

## A new species of the genus *Homoeosoma* (Lepidoptera: Pyralidae: Phycitinae) from the Leningrad Province, Russia

## Новый вид рода *Homoeosoma* (Lepidoptera: Pyralidae: Phycitinae) из Ленинградской области, Россия

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**Abstract.** *Homoeosoma oxyargentella* sp. nov. is described from the Leningrad Province of Russia. The new species can be distinguished by very short wedge-shaped processes of vinculum, rather narrow valva, relatively long sacculus, and straight or only slightly convex anterior margin of gnathos in male genitalia; and by elongate signa, short eighth tergum, and short posterior apophyses in females. A key to the European species of the genus *Homoeosoma* Curtis, 1833 is given based on the male genitalia and external characters.

**Резюме.** Описан новый вид *Homoeosoma oxyargentella* sp. nov. из Ленинградской области России. Вид отличается очень короткими клиновидными отростками винкула, довольно узкой вальвой, относительно длинным саккулусом и прямым или лишь немного выпуклым передним краем гнатоса в гениталиях самца; удлинённой сигной, короткими задними апофизами в гениталиях самки, а также коротким восьмым тергитом самок. Дан ключ для определения видов рода *Homoeosoma* Curtis, 1833 европейской фауны по гениталиям самцов и внешним признакам.

**Key words:** Leningrad Province, Russia, Pyralidae, Phycitinae, *Homoeosoma*, new species

**Ключевые слова:** Ленинградская область, Россия, Pyralidae, Phycitinae, *Homoeosoma*, новый вид

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### Introduction

The genus *Homoeosoma* Curtis, 1833 contains up to forty species in the Holarctic, which are about half of all species in this genus. Nineteen species are found in North America (Goodson & Neunzig, 1993), others inhabit the Palaearctic region (Roesler, 1973; Meyer et al., 1997). Eight species are listed by Leraut (2014) for Europe.

The genus belongs to the tribe Phycitini and is closely related to the genera *Patagonia* Hampson, 1901, *Phycitodes* Hampson, 1917 and *Patagoniodes* Roesler, 1969. Having a similar larval bion-

omics, all the four genera feed on the flower heads of plants from the family Asteraceae. The larvae of *H. nebulella* ([Denis et Schiffermüller], 1775) and *H. electella* (Hulst, 1887) occasionally damage sunflowers in Eurasia (Roesler, 1973) and North America (Goodson & Neunzig, 1993), respectively. Adult moths usually occur in open, sun-heated habitats: meadows, steppes and semi-deserts.

Most representatives of *Homoeosoma* and allied genera are very similar in habitus, so usually the use of the genital characters is necessary for reliable identification of species. The diagnostic characters in the male genitalia are the shape of the

lateral processes of vinculum, the shape of uncus and gnathos, and the structure of valva. Elongate lateral processes of the vinculum with free apical parts are specific only for the genus *Homoeosoma*. The female genitalia of *Homoeosoma* spp. are characterised by the rather long anterior and posterior apophyses, by the membranous antrum, relatively narrow membranous ductus bursae, and ovoid corpus bursae with one (rarely two) small dentate signa. For species diagnosis, the relative and absolute lengths of the eighth segment, papillae anales and apophyses can be used. The signae in different species are sometimes very similar and at the same time the structure of signa varies within a species.

According to Roesler (1973), the European fauna of *Homoeosoma* includes ten species, some of which were placed into synonymy later (Leraut, 2014). It should be noted that two species, *H. inustella* Ragonot, 1884 and *H. calcella* Ragonot, 1887, were reported as separate species for the European part of Russia (Sinev, 1986, 2008); in the second edition of the “Catalogue of the Lepidoptera of Russia” (Sinev et al., 2019), *H. calcella* is treated as a junior synonym of *H. inustella*. However, the taxon which was regarded as *H. calcella* now has unclear status, and here I use the name *H. calcella* sensu auctorum for the species illustrated by Roesler (1973) and Sinev (1986), which well differs morphologically from *H. inustella*.

In this paper, a new species of the genus *Homoeosoma* is described from the south of the Leningrad Province of Russia. The type material is deposited in the collection of the Zoological Institute, Russian Academy of Sciences, St Petersburg (ZIN).

