



Sophronia salaganella sp. n. from the Russian Altai and new data on Palaearctic *Sophronia* Hübner, [1825] species (Lepidoptera, Gelechiidae)

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Abstract

Sophronia salaganella Šumpich & Bidzilya, **sp. n.**, is described based on specimens collected in the mountains of the Altai Republic and Buryatia in Russia. The new species is most similar to *S. illustrella* (Hübner, 1796) and *S. orientalis* Li & Zheng, 1998 from which it can be reliably distinguished by characters of the genitalia. *Sophronia iciculata* Omelko, 1999, **syn. n.**, is a junior synonym of *S. orientalis*; and *S. marginella* Toll, 1936, **syn. n.**, is a junior synonym of *S. consanguinella* Herrich-Schaffer, [1854]. *Sophronia alaicella* Caradja, 1920 is redescribed, and the adult and the male and female genitalia are illustrated. *Sophronia illustrella* (Hübner, 1796) is recorded from Russia for the first time. A checklist of *Sophronia* Hübner, [1825] of the world is provided.

Key words: taxonomy, new species, new synonym, Russia, Altai Mountains, East Sayan Mountains

Introduction

The species of *Sophronia* Hübner, [1825] are defined externally by the presence of a long brush of hair-like scales on the underside of segment II of the labial palpus, and the forewing with a white pattern along the costal margin, a white oblique subapical costal streak, and the apex usually distinctly falcate. The narrow cuculli, an elongated tube-shaped ventral sclerite fixed to the aedeagus distally, is characteristic for the male genitalia. The female genitalia are recognized by a well-defined cap-shaped or tubular antrum, usually well-developed signum with long arms, and very long apophyses posteriores.

The position of *Sophronia* within Gelechiidae is rather controversial. In two recent well supported classifications of Gelechiidae (Ponomarenko 2005, Karsholt *et al.* 2013) the genus was placed either in Anacampsinae or Gelechiinae. Ponomarenko (2005) suggests that affinity of *Sophronia* with Anacampsinae (namely Anacampsini) is supported by the presence of a ventral tube-shaped sclerite that is formed by the ankylosed sacculi and juxta merged with the vinculum. The homology of this sclerite was established on the basis of functional morphological investigations of the male copulative apparatus (Ponomarenko 2005: 35–38, 2009: 76–81). This tube-shaped sclerite surrounding the aedeagus limits its mobility to rotation to the dorsoventral plane. These morphological transformations are characteristic for *Mesophleps* Hübner, [1825], *Anacampsis* Curtis, 1827, *Stomopteryx* Heinemann, 1870 and other „traditional“ genera of Anacampsini (Ponomarenko 2005: 76–77; 2009: 164–165).

In an alternative classification of Gelechiidae proposed by Karsholt *et al.* (2013) based on molecular data and supported by morphological characters, the laterally separated tergum VIII and sternum VIII was considered a synapomorphy of this subfamily (Karsholt *et al.* 2013: 345). In that classification *Sophronia* is placed near *Mirificarma* Gozmány, 1955 in the subfamily Gelechiinae, tribe Gelechiini.

Corley (2001) separated *Pseudosphronia* Corley, 2001 from *Sophronia* based on differences in wing venation and characters of the genitalia (e.g., the shape of the aedeagus in the male, and the absence of a signum in female); for details see Corley (2001: 214). Its position within the family requires clarification (Corley 2001: 224).

Currently, *Sophronia* comprises 23 described species: 17 are known only from the Palaearctic region, three from the Nearctic, one from the Neotropical, and one from the Afrotropical region (Gaede 1937). *Sophronia gelidella* Nordman, 1941 was recently documented as Holarctic by Landry *et al.* (2013). Because the entire genus has not been subject to revision, correct assignment of some of the species to *Sophronia* or *Pseudosphronia* remains unresolved (see also Corley 2001: 221), therefore the checklist of the species of *Sophronia* presented in this work is considered provisional. The fauna of Europe was partially revised by Elsner *et al.* (1999) and Corley (2001). Nine species of *Sophronia* were reported by Ponomarenko (2008) from Russia.

In the Altai mountains we repeatedly collected a *Sophronia* species that externally resembles *S. gelidella*, *S. illustrella* (Hübner, 1796), and *S. iciculata* Omelko, 1999. A subsequent, precise comparative study of external and genitalia characters of this group of species showed that the specimens from Altai represent a separate, undescribed species. Within the study we examined the little known species *Sophronia alaicella* Caradja, 1920 and realised that it is broadly distributed both in mountain and desert areas of Central Asia. We also discovered that *Sophronia marginella* Toll, 1936 is conspecific with *Sophronia consanguinella* Herrich-Schäffer, [1854] and *Sophronia iciculata* is a junior synonym of *Sophronia orientalis* Li & Zheng, 1998. Below we describe a new species from Altai, establish two new synonyms, redescribe *S. alaicella* and *S. orientalis*, and provide an updated list of *Sophronia* species.

Material and methods

The present study is based on the material from the following collections:

Abbreviations of museums and private collections:

DVI	Private collection of Ivo Dvořák, Jihlava, Czech Republic
FSCB	Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far Eastern Branch of Russian Academy of Sciences, Vladivostok, Russia
MGAB	Muzeum Național de Istorie Naturală "Grigore Antipa", București, Romania
NKU	Insect Collection of College of Life Sciences, Nankai University, Tianjin, China
NMPC	National Museum, Natural History Museum, Prague, Czech Republic
NUPP	Private Collection of Kari & Timo Nupponen, Espoo, Finland
TLMF	Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria
ZIN	Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia
ZMKU	Zoological Museum, Kiev Taras Shevchenko National University, Ukraine
ZMUC	Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark

Examples of the new species were collected by the first author using portable light traps (with ultraviolet 8W/12V tubes) or attracted to ultraviolet light 250W/220V. The second author collected the new species at the light of a "Petromax" gasoline lamp and by netting adults in grass in the morning just after sunrise. The study of moth specimens and preparation of genitalia slides were made by traditional methods as described by Huemer & Karsholt (2010). The genitalia of both sexes were studied in glycerol, in some cases mounted on a glass slide in Euparal and subsequently examined using Nikon SMZ-10, Olympus SZX16 and Olympus BX41 stereomicroscopes. Photographs of adults and genitalia were made with Nikon Coolpix 8700, Olympus DP74 and Canon EOS 1100D digital cameras. In the descriptions, the terminology for genitalia structures follows Klots (1970) with modifications according to Ponomarenko (2005) on the basis of functional morphological investigations. Most of the photographs were edited in Helicon Focus 6.3.5 Pro and Adobe Photoshop CC.

