky steppe, 1400 m, 4 ♂♂, 1 ♀, 27-28-VII-2017, J. Šumpich leg. (gen. prep. 22055, J. Šumpich; gen. slide 197/21, ♀, O. Bidzilya) Barcode NMPC-Lep-0318 and NMPC-Lep-0319); Altai Republic, Ulagan vill., Chulyshman valley, 51º01'03"N; 88º00'39"E, grassy steppe, rocks, 600 m, 3 ♂♂, 27-28-VI-2015, J. Šumpich leg. (gen. prep. 22054, J. Šumpich; Barcode NMPC-Lep-0088); 7 ♂♂, 16 ♀♀, same data but 26-27-VI-2019 (gen. prep. 22056, J. Šumpich); 2 ♂♂, 1 ♀, same data but 4-5-VII-2019 (gen. prep. 22057, J. Šumpich) (all NMPC, 2 ♀♀ MNCN, 2 ♀♀ ZMKU); 4 ♂♂ Russia, Altai, Ongudai distr., Tchuya river bank 15 km downstream of Iodro village, 6-7-VIII-2000, O. Bidzilya (Barcode Bidz. 00098, 00099, 00100, 00101 [all failed]) (gen. slide 132/14, 376/14, O. Bidzilya) (ZMKU); 1 ♂, USSR, SW-Altai, Katun valley 10 km W Katanda, 1200 m, 15-19-VII-1983, K. Mikkola, H. Hippa & J. Jalava leg.; 1 ♂, USSR, SW-Altai, 5 km W Katanda, light trap, 1200 m, 1-VII-1983, K. Mikkola, H. Hippa & J. Jalava leg. (gen. slide 100/22, O. Bidzilya) (MZH); 1 ♀ Russia, Tuva rep., 50º44N 93º08'E, E Tannu-Ola, Irbitel r., stony steppe slopes, 1000 m, 13-16-VI-1995, J. Jalava & J. Kullberg leg. (gen. slide 99862, PH); 1 ♂ Russia, Tuva rep., 52º04N 94º22'E, Ust-Ujuk steppe hills, 570 m, 3-5-VI-1995, J. Jalava & J. Kullberg leg. (gen. slide 100/22, O. Bidzilya) (MZH); 1 ♂, Russia, SW Buryatia, 51º47-48'N 100º55-58', E Sayan Mts., Mondy vill. 2 km E, forest-steppe, 15-VI-2002, K. Nupponen leg. (gen. slide 346/16, O. Bidzilya) (NUPP); 1 ♂, 3 ♀♀, Altai Republic, Ulagan district, 12 km SSE Koo, 50º58'N 87º56'E, 550 m, 6-8-VII-2013, S. Sinev leg. (ZIN).

Diagnosis: *Klimeschiopsis varia* is difficult to distinguish from *K. discontinuella* and *K. maritimaealpina* by external appearance. In the series, *K. varia* is a smaller species and compared to the latter's it appears darker. Within comparison of Siberian species, the largest specimens of *K. varia* reach the size of the smallest specimens of *K. confusella*. Reliable identification is only possible by examination of the genitalia or genetic data. Male genitalia of *K. varia* are characterized by stout sacculus (slender in *K. confusella*), a very narrow saccus, only slightly widening at the base (broader in *K. confusella*, wider and shorter in *K. maritimaealpina*), narrow and comparatively long phallus (broader and shorter in *K. confusella* and *K. discontinuella*) and broad base of tegumen (narrower in *K. confusella*, *K. maritimaealpina* and *K. discontinuella*). Female genitalia of *K. varia* are distinguished by elongated funnel-shaped antrum (in the shape of an almost regular triangle in *K. discontinuella*) and signum that is about half length of apophysis anterioris (one quarter in *K. discontinuella*, one third in *K. confusella*).

Description Adult (Figures 1-8, 21-22): Wingspan 10.0-14.0 mm. Head creamy yellow, tegulae covered with brown and creamy yellow scales with brown tips, thorax dark brown, labial palpi light yellow, base of third and second segment with brown scales, tip of third segment brown. Antennae dark, ringed with yellow, more conspicuous in their ending, filiform. Forewing brown-grey with two dark fasciae near base and in first third, and wide dark transversal line in two third. Apex more or less suffused with creamy yellow scales, bright, slightly angulated fascia near apex that tends to be more conspicuous in darker specimens. Fringes yellowish mixed with brown scales. Hindwing and its cilia grey, slightly darker in apical area.

Variation: Sexual dimorphism is not observed. In the most specimens, fascia in the first third of forewing reaches the costal margin only, but in some specimens, it connects costal and dorsal margins. Individual specimens may look brighter and more contrasting due to more intensive creamy yellow suffusion between dark fasciae and in the apical area. Based on study of the available collection material it seems that the specimens collected in higher altitudes and in colder conditions (Figures 1-2) have larger wingspan than the moths collected at lower altitudes.

Male genitalia (Figures 25-28): Tegumen narrow with deep anteromedial emargination, uncus broader than long, rounded, distal sclerite of gnathos small and rounded, valva slightly curved, blunt-ended, distinctly shorter than top of uncus. Sacculus comparatively broad, significantly bent, regularly tapering, pointed at end. Posterior margin of vinculum with U-shaped emargination, lateromedial projections broad and rounded. Saccus very narrow, comparatively long, only slightly widening at base. Phallus narrow, long, hook-ended.

Female genitalia (Figures 32, 34-37): Apophysis anterioris three times shorter than apophysis posterioris. Antrum funnel-shaped with slightly concave outer margin, ductus bursae nearly as long as corpus bursa, membranous, slightly widening proximally, corpus bursa oval, signum hook-shaped, sharply pointed. Signum half-length of apophysis anterioris.

Molecular data: BIN: BOLD:ADR5392. The intraspecific average distance of the barcode region is 0.18% (n=7). According to the BOLD, the minimum distance to the nearest neighbour, *Klimeschiopsis confusella*, is 4.98 % (p-dist), respectively 5.18 distance computed by MEGAX software using another algorithm (Table 1).

