Mealybugs of the genus *Rhizoecus* Künckel d'Herculais, 1878 (Homoptera: Pseudococcidae) of the fauna of Russia and adjacent countries

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A key and a review of 15 species inhabiting the territory of the former USSR are given. *Rhizoecus microtubulatus* Gavrilov & Danzig **sp. nov.** from Astrakhan is described. All discussed species are briefly morphologically described and illustrated. The lectotype is designated for *Rh. vitis* Borchsenius, 1949. Four new synonyms are established: *Rhizoecus poltavae* Laing, 1929 = *Rh. desertus* Ter-Grigorian, 1967 **syn. nov.** = *Rh. pallidus* Tereznikova, 1968 **syn. nov.**; *Rh. tritici* Borchsenius, 1949 = *Rh. pratensis* Borchsenius & Tereznikova, 1959 **syn. nov.**; *Rh. albidus* Goux, 1942 = *Rh. gentianae* Panis, 1968 **syn. nov.**

Key words: scale insects, Homoptera, Pseudococcidae, *Rhizoecus*, new species

TAXONOMIC PART

Genus *Rhizoecus* Künckel d'Herculais, 1878

Rhizoecus Künckel d'Herculais, 1878: 163
Rhizoecus: Hambleton, 1946: 50; 1976: 6; Borchsenius, 1949: 174, Ferris, 1953: 426; McKenzie, 1967: 126; Danzig, 1980: 196; Ter-Grigorian, 1973: 89; Tereznikova, 1975: 246; Cox, 1987: 84; Tang, 1992: 53; Williams & Granada de Willink, 1992: 494; Williams & Watson, 1988: 213; Williams, 2004: 746; Kozár & Benedicty, 2007: 126.
Ripersiella Tinsley, in Cockerell, 1899: 278 (type species *Ripersia rumicis* Maskell, 1892 by original designation).
Ripersiella: Kozár & Benedicty, 2007: 380.
Pararhizoecus Goux, 1941: 197 (as subgenus; type species *Pararhizoecus petiti* Goux, 1941 by monotypy).

Type species: *Rhizoecus falcifer* Künckel d'Herculais, 1878 by monotypy.

Diagnosis of the genus. Adult female. Body elongate oval, often with almost parallel margins, up to 2 mm long, covered with white powder wax; during the oviposition period females extract a loose wax sac. Anal lobes poorly developed, sometimes with sclerotized plate, with two (sometimes more) flagellate setae on dorsal side and usually with one apical setae on ventral side of the same size as dorsal ones. Antennae with six or very rarely five broad, densely settled segments. Legs short, with broad segments. Claw elongated. Coxae and tibiae without translucent pores. Ostioles poorly visible, sometimes without trilocular pores and slender setae. Circulus usually present, more often conical and sclerotized, with cellular pattern. Anal ring with 6 flagellate setae and few distinctive large elongated pores. Multilocular pores usually present, located on posterior abdominal sternites, rarely numerous on both body sides [*Rh. poltavae* Laing, 1929, *Rh. brevipes* (Goux, 1943)]. Trilocular pores numerous on both body sides. Tubular ducts of different size and number. Peculiar bi- and tritubular ducts are characteristic. Their length is usually comparable to multilocular pores diameter. Sometimes tritubular pores can be significantly larger (*Rh. vitis* Borchsenius, 1949), and bitubular to the contrary smaller. Some species (for example, *Rh. parvus* Danzig, 1985) lack those ducts completely. Flagellate and slender setae approximately equal on both body sides.

Mode of life. According to the mode of life the majority of *Rhizoecus* species can be referred to soil insects; they live on thin roots of different plants, mostly perennial herbs, and only in rare cases inhabit overhead parts of host plants additionally. The life cycle is typical for all mealybugs. Some species are ovoviviparous laying eggs at the stage of germ band invagination or even with fully developed larvae inside (Trapeznikova & Gavrilov, 2008). At present, only five species are cytogenetically investigated. Two species possess 2n=12, two 2n=10 and one 2n=8; all those five species are characterized by a Lecanoid genetic system and bisexual reproduction (Nur et al., 1987; Gavrilov, 2007; Gavrilov & Trapeznikova, unpubl.).

The genus is distributed all over the world and comprises more than 200 species. Due to the concealed mode of life and polyphagia some species have distributed together with the introduced host plants far beyond their natural ranges. The fauna of Russia and adjacent countries contains 15 species of the genus, three of which are non-indigenous having been introduced from North America and live only in greenhouses. In Western Europe there are some more species of *Rhizoecus*. These are species from South France and Italy *Rh. brevipes*, *Rh. brussieui* (Goux, 1985), *Rh. ovoides* (Goux, 1943), *Rh. periolanus* (Goux, 1985), *Rh. petiti*, Italian *Rh. lelloi* Mazzeo, 1995, *Rh. vidanoi* Marotta & Tranfaglia, 1995 and still not interpreted *Rh.* (?) *targionii* (Cockerell, in Fernald, 1903), and also two species described from Germany – *Rh. caesii* Schmutterer, 1956 and *Rh. franconiae* Schmutterer, 1956.

In greenhouses of Europe the following species are also recorded according to the data of Jansen (2004): *Rh. advenoides* Takagi & Kawai, 1971, *Rh. aloes* Williams & Pellizzari, 1997, *Rh. americanus* (Hambleton, 1946), *Rh. amorphophalli* Betrem, 1940, *Rh. elongatus* Green, 1926, *Rh. falcifer*, *Rh. hibisci* Kawai & Takagi, 1971 and *Rh. maasbachi* Jansen, 2003.

1. ***Rhizoecus dianthi* Green, 1926**
(Fig. 1)

Rhizoecus dianthi Green, 1926: 175.
Rhizoecus dianthi: Williams, 1962: 43; Cox, 1987: 86; Kozár & Benedicty, 2007: 196; Danzig et al., 2008: 600.
Rhizoecus eluminatus McKenzie, 1960: 747 (USA: California).
Rhizoecus eluminatus: McKenzie, 1967: 388.
Rhizoecus pritchardi McKenzie, 1960: 749 (USA: California).
Rhizoecus pritchardi: McKenzie, 1967: 400; Williams & Nakahara, 1980: 336.

Material. Five females from St. Petersburg, several tens of series from Moscow: the Main Botanical Garden of the Russian Academy of Sciences, series of females from England (ZIN).

Description. Adult female. Ostioles well-developed. Circulus absent. Multilocular pores few, located only on three posterior abdominal sternites. Tritubular ducts of common size, few on dorsal body surface and along margin of ventral body surface, sometimes part of ducts accompanied by 1 or 2 flagellate setae. Tubular ducts absent.

Systematical note. The species concerned is probably identical to *Rh. cyperalis* (Hambelton, 1946) and *Rh. nemoralis* (Hambelton, 1946) described from Central America, that was noted previously (Williams, 1962; Williams, Granada de Willink, 1992).

Distribution. Reported only from greenhouses. Russia: St. Petersburg, Moscow. Europe, USA, Australia and New Zealand.

