

THREE NEW SPECIES OF THE GENUS *CASIGNETELLA* STRAND, 1928
(LEPIDOPTERA: COLEOPHORIDAE) FROM SOUTHERN SIBERIA

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Summary. *Casignetella pseudohelgada* sp. n., *C. pseudoheihensis* sp. n., and *C. sibirolinosyris* sp. n. (Lepidoptera: Coleophoridae) are described from the south of Krasnoyarsk Region and the Republic of Khakassia. Type specimens are deposited in collection of the Zoological Institute of the Russian Academy of Sciences (St. Petersburg).

Key words: casebearer moths, taxonomy, new species, Krasnoyarsk Region, Republic of Khakassia, Russia.

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Резюме. С юга Красноярского края и из Республики Хакасия описаны *Casignetella pseudohelgada* sp. n., *C. pseudoheihensis* sp. n. и *C. sibirolinosyris* sp. n. (Lepidoptera: Coleophoridae). Типовой материал хранится в коллекции Зоологического института РАН (Санкт-Петербург).

INTRODUCTION

Casignetella Strand, 1928 is the largest ubiquitous genus of casebearer moths with more than 600 described species (Baldizzone *et al.*, 2006; Anikin, 2016). So far, 94 species have been known in Siberia (Anikin, 2019; Akulov *et al.*, 2019; Anikin & Knyazev, 2021), of which the presence of one species, *C. follularis* (Vallot, 1802), is doubtful. As a result of field collections by the first author in the south of the Krasnoyarsk Region and the Republic of Khakassia, a large amount of new material on this genus was obtained. Among this material three new species are found. These species are described and illustrated below.

MATERIAL AND METHODS

Almost all specimens of the genus *Casignetella* were collected by first author during field trips to various localities in the south of the Krasnoyarsk Region and the Republic of

Khakassia in 2015–2023. In total, 40 field trips were carried out and at least 300 specimens of *Casinetella* were collected. Among them males of three previously unknown species were found.

Photographs of genitals in glycerin were taken with a Canon EOS 650D digital camera (Japan) and an Olympus Biological Microscope Model CX-40 optical equipment and Zeiss Stent 2000 C stereomicroscope (Germany). Preparation of drawings and processing of photographs was carried out using Microsoft PowerPoint and Adobe Photoshop 21.2.9. Some photos were stacked using Zerene Stacker.

The holotypes and paratypes of all species are stored in the collection of the Zoological Institute of the Russian Academy of Sciences (St. Petersburg) (ZIN)

TAXONOMY

Casinetella pseudohelgada Budashkin et Akulov, sp. n.