Biology: Host plant unknown. Adults have been collected from early June to early August at altitudes between 600 and 2150 m in rocky steppes (Figures 43, 45). It is obvious that the species is occurring in the habitats in lower altitudes compared with *K. confusella*.

Distribution: Russia (Altai Mts., Tuva, Buryatia).

Etymology: The species name is derived from the Latin *varius* which points to diversity in external appearance as well as to different size of individual specimens.

Klimeschiopsis confusella Šumpich & Bidzilya, sp. n.

Material examined: Holotype ♀, Russia, Altai Republic, Belyashi (Dzhazator) env. (56 km SE), 49º39’45”N, 88º14’28”E, rocky steppe and mountain meadows near Tara River, 2400 m, 25-26-VII-2017, Jan Šumpich leg. (gen. prep. 18576, J. Šumpich; Barcode NMPC-Lep-0320) (NMPC).

Paratypes: Russia: 2 ♂♂, 1 ♀, same data as for holotype (gen. slide 22058 J. Šumpich, gen. prep. 22099, J. Šumpich); Altai Republic, Kosh-Agach Distr., Kurai env. (15 km SW), Dzhangyskol lake (or Salagana lake), 1830 m, 50º10’49”N; 87º44’19”E, coniferous forest/steppe, 4 ♂♂, 24-25-VI-2015, J. Šumpich leg. (Barcode NMPC-Lep-0321 [failed]) (gen. slide 22053, J. Šumpich, gen. prep. 22095 and 22096, J. Šumpich); same data but 29-30-VI-2019 (gen. prep. 22050, J. Šumpich); Altai Republic, Aktash vill., 5019’12”N; 8736’00”E, grassy steppe, rocks, 1400 m, 1 ♂, 11-VII-2014, J. Šumpich leg. (gen. prep. 22097, J. Šumpich); 2 ♂♂, same data but 21-VI-2015 (gen. prep. 22093, J. Šumpich); Altai Republic, Aktash env., road to 9. station (“Zavod”), 50º19’34”N; 87º43’54”E, mountain meadows, 2400-2900 m, 1 ♂, 23-VI-2015, Jan Šumpich leg. (Barcode NMPC-Lep-0087 [failed]) (all NMPC, 1 ♂ ZMKU); 1 ♂, Buryatia, 54º52’N 110º55’E, Barguzin range, 1400-1800 m, rocky creek, 4-5-VII-1996, J. Kullberg leg. (gen. slide 99861, PH) (MZH).

Diagnosis: *Klimeschiopsis confusella* has no yellowish suffusion on the forewings and it is much darker compared with *K. varia, K. maritimaealpina* and *K. discontinuella*. The new species somewhat resembles *K. kinigerella* (Duponchel, [1843]) and *K. terroris* (Hartig, 1938) too, but it is less contrasting. Reliable identification of some specimens is only possible by examination of the genitalia or genetic data. Male genitalia of *K. confusella* are characterized by stout saccus broad in its base (slender in *K. varia*), and by toothed termination of phallus which seems to be unique within genus. Generally, male genitalia of *K. confusella* are very similar to those of *K. discontinuella*, but these species are easily separated by their external appearance. Female genitalia of *K. confusella* are characterized by a signum with two sclerotised plates at its base which seems to be unique within genus.

Description Adult (Figures 9-16, 23-24): Wingspan 12.0-15.0 mm. Head light yellow, tegulae and thorax dark brown, labial palpi light yellow, base of third and second segment with brown scales, tip of third segment brown, antennae dark, filiform. Forewing narrow strikingly elongated and almost pointed distally, brown-grey with black fasciae at base and apical area, and two blackish transversal fasciae in

second and third fifth of wing. Fringes yellowish suffused with dark scales usually in an irregular row. Hindwing grey, slightly darker in apical area.

Variation: Sexual dimorphism is not observed. Based on our study of available collection material, the specimens collected in higher altitudes and in colder conditions (Figures 11, 14) have larger wingspan and more contrasting forewing than the moths collected at lower altitudes.

Male genitalia (Figures 29-31): Tegumen broad proximally, with deep anteromedial emargination, uncus comparatively small, rounded, distal sclerite of gnathos small and rounded, valva slightly curved, blunt-ended, reaching top of uncus. Sacculus narrow, broader at base, significantly bent, regularly tapering, pointed apically. Posterior margin of vinculum with V-shaped emargination and two triangular lateromedial projections. Saccus broader, comparatively shorter, distinctly widening at base. Phallus broad, comparatively shorter, hook-ended with several thin spines.

Female genitalia (Figures 33, 38-41): Apophysis anterioris 2.7x shorter than apophysis posterioris. Antrum funnel-shaped with straight outer margin, ductus bursae distinctly shorter than corpus bursa, membranous, slightly widening proximally, corpus bursa oval, signum hook-shaped, sharply pointed, with two sclerotised plates at its base. Signum one third length of apophysis anterioris.

Molecular data: BIN: BOLD:ADR5393. The intraspecific average distance of the barcode region is unknown (n=1). According to the BOLD, the minimum distance to the nearest neighbors, an unidentified species of *Klimeschipsis* from Pakistan (BIN: BOLD:ACI9729) and *K. varia* sp. n., is 4.98 % (p-dist). The comparable similarity shows the results computed by MEGAX software in Table 1 with 5.17 and 5.18 distances.

Table 1. The group mean distance according to the tree in fig. 42 computed by MEGAX

		1.	2.	3.	4.	5.	6.	7.	8.
1.	*K. kinigerella* (a)								
2.	*K. kinigerella* (b)	0,0266							
3.	*K. terroris*	0,0978	0,0981						
4.	*K. discontinuella*	0,0734	0,0763	0,1070					
5.	*K. maritimaealpina*	0,0746	0,0781	0,0979	0,0484				
6.	*K. varia* sp. n.	0,0572	0,0656	0,0805	0,0763	0,0728			
7.	*K. confusella* sp. n.	0,0670	0,0765	0,0998	0,0698	0,0736	0,0518		
8.	*K.* sp.	0,0565	0,0672	0,0894	0,0721	0,0635	0,0592	0,051	

Biology: Host plant unknown. Adults have been collected from late June to end July at altitudes between 1400 and 2900 m in rocky steppes (Figures 44-45). It seems the species is preferring the habitats in higher altitudes compared with *K. varia*.