Mode of life. Widely polyphagous on flowering plants. In St. Petersburg, it was collected from Ophiopogon sp. (family Liliaceae). In Moscow, found on a range of plants in cactuses and succulents department. When the infestation is heavy the root system and soil are entirely covered with white fluffy wax (Kozarzhevskaya, 1992). Serious pest of Saintpaulia spp. in California, cause leaf shrinkage and plants death.

2. ***Rhizoecus cacticans* (Hambelton, 1946)**
(Fig. 2)

Ripersiella cacticans Hambelton, 1946: 64 (Ecuador).

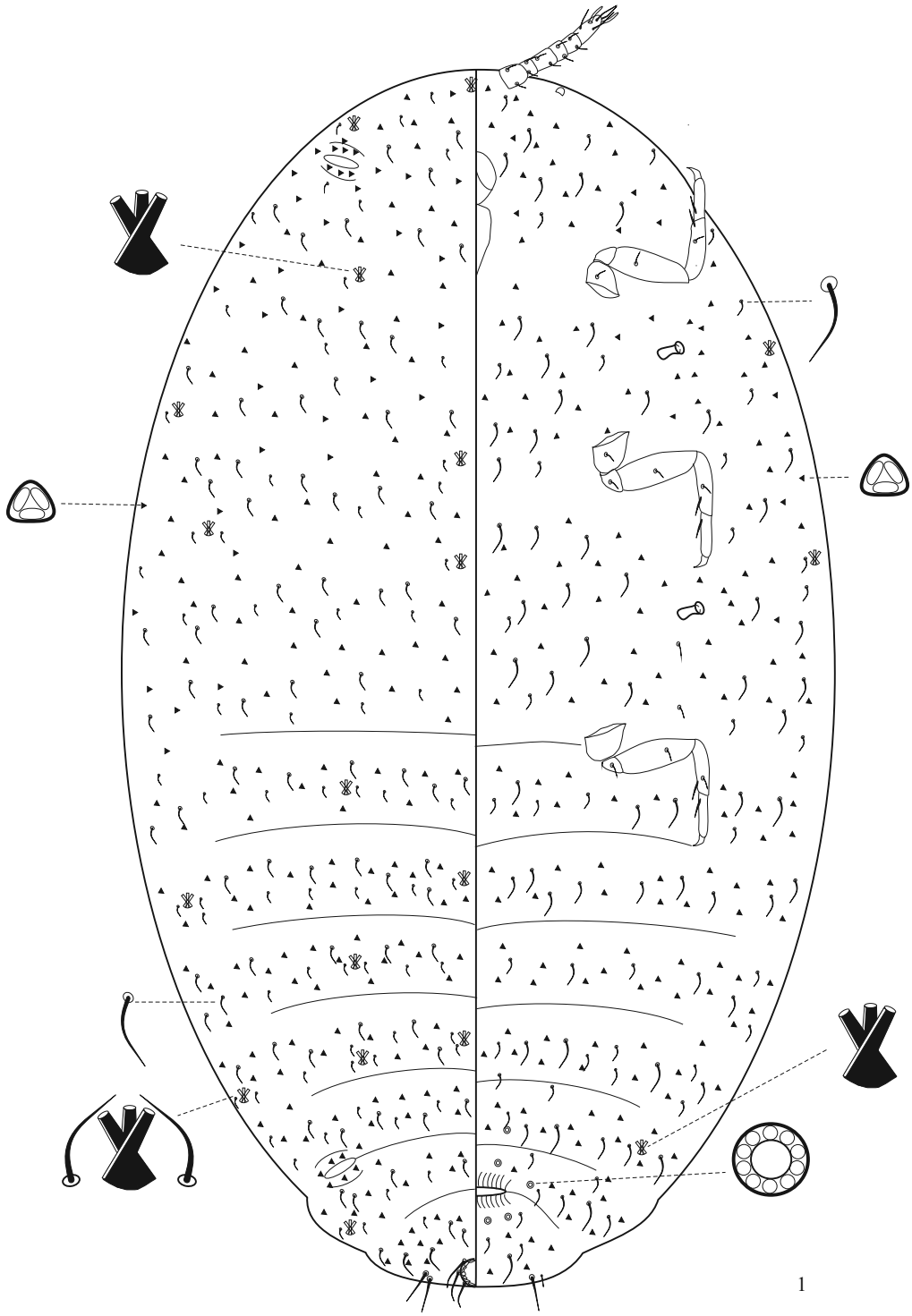

Fig. 1. *Rhizoecus dianthi*, female, after Danzig et al. (2008), with specification.