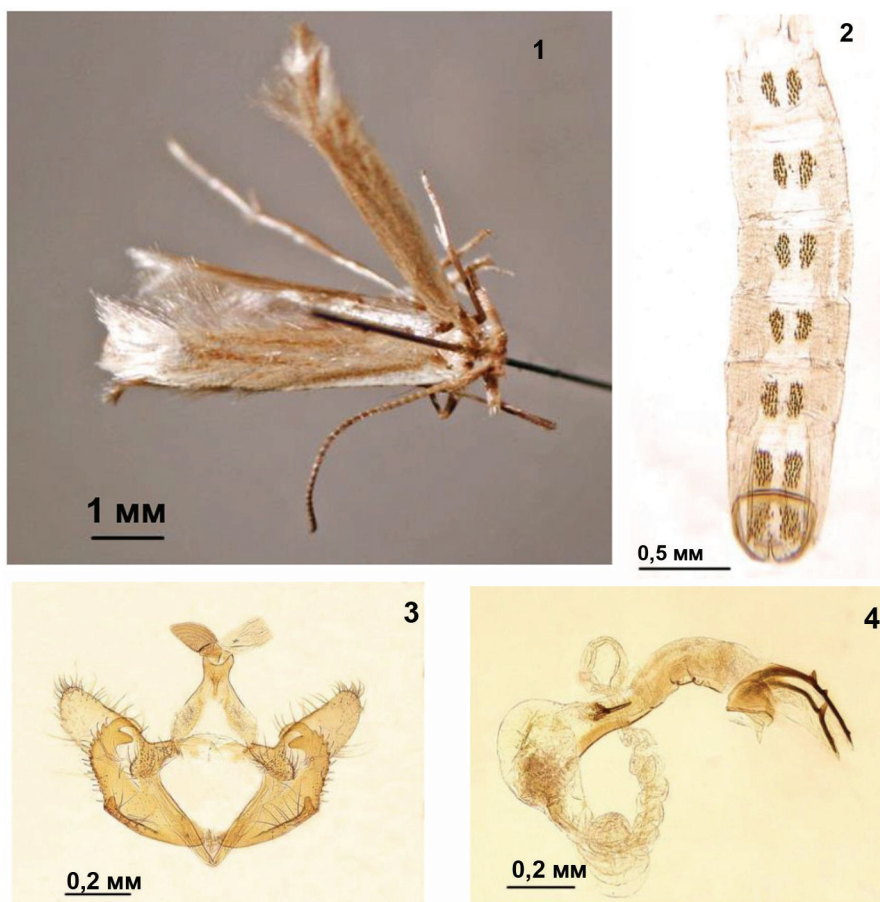
<https://zoobank.org/NomenclaturalActs/993CA9EB-B6F6-4753-8EDA-684E254DFCEB>

Figs 1–4

TYPE MATERIAL. Holotype: ♂, **Russia**: Republic of Khakassia, Shirinskii District, Chjernoe Ozero village., steppe, at light, 30.VII 2019, coll. E. Akulov (ZIN).

DESCRIPTION. Male. Wingspan 11 mm (Fig. 1). Labial palps moderately long, 1.6 times as long as eye diameter, light brown, strongly elevated, the third segment is 0.6 times the length of the second segment. Ventral apical tuft of the second segment of labial palps very short. Head and basal segment of antennae approximately the same color as labial palps. The head is completely covered with protruding scales. Antennal flagellum with very indistinct alternating narrow light (brownish-white) and wide dark (brown, slightly darker than head) ringlets. The thorax slightly lighter than the head. Forewings light brown, the anterior about a third of the wing area is noticeably broadly lightened to brownish-white, with intermittent wide dark brown line in median cell and with small and rare accumulations of the same dark brown scales in different parts of the wing. The cilia mostly gray, with large dark brown fragments on the outer margin of the wings and on its costal margin in front of the apex. Hindwings gray, with the same gray cilia as on the forewings (cilia noticeably lighter than wing area). Spiny plates on abdominal tergites of medium length, wide (Fig. 2).

Male genitalia (Figs 3, 4). Gnathos more or less narrowly pineal. Transtilla branches contiguous, with spherically expanded apical parts. The valva is narrow and short, the sacculus is well sclerotized, of medium size, its terminal outgrowth is more or less finger-shaped directed upwards and slightly inward and reaches the upper edge of the valva, at the apex of this outgrowth has a large wide hook-shaped lobe directed towards the base of the valva, and slightly below it through a fairly wide gap, another one is slightly wider rounded-wide-triangular blade, approximately the same in length and similarly directed. Distal edge of the sacculus has a vertical row of large triangular teeth directed outwards. Cucullus of medium length and width, more or less bean-shaped. Valvula small, with arcuate lower margin. Phallosome rods small, narrow, are bent down at a rounded angle before the middle of the length. The left rod has a powerful lateral triangular tooth for about two-thirds of its length, and a very small wide-triangular tooth in the apical part of the rod. The right rod is armed with three smaller, laterally triangular teeth, two of which are located next to each other a little more proximally than on the left rod and the third tooth is located in the apical part of the right rod and is directed obliquely upward to the right with respect to the vertical axis of the phallosome. Ribbon-like sclerite is slightly longer than phallosome rods. Cornutus single, short but rather strong, located on a small flat oval basal plate.