Results

Sophronia salaganella Šumpich et Bidzilya, sp. n.

(Figs. 1–7, 17–22)

Type material. Holotype ♀: ‘Russia, Altai Republic | Kosh-Agach Distr. | Kurai env. (15 km SW) | Dzhangyskol lake (or | SALAGANA lake) | 50°10'49"N; 87°44'19"E | coniferous forest/steppe | 24.–25.vi.2015, 1830 m | Jan Šumpich leg.’ | ‘Photo / | Gen. prep. | J. Šumpich | 18/419’ | ‘HOLOTYPUS ♀ | *Sophronia salaganella* | Šumpich & Bidzilya, 2018’ [red label] (NMPC).

Paratypes: **Russia, Altai Mts.** 4♂♂, 2♀♀, the same data as holotype. 1♂, 1♀, Aktash village, 50°19'12"N, 87°36'00"E, grassy steppe, rocks, 1400 m, 11.vii.2014 (J. Šumpich) (gen. prep. 18425♀, Jan Šumpich); 1♂, 1♀, the same locality, but 21.vi.2015 (J. Šumpich) (gen. prep. 18424♂, J. Šumpich). 1♂, 1♀, Belyashi (Dzhazator) environs (25 km NW), confluence of Argut and Karagem rivers, 49°51'56"N, 87°10'22"E, 1400 m, rocky steppe, 27.–28.vii.2017 (J. Šumpich). 1♂, Shebalino distr., 8 km W of Cherga, rocky slopes, steppe, 580 m, 7.vii.2015 (J. Šumpich) (all NMPC). 1♂, Kuraiskiy khrebet near Aktash, Jarly-Jary upper stream, mountain tundra, 2600 m, 8.vii.1976 (Yu. A. Kostjuk) (gen. slide 164/18, O. Bidzilya). 1♂, Kuraiskiy khrebet near Aktash, Jarly-Jary middle stream, south mix-grass steppe slope, 2400 m, 5.vii.1976 (Yu. A. Kostjuk). 4♂♂, Kosh-Agatch distr., Ukok plateau, 11, 20, 22.vii.2001, 2200 m (O. Bidzilya). 4♂♂, Kosh-Agatch distr., Tjurgun river near Tchuja road, 1500 m, 7.vii.2001, on light (O. Bidzilya). 1♀, 15 km S Ongudai, 1200 m, 50°40'N, 86°16'E, 7–8.vii.1997 (P. Ustjuzhanin) (gen. slide 59/17, O. Bidzilya) (all ZMKU). 1♀, Ulagan distr., 11 km NNW of Aktash, 1900 m, 28–30.vii.2016 (P. Huemer, B. Wiesmair). 1♀, Ulagan distr., 10 km NE of Aktash, Kurai Mountains Range, between the rivers Korumdyajry and Yarlyamry, 2150 m, 7.viii.2016 (P. Huemer, B. Wiesmair) (all TLMF). 1♂, Kuraiskiy khrebet, 50°16'–20'N 87°50'–55'E, 2400–2800 m, 7.vii.2001 (K. Nupponen); 1♀, the same locality, but 8.vii.2001 (K. Nupponen). 1♂, Kuraiskaya steppe, 50°14'–16'N, 87°50'–55'E, 1500–1700 m, 13.vii.2001 (genitalia slide K. Nupponen 1/1.i.2002) (K. Nupponen) (all NUPP). [**Buryatia**], East Sayan Mts., 1♂, Mondy village (2 km E), 51°47'–48'N 100°55'–58'E, forest steppe, 1450 m, 13.vi.2002 (K. Nupponen) (NUPP).

Description. Adult (Figs. 1–7). Wingspan 18–19 mm in male, 16–18 mm in female. Head and thorax whitish brown, slightly lighter than general coloration of forewings. Labial palpi slightly curved, segment 2 very broad, fan-shaped, both inner and outer sides chocolate brown, upper edge closer to frons whitish. Segment 3 long, almost straight, pointed, slightly longer than the segment 2, upper surface white, under surface side brown. Antennae dark brown dorsally, whitish ventrally throughout. Forewings narrow, strongly curved at the apex. Forewing in basal and distal parts with a comparatively short longitudinal streak, two pairs of short thicker streaks (less visible on dark specimens) in middle. Coloration in area from base to middle of costa as well as tornal area whitish. Forewings of fresh and lighter specimens suffused by orange-ochreous scales; in distal part two distinct light arrow-shaped lines, and one, sometimes two, short lines along sickle-like curve; between them, and perpendicularly to them, two very short whitish streaks, mostly visible also in dark specimens. Hindwings unicolourous, grey to grey-brown, fringes concolourous. Sexual dimorphism is imperceptible, females are slightly smaller, and the forewings are weakly narrower. Dark brown coloration varies considerably: sometimes considerably reduced, whereas some specimens of both sexes entirely dark brown, with only light arrow-shaped subapical lines visible (Figs. 3–6).

Male genitalia (Figs. 17–20). Uncus subrectangular, twice as long as broad, posterior margin with narrow triangular medial emargination. Gnathos strongly curved in middle, relatively uniform in width, apex pointed. Tegumen subrectangular, two to three times longer than broad, weakly constricted beyond mid-length, anteromedial emargination triangular, extending to 1/4–1/3 length of tegumen. Cucullus narrow, broadened in distal 1/3, apex rounded, slightly extending half length of uncus. Valvella straight, about twice as short as the length of cucullus. Vinculum very narrow, band-shaped. Juxta and sacculus form setaceous tube surrounding aedeagus. Saccus subrectangular, twice as long as than broad, slightly extending beyond top of pedunculus. Aedeagus longer than tegumen and uncus, straight, nearly uninform in width, with a small subapical hook.

Female genitalia (Figs. 21–22). Papillae anales broad, round. Apophyses posteriores long, apophyses anteriores approximately one third length of apophyses posteriores. Antrum long, slightly tapering anteriorly (funnel-shaped), sclerotized. Ductus bursae membranous, narrow, slightly expanding toward to bursa copulatrix, only slightly longer than antrum. Bursa copulatrix symmetrically oval, same length as antrum and ductus bursae combined. Signum in shape of a longer broad plate with irregular edges with darkly sclerotized ends.