Distribution: Russia (Altai Mts., Buryatia).

Etymology: The species name is derived from the Latin *confusus* which points to easy confusion of a new species with *K. varia*.

Checklist of species of *Klimeschiopsis* Povolný, 1967

Klimeschiopsis afghana Povolný, 1968 (Figure 20)

Distribution: Afghanistan (Povolný, 1968).

Remark: The species is hitherto known only from holotype which is stored in NHMW. Unfortunately, genitalia slide was not found there (S. Gaal-Haszler, pers. comm.). At the same time, this species is not listed as a part of Dalibor Povolný collection according to Kubáň & Jakeš (2006), therefore genitalia slide seems to be lost.

Klimeschiopsis confusella Šumpich & Bidzilya, **sp. n.**

Distribution: Russia (Altai Mts., Buryatia) (this paper).

Klimeschiopsis discontinuella (Rebel, 1899)

Distribution: central Europe (Alps) (Huemer & Karsholt, 2010).

Remark: Record from the Altai Mountains (Bidzilya, 2005) must be referred to *K. varia*. Records from Zabaikalskiy kray of Russia (Ponomarenko, 2004, 2008) and China (Li, 2002) need confirmation, as specimens from neighboring territories examined by us turned out to be either *K. varia* or *K. confusella*.

Klimeschiopsis kiningerella (Duponchel, [1843])

Distribution: Europe (from France to southern Ural Mts.), Turkey (Huemer & Karsholt, 2010).

Klimeschiopsis maritimaealpina Nel & Varenne, 2011

Distribution: France (Maritime Alps) (Nel & Varenne, 2011)

Klimeschiopsis sinevi Bidzilya, 2012

Distribution: Northern Iran (Mazandaran), Eastern Georgia, Azerbaijan (Talysh) (Bidzilya, 2012).

Remark: An unidentified barcoded specimen from Azerbaijan (BIN: BOLD:ADI2598) is strikingly reminiscent of *K. sinevi* (cf. BOLD).

Klimeschiopsis terroris (Hartig, 1938)

Distribution: Spain (Andalusia, Castellón, Teruel) (Huemer & Karsholt, 2010).

Klimeschiopsis varia Šumpich & Bidzilya, **sp. n.**

Distribution: Russia (Altai Mts., Tuva, Buryatia) (this paper).

Acknowledgements

The authors thank Sabine Gaal-Haszler (NHMW), Lauri Kaila (MZH) and Sergey Sinev (ZIN) for assistance during the work with collections under their care. We are grateful to Antonio Vives for preparing the Spanish text. The work was supported by the Ukrainian State Budget Program "Support for the Development of Priority Areas of Scientific Research" (Code: 6541230) (O. Bidzilya). J. Šumpich carried out his part of the work on this article with support from the Ministry of Culture Czech Republic (DKRVO 2019-2023 / 5.I.d, National Museum, 00023272).