Figs 1–4. *Casignetella pseudohelgada* sp. n., holotype. 1 – imago; 2 – spine plates on abdominal tergites; 3 – male genitalia, phallotheca removed; 4 – phallotheca.

DIAGNOSIS. New species belongs to a small *aestuariella*-species group which, until now, included only three species: *C. aestuariella* (Bradley, 1984) (Central and Southern Europe), *C. ochroptera* (Li, 2004), **comb. n.** (Northwestern China), and *C. helgada* (Anikin, 2005) (Russia: Crimea, Western Caucasus, Volga-Don and Lower Volga regions) (Bal-dizzone *et al.*, 2006; Li, 2004; Anikin, 2005, 2019; Budashkin & Puzanov, 2017). Externally the new species is well distinguished from all these three species by the absence of ocher tones in the coloration of forewings and other parts of the body. In male genitalia a new species has a longest and narrowest of gnathos, and the peculiar armament of the phallotheca rods, which consists on left rod from one large external lateral tooth for two thirds of the length of the rod and one very small wide-triangular tooth in the apical part of the rod, and on right rod – from two also external lateral, but smaller teeth side by side, slightly more proximal, and one tooth in apical part of the rod.

BIONOMY. The host plants are unknown. The holotype collected in meadow grass-forb steppe with the predominance of *Calamagrostis neglecta*, *Helictotrichon desertorum*, *Aster*

alpinus, *Fragaria viridis* and *Astragalus versicolor*. Taking into account that the new species belongs to *aestuaria*-species group (Bradley, 1984; Li, 2004; Anikin, 2005), it can be assumed with a very high degree of probability that it inhabits the banks of salt ponds and salt lakes, and its larvae are tropically associated with *Suaeda* sp.

DISTRIBUTION. Russia: Republic of Khakassia.

ETYMOLOGY. The proposed name of the new species emphasizes its greatest similarity with *C. helgada*.

***Casignetella pseudoheihensis* Budashkin et Akulov, sp. n.**

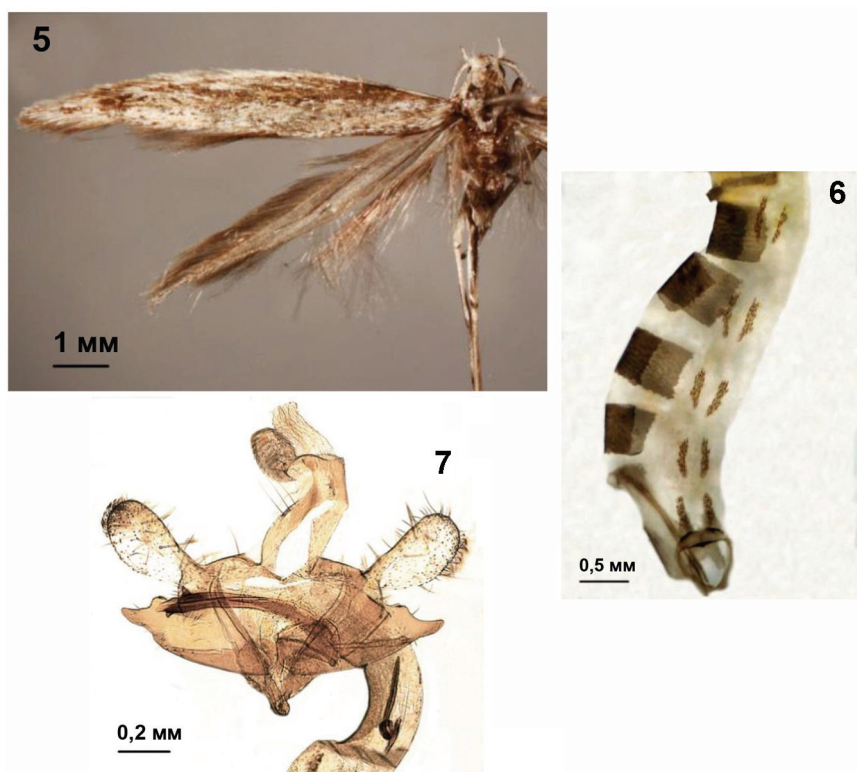
<https://zoobank.org/NomenclaturalActs/091FC485-D651-47FB-B409-0E8AB7785CA5>