Diagnosis. In habitus, *S. salaganella* is most similar to *S. illustrella* (Figs. 11–12), but *S. illustrella* lacks the two short whitish streaks at the point where the bend of the apex begins. Additionally, the suffusion of the forewings is mostly whitish in *S. salaganella* and ochreous, sometimes reddish, in *S. illustrella*. In the male genitalia, the aedeagus is shorter and stouter in *S. illustrella*; in the female genitalia the shape of the signum distinguishes the species. *Sophronia salaganella* also resembles *S. orientalis* (Figs 23–26), but the latter is comparatively smaller with a wingspan of 11.5–15.0 mm (cf. Park & Ponomarenko 2007), the longitudinal streaks in the proximal and distal areas of the forewings are longer and more distinct, and the two pairs of short streaks in the middle of wing are usually absent. The suffusion of the forewings is mostly reddish in *S. orientalis* and whitish in *S. salaganella*. In the male genitalia, the aedeagus is narrower, slightly curved and just beyond the middle with a toothed lobe-like ventral process in *S. orientalis*, but straight and without a toothed plate in *S. salaganella*. Females are easily distinguished by the signum shape: its middle part is oval in *S. orientalis* and rectangular in *S. salaganella*. *Sophronia salaganella* cannot be confused with *S. alaicella* (Figs 13–14) which has narrower forewings, with a less arcuate apex and with all longitudinal streaks practically absent.

Sophronia salaganella can be distinguished from *S. gelidella* (Figs 15–16) by the following: *S. gelidella* lacks the longitudinal streak in the distal area of forewings; in the male genitalia the aedeagus is distally curved and with a subapical, dentiform process (not present in *S. salaganella*); and in the female genitalia the signum is markedly larger in *S. gelidella* (its length is about half as long as the bursa copulatrix, whereas about one-fourth as long in *S. salaganella*). For a more detailed comparison, along with photographs of the genitalia of both sexes, see Landry *et al.* (2013: 24, 28).

Distribution. Russia: Altai Republic, Buryatia.

Bionomics. Early stages unknown. Adults have been found from late June to late July at altitudes between 1200 m and 2600 m on rocky steppe, in mountains tundra, and in mixed-grass steppe in Altai Mountains (Fig. 10).

Etymology. The species is named after the local name of the mountain lake Salagana near Kurai village in the Altai Mts, which is located near the type locality of the new species. This lake is better known on some maps as Dzhangyskol lake.

***Sophronia orientalis* Li et Zheng, 1998** (Figs 8, 23–35)

= *iciculata* Omelko, 1999, **syn. n.**

Type material examined. Holotype of *orientalis*, ♂: China: Mt. Xijia, Fengxian County, Shaanxi Province, 1600 m, 10.vii.1988, gen. slide No. 89097 (Houhun Li) (NKU). Paratype, ♂, same data as holotype (NKU).

Additional material examined. Russia, Primorsky krai: 2 ♂♂, Ussuriysk district, 20 km SE Ussuriysk, Gornotaezhnoe, 26.vii.1994, gen. slides M. Ponomarenko Nos 130 (♂), 131 (♂). 3 ♂♂, 1 ♀, Khasansk district, 14 km SW Slavyanka, Ryazanovka, 19.vii.1992, 21.vii.1997, 18.viii.1997, 19.vii.2008, gen. slides M. Ponomarenko Nos 129 (♂), 132 (♂), 133 (♀), 134 (♂). 1 ♂, 22 km SW Slavyanka, Gamov Peninsula, Lev Cape, 26.vii.1997 (all M. Ponomarenko) (FSCB).

Redescription. Adult (Figs. 23–26). Wingspan 11–15 mm. Head light grey; labial palpi mainly light grey, curved upwards, twice as long as the head; basal segment light grey, half as long as second. Second segment with trapezoid patch of hair-like scales, on outer side with two dark brown transverse streaks at the base and before apex, on inner side with one dark brown transverse streak before apex; dorsal edge of segment light grey basally and whitish distally. Third segment of labial palpus longer than second, with dark brown ring at middle and brown apex (Fig. 8). Antennae with scape and basal 1/4 of flagellum dark brown dorsally and light grey ventrally; distal 3/4 of flagellum with alternate light grey and dark grey rings. Thorax concolorous with the head. Forelegs and middle legs mainly dark grey on outer side with light grey ring at the apices of femur, tibia and each tarsomere; both pairs of legs whitish on the inner side; spurs dark grey. Hindlegs light grey with scattered dark scales on femur and tibia; each tarsomere dark grey with white apical ring; spurs dark grey. Forewings narrow, lanceolate, with tapered falcate apex. Ground colour grey with scattered dark grey scales; pattern formed by longitudinal dark brown, orange and white streaks and lines, including a narrow, dark brown band along median line about 1/3 wing length and a white, wedge-shaped narrow line on distal half of wing, plus three, parallel, short white streaks abutting

termen. Fringe light grey with dark brown middle band and concolorous edge. Hindwings unicolourous, grey brown, fringe concolorous with light grey middle.

Male genitalia (Figs. 28–29, 33–35). Uncus slightly narrowed distally, with a row of long setae along posterior edge except for middle part with V-shaped incision. Tegumen deeply hollowed on sides at 3/4 distally, with strong transverse posterior sclerotization and with deep triangular cut between widened anterolateral parts. Gnathos hook-like, curved at about 1/3 basally. Cucullus slender with clavate distal part. Valvella digitate, about half as long as cucullus. Saccus and juxta ankylosed into semisclerotised setaceous tube joining with vinculum and surrounding aedeagus. Saccus wide and flat-topped. Aedeagus with basal half 4 times thicker than distal half, with toothed ventral plate just beyond the middle.

Female genitalia (Figs. 30–32). Papilla analis ovoid, with rounded sclerotization at base; ovipositor telescopic, intersegmental membrane between IX and VIII about 2/3 length of apophyses posteriores. Segment VIII membranous ventrally. Ostium on level of anterior margin of segment VIII. Antrum cup-shaped, wider than 1/2 width of segment VIII, narrowed before ring-like cingulum. Ductus bursae narrow, membranous, longer than corpus bursae, ductus seminalis junction at 2/3 distally. Corpus bursae ovoid, about 3/5 as long as ductus bursae; signum large, about 1/3 of bursae copulatrix width, in posterior half of corpus bursae.

Diagnosis. *Sophronia orientalis* is similar to *S. illustrella* in forewing pattern and genitalia of both sexes. In the male genitalia it can be distinguished by the relatively longer aedeagus, which is slightly longer than the total length of the uncus plus the tegumen, with a narrow distal half and a tube-like apex; in the female genitalia the cup-shaped antrum is diagnostic. In *S. illustrella* the aedeagus is shorter than the uncus plus the tegumen, wider in the distal part and with a different shaped apex, whilst the female antrum is goblet-shaped.