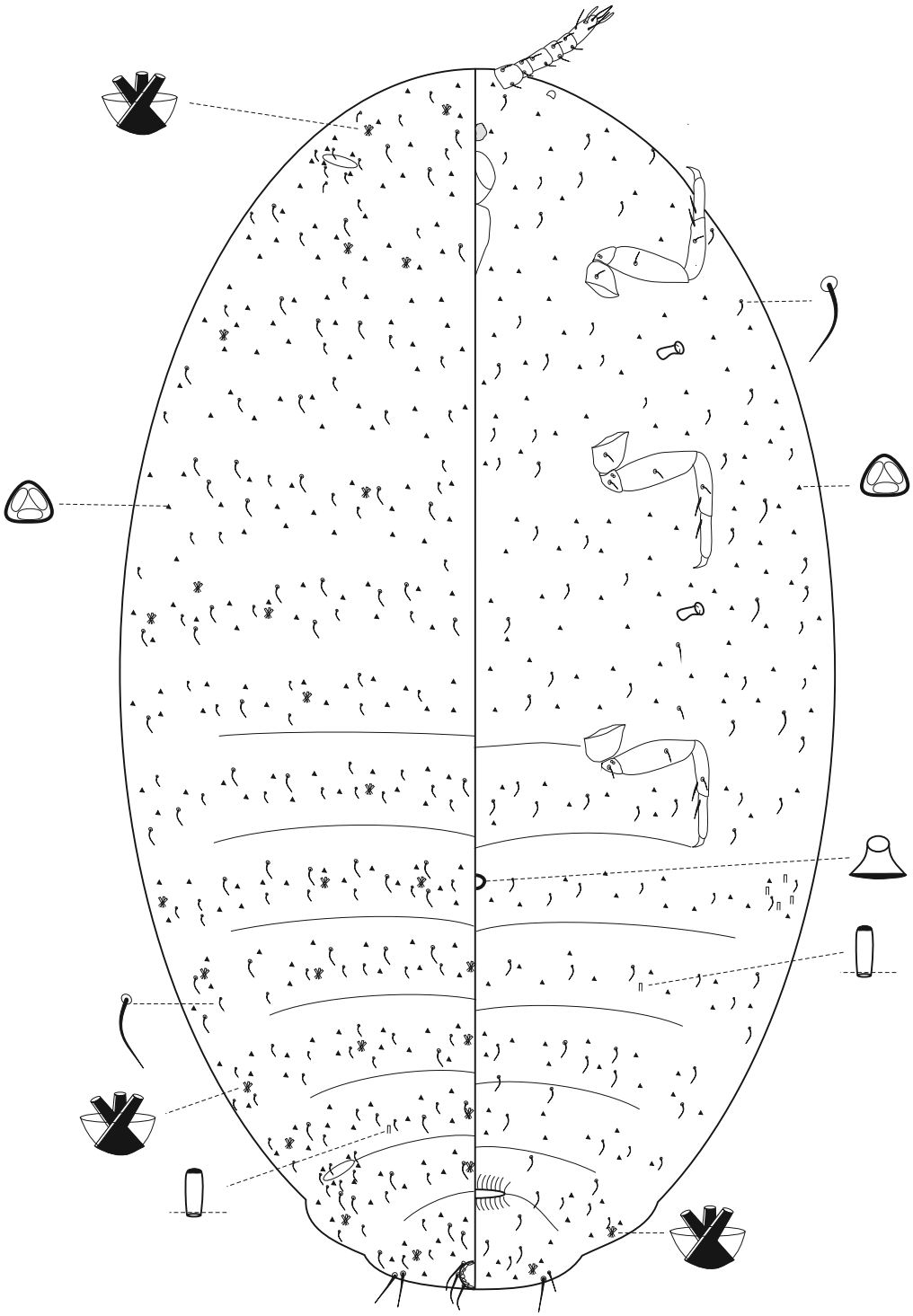

Fig. 2. *Rhizoecus cacticans*, female, Moscow, greenhouse.

Ripersiella cacticans: Ferris, 1953: 432; Hambelton, 1976: 17; Zahradnik, 1990: 41; Kozarzhevskaya, 1992: 219; Kozár & Benedicty, 2007: 168.
Rhizoecus epiphylli Ferris, 1953: 442 (USA: California, Ontario).
Rhizoecus epiphylli: McKenzie, 1960: 745 (= *R. cacticans*).

Material. Large series from Moscow: the Main Botanical Garden of the Russian Academy of Sciences, 14 specimens from St. Petersburg, Minsk, Kiev, Donetsk and England (ZIN).

Description. Adult female. Ostioles poorly developed. Circulus conical, heavily sclerotized. Multilocular pores absent. Tritubular ducts of common size, sparsed throughout dorsal body surface, few along margin of ventral body surface. Tubular ducts narrow, with parallel sides, few on both body sides.

Distribution. Distributed throughout tropics and subtropics. In Russia and Europe is common in greenhouses.

Mode of life. Polyphagous, live on different species of cactuses, harmful.

3. ***Rhizoecus kazachstanus*** **Matesova, 1980** (Fig. 3)

Rhizoecus kazachstanus Matesova, 1980: 110 (Kazakhstan).
Rhizoecus kazachstanus: Kozár & Benedicty, 2007: 240.

Material. Holotype and paratype (ZIN).

Description. Adult female. Ostioles poorly developed. Circulus conical. Anal lobes in holotype with a sclerotized plate, in paratype and in material from Hungary the sclerotized plate is not developed. Multilocular pores located on three posterior abdominal segments. Tritubular ducts of common size, numerous on both body sides. Tubular ducts dilated towards apex, located on both body sides.

Taxonomic Remarks. A figure based on the material from Hungary (Kozár & Benedicty, 2007) differs from the type material in a larger number of tubular ducts.

Distribution. Western and northern Kazakhstan. Hungary.

Mode of life. Collected from Tanacetum vulgaris and Festuca sp.

4. ***Rhizoecus inconspicuus*** **Danzig, 1971** (Fig. 4)

Rhizoecus inconspicuus Danzig, 1971: 372 (South of Primorsk Terr.).
Rhizoecus inconspicuous: Danzig, 1980: 196.
Rhizoecus inconspicuus: Kozár & Benedicty, 2007: 230.

Material. Holotype and paratypes (ZIN).

Description. Adult female. Ostioles well-developed. Circulus conical. Anal lobes in holotype with a sclerotized plate with 3 long and 1 or 2 shorter flagellate setae. Multilocular pores few, located on three posterior abdominal segments. Tritubular ducts of common size, forming transverse rows on dorsal body surface, occur along the margin of ventral body surface. Tubular ducts short and narrow, with parallel sides, numerous on both body sides.

Taxonomic Remarks. The close species *Rh. advenoides* Takagi & Kawai, 1971 also connected with Artemisia spp. was described from Japan (Honshu). It differs in the absence anal lobes lacking a sclerotized plate and minority of tubular ducts. Both characters can result from interspecific or geographical variability, these species may be identical.

Distribution. Russia: South of Primorsky Terr.

Mode of life. Females were collected during oviposition on July 22 on Artemisia sp. on weed-grown waste.

5. ***Rhizoecus albidus*** **(Goux, 1942)** (Fig. 5)

Pararhizoecus albidus Goux, 1942: 40 (France).
Pararhizoecus albidus: Schmutterer, 1952: 394; Williams, 1962: 41; Tereznikova, 1975: 248; Danzig, 1980: 196; Kozár & Benedicty, 2007: 140.
Rhizoecus uniporus Borchsenius, Tereznikova, 1959: 323 (Ukraine).
Rhizoecus uniporus: Tereznikova, 1975: 248 (= *R. albidus*); Ter-Grigorian, 1973: 92.

