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A Review of the Lyonetiid Moths (Lepidoptera, Lyonetiidae): II. The Subfamilies Lyonetiinae and Bedelliinae

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Abstract—The second communication of the survey deals with two subfamilies of the family Lyonetiidae: Lyonetiinae and Bedelliinae. The genus *Phyllobrostis* Stgr., not found in Russia hitherto, was earlier referred to the subfamily Cemiostominae (Seksyaeva, 1981, 1994), but now many authors include it in the subfamily Lyonetiinae (Karsholt and Razowski, 1996; Leraut, 1997). It is considered here within the latter subfamily, being mentioned here since findings of its representatives may be expected in Russia. The annotated list of Lyonetiinae and Bedelliinae of the fauna of Russia includes eight species from three genera.

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Subfamily LYONETIINAE Stainton, 1854

The subfamily comprises two genera: *Lyonetia* Hbn. and *Phyllobrostis* Stgr.

Genus ***LYONETIA*** Hbn.

Hübner, [1825] 1816, Verz. Bekannter Schmett.: 423.—*Gracillarioides* Bruand, [1851] 1850, Mém. Soc. Emul. Doubs (I) 3 : 53.—*Nocturno* Gistl, [1847] 1848, Handb. Naturg. : 486.—*Olethria* Gistl, 1848, Naturg. Thierreichs: IX.

Type species *Phalaena clerkella* Linnaeus, 1758.

Description. Moths with wing span 8–14 mm. Head tufted. Fore wing narrowly lanceolate, with markedly elongate apex. Principal elements of fore-wing pattern represented by narrow costal, dorsal, and apical streaks, apical dot, and, frequently, discal spot. Fore wing variously colored from white to brown. Many species demonstrating seasonal or geographic variability. Veins R_3, R_4, and R_5 of fore wing fused or stalked, *M* and *Cu* not fused with other veins; discal cell strongly elongated and acute-angled apically (Fig. 1, *1*, *2*). Male genitalia characterized by secondary tegminal lobes with triangular apices. Abdominal segment VIII with paired distal projections and proximal process. Valvae occasionally fused basally. In females, ovipositor specialized to piercing plant tissues.

The genus is divided into two subgenera (*Lyonetiola* Kuroko and *Lyonetia* Hbn.) differing in the length of the antennae, venation of the wings, and the shape of the abdominal segment VIII and tegminal lobes of the male. The distribution is almost cosmopolitan (except in Australia). Five species are recorded from Russia.

Subgenus *LYONETIOLA* Kuroko

Kuroko, 1964, Esakia, 4 : 16.

Type species *Lyonetia castaneella* Kuroko, 1964.

The subgenus differs from the nominotypical one in the longer antennae, more numerous veins, in particular, the medial veins in the fore wing and the cubital veins in the hind wing. Projections of the male abdominal segment VIII are membranous and shifted laterally. The subgenus is represented in Russia by a single species.

Lyonetia (Lyonetiola) castaneella Kuroko

Kuroko, 1964, Esakia, 4 : 16.

Male genitalia as in Fig. 2, *1*; female genitalia as in Fig. 4, *1*.

Distribution. Russia, southern part of Primorskii Territory (Gornotaezhnoe and Khasan District). Japan.

Biology. In the southern part of Primorskii Territory, the larvae mine leaves of the alder (*Alnus japonica*). In Japan, the larvae are trophically associated with the chestnut (*Castanea cretata*) and oak (*Quercus acutissima*) (Kuroko, 1964). In the southern part of Primorskii Territory, the moths fly from July to Au-