Distribution. Russia (Far East: Primorsky krai), Japan (Hokkaido, Honshu), China (Gansu, Shaanxi) (Li & Zheng 1998; Omelko 1999; Li 2002; Park & Ponomarenko 2007; Ponomarenko 2008, 2016; Sakamaki & Ueda 2013).

Remarks. *Sophronia orientalis* was described from seven specimens collected in Shaanxi and Qinghai Provinces, China (Li & Zheng 1998: 309). *Sophronia iciculata* was described from 11 males and 19 females collected in Primorsky krai of the Russian Far East (Omelko 1999: 169). The comparison of adults and the male genitalia of specimens collected in type locality of *S. iciculata* with photographs of the holotype of *S. orientalis* allows us to establish *S. iciculata* Omelko, 1999 as a junior synonym of *S. orientalis* Li & Zheng, 1998. The pattern of the forewing and the male genitalia in ventral aspect of both species are almost identical. Small differences in the male genitalia are seen in the length of the valvella, which is slightly longer in specimens from Far Eastern population, and in the size of the saccus, which is wider in Chinese population; these represent intraspecific variability. Genitalia of Japanese specimens were not studied.

Sophronia illustrella (Hübner, 1796)

Material examined. 1♂, **Russia**, Dagestan, 8.vi.1933 (M. A. Rjabov) (gen. slide 241/18, O. Bidzilya) (ZIN).

Distribution. Central Europe, Balkan peninsula, Italy (Karsholt 2013), Turkey (Kemal & Koçak (2018: 5), Russia (Dagestan).

Remark. New species for Russia.

Sophronia consanguinella Herrich-Schäffer, 1854

= *marginella* Toll, 1936, **syn. n.**

= *cassinatella* Herrich-Schäffer, 1854, misspelling (Bidzilya 2002: 70; Ponomarenko 2008: 101)

Toll (1936: 405) described *S. marginella* from Ternopil' region of Ukraine ("Podolien, Kreis Zaleszczyki, Wołczków"). This taxon was mentioned in various checklists as a species of uncertain taxonomic position (e.g., Elsner *et al.* 1999: 50, Ponomarenko 2008: 101). An accurate drawing of the adult and male genitalia of *S. marginella* in the original description agrees in all details with typical specimens of *S. consanguinella*, and therefore we synonymize *S. marginella* with *S. consanguinella*.

The name „*Sophronia cassinatella* Herrich-Schäffer, 1854“ was mistakenly applied to a specimen of *S.*

consanguinella from Minusinsk, Krasnoyarskiy krai of Russia (Bidzilya 2002: 79). This mistake was duplicated in the catalogue of Lepidoptera of Russia (Ponomarenko 2008: 101). The name "*Sophronia cassignatella*" is a misspelling of the *Sophronia consanguinella* and must be removed from the list of Gelechiidae of Russia.

***Sophronia alaicella* Caradja, 1920**

(Figs. 9, 13–14, 36–38)

Sophronia sp.–Falkovitsh & Bidzilya 2009: 82

Type material examined. Lectotype, ♂, [Kyrgyzstan], Alai Mts. (MGAB). Paralectotypes, ♂♂, same data as lectotype (MGAB).

Additional material examined. **Kyrgyzstan:** 1♂, Tian-Shan, Mts. Suusamy-Too, loc. Tshytshkan, alt. 1650 m, 3.vii.1999, lum (E. V. Rutjan) (gen. slide 168/18♂, O. Bidzilya) (ZMKU). **Uzbekistan:** 3♂, 2♀, Ajakguzhumdy, 40 km O Dzhangildy, Kyzylkum, 15.v.1976 (M. I. Falkovitsh); 3♂, 3♀, same data but 14, 17, 18.v.1967.; 2♂, Kyzylkum desert, Kul'dzhuktau Mts., 30.iv, 1.v.1967 (M. I. Falkovitsh). 1♂, Kyzylkum desert, Zhamansai, 4.v.1967 (M. I. Falkovitsh) (all ZIN). **Turkmenistan:** 3♂, 4♀, Badkhyz, 25.iv.1958 (gen. slide 167/18, O. Bidzilya) (ZMKU). 2♂, 2♀, Badkhyz, Eroilanduz lake, 26.iv.1982, at light (V. I. Pechen) (gen. slide 165/18, 167/18, O. Bidzilya) (ZMKU).

Redescription. Adult (Figs. 13–14). Wingspan 11.0–15.5 mm. Head and thorax white to light grey. Labial palpi upcurved, segment II white mixed with brown, apex and inner surface white, with brush of very long hair-like scales beneath, segment III white mottled with brown, as long as segment II, very thin, acute (Fig. 9). Scape brown, flagellum brown with white rings. Thorax greyish brown. Forewing comparatively narrow, apex rounded, evenly covered with white grey to brown-tipped scales, long brown streak in middle, shorter single or paired brown streak mixed with ochreous on 2/3 length in mid-width, short brown blotch in half length close to dorsal margin, fold brown, suffused with orange-ochreous, one to three blackish-brown lines in corner of cell, white oblique streak from 2/3 of costal margin to mid-width, apex with black spot edged with light brown from below, fringes white, brown-tipped. Hindwing grey to brown, fringes of same shade.