Figs 5–7

TYPE MATERIAL. Holotype: ♂, **Russia**: Krasnoyarsk Region, Emelyanovskii District, Minino settl., Pyatkova river, forest-steppe, dry slope, at light, 18.VIII 2018 coll. E. Akulov (ZIN). Paratype: ♂, **Russia**: Krasnoyarsk Region, Emelyanovskii District, Minino settl., Karakusha river, forest-steppe, dry slope, at light, 12.VIII 2023 coll. E. Akulov (ZIN).

DESCRIPTION. Wingspan 16–17 mm (Fig. 5). Labial palps moderately long, 2.5 times as long as eye diameter. The third segment is 0.75 times the length of the second segment, raised obliquely upwards at a slight angle and covered with more or less smooth brownish-dirty-white scales, lighter on the lateral and upper sides and darker in the lower half of the segment. The second segment is completely covered with rather long protruding scales the same as the third segment in color and almost also lighter on the upper side and partly darker on the sides and lighter (dirty-white) in its lower part. Ventral apical tuft of the second segment of labial palps is very long. The head is covered mainly with bicolor scales, which are brownish in the lower part and dirty-white in the upper part, therefore in far as general, it looks quite variegated. The coloration of the thorax is similar to that of the head as it can be judged from a single not very fresh specimen we studied. Scape covered with more or less smooth brownish scales, flagellum with indistinct alternating darker brownish wide and light narrow dirty-white rings. Forewings brown in the anterior half with large inclusions of dirty-white scales forming blurry intermittent dirty-white stripes along almost all veins running into the costal margin of the wing. On the costal margin, such scales form rather narrow lightening of the wing. A few relatively small clusters of dark brown scales scattered over the entire area of the wing; only in an external field, partially merging they form several rather large dark spots touching each other. Cilia is dark, brownish-gray; in the apical half of the outer edge of the wing it consists of scales of two colors: the deeper scales dark brownish-gray as the rest of the cilia whereas outer scales, laying in one row above the former scales are shorter and flat-wide dirty-white. Hindwings are gray with the same dark brownish-gray cilia as the forewings. Spiny plates on abdominal tergites of medium length, rather narrow (Fig. 6)

Male genitalia (Fig. 7). Gnathos broadly oval. Transtilla branches narrowly triangular, contiguous, not terminally pointed. Valva of medium width, relatively short. Sacculus is well sclerotized, of medium size, its terminal outgrowth rounded-narrow-triangular and directed outwards. Cucullus of medium length and width, club-shaped. Valvula medium size, with slightly arcuate outer margin. Phallosome rods of the same length, short and thin, approximately in middle rather slightly arcuately curved upwards, separated throughout their length. At the top of each rod bears, there is one small curved triangular tooth. Cornutus rather long and powerful, terminally almost not pointed, nearly straight over most of its length, but has a small annular loop at the base, connecting with a small rod-shaped basal area in parallel to the main spine, but slightly set back.



Figs 5–7. *Casignetella pseudoheihensis* sp. n., holotype. 5 – imago; 6 – spiny plates on abdominal tergites; 7 – genitalia.

DIAGNOSIS. The new species belongs to the *directella*-species group and is similar to *C. heihensis* (Li et Zheng, 1999) (Russia: Middle Amur region, Primorsky region; North-eastern China) (Li & Zheng, 1999; Anikin, 2019). Externally the new species just slightly differs from *C. heihensis* by darker colored of wings. In male genitalia, the new species is clearly distinguished by much longer and thinner transtilla branches, noticeably longer distal sacculus outgrowth, thinner phallotheca rods, their different armament (i.e. the presence of smaller apical teeth on both phallotheca rods, whereas in *C. heihensis*, only one larger tooth is present on the left rod, and the right rod not armed), and much thicker cornutus.