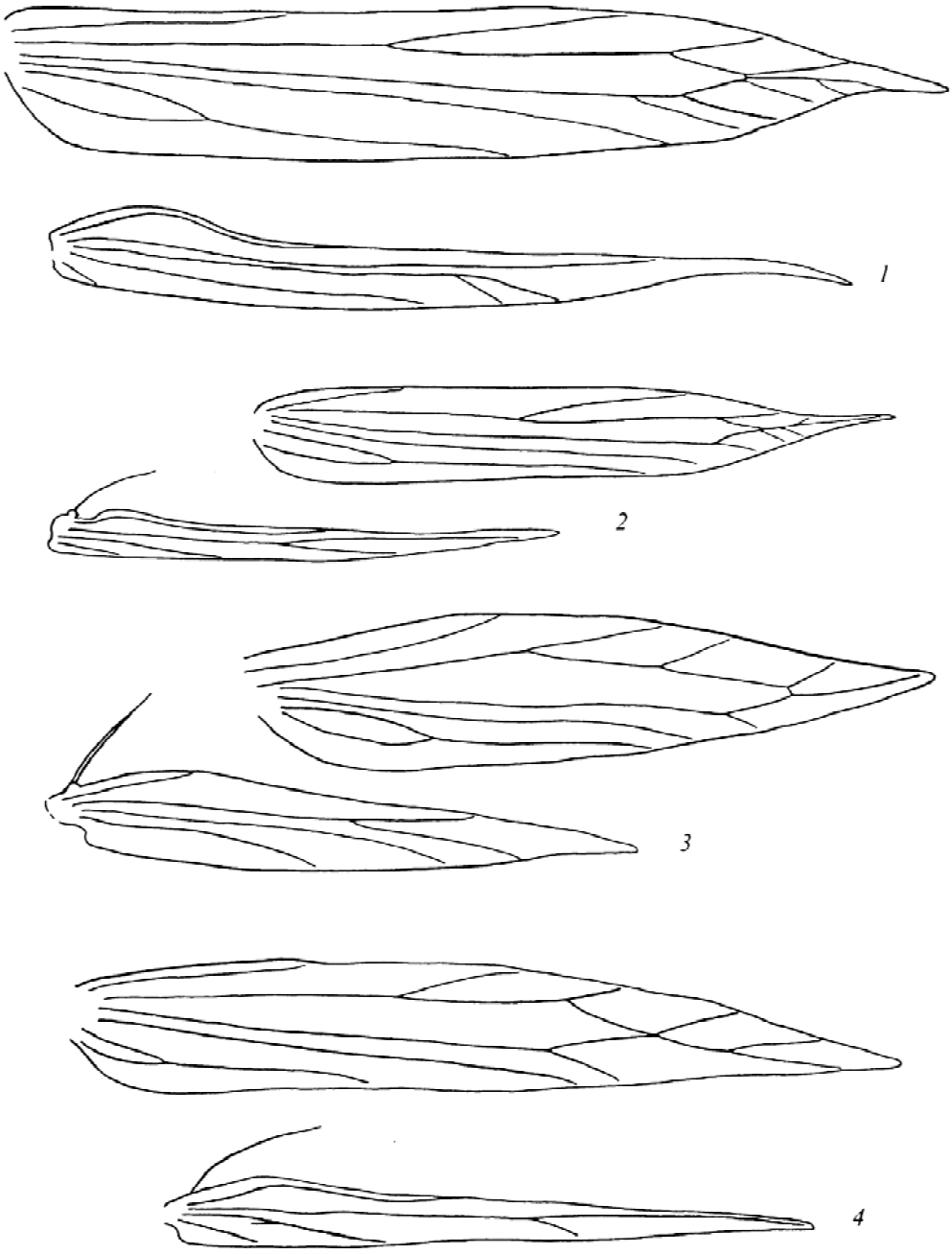

Fig. 1. Venation of wings: (*1*) *Lyonetia* (*Lyonetiola*) *castaneella* Kuroko, (*2*) *L.* (*Lyonetia*) *clerkella* (L.), (*3*) *Phyllobrostis hartmanni* Stgr., (*4*) *Bedellia somnulentella* (Z.).

gust. Two forms of the adults were established by Kuroko: aestival and autumnal. The fore wing of the aestival form is white, that of the autumnal form, golden yellow. In Primorskii Territory, only the aestival form has been found.

Subgenus *LYONETIA* Hbn.

Hübner, [1825] 1816, Verz. Bekannter Schmett.: 423.

Type species *Phalaena clerkella* Linnaeus, 1758.

Description. Antennae shorter than those in species of the subgenus *Lyonetiola*. Fore wing with two *M* veins, hind wing with single *Cu* vein. Projections of male abdominal segment VIII weakly sclerotized, situated on tergum. Four species are known for the fauna of Russia.

Lyonetia (Lyonetia) clerkella (L.)