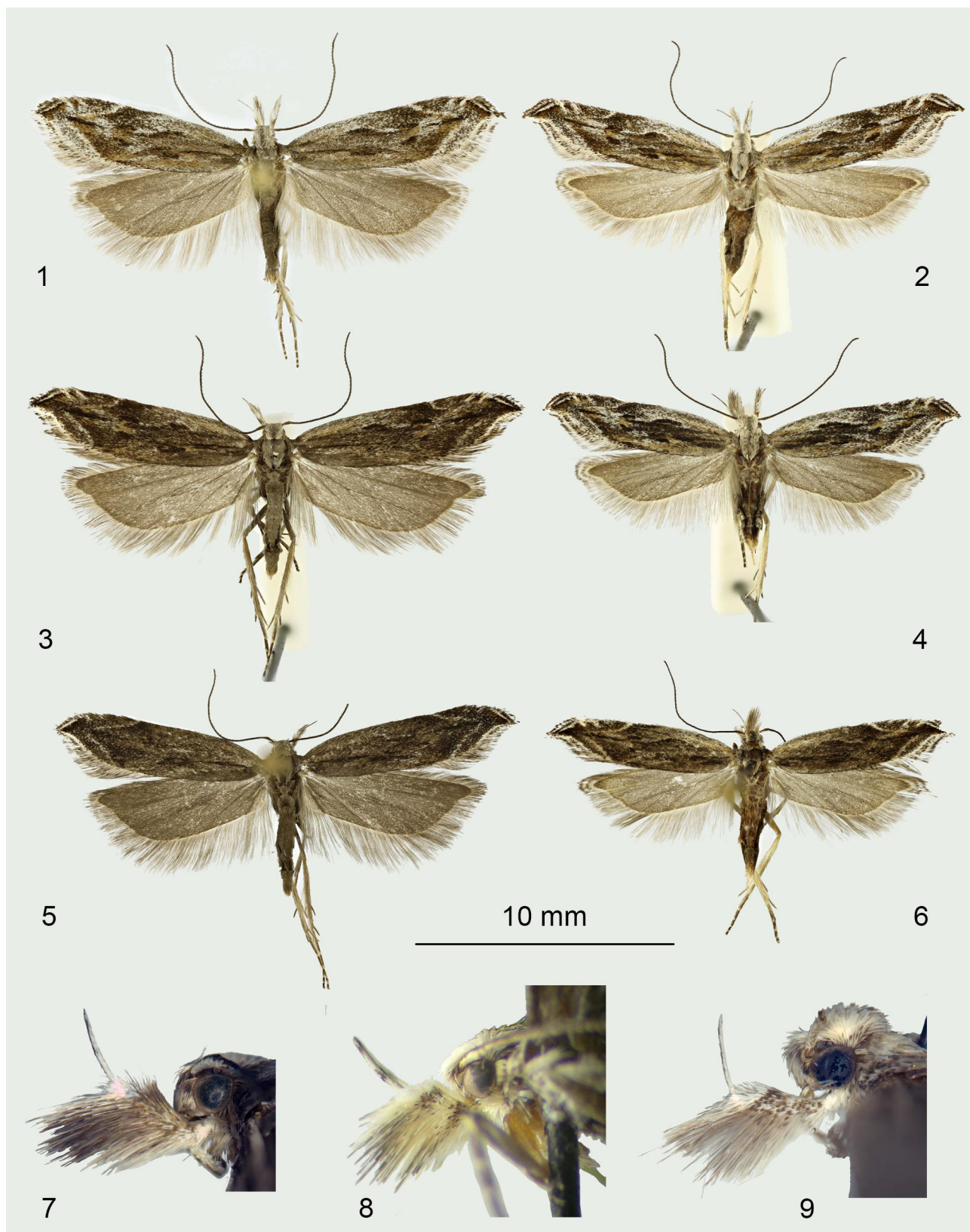
Variation. In some specimens costal 1/3 almost entirely white with less distinct brown pattern, brown medial streaks nearly merged.

Male genitalia (Fig. 36). Uncus subrectangular in basal half, narrowed apically, posterior margin with narrow medial incision. Gnathos hook-shaped, curved at right angle before middle, distal portion of uniform width, apex pointed. Tegumen narrow with triangular anteromedial invagination extending to its 1/3 length. Valvae weakly S-shaped, narrow in basal half, distal portion gradually broadened, apex rounded, extending to half length of uncus. The valvella thin, as broad as basal half of valva, straight, approximately 1/3 length of valva. Vinculum narrow, band-shaped. Ventral sclerite twice as long as broad, extending to middle of valva, densely spinose in distal 1/3. Saccus subtriangular, apex rounded, slightly extending beyond top of pedunculus. Aedeagus straight, as long as tegumen, weakly broadened in 1/3 length, slightly constricted before subquadrate apex.

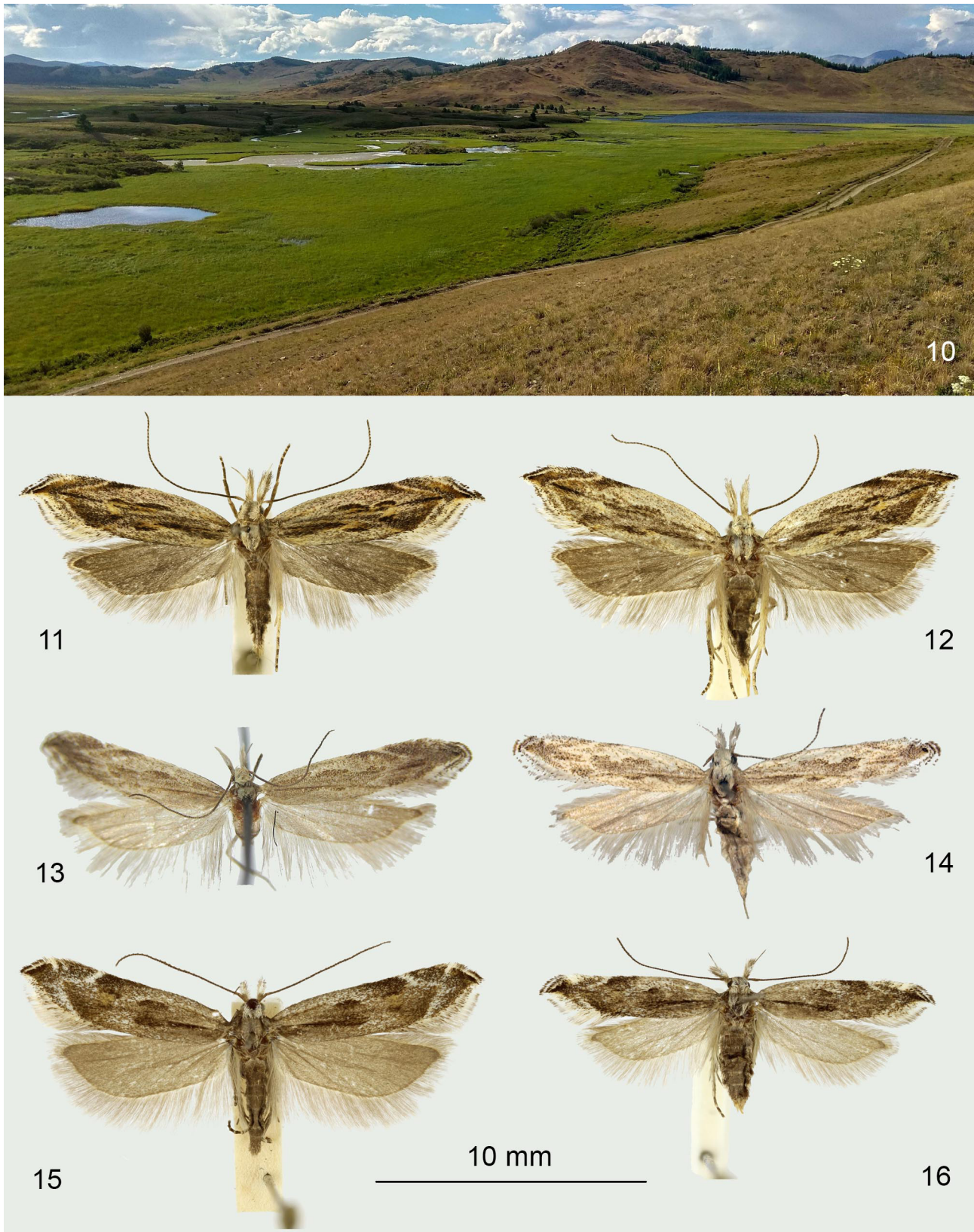
Female genitalia (Figs. 37–38). Papillae anales subovate. Apophyses posteriores very thin, about twice as long as ductus and corpus bursae, apophyses anteriores approximately half as long as apophyses posteriores. Segment VIII weakly sclerotized, three times as long as broad. Antrum slightly shorter than segment VIII, cylindrical, anteriorly weakly narrowed, with paired lateral sclerites. Ductus bursae membranous, two to three times narrower than antrum, slightly expanding toward bursa copulatrix, only slightly longer than antrum. Bursa copulatrix oval, as long as ductus bursae. Signum a narrow sub-hexagonal plate about 1/2 length of bursa copulatrix, medial ridge narrow, anterior and posterior lobes long and narrow, laterally dentate.