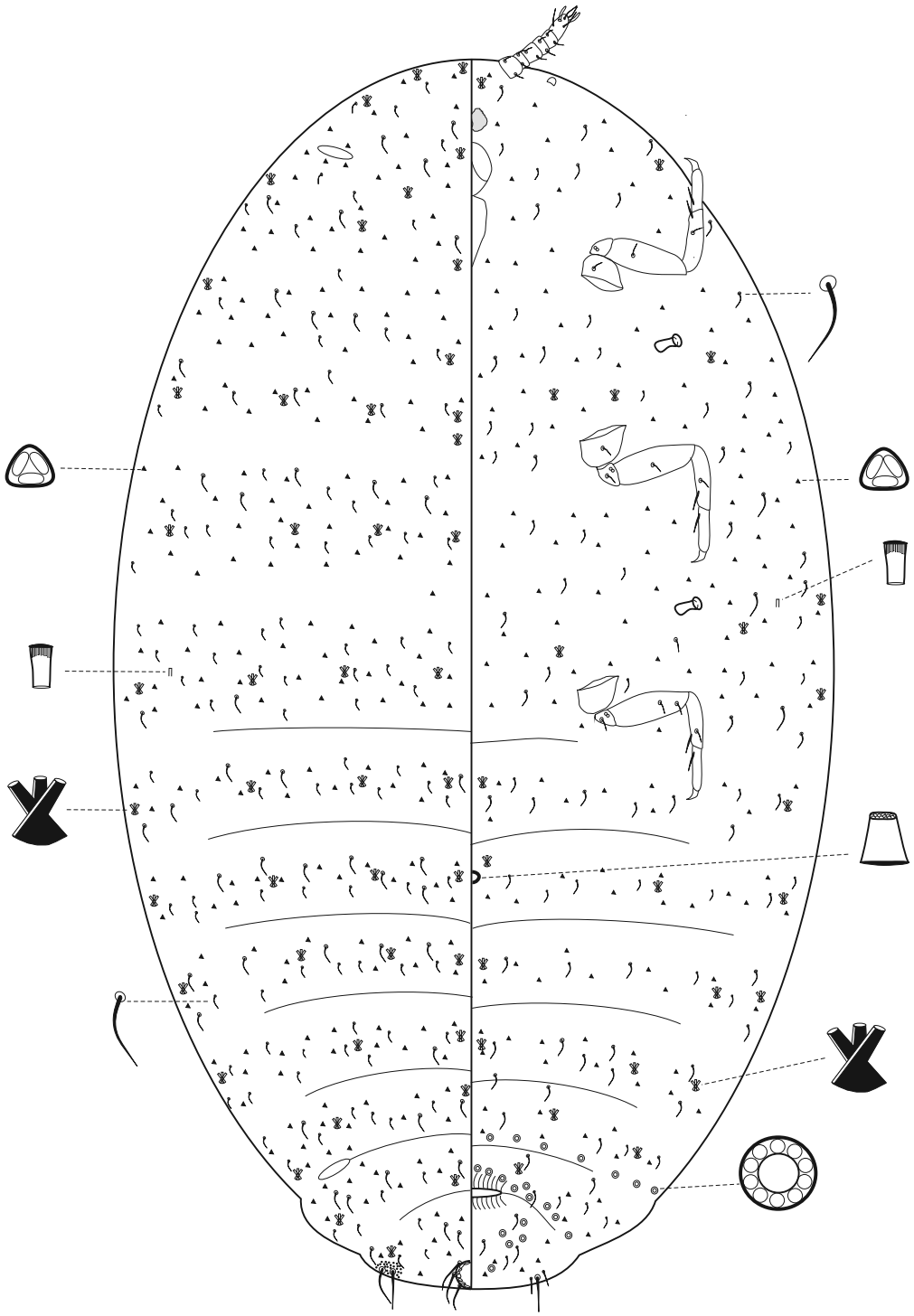

Fig. 3. *Rhizoecus kazachstanus*, female, holotype.

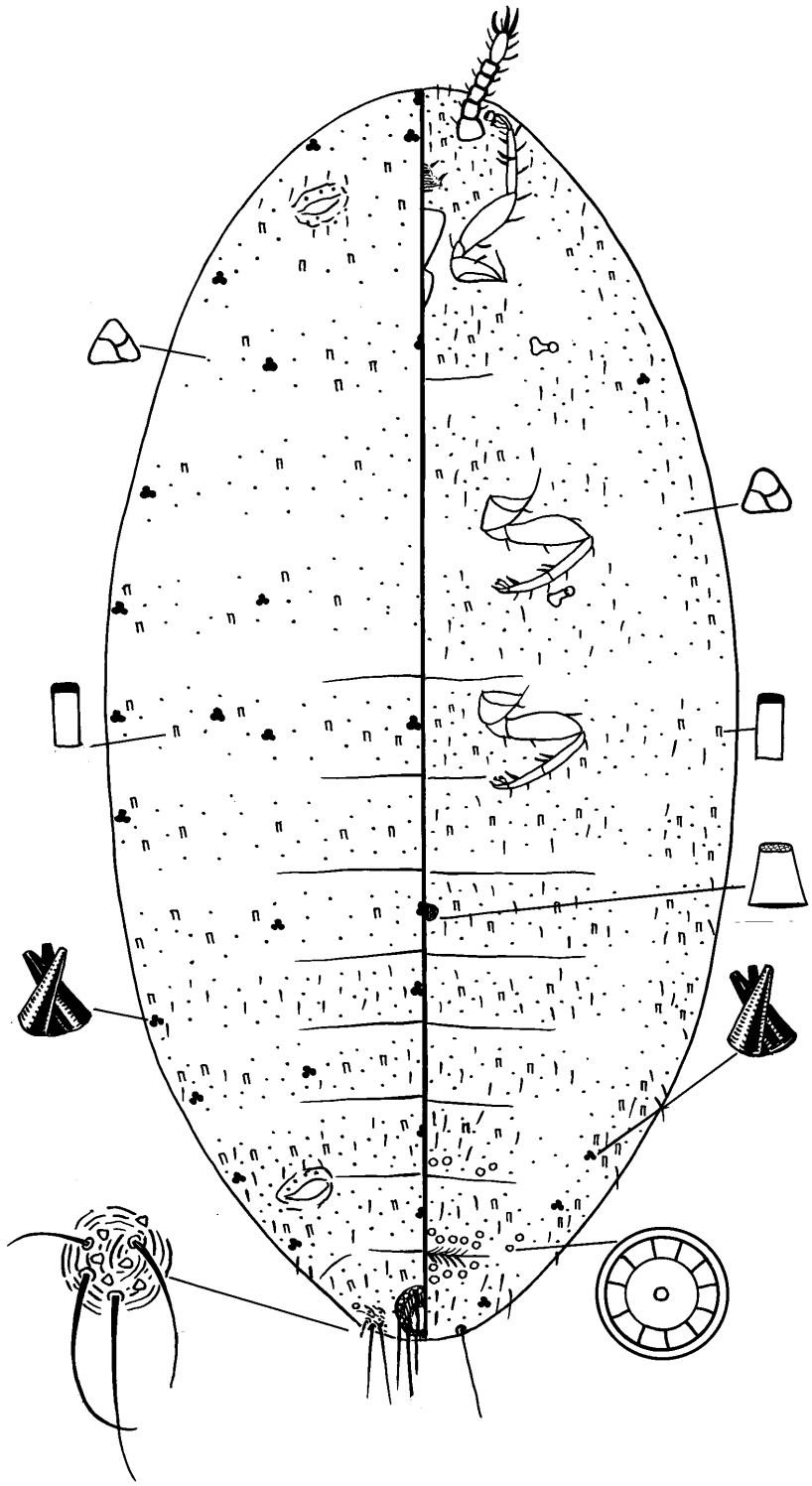

Fig. 4. *Rhizoecus inconspicuus*, female, after Danzig (1971), with additions.