NOTES. Previously material on this species was erroneously identified as *C. heihensis* (Akulov *et al.*, 2019).

BIONOMY. The host plants are unknown. The holotype was collected in forest-steppe biotopes on dry slope with *Pinus silvestris*, *Betula* sp., *Populus* sp. and forb-grass vegetation with the predominance of grasses *Stipa pennata*, *S. capillata*, *Koeleria macrantha* and other are replaced by forb meadows and marshy grass-forb-legume meadows with *Medicago falcata*, *Onobrychis* sp., *Artemisia* sp., *Veronica* sp. and other.

DISTRIBUTION. Russia: Krasnoyarsk Region.

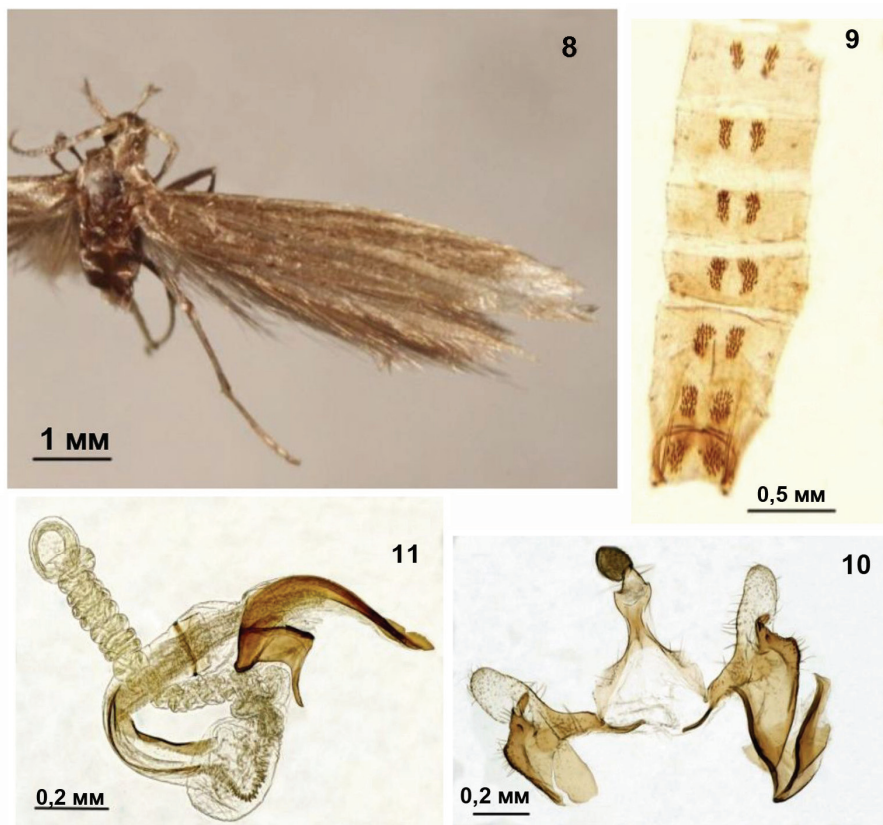
ETYMOLOGY. The proposed name of the new species emphasizes its greatest similarity with *C. heihensis*.

***Casignetella sibirolinosyris* Budashkin et Akulov, sp. n.**

<https://zoobank.org/NomenclaturalActs/19CB8D3D-0415-488A-8623-63E82ADF0A3D>

Figs 8–11

TYPE MATERIAL. Holotype: ♂, **Russia**: Krasnoyarsk Region, Emelyanovskii District, Minino settl., Pyatkova river, forest-steppe, dry slope, at light, 18.VIII 2018, coll. E. Akulov (ZIN). Paratypes: 2 ♂, with same data as for holotype (ZIN).