Diagnosis. *Sophronia alaicella* can be separated superficially from the externally somewhat similar *S. illustrella*, *S. gelidella*, and *S. salaganella* by the comparatively narrow forewing with a rounded, rather than pointed, apex. The short sacculus and comparatively short and broad aedeagus are characteristic for the male genitalia. The female genitalia are defined by very long and narrow lobes of signum and presence of paired sclerites in the antrum.

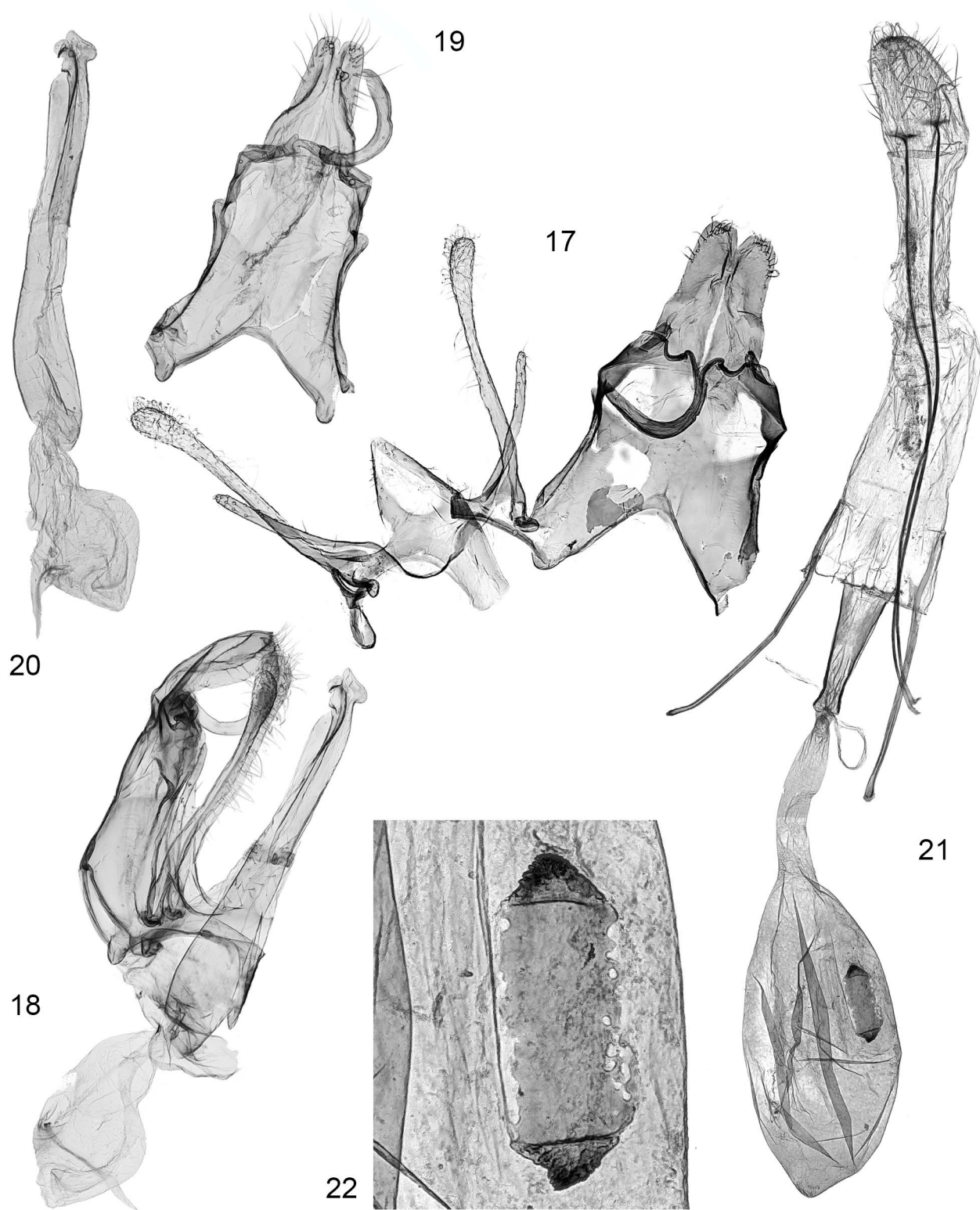
Biology. Early stages unknown. Adults have been recorded from late April to mid-May in Uzbekistan and Turkmenistan and in early July in Kyrgyzstan.