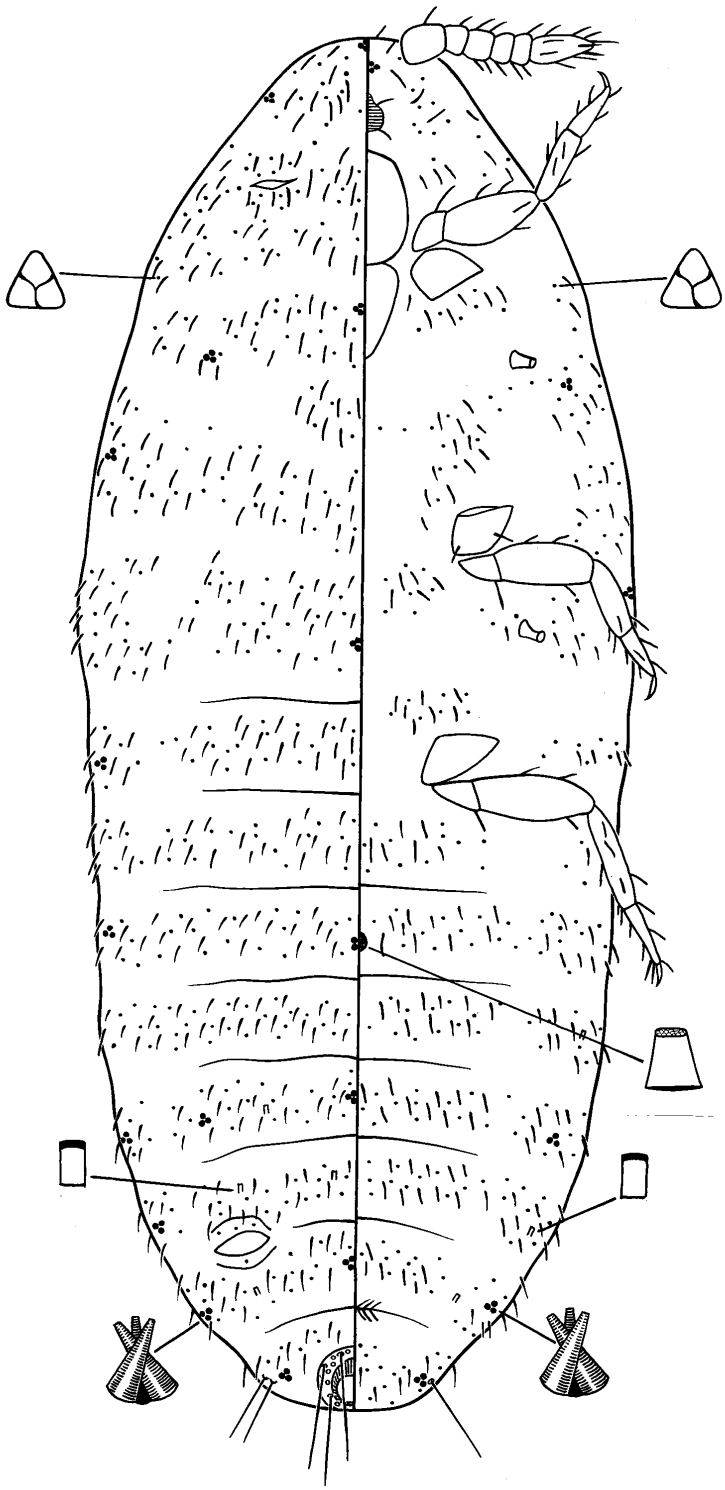

Fig. 5. *Rhizoecus albidus*, female, after Danzig (1980), with specification.

Rhizoecus gentianae Panis, 1968 (France, Italy), **syn. nov.**
Rhizoecus gentianae: Kozár & Benedicty, 2007.

Material. Paratype and 19 females from Russia (Irkutsk Prov., South of Primorsk Terr.), Ukraine, Armenia, Switzerland, England and the Iran (ZIN).

Description. Adult female. Ostioles well-developed. Circulus conical. Multilocular pores absent. Tritubular ducts of common size, forming row along dorsal body surface margin and middle line, single pores occur in middle part of body; on ventral body surface arranged only along body margin. Tubular ducts short and narrow, with parallel sides, few.

According to the description and figure of Panis (1968) and also comments of Kozár & Benedicty (2007), *Rhizoecus gentianae* differs from *Rh. albidus* in longer labium only. This character varies individually and can not be used for the species separation.

Distribution. Russia: Irkutsk Prov. and South of Primorsky Terr.; Ukraine, Armenia. Europe: widely, Iran.

Mode of life. Live mainly on gramineous plants; in the Far East females were collected in the end of August.

6. *Rhizoecus vitis* Borchsenius, 1949 (Fig. 6)

Rhizoecus vitis Borchsenius, 1949: 175 (Ukraine, Crimea).
Rhizoecus vitis: Tereznikova, 1975: 246; Kozár & Benedicty, 2007: 252.

Material. Lectotype (designated here). ZIN, slide № 7–40; female, **Ukraine**, Crimea, Balaklava Reg., 15 July 1939, coll. Sheffer. *Paralectotypes.* Six females, same data as lectotype, and 6 females from different regions of Crimea.

Description. Adult female. Differs from the other species in 5-segmented antennae. Ostioles well-developed. Circuli 3 in number, large, flat. Anal lobes with large, convex sclerotized plate with 11–15 long flagellate setae. Multilocular pores numerous on two posterior abdominal sternites. Tritubular ducts larger than in other species of Russian fauna, significantly larger than multilocular pores, located on both body sides, not numerous. Tubular ducts wide, located on both body sides.

Distribution. Known only from the type series.

Mode of life. Collected from roots of vine.

7. *Rhizoecus mexicanus* (Hambelton, 1946) (Fig. 7)

Ripersiella mexicana Hambelton, 1946: 67 (Mexico, imported from California).
Ripersiella mexicana: Hambelton, 1976: 37; Kozár & Benedicty, 2007: 500.
Rhizoecus mexicanus: Hambleton, 1976: 37; Williams & Granada de Willink, 1992: 549; Gavrilov, 2004: 115.

Material. One paratype and 4 females from Russia and the Netherlands (ZIN).

Description. Adult female. Ostioles poorly developed. Circulus slightly convex. Multilocular pores located on two posterior abdominal sternites and penultimate abdominal tergite. Bitubular ducts close in size to multilocular pores, occur throughout dorsal body surface and along margin of ventral body surface, single ducts located in middle part of posterior abdominal and thoracical sternites. Tubular ducts of middle size, with parallel sides, sclerotized apex, numerous on both body sides.

Distribution. Greenhouses of Russia (St. Petersburg) and the Netherlands, Mexico, USA.

Mode of life. Live on cactuses; in St. Petersburg and the Netherlands collected from Opuntia spp.

8. *Rhizoecus poltavae* Laing, 1929 (Fig. 8)

Rhizoecus poltavae Laing, 1929: 469.
Rhizoecus poltavae: Borchsenius, 1949: 177; Hambelton, 1946: 50; Tereznikova, 1975: 251.
Ripersiella poltavae: Kozár & Benedicty, 2007: 524.
Rhizoecus desertus Ter-Grigorian, 1967: 93 (Armenia), **syn. n.**
Rhizoecus pallidus Tereznikova, 1968: 377 (Ukraine), **syn. n.**