Linnaeus, 1758, Syst. Nat. (Ed. 10), I : 542.—*cerasifoliella* Hübner, 1796.—*malifoliella* Hübner,

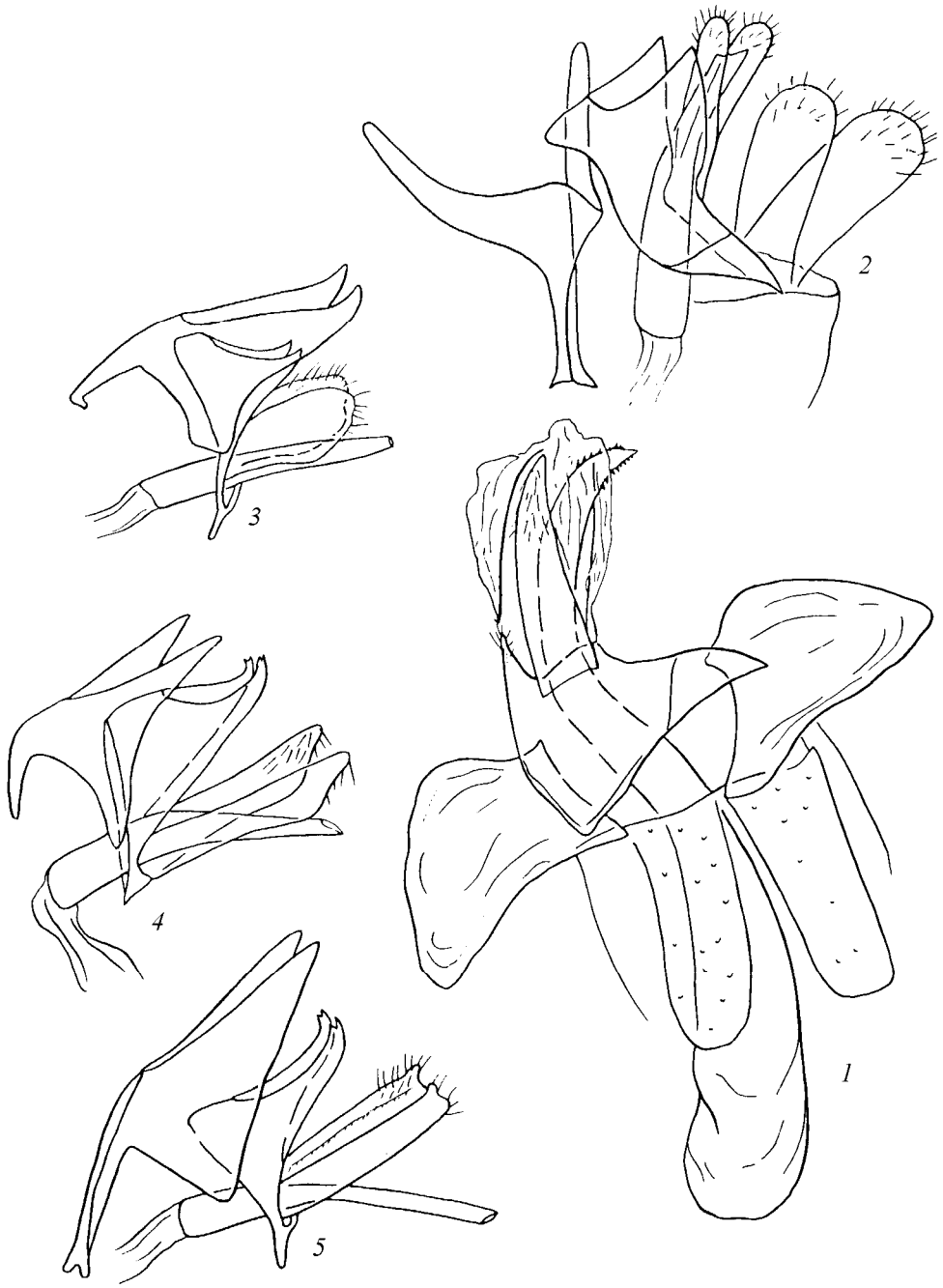

Fig. 2. Male genitalia: (*1*) *Lyonetia* (*Lyonetiola*) *castaneella* Kuroko, (*2*) L. (*Lyonetia*) *clerkella* (L.), (*3*) *L.* (*L.*) *prunifoliella* Hbn., (*4*) *L.* (*L.*) *ledi* Wck., (*5*) *L.* (*L.*) *pulverulentella* (Z.).