## Material and methods

Most of the specimens of the new species were taken by an entomological net in the evening in the Volosovo District of the Leningrad Province in June 2014. The visited places located near the Dontso and Gorki villages and Lake Khyul’gyuzi are mostly chalk grasslands with diverse vegetation. In June and July 2015, additional material was collected in the environs of Lake Khyul’gyuzi. One female was attracted to light on 18 July 2015, but other specimens were again taken by a net at twilight.

Photographs of the mounted specimens, live imago and biotope were taken with a Nikon Coolpix 4500 digital camera. Drawings of the genitalia were prepared based on photographs. The terminology of genital structures follows that of Falkovitsh & Stekolnikov (1978), and the accepted classification of the genus corresponds to that of Leraut (2014).

The key presented in this paper is based on a morphological study of species from my own collection and on literature data (Roesler, 1973).

## Results

### Order Lepidoptera

### Family Pyralidae

### Subfamily Phycitinae

### Genus *Homoeosoma* Curtis, 1833

### *Homoeosoma oxyargentella* sp. nov.

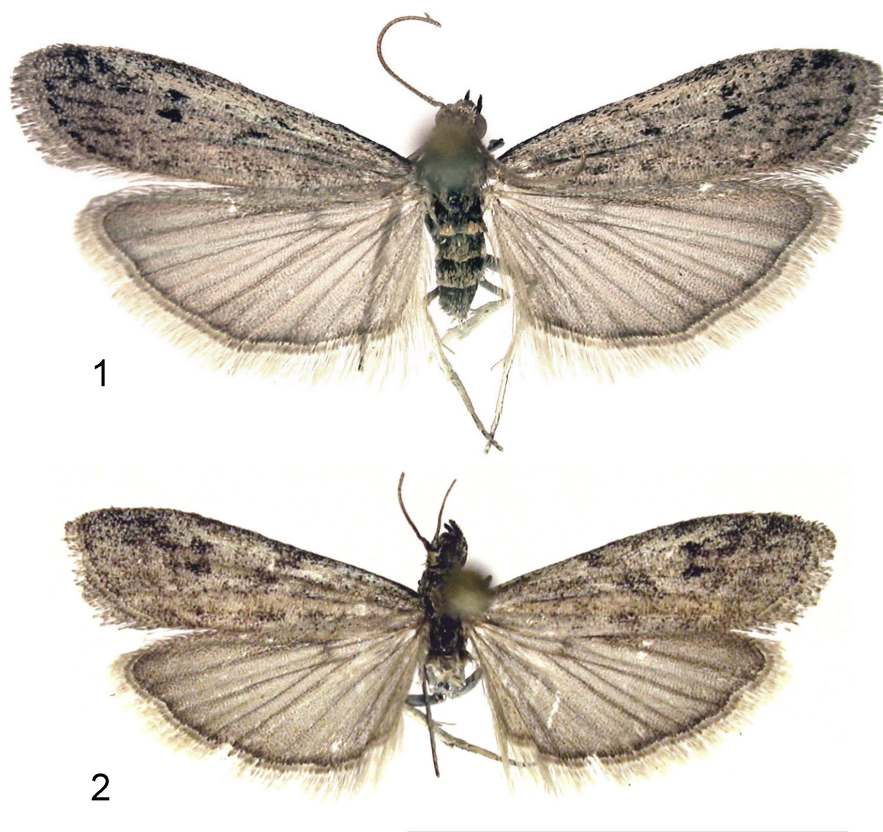
(Figs 1–3, 5–9)

*Holotype*. Male, **Russia**, *Leningrad Prov.*, Volosovo Distr., environs of Lake Khyul’gyuzi, 25.VI.2015, leg. E.V. Tsvetkov (ZIN).

*Paratypes* (all in ZIN). The same data as for holotype, 2 males, 1 female; the same locality and collector, 27.VI.2014, 1 male, 2 females, 18.VII.2015, 1 female; environs of Dontso Vill., 28.VI.2014, the same collector, 1 female.

*Description*. Length of forewing 8–9 mm. Labial palpi, frons, thorax, legs and abdomen grey, with admixture of whitish scales. Forewing ground colour grey or silvery grey (Figs 1–3), costal margin marked with dark scales; blackish medial dots distinct, rounded, in some specimens slightly elongated along veins; three postbasal black dots small, sometimes streaklike or nearly indiscernible; postmedial oblique line almost straight, pale, outlined with dark grey from both sides, more extensively near costal margin; marginal blackish dots sometimes forming broken dark line along outer margin; some specimens (holotype and two paratypes) with submarginal row of dark streaks along veins. Hindwing grey. Both wings uniformly grey from underside and with grey fringe.