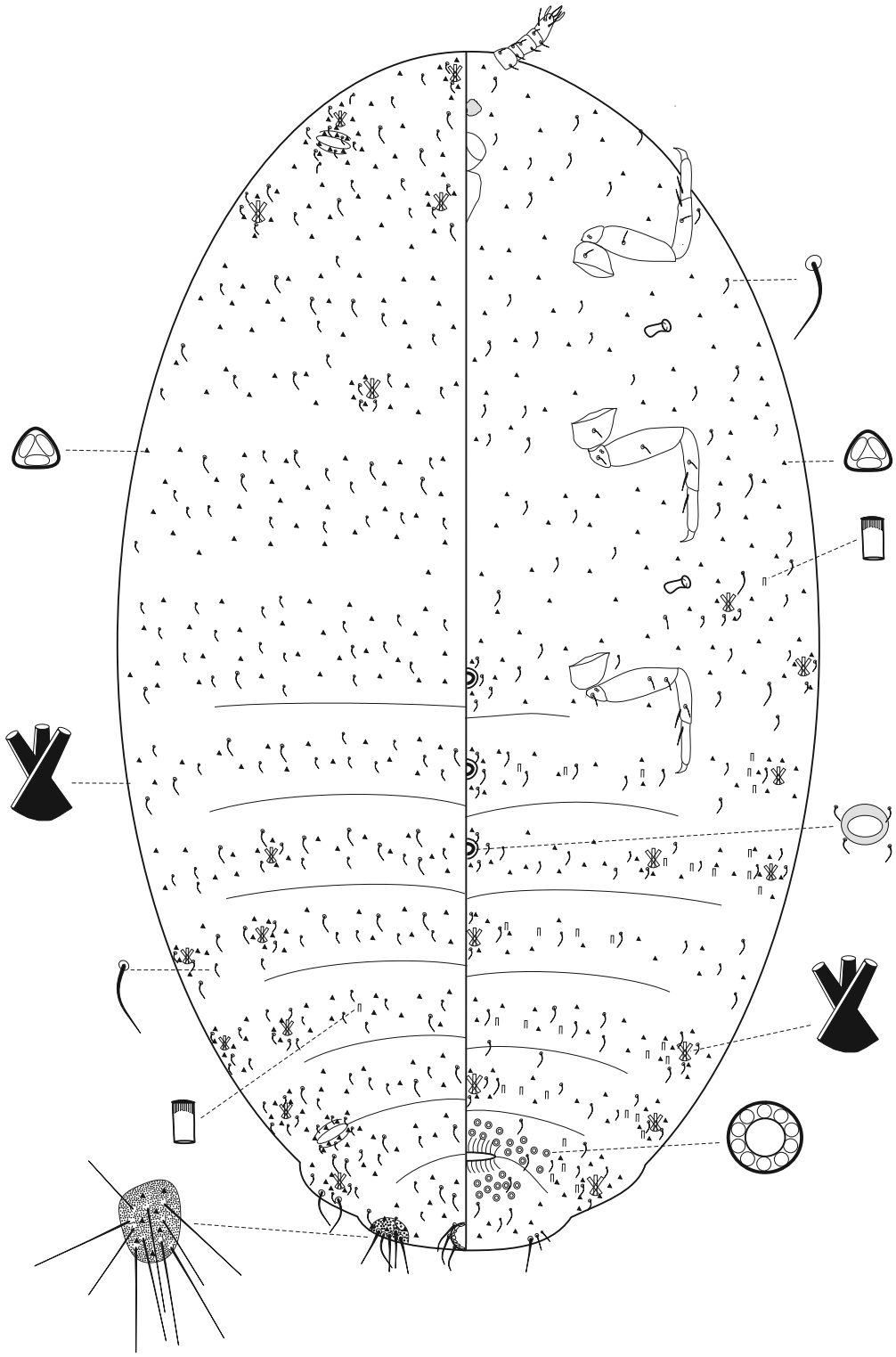

Fig. 6. *Rhizoecus vitis*, female, lectotype.

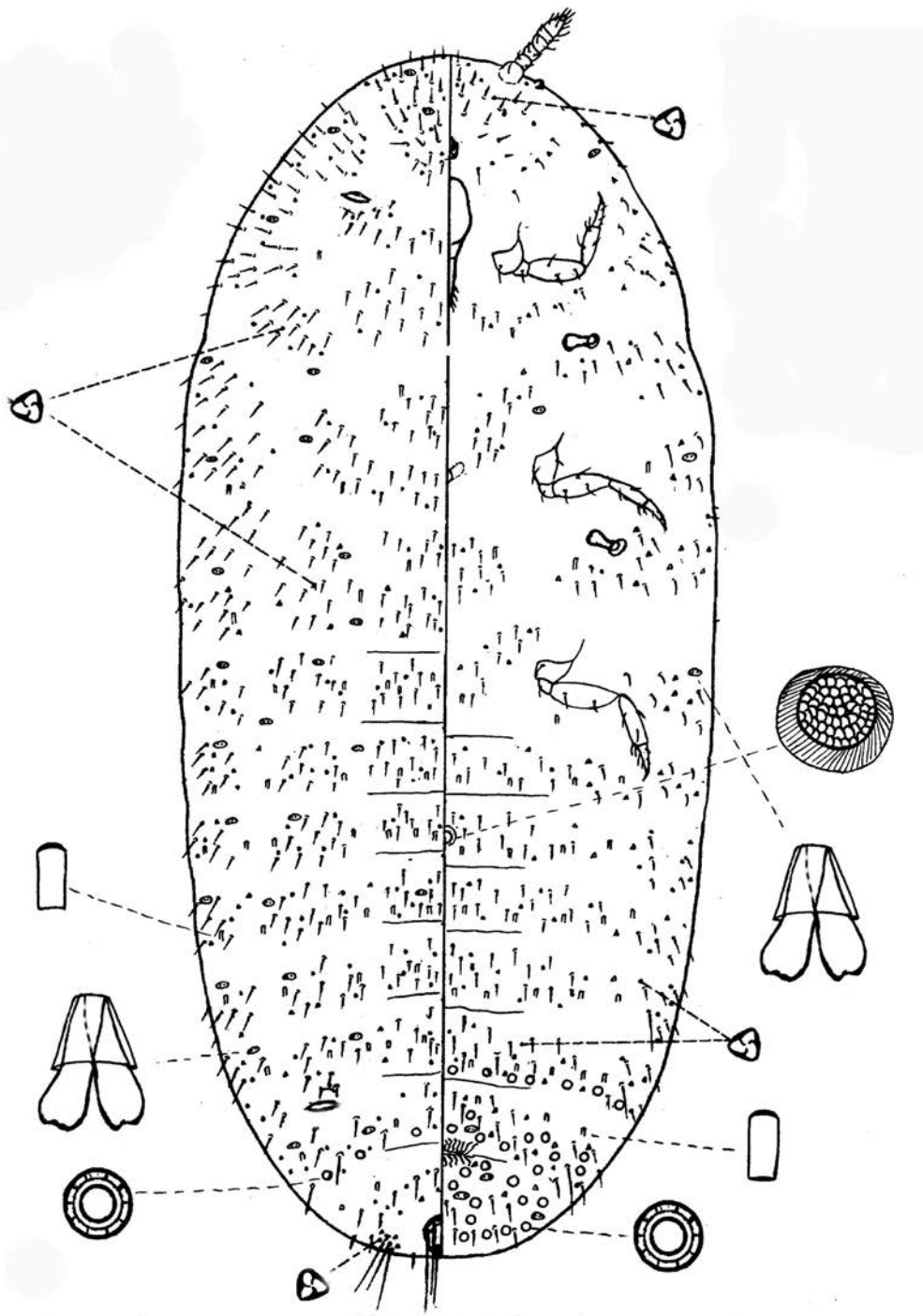

Fig. 7. *Rhizoecus mexicanus*, female, after Gavrilov (2004).