Figs 8–11. *Casignetella sibirolinosyris* sp. n., holotype. 8 – imago; 9 – spiny plates on abdominal tergites; 10 – male genitalia, pallothea removed; 11 – pallothea.

DESCRIPTION. Wingspan 11–12 mm (Fig. 8). Labial palps moderately long, 2.5 times as long as eye diameter. The third segment is 0.8 times the length of the second segment, raised upwards almost at a right angle and covered with more or less smooth brownish and dirty-white scales. The second segment is about the same in color as the third, but with more dark (brownish) scales, and, therefore, it is noticeably darker than the third segment. The apex of the second segment with ventral tuft of the medium length. Head and thorax covered with more or less monochromatic gray-brown scales. Scape covered with more or less smooth

gray-brown scales of the same color as the head and thorax; flagellum with very indistinct, alternating light (dirty-white) and dark (brownish-gray) rings approximately equal in width. Forewings gray-brown with a rather wide dirty-white lightening of the costal margin and the same wide blurred lines along veins of the sectors that flow into costal and outer margins of the wing. Another elements of the forewing pattern are a few, but rather large dark brown spots that occur in the proximal half of the forewings. The cilia dark, brownish-gray. Hindwings dark gray with the same dark brownish-gray cilia as the forewings. Spiny plates on abdominal tergites of medium length, wide (Fig. 9).

Male genitalia (Figs 9–10). Gnathos with a flattened bottom, medium wide and medium long, rounded triangular. Transtilla branches relatively narrow, contiguous, curved in the middle. Valva of medium length and width. Sacculus is well sclerotized, with a powerful finger-shaped terminal outgrowth directed obliquely upwards and with a rounded ventro-caudal angle. Cucullus of medium length and width, oval. Valvula medium size, rounded widely triangular. Phallosome rods fused, medium length, about a half of the length, strongly narrowed towards apex and arcuate curved down. The apex of phallosome rods is armed with two teeth, one of which is long comb-shaped and is located at the top of phallosome, and the second, much smaller, obliquely-widely triangular, is located at a short distance proximal to the first. Cornutus is very long, arcuate curved, longer than sacculus.

DIAGNOSIS. Relatively small species (wingspan 11–12 mm). Externally it resembles many species of the genus with a similar brownish or brownish-grey basic coloration of the forewings with widely lightened dirty white veins, especially in the upper sectors. By external morphology and male genitalia, the new species is highly similar to *C. linoxyris* (Hering, 1937) (North Africa, South and Central Europe, Russia: Crimea, South Ural) (Baldizzone *et al.*, 2006; Budashkin & Puzanov, 2017; Anikin, 2019), but distinctly different by smaller size, darker color and the absence of a lobe at the ventro-caudal angle of the sacculus, merged phallosome rods and the presence of two teeth vs. one in a closely related species.

BIONOMY. Host plants are unknown. The holotype and paratypes were collected 18.VIII.2018 at light in forest-steppe on dry slope with *Pinus sylvestris*, *Betula* sp., *Populus* sp. and forb-grass vegetation with the predominance of grasses *Stipa pennata*, *S. capillata*, *Koeleria macrantha* and other are replaced by forb meadows and marshy grass-forb-legume meadows with *Medicago falcata*, *Onobrychis* sp., *Artemisia* sp., *Veronica* sp. and other.

DISTRIBUTION. Russia: Krasnoyarsk Region.

ETYMOLOGY. The proposed name of the new species emphasizes its relatedness to *C. linoxyris* and presence of the new species in Siberia.

CONCLUSIONS

Our study increased the total number of representatives of the genus *Casignetella* known from territory of Siberia from 94 to 97 species. Further field studies would be needed to explore the diversity of Coleophoridae in the Siberian regions and clarify their trophic associations with woody and herbaceous plants.

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