Male genitalia (Figs 5, 6). Uncus elongate trapezoidal, with rounded apex, lateral margins curved down, dorsal surface densely covered with



**Figs 1, 2.** *Homoeosoma oxyargentella* sp. nov., habitus of imago. **1**, holotype; **2**, paratype, female, Lake Khyul'gyuzi, 27 June 2014. Scale bar: 1 cm.

long bristles. Gnathos large, broadly triangular, apically pointed, with oblong and upcurved lateral angles; its anterior margin straight or only slightly convex. Valva relatively long and narrow; sacculus rather long, narrowed medially. Lobes of juxta narrowly digitiform. Processes of vinculum sphenoid, pointed and very short (Fig. 5). Aedeagus broadest medially, narrowed at both ends; vesica armed with curved sclerotised elongate plate (Fig. 6). The eighth sternum bearing weakly sclerotised horn-like posterior process; its anterior edge formed by heavily sclerotised, arched and very narrow plate (Fig. 7). Culcita absent. Posterior margin of the eighth tergum widely rounded; its anterior margin with large notch and Y-shaped sclerotised area (Fig. 8).

Female genitalia (Fig. 9). Papillae anales elongate, tapering to pointed apices. Anterior apophyses 1.6–1.7 times as long as papillae anales and slightly broader than posterior apophyses; posterior apophyses 1.5 times as long as anterior ones. Ductus bursae membranous, slightly widened to-

wards corpus bursae. Corpus bursae ovoid, dentation on its surface almost indiscernible; signa narrow, with wide and short triangular denticles of different size in several rows.

*Diagnosis.* The colouration of the new species is typical for the genus, and external characters may be unreliable for identification of the species in some cases, but it can be easily recognised by the male and female genitalia.

In *H. nimbella* (Duponchel, 1837), the forewings usually have light reddish strip between *Cu* stalk and *A* vein, which is absent in *H. oxyargentella* sp. nov. The males of *H. nimbella* are well distinguished from the males of the new species by free and very long processes of vinculum and by anteriorly convex gnathos. Females

of *H. nimbella* have longer segment 8 and posterior apophyses (Fig. 10). In *H. calcella* auct., the forewing is narrower, with the ratio of length to width more than 3.5 (*vs* 3–3.4 in *H. oxyargentella* sp. nov.), and its ground colour is more light, whitish. The male genitalia of *H. calcella* are 1.3–1.4 times as large as those of the new species; in females, the tergum 8 of *H. calcella* is longer (about 0.6–0.7 mm *vs* 0.4–0.5 mm in *H. oxyargentella* sp. nov.) and the posterior apophyses are much longer also (Fig. 11). The species *H. inustella* Ragonot, 1884 differs by the whitish or creamy colouration of the forewing and the presence of free lateral processes of vinculum in males; females of this species have the same genital characters as in *H. nebulella*, differing them from *H. oxyargentella* sp. nov. (Fig. 12). In *H. nebulella* ([Denis & Schiffermüller], 1775), the forewing is narrower than in the new species, with a less finely marked postdiscal light oblique line; the male genitalia with quite distinct lateral processes of vinculum, which are absent in the new species.