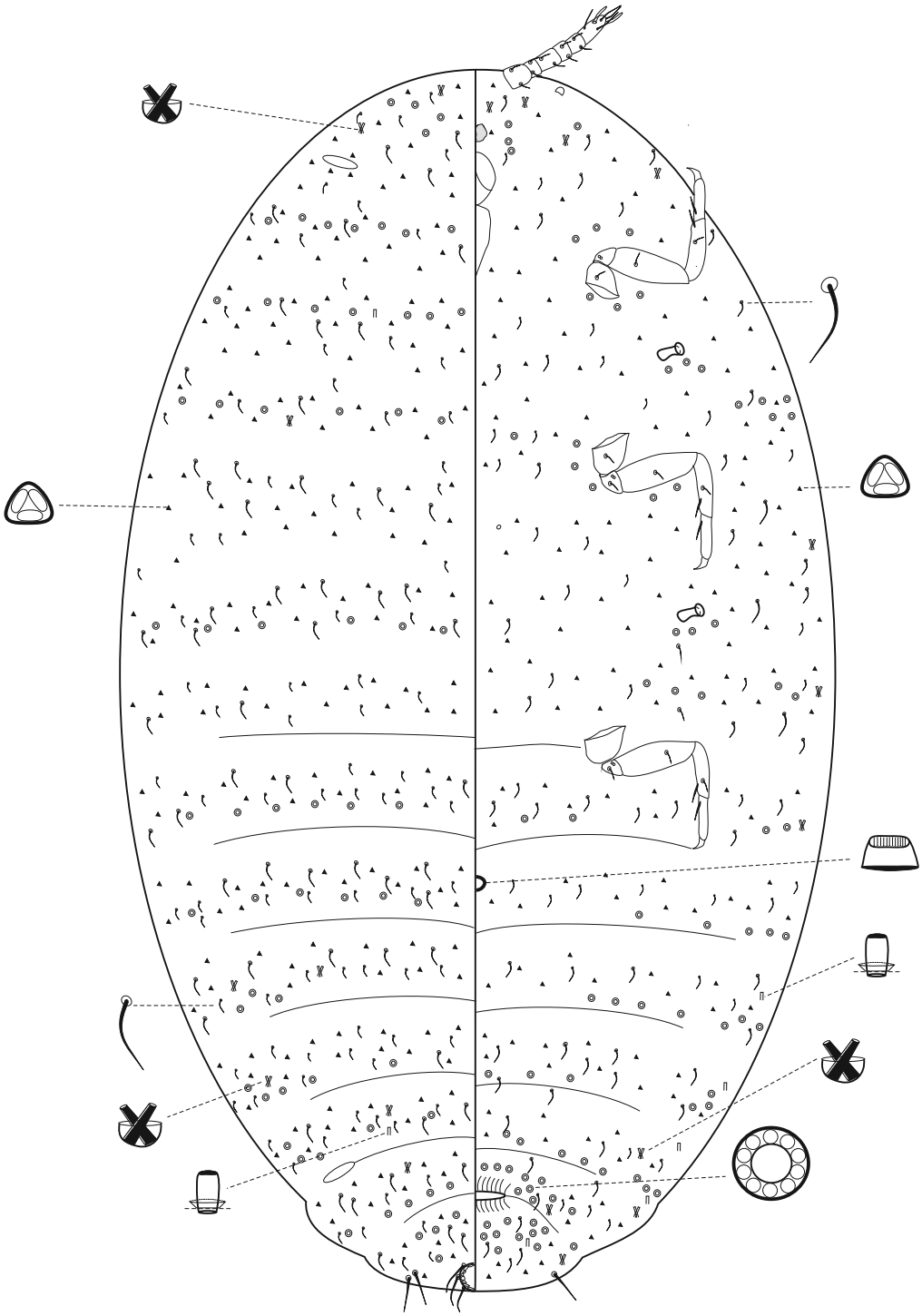

Fig. 8. *Rhizoecus poltavae*, female, lectotype.

Lectotype of *Rh. poltavae* (designated here). ZIN, female, **Ukraine**, "*Rhizoecus poltavae* Laing, Poltava, Ogloblin". Slide without number, specimen in black circle.

Paralectotypes. ZIN; 4 more females together with lectotype, 6 females on two other slides with the same label and 4 females from the same locality but with the date 28.04.1925. In the species description an error was made in the type locality indication "Crimea: Poltava", in London (the Natural History Museum) four slides with the label *Rh. poltavae* Laing are deposited, on two of them also "Crimea: Poltava" is given, on the others "Odessa, Ukraina, Poltava". On every slide the date 28.04.1925 and the collector A.N. Kiritshenko are indicated. It is evident that it is the same material that was collected by Ogloblin in Poltava and sent to London by Kiritshenko. For that reason we consider the English material as belonging to the type series and, thus, paralectotypes.

Other material examined. Holotype of *Rh. desertus* and paratype of *Rh. pallidus*, large series of females and nymphs from western Kazakhstan, one female from Kirghizia (Kungey-Alatau).

Description. Adult female. Ostioles not developed. Circulus slightly convex. Multilocular pores numerous on both body sides. Bitubular ducts smaller than multilocular pores, located on dorsal body surface and along margin of ventral body surface, single ducts located in middle part of posterior abdominal and thoracic sternites. Tubular ducts wide, with a small collar at the base, occur on both body sides, few.

Taxonomic Remarks. The synonymy is established while comparing of the types of *Rh. poltavae*, *Rh. desertus* and *Rh. pallidus*. *Rh. lelloi* Mazzeo, 1995, that was described from Italy and noted for Hungary, and also *Rh. caesii* Schmutterer, 1956 from Germany, are probably identical to *Rh. poltavae*. Unfortunately, we had no opportunity to become acquainted with the types of those species. To this species group with numerous multilocular pores *Rh. brevipes* Goux, 1943 also belongs. In description of this species Goux points to the absence of bitubular ducts. When studying the paratype of this species we also failed to reveal it. Tubular ducts in *Rh. brevipes* and *Rh. poltavae* also differ in it's structure.

In the description and figure made by Tereznikova (1975) any bitubular ducts are missing. We examined the material on which the description and the figure were based.

Distribution. Russia: Krasnodar Terr. (Anapa Reg.); Ukraine, Armenia, western Kazakhstan, Kirghizia. Italy.

Mode of life. Host plants for the type series of *Rh. poltavae* are unknown; *Rh. desertus* was described from Veronica armena, *Rh. pallidus* – from a gramineous plant; in Kazakhstan it was collected from Spiraea sp.

9. ***Rhizoecus tritici*** **(Borchsenius, 1949)** (Fig. 9)

Rhizoecus tritici Borchsenius, 1949: 177 (Russia: Orenburg Reg.).
Rhizoecus tritici: Tereznikova, 1975: 251.
Ripersiella? *tritici:* Kozár & Benedicty, 2007: 564.
Rhizoecus pratensis Borchsenius & Tereznikova, 1959: 322 (Ukraine: Transcarpathia), **syn. n**.
Rhizoecus pratensis: Tereznikova, 1975: 248 (as *Ph. halophilus*).
Ripersiella pratensis: Kozár & Benedicty, 2007: 526.