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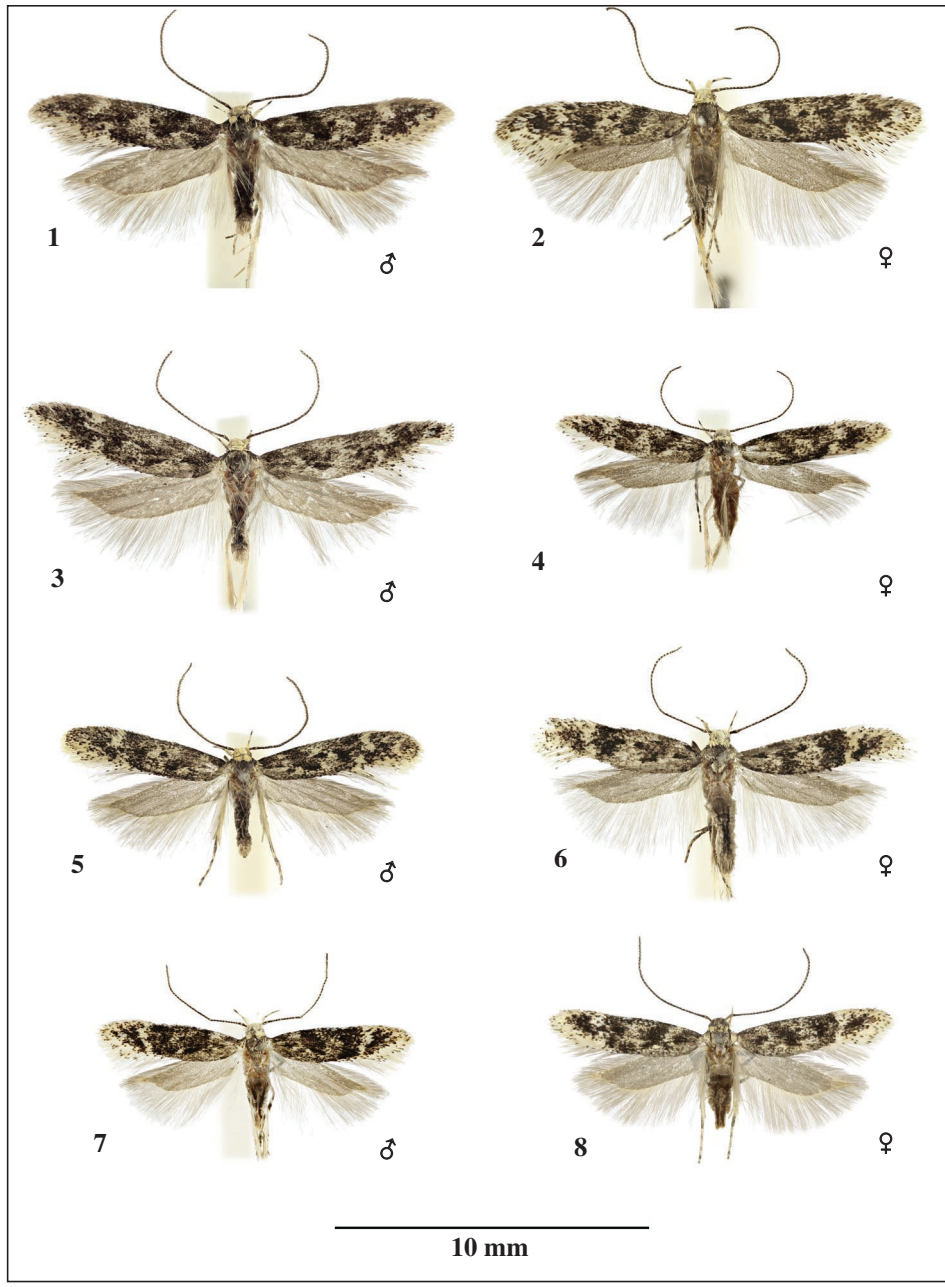
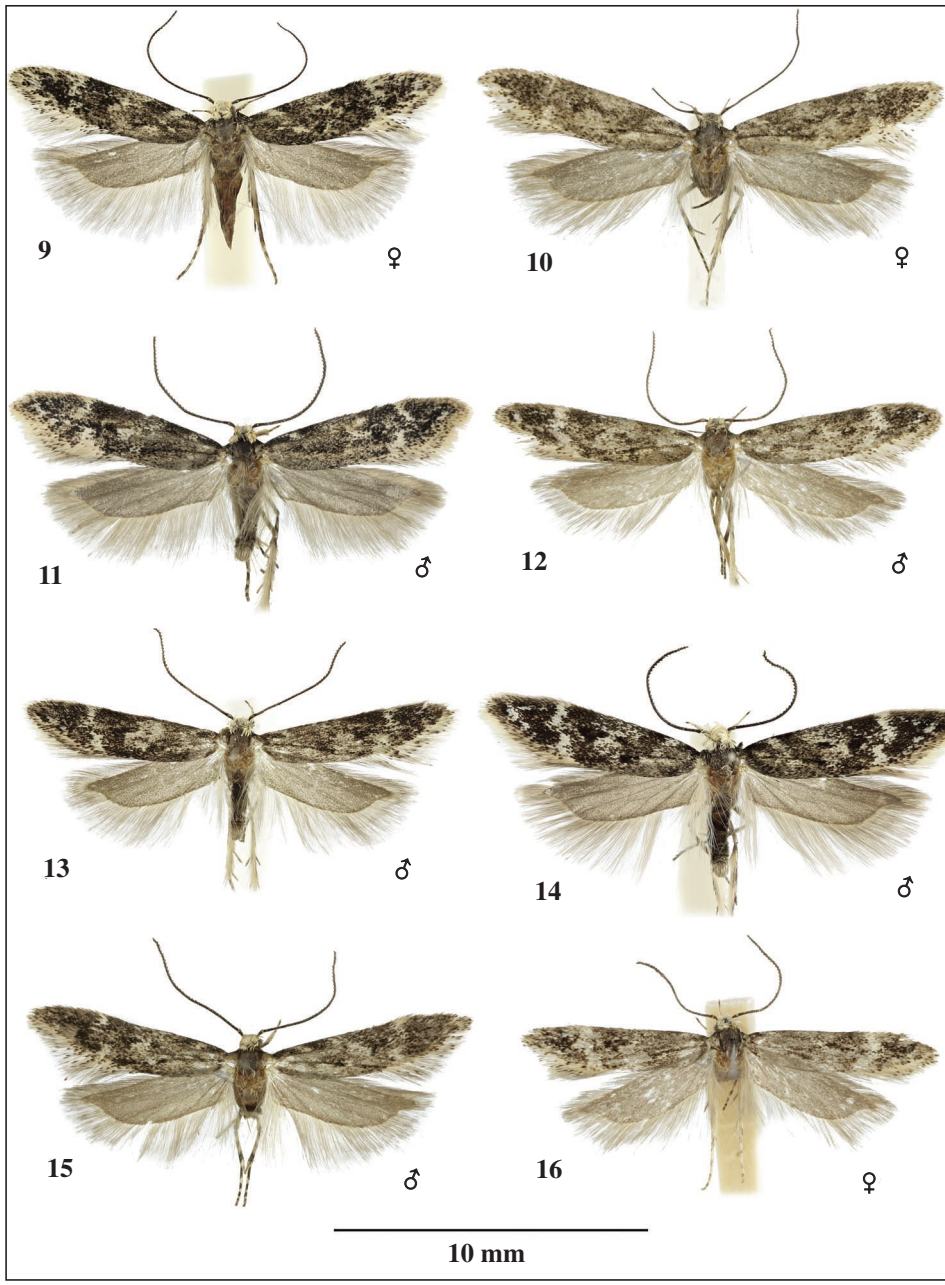
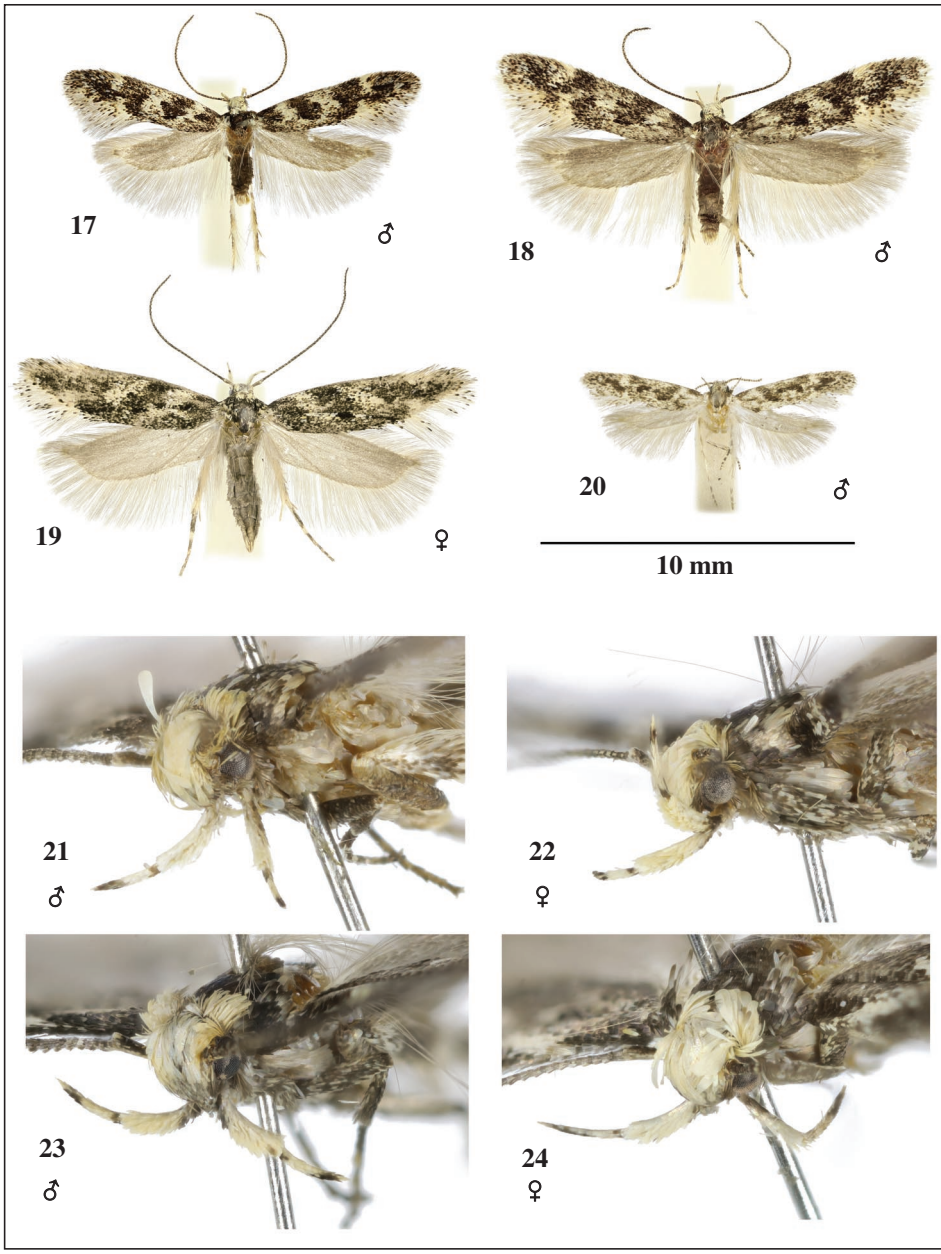
(Recibido para publicación / *Received for publication* 23-V-2022)
(Revisado y aceptado / *Revised and accepted* 27-VI-2022)
(Publicado / *Published* 30-XII-2022)