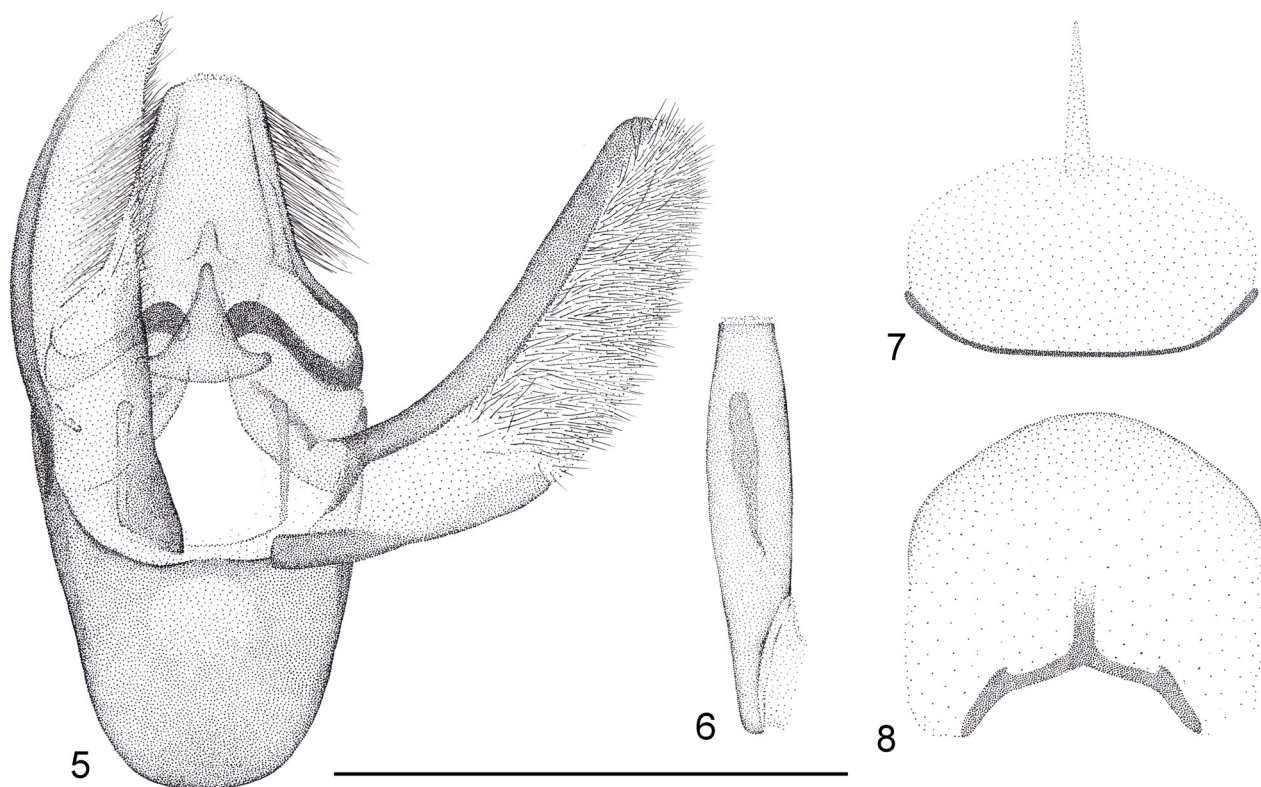


**Figs 3, 4.** *Homoeosoma oxyargentella* sp. nov. and its natural habitat. **3**, imago in nature; **4**, dry grassland near Lake Khyul'gyuzi (July 2015).

Females of *H. nebulella* have longer tergum 8 and much longer posterior apophyses (Fig. 13). The general colouration of *H. incognitellum* Roesler, 1965 is similar to that of the new species; in males of the latter, the cucullus is relatively narrower, sacculus is longer, and sclerotised plate of the sternum 8 is much narrower.

In females of *H. incognitellum*, the posterior apophyses are relatively longer (nearly twice as long as anterior apophyses and up to three times as long as tergum 8), and signa bears larger dentes (Baldizzone, 2004). The species *H. capsitanella* Chrétien, 1911 well differs from *H. oxyargentella* sp. nov. in strongly reduced black markings on the forewing, and in the male genitalia, by the presence of culcita, anteriorly convex gnathos and relatively shorter sacculus. In *H. candefactella* Ragonot, 1887, the ground colour of the forewing is whitish, and in the female genitalia, posterior apophyses are relatively longer, nearly twice as long as anterior apophyses (*vs* 1.5 times in *H. oxyargentella* sp. nov.). The species *H. sinuella* (Fabricius, 1794) can be easily distinguished from the new species by the ochreous ground colour of the forewing, by relatively smaller vinculum and gnathos in the male genitalia, and by relatively longer papillae anales in the female genitalia. Males of *H. kasyellum* (Roesler 1965) well differ from males of the new species by free and very long processes of the vinculum, and females, by the presence of two signae in bursa copulatrix.

The original illustrations of the female genitalia of several compared species are given in the present paper (Figs 10–13). Images of the genitalia of other *Homoeosoma* spp. can be found in the monograph of Roesler (1973), and the female genitalia of *H. incognitellum* Roesler, 1965 are illustrated by Baldizzone (2004).



**Figs 5–8.** *Homoeosoma oxyargentella* sp. nov., male genitalia and the eighth segment. **5**, male genitalia (aedeagus removed); **6**, aedeagus; **7**, eighth sternum; **8**, eighth tergum. Scale bar: 1 mm.