1796.—*autumnella* Curtis, 1829.—*aereella* Treitschke, 1833.—*nivella* Stephens, 1834.

Male genitalia as in Fig. 2, *2*; female genitalia as in Fig. 4, *2*.

Distribution. Russia: European part (except for northernmost regions), Southern Siberia, southern part of Primorskii Territory; Belarus, Ukraine, Transcaucasia, Kazakhstan. Western Europe (except for northern part of Scandinavia); North Africa, Middle East, Asia Minor, Madagascar, China (including Taiwan), Japan, and North America.

Biology. The larvae are found on fruit rosaceans and also on the currant, chestnut, birch, willow, and hop; in Madagascar, the larvae mine leaves of the eucalypt (Kuroko, 1964). Up to four generations develop in the southern regions. In Russia, the moths fly

from April to September. Kuroko recorded two forms of adults: the aestival form, smaller and with the white fore wing, and the autumnal one, larger and having the fore wing with an admixture of pale brown scales. In Russia, the only aestival form has been found.

Lyonetia* (*Lyonetia*) *prunifoliella (Hbn.)

Hübner, 1796, Samml. europ. Schmett.: 191.—*padifoliella* Hübner, 1816.—*acerifoliella* Curtis, 1850.—*ringoniella* Matsumura, 1931.

Male genitalia as in Fig. 2, *3*.

Distribution. Russia: European part (except for northernmost regions), Caucasus, Transbaikalia, southern part of the Far East; Kazakhstan, Middle Asia. Western Europe (up to southern part of Sweden northwards); Asia Minor, Korean Peninsula, China, and Japan. In Primorskii Territory and Japan, only the subspecies *L.* (*L.*) *prunifoliella malinella* (Matsumura, 1907) has been recorded.

Biology. The larvae mine leaves of fruit rosaceans and the birch. For Western Europe, the autumnal form, *padifoliella* (not found in Russia) is known. *L.* (*L.*) *prunifoliella malinella* has been recorded by Kuroko on *Malus pumila*. In Russia, the moths were observed to fly from May to mid-September. This subspecies is characterized by infrasubspecific seasonal forms: the aestival form, *ringoniella*, and the autumnal form, *malinella*, with the only summer form occurring in Russia.

Lyonetia* (*Lyonetia*) *ledi Wck.

Wocke, 1859, Jhrsb. Schles. Ges. : 101.—*candida* Braun, 1916.

Male genitalia as in Fig. 2, *4*.

Distribution. Russia: NW of the European part, Caucasus (Essentuki), Irkutsk Province (Zun-Murino), Khabarovsk Territory (Cheremukhovaya River), Primorskii Territory. Western Europe, Korean Peninsula, North America.

Biology. The larvae mine leaves of the ericaceans (*Ledum*, *Rhododendron*, and *Menziesia pentarda*), as well as *Myrica gale*. The moths fly from July to August in European Russia, being recorded in October in Khabarovsk Territory. The species is known to form the northern race distinguished from the southern one by the fore-wing pattern (Kuroko, 1964). This race is recorded for the first time in Russia on the basis of the material collected by V.P. Ermolaev in Khabarovsk Territory.

Lyonetia* (*Lyonetia*) *pulverulentella Z.

Zeller, 1839, Isis : 216.—*frigidariella* Herrich-Schäffer, 1855.

Male genitalia as in Fig. 2, *5*.

Distribution. Russia: NW of the European part (environs of St. Petersburg); Ukraine (Kiev Province). Western Europe (from Norway to Italy).

Biology. The larvae mine leaves of the willow. The moths fly from May to September.

Genus ***PHYLLOBROSTIS*** Stgr.

Staudinger, 1859, Ent. Ztg. Stettin, 20 : 257.

Type species *Phyllobrostis daphneella* Staudinger, 1859.

Description. Wing span 10–12 mm. Scales on head appressed, forming no tuft. Fore wing grayish with dull luster, one-colored. Venation reduced, represented in fore wing by 8 veins (Fig. 1, *3*). Discal cell of fore wing narrow and closed by very short cross-vein. R_2 of fore wing fused with R_3, R_5 fused with median stalk. Larvae mine leaves of Thymelaeaceae.

Phyllobrostis hartmanni Staudinger, 1867

Male genitalia as in Fig 3, *1*; female genitalia as in Fig. 4, *3*.