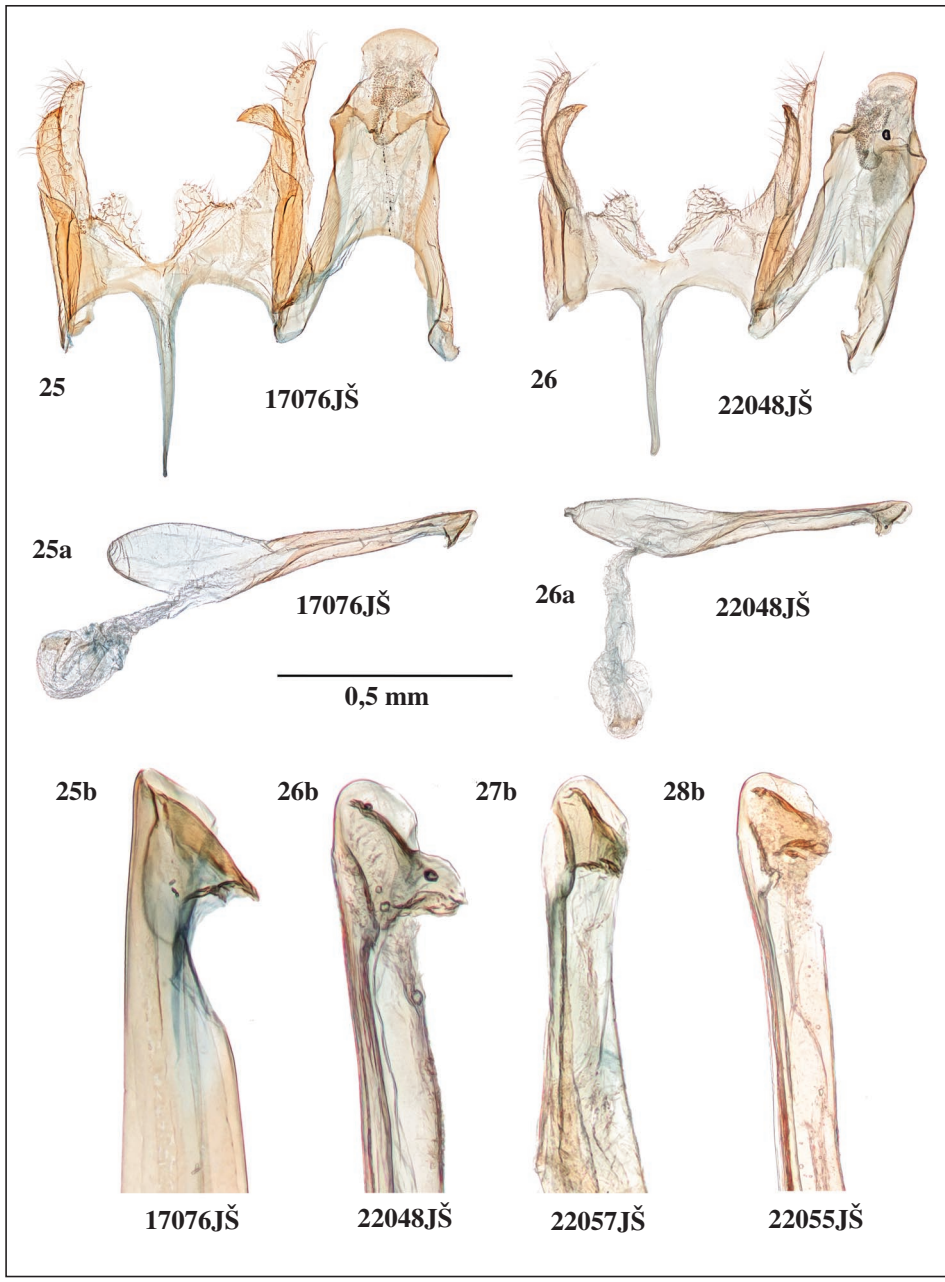
Figures 1-8. *Klimeschiopsis varia* Šumpich & Bidzilya, sp. n., Russia, Altai Mts., adults. **1.** Holotype, Dzhangyskol lake. **2-8.** Paratypes. **2.** Beltir. **3-4.** Aktash. **5-6.** Confluence of Karagem and Argut rivers. **7-8**. Chulyshman valley. (1-7 barcoded).