**Etymology.** The name of the new species is a noun derived from the Ancient Greek prefix *oxy-* and the Latin word *argentum*.

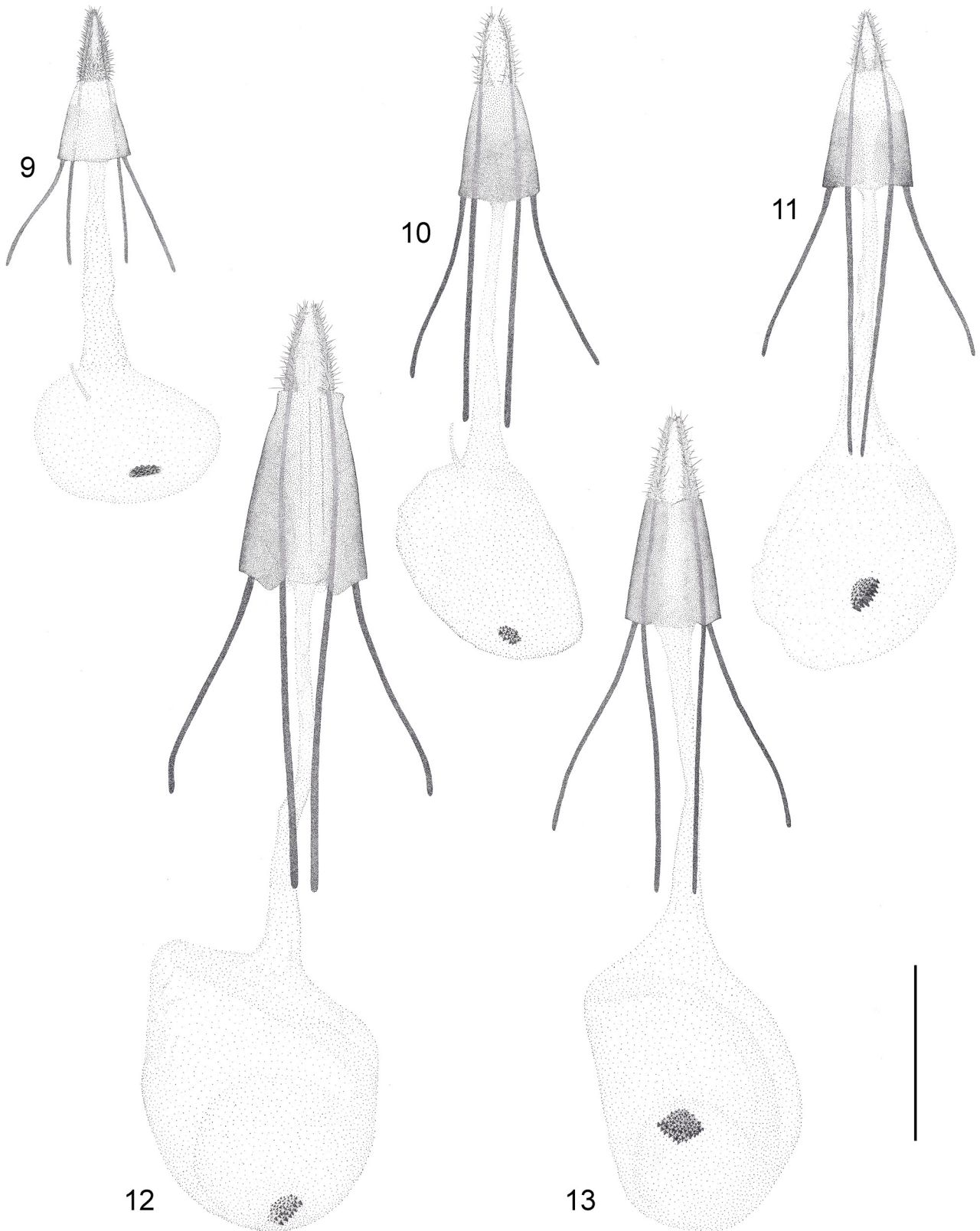
**Distribution.** The species inhabits the Izhora Plateau in the Leningrad Province. It is found in two closely situated localities near the Dontso Village at the source of the Oredezh River and near Lake Khyul'gyuzi (14 km NW from the first locality).