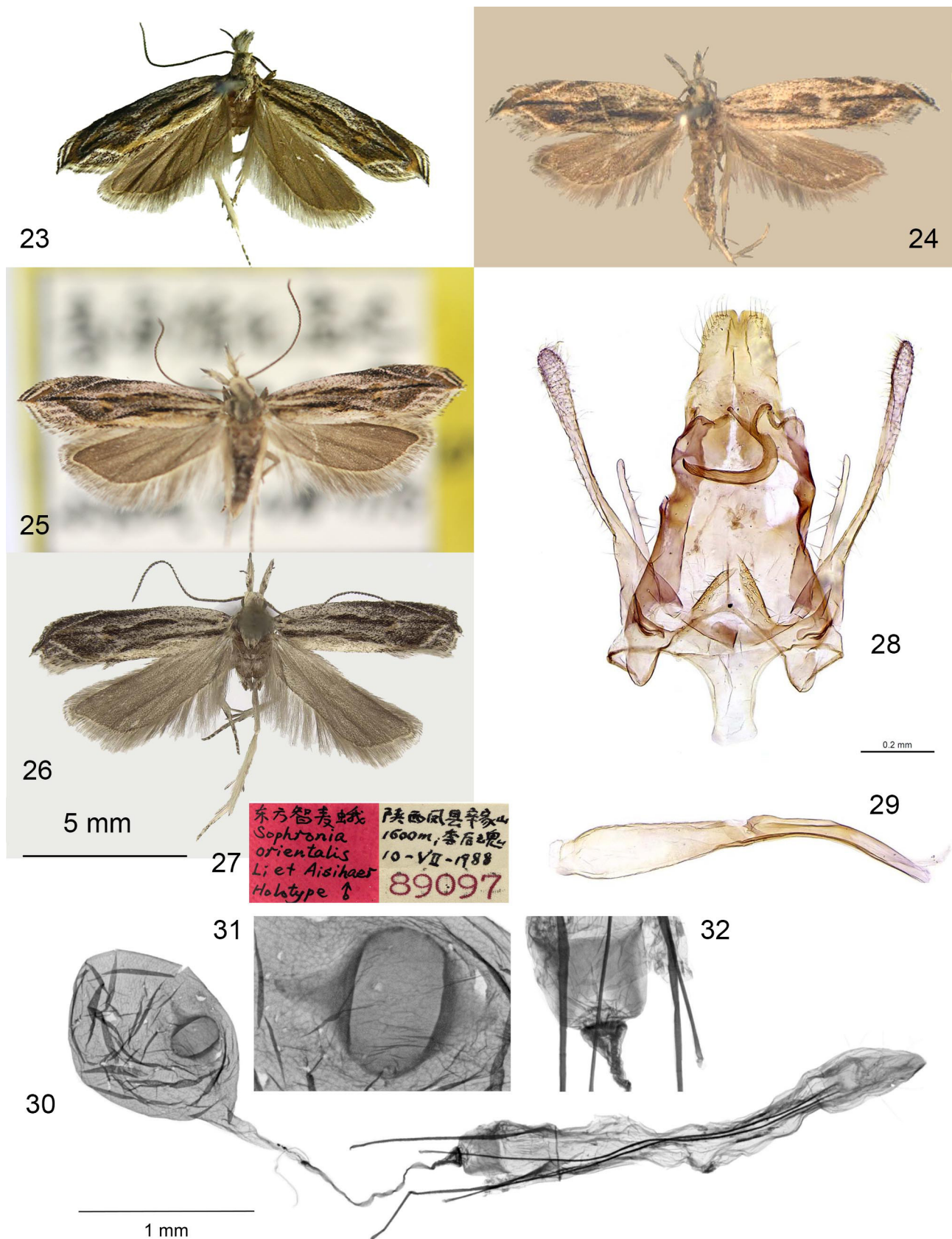
FIGURES 1–9. Adults of *Sophronia* species. 1–7. *S. salaganella* sp. n. 1–6. Russia, Altai Mts. (NMPC), ♂♂ left, ♀♀ right. 1–2, 4–6. Kurai env., Dzhangyskol (Salagana) lake. 3, 7. Aktash. 8. *S. orientalis*, Russia, Primorsky krai (FSCB). 9. *S. alaicella*, Kyrgyzstan, Alai Mts. (MGAB). (4. Holotypus. 1–3, 5–7. Paratypes, 7–9, head, lateral view).



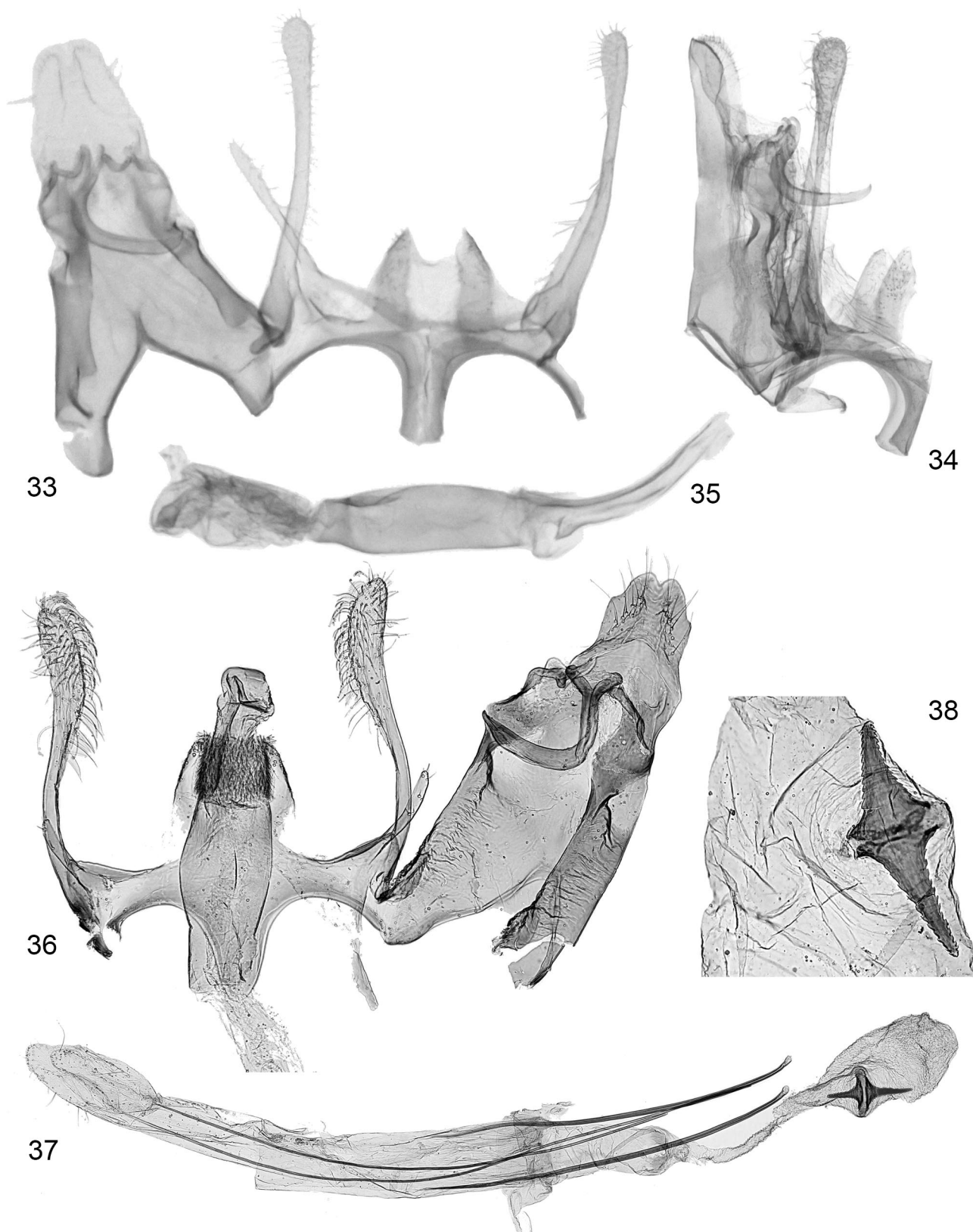
FIGURES 10–16. 10. Russia, Altai Mts., surroundings of the Salagana lake, habitat of *Sophronia salaganella*, sp. n. 11–16. Adults of *Sophronia* species. 11–12. *S. illustrella*: 11. ♀, Czech Republic, Švařec (DVI). 12. ♀, Hungary, Czákberény (DVI). 13–14. *S. alaicella*: 13. ♂, lectotype, Kyrgyzstan, Alai Mts. (MGAB) (courtesy, the “Grigore Antipa” National Museum of Natural History, Bucharest). 14. ♂, Uzbekistan, Ajakguzhumdy (ZMKU). 15–16. *S. gelidella*, Sweden: 15. ♂, Torne Lappmark, Pältsa, R. Johansson (NMPC). 16. ♀, Pältsan, L. Imby & H. Elmqvist (ZMUC).