Distribution. Western Europe: central belt and southern regions.

Biology. The larvae mine leaves of *Daphne cneorum*, *D. alpina*, and *D. gnidium*.

Morphological notes. Male abdominal segment VIII markedly sclerotized. Tegumen almost entirely divided into two slender lobes with connate bases. Valvae asymmetrical, left valva with supplementary lobe.

Subfamily BEDELLIINAE Meyrick, 1880

The subfamily consists of a single genus comprising about 10 species. Several authors regard this group as a separate family (Kyrki, 1990; Karsholt and Razowski, 1996). However, our studies (Kuznetzov et al., 1988; Seksyaeva, 1994) allow maintaining a status of a subfamily for this group.

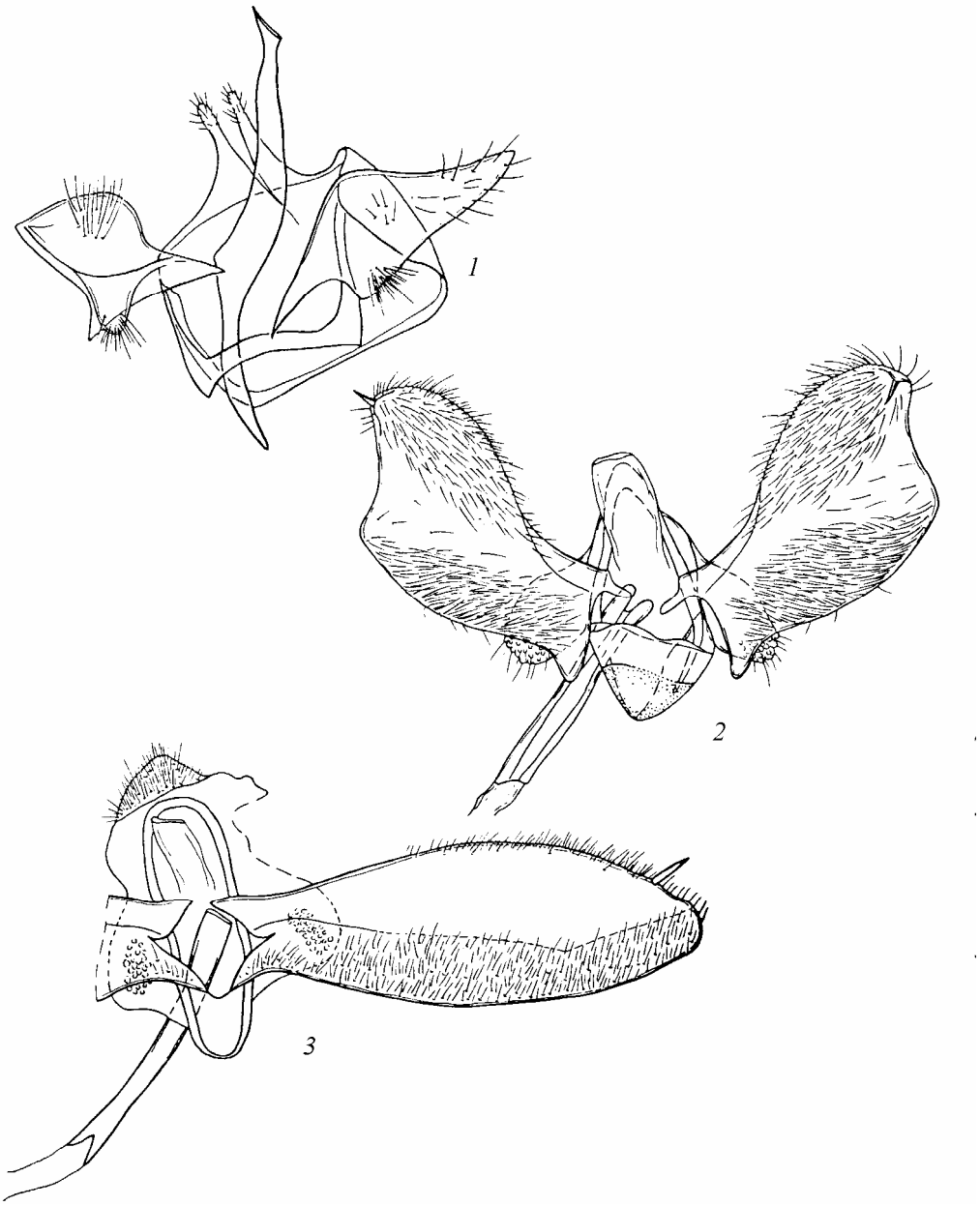

Fig. 3. Male genitalia: (*3*) *Phyllobrostis hartmanni* Stgr., (*2*) *Bedellia somnulentella* (Z.), (*3*) *B. ehikella* Szöcs.