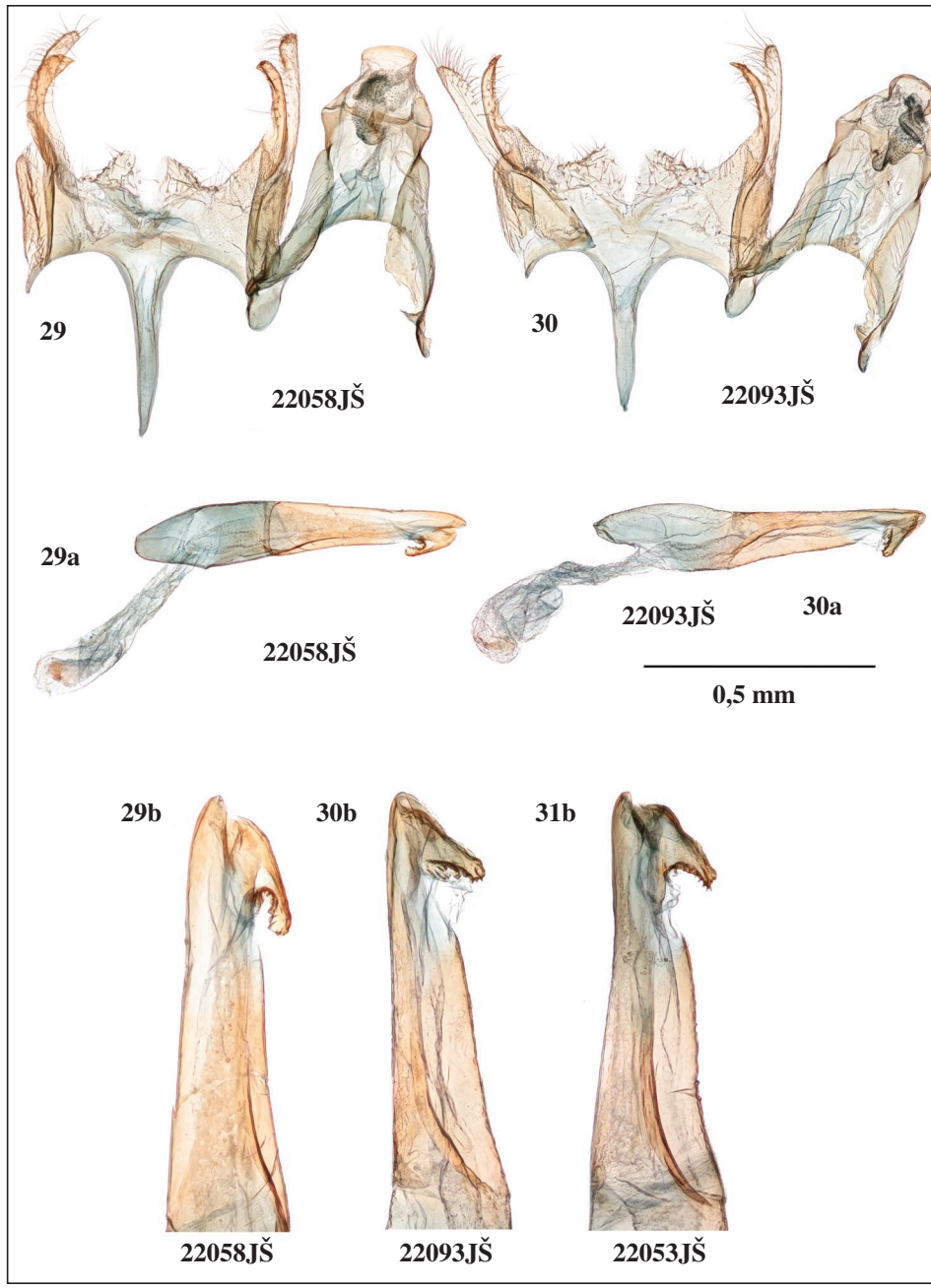
Figures 9-16. *Klimeschiopsis confusella* Šumpich & Bidzilya, sp. n., Russia, Altai Mts., adults. **9.** Holotype, Dzhazator, Tara valley. **10-16.** Paratypes. **10.** Dzhazator, Tara valley. **11-13.** Dzhangyskol lake. **14.** Zavod. **15-16.** Aktash. (9 barcoded).