**Bionomics.** *Homoeosoma oxyargentella* sp. nov. is a narrowly distributed species occurring on chalk grasslands (Fig. 4) with diverse vegetation composed by *Gentiana cruciata* L., *Cypripedium calceolus* L., *Orchis militaris* L., *Trifolium montanum* L., *Plantago lanceolata* L., *Agrimonia eupatoria* L., *Melampyrum nemorosum* L., *Centaurea scabiosa* L., *Scorzonera humilis* L., and *Leucanthemum vulgare* Lam. The flight period is rather short and lasts from late June to mid-July. Just hatched moths are active at twilight and during the daytime in cloudy weather. In the evening, the moths often sit on grassy plants and fly away being disturbed.

Herewith I provide a key to the European species of the genus, based on the male genitalia and external characters. *Homoeosoma candefactella* is absent here as this species is known only from females. All the Asian species are quite distinct from the new species and are not mentioned in this paper.

#### Key to the European species of *Homoeosoma*

1. Lateral processes of vinculum long, with free apical parts (not adjacent to tegumen) ..... 2
- Lateral processes of vinculum absent or very short and adjacent to tegumen. .... 6
2. Veins  $M_2$  and  $M_3$  of forewing merged. Forewings usually with light reddish strip between *Cu* stalk and *A* vein. .... ***H. nimbella***
- Veins  $M_2$  and  $M_3$  of forewing separated. .... 3
3. Lateral processes of vinculum curved. Aedeagus nearly as long as valva. .... ***H. kasyellum***
- Lateral processes of vinculum straight. Aedeagus usually shorter than valva ..... 4
4. Forewings whitish or creamy, sometimes with ochreous tinge. Lateral processes of vinculum pointed, elongately cuneiform or spire-like. .... ***H. inustella***



**Figs 9–13.** *Homoeosoma* spp., female genitalia. **9**, *H. oxyargentella* sp. nov., paratype, Lake Khyul'gyuzi; **10**, *H. nimbella*, Leningrad Prov.; **11**, *H. calcella* auct., Voronezh Prov.; **12**, *H. inustella*, Voronezh Prov.; **13**, *H. nebulella*, Volgograd Prov. Scale bar: 1 mm.

- Forewings grey to brownish grey, sometimes with whitish costal streak. Lateral processes of vinculum obtuse, usually narrow vane-like. . . . . *H. nebulella*
- 6. Forewings ochreous or brownish yellow. . . . . *H. sinuella*
- Forewings grey or whitish . . . . . 7
- 7. Culcita present as a pair of short scale tufts on sides of the eighth sternum . . . . . *H. capsitanella*
- Culcita absent . . . . . 8
- 8. Sclerotised plate in anterior part of sternum 8 wider, comparable in width to branches of gnathos. Sacculus much shorter than vinculum (if the latter is measured from the base of sacculus). . . . . *H. incognitellum*
- Sclerotised plate in anterior part of sternum 8 narrower than branches of gnathos. Sacculus of the same length as vinculum or even longer . . . . . 9
- 9. Forewings narrower (ratio of length to width more than 3.5), its ground colour whitish, sometimes with slight greyish tinge. . . . . *H. calcella* auct.
- Forewings broader (ratio of length to width 3–3.4), its ground colour dark grey or silvery grey . . . . .  
. . . . . *H. oxyargentella* sp. nov.

## Conclusions

*Homoeosoma oxyargentella* sp. nov. is possibly closely related to *H. incognitellum* and *H. calcella* auct. The first of them is known only from the Southern Alps in France and Italy. The distribution range of *H. calcella* auct., as well as the status of this taxon needs to be clarified. In the European part of Russia, this species is distributed only in the steppe zone and penetrated to the north of the forest-steppe zone (Sinev, 2008).

The finding of the new species is quite unexpected. It does not occur anywhere else in the Leningrad Province according to my observations, and moreover there are no any materials on this species from neighboring regions. Considering very short flight period of this species, I suppose that its populations are adapted to northern boreal conditions. Probably, this boreal or boreal-alpine species has suffered an extinction and is preserved only in small isolated populations in relic open habitats in the forest zone. With land development, the area of open biotopes in the Volosovo District has increased dramatically. The relic biotopes ceased to be isolated, however, the species retained its localisation and could not spread due to an inappropriate vegetation of anthropogenic open habitats.

The species may be regarded as endangered in its habitat. Its population near Lake Khyul'gyuzi, unfortunately, has got under heavy pressure of cattle grazing. The second place where the species was found is located in the boundaries of a specially protected natural area (the source of the Oredez River in the Dontso locality).

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