Genus ***BEDELLIA*** Stainton

Stainton, 1849, Syst. Cat. Brit. Tin. : 23.

Type species *Lyonetia somnulentella* Zeller, 1847.

Description. Wing span 9–12 mm. Head with scale tuft. Fore wing pale, grayish beige, without markings, occasionally covered with brownish scales, venation represented by 10 veins, discal cell narrow and apically pointed (Fig. 1, *4*). Male genitalia pronouncedly reduced, with robust broad valvae; abdominal segment VIII forming no lobes but protruding behind tegumen. Larvae of all species trophically associated with Convolvulaceae. Distribution cosmopolitan. Two species were recorded from the territory of the former USSR.

Bedellia somnulentella (Z).

Zeller, 1847, Isis : 894.—*orpheella* Stainton, 1849.—*convolvulella* Fologne, 1860.—*mnesileuca* Meyrick, 1928.—*ipomoeae* Bradley, 1953.

Description. Male genitalia as in Fig. 3, *2*; female genitalia as in Fig. 4, *4*.

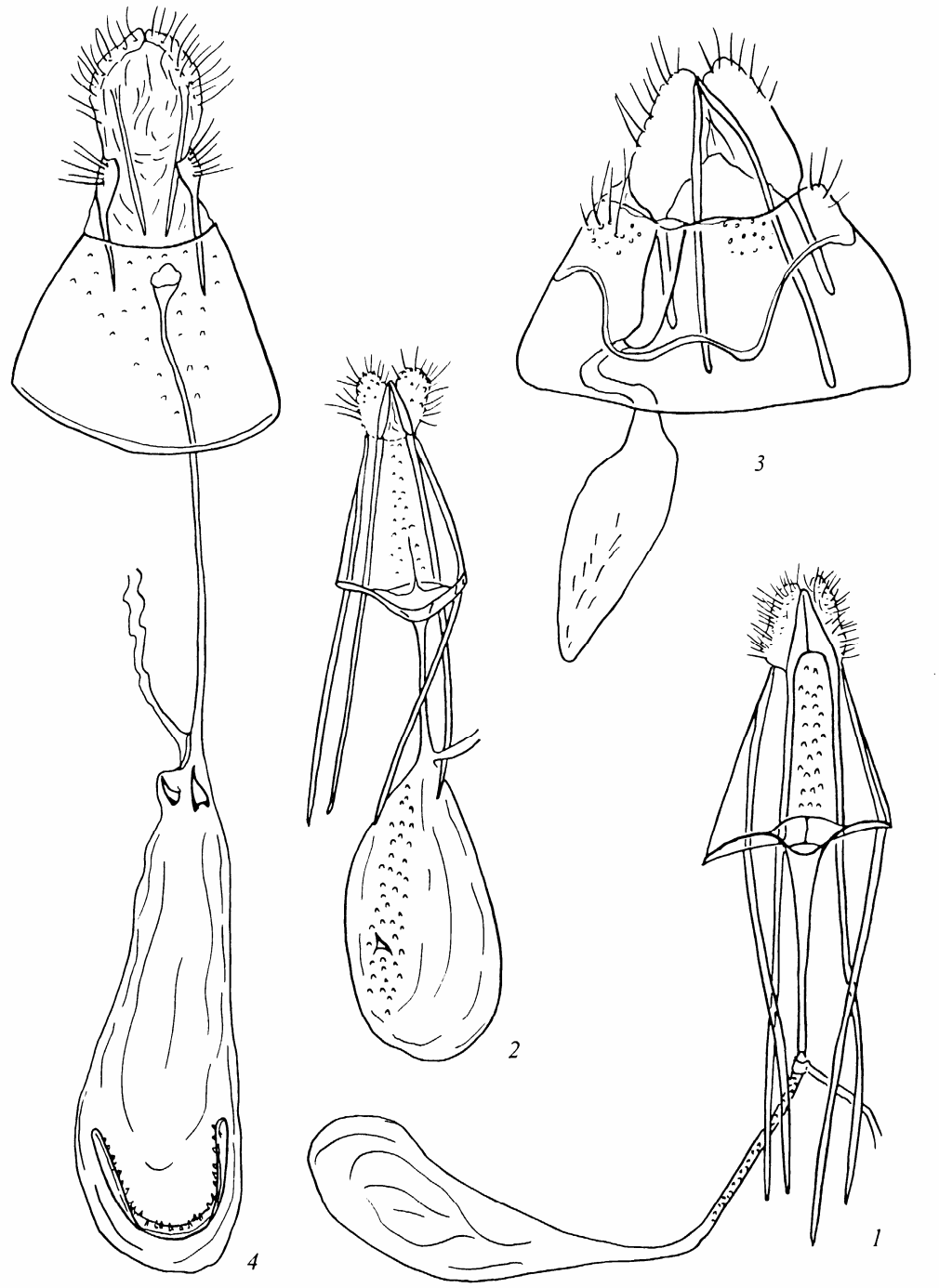

Fig. 4. Female genitalia: (*1*) *Lyonetia* (*Lyonetiola*) *castaneella* Kuroko, (*2*) *L.* (*Lyonetia*) *clerkella* L., (*3*) *Phyllobrostis hartmanni* Stgr., (*4*) *Bedellia somnulentella* (Z.).

Distribution. Russia: European part (Saratov, Essentuki, and Armavir), Dagestan, Tuva, southern part of Primorskii Territory (Khasan District); Ukraine, Georgia (Lagodekhskii Reserve), southern Kazakhstan (Aksu-Dzhabagly Reserve), Kirgizia, Uzbekistan. Western Europe (to southern part of Sweden northwards), Middle East, Africa, India, Japan, North America, Australia, New Zeeland, Oceania, and Hawaii Islands.

Biology. The larvae mine leaves of convolvulacean plants: *Convolvulus*, *Calistegia*, *Pharbitis*, and *Ipomoea*. In the territory of Russia, the moths occur from May to October.