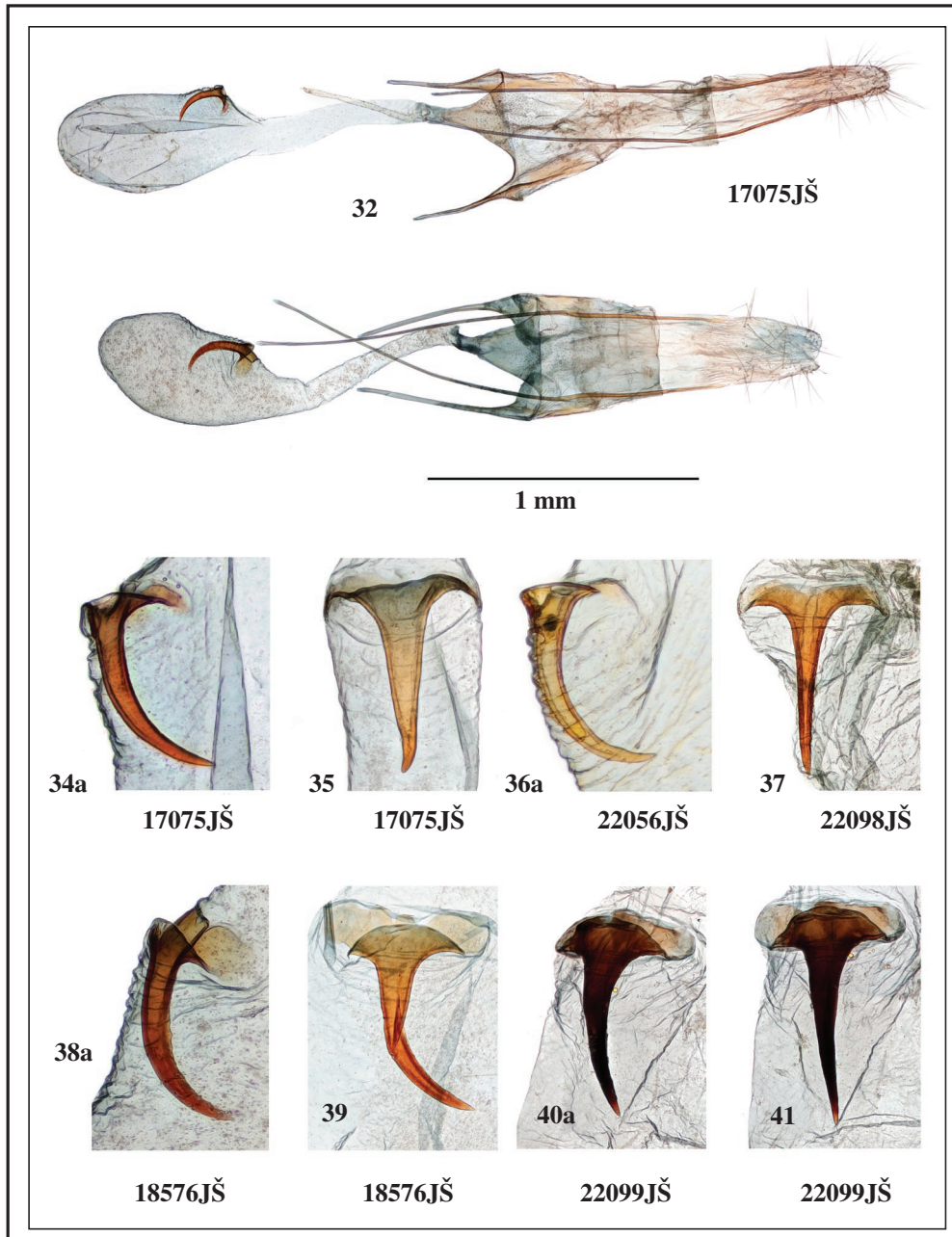
Figures 17-24. *Klimeschiopsis* species. **17-20.** Adults. **17-19.** *K. discontinuella* (Rebel, 1899), Italy, S Tirol. **13.** Lasa, J. Šumpich leg. **14.** Laatsch, J. Šumpich leg. **15.** Stelvio, J. Liška leg. **20.** *K. afghana* Povolný, 1968. (17-19 in coll. NMPC, 20 in coll NHMW). **21-24.** Heads. **21-22.** *K. varia* Šumpich & Bidzilya, sp. n. **23-24.** *K. confusella* Šumpich & Bidzilya, sp. n. (21 and 24 holotypes).



Figures 25-28. Male genitalia of *Klimeschiopsis varia* Šumpich & Bidzilya, sp. n. **25.** Holotype, Dzhangyskol lake. **26-28.** Paratypes. **26.** Krasnaya Gorka. **27.** Chylushman valley. **28.** Karagem. (a - phallus, b - detail of tip of phallus: 25-26. Lateral view, 27-28. Frontal view).



Figures 29-31. Male genitalia of *Klimeschiopsis confusella* Šumpich & Bidzilya, sp. n., paratypes. **29.** Dzhazator, Tara valley. **30.** Aktash. **31.** Dzhangyskol lake. (a - phallus, b - detail of tip of phallus, lateral view).



Figures 32-41. Female genitalia of *Klimeschiopsis*. **32-33.** General view. **32.** *K. varia* Šumpich & Bidzilya, sp. n., Aktash, paratype. **33.** *K. confusella* Šumpich & Bidzilya, sp. n., Dzhazator, Tara valley, holotype. **34-41.** Detail of signum. **34-37.** *K. varia* Šumpich & Bidzilya, sp. n. **34-35.** Aktash. **36.** Chulyshman valley. **37.** Aktash. **38. 41.** *K. confusella* Šumpich & Bidzilya, sp. n., Dzhazator, Tara valley. **38-39.** Holotype (a - lateral view).