FIGURES 17–22. Male and female genitalia of *Sophronia salaganella*, **sp. n.**, Russia, Altai Mts., Aktash (NMPC, ZMKU). 17–20. Male genitalia (17. gen. slide 164/18, O. Bidzilya, 18–20. gen. prep. 18424 Jan Šumpich). 17. Unrolled view. 18. Lateral view. 19. Tegumen. 20. Aedeagus. 21–22. Female genitalia (gen. prep. 18425 Jan Šumpich). 21. General view. 22. Detail of signum.



FIGURES 23–32. Adults and genitalia of *Sophronia orientalis*. 23. ♂, Russia, Primorsky krai (FSCB). 24. ♂, Japan, Hokkaido island, Futatsuyama, Kushiro, K. Iijima (copyright of Y. Sakamaki). 25. ♂, paratype, China, Shaanxi Province (NKU). 26–29. ♂, holotype, China, Shaanxi Province, genitalia slide No. 89097 Houhun Li (NKU) (copyright of H. Li): 26. Adult. 27. Label. 28. Male genitalia. 29. Aedeagus. 30–32. ♀, Russia, Primorye territory, gen. slides Nos 133 M. Ponomarenko: 30. General view. 31. Detail of signum. 32. Detail of antrum.



FIGURES 33–38. Male and female genitalia of *Sophronia* species. 33–35. Male genitalia of *S. orientalis*, Russia, Primorsky krai (gen. slides Nos 129 (unrolled view and aedeagus), 132 (lateral view), M. Ponomarenko): 33. Unrolled view. 34. Lateral view. 35. Aedeagus. 36–38. Genitalia of *S. alaicella*. 36. ♂, Kyrgyzstan, Tshytshkan (gen. slide 168/18, O. Bidzilya) (ZMKU). 37–38. ♀, Turkmenistan, Badkhyz (gen. slide 165/18, 167/18, O. Bidzilya). 37. General view. 38. Detail of signum.

Distribution. SE Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan (Falkovitsh & Bidzilya 2009: 82).

Remarks. *Sophronia alaicella* was described on the basis of five males and two females collected in Alai mountains, most probably in Kyrgyzstan (the country is not stated either on the labels or original description (cf. Caradja 1920: 116). We examined the type series (three males) and additional material from the mountains of Kyrgyzstan and the deserts of Turkmenistan and Uzbekistan.

Updated checklist of *Sophronia* species with type locality

Sophronia Hübner, [1825]

<i>acaudella</i> Rebel, 1903	Slivno [Sliven, Bulgaria]
<i>alaicella</i> Caradja, 1920	Alai Mts. [Kyrgyzstan]
<i>albomarginata</i> Li & Zhang, 1998	Xinjiashan [Shaanxi prov., China]
<i>aquilex</i> Meyrick, 1926	Montagu [Cape prov., Republic of South Africa]
<i>ascalis</i> Gozmány, 1951	Pásztó [Hungary, Nógrád County]
<i>catharurga</i> Meyrick, 1923	Akka [Acre, Israel]
<i>chilonella</i> (Treitschke, 1833)	Borhelzern [?] Europe
<i>consanguinella</i> Herrich-Schäffer, [1854]	“Wien und Regensburg” [Austria, Germany]
= <i>uniplagella</i> Rebel, 1927	Bulgaria
= <i>marginella</i> Toll, 1936, syn. n.	Wolczków [Ternopil reg., Ukraine]
<i>curonella</i> Standfuss, 1884	Apennines [Italy]
<i>finitimella</i> Rebel, 1905	Erdschias Gebiet [Erciyes (=Argaeus), Turkey]
<i>gelidella</i> Nordman, 1941	Kilpisjärvi [Finland]
<i>grandii</i> M. Hering, 1933	Bologna [Italy]
<i>humeralia</i> ([Denis & Schiffermüller], 1775)	Europe
<i>illustrata</i> (Hübner, 1796)	Europe
<i>mediatrix</i> Zeller, 1877	Bolonga vic. [Colombia]
<i>orientalis</i> Li & Zheng, 1998	Xinjiashan [Shaanxi prov., China]
= <i>iciculata</i> Omelko, 1999, syn. n.	Gornotajezhnoe [Primorky krai, Russia]
<i>parahumeralia</i> Amsel, 1935	Tel-Aviv vicinity [Israel]
<i>primella</i> Busck, 1907	Arizona, Colorado [U.S.A.]
<i>roseicrinella</i> Busck, 1909	Kerrville [Texas, U.S.A.]
<i>sagittans</i> Meyrick, 1923	Haifa [Israel]
= <i>karmeliella</i> Amsel, 1933	Mount Carmel [Israel]
<i>salaganella</i> sp. n.	Kosh-Agachsky distr. [Altai Republic, Russia]
<i>santolinae</i> Staudinger, 1863	San Ildefonso [Spain]
<i>semicostella</i> (Hübner, [1813])	Europe
= <i>parenthesella</i> Haworth, 1828	Great Britain
<i>sicariellus</i> (Zeller, 1839)	Wien [Austria]
<i>teretracma</i> Meyrick, 1927	Texas [U.S.A.]

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