Bedellia ehikella Szöcs

Szöcs, 1967, Acta zool. Acad. Sci. Hung., 13 (1–2) : 231–236.

Distribution. Ukraine (Crimea: Karadagskii Reserve), Europe: Hungary and Italy.

Biology. In Hungary, the larvae mine leaves of *Convolvulus cantabricus*. In the Crimea, the moths were observed to fly from late March to mid-May and from July to September (Budashkin, 1987).

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REFERENCES

1. Budashkin, Yu.I., "Lepidoptera," in *Annals of Nature, 1987* (Akad. Nauk Ukr.SSR, Simferopol, 1990), Vol. 4, Part 2, pp. 49–56.
2. Buszko, J., "Gracillariidae," in *The Lepidoptera of Europe. A Distributional Checklist*, Ed. by Karsholt, O. and Razowski, J. (Apollo Books, Stenstrup, 1996), pp. 48–54.
3. Kuroko, H., "Revisional Studies on the Family Lyonetiidae of Japan (Lepidoptera)," Esakia **4**, 1–61 (1964).
4. Kuznetzov, V.I., Kozlov, M.V., and Seksyaeva, S.V., "To the Systematics and Phylogeny of Mining Moths of the Families Gracillaridae, Bucculatricidae, and Lyonetiidae with Regard to Functional and Comparative Morphology of Male Genitalia," Trudy Zool. Inst. Akad. Nauk SSSR **176**, 52–71 (1988).
5. Kyrki, J., "Tentative Classification of Holarctic Yponomeutoidea (Lepidoptera)," Nota lepid. **13** (1), 28–42 (1990).
6. Leraut, P.J.A., "Liste systématique et synonymique des Lépidoptères de France, Belgique et Corse," in *Suppl. à Alexanor* (Paris, 1997), pp. 1–526.
7. Seksyaeva, S.V., "Lyonetiidae (Leucopteridae)," in *A Key to Insects of the European Part of the USSR*, (Nauka, Leningrad, 1981), Vol. 4, Part 2, pp. 420–430.
8. Seksyaeva, S.V., "Comparative Morphological Analysis of Male Genitalia in the Family Lyonetiidae (Lepidoptera), Entomol. Obozr. **73** (3), 716–722 (1994).