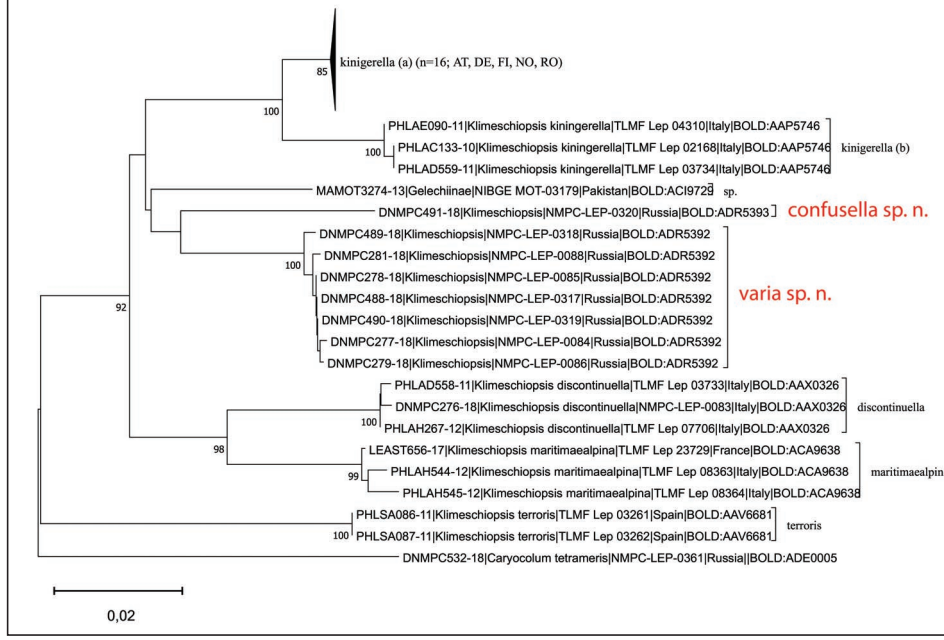
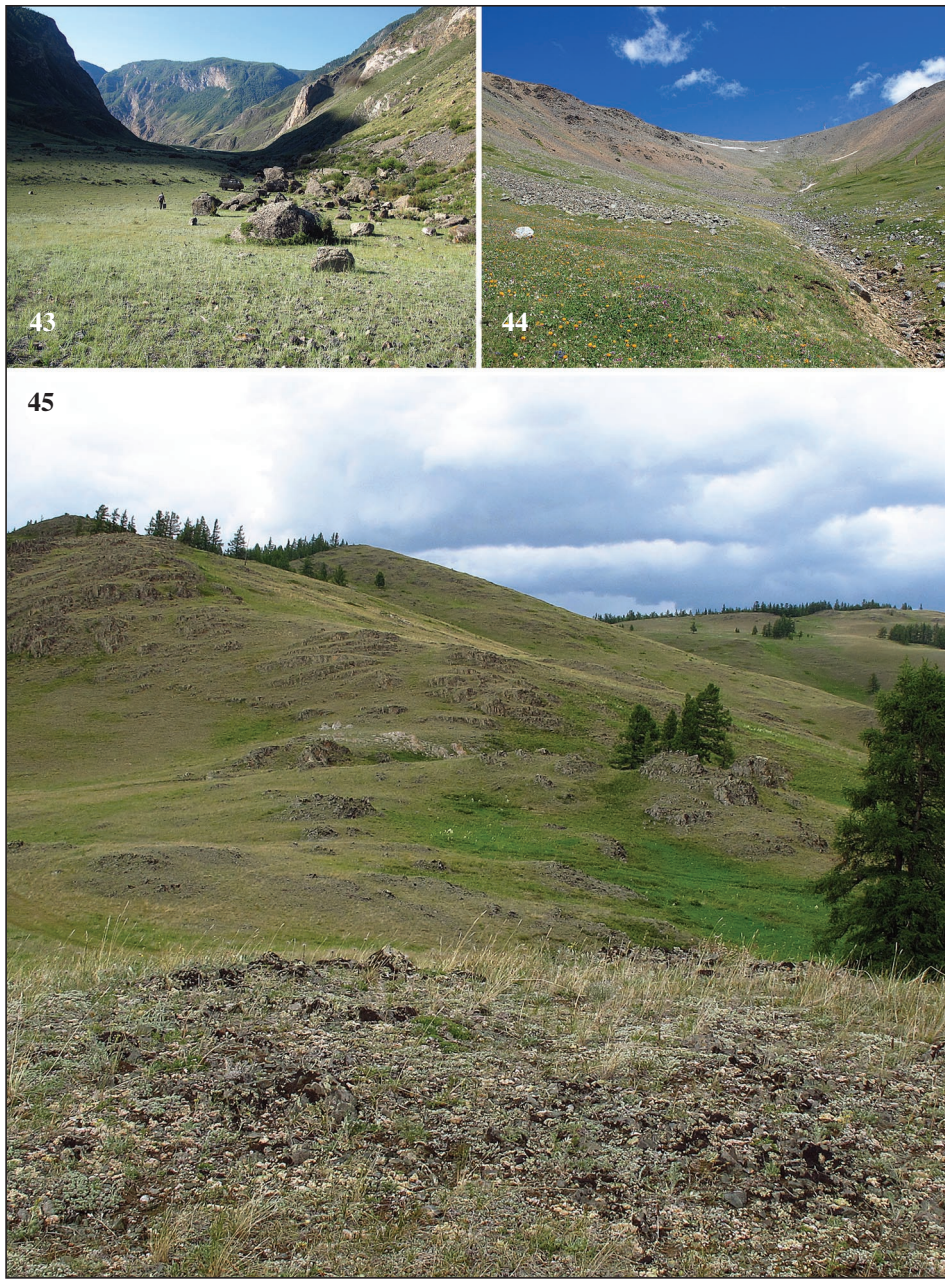


Figure 42. Neighbor-Joining tree of *Klimeschiopsis* species created from public records in BOLD, with *Caryocolum tetrameris* (Meyrick, 1926) as outgoroup. Source: Barcode of Life. Database, cf. RATNASINGHAM & HEBERT (2007).



Figures 43-45. Habitats of new *Klimeschiopsis* species in Altai Mts. **43.** Chulyshman valley, 600 m a.sl., habitat of *K. varia* Šumpich & Bidzilya, sp. n. **44.** Zavod, 2900 m a.sl., habitat of *K. confusella* Šumpich & Bidzilya, sp. n. **45**. Steppe near Dzhangyskol lake, 1830 m a.sl., where both species occur sympatrically.