Material. Holotypes (monotypes) of *Rh. pratensis* and *Rh. tritici* and a female series from Kazakhstan.

Description. Adult female. Ostioles well-developed. Circulus not slightly convex. Multilocular pores arranged on three posterior abdominal sternites. Bitubular ducts smaller than multilocular pores, few on both body sides. Tubular ducts wide, with parallel sides, sclerotized at base, numerous on both body sides.

Systematical notes. Synonymy was established when comparing of the holotypes of *Rh. tritici* and *Rh. pratensis*. In the primary description and in the book by Tereznikova (1975) bitubular ducts in *Rh. pratensis* are missing. *Rhizoecus petiti* is close to *Rh. pratensis*, differs in character of tubular and tritubular ducts.

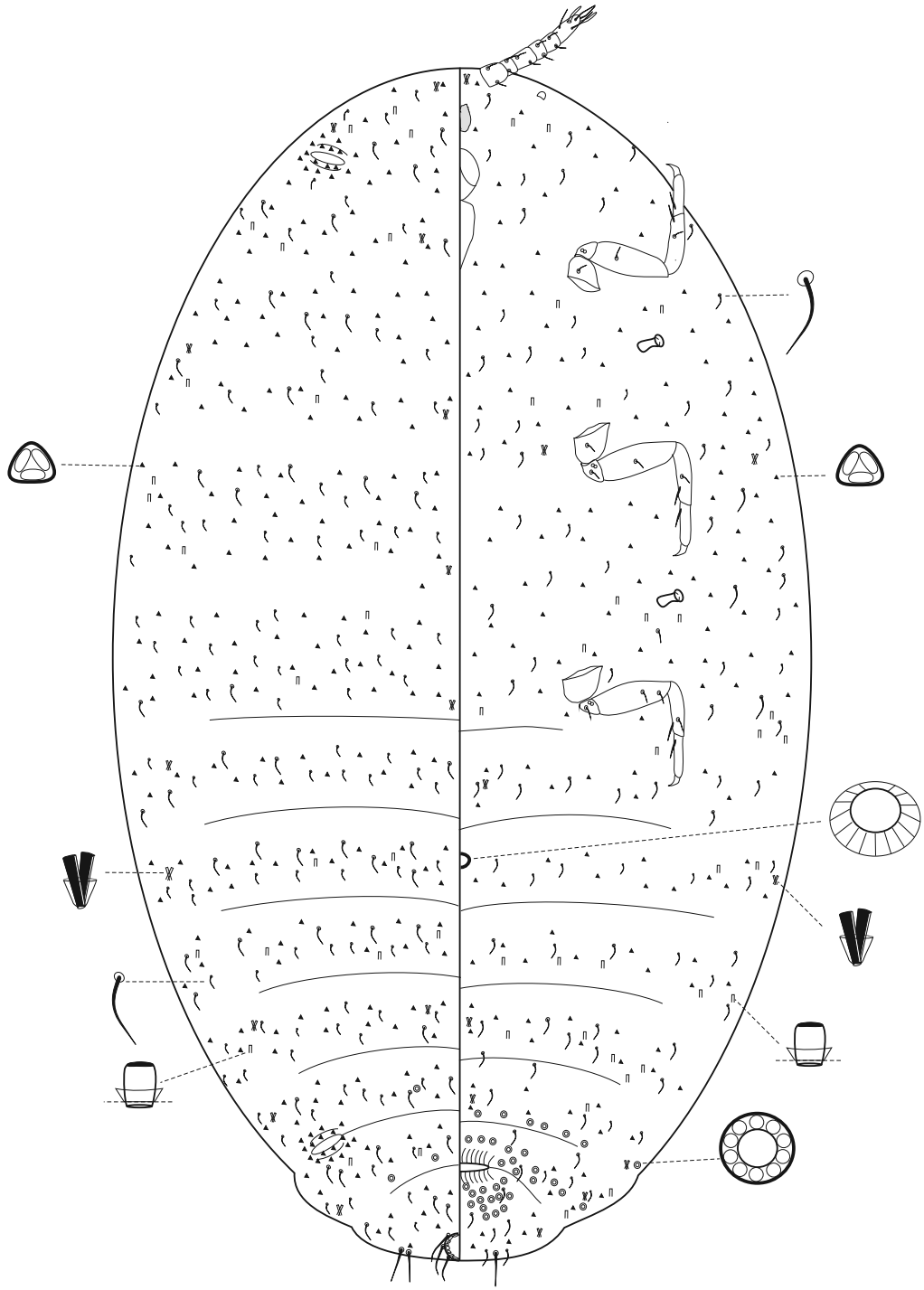

Fig. 9. *Rhizoecus tritici*, female, holotype.

Distribution. Russia: Orenburg Reg.; western Kazakhstan, Ukraine. Italy.

Mode of life. Collected from Festuca sulcata and Koeleria gracilis.

10. ***Rhizoecus ornatus*** **Borchsenius, 1949** (Fig. 10)

Rhizoecus ornatus Borchsenius, 1949: 176 (Armenia)
Rhizoecus ornatus: Ter-Grigorian, 1973: 90; Kozár & Benedicty, 2007: 288.
Rhizoecus ornatoides Tang, 1992: 62 (a substitute name erroneously introduced for *Rhizoecus ornatus* Borchsenius, 1949, a senior homonym of *Rh. ornatus* Hambelton, 1976; the latter species is now in *Benedictycoccina* Kozár & Foldi, 2004).

Material. The species known from the holotype (ZIN).

Description. Adult female. Ostioles well-developed. Circulus conical. Anal lobes with large, flat, sclerotized plate with 3 long and 1 short flagellate setae. Multilocular pores located on two or three posterior abdominal sternites. Bitubular ducts (large trilocular in description by Borchsenius and Ter-Grigorian, trilocular in Kozár & Benedicty), equal to multilocular pores in size, forming transverse rows on dorsal body surface, single on ventral body surface. Tubular ducts small, with parallel sides and sclerotized apex, present on both body sides.

Distribution. Armenia.

Mode of life. Collected under a stone.

11. ***Rhizoecus halophilus*** **(Hardy, 1868)** (Fig. 11)

Coccus halophilus Hardy, 1868: 136 (Scotland).
Rhizoecus halophilus: Williams, 1962: 47.
Ripersiella halophila: Kozár & Benedicty, 2007: 458.

Material. 14 females from Karelia, 2 from Italy, 1 from Ireland, female series collected by I.A. Gavrilov in Bulgaria (Rila Mountains) (ZIN).

Description. Adult female. Ostioles well-developed. Circulus conical. Multilocular pores located on three posterior abdominal sternites. Bitubular ducts equal to multilocular pores in size, few, located only on dorsal body surface. Tubular ducts small, with parallel sides, numerous on both body sides.

Distribution. Russia: Karelia. Europe: widely.

Mode of life. Polyphagous species. In Karelia collected in littoral on Triticum vulgaris, Leumus arenarius, Elytrigia, Plantago maritima, Trifolium vulgaris.

12. ***Rhizoecus microtubulatus*** **Gavrilov & Danzig, sp. nov.** (Fig. 12)

Holotype. ZIN, K No 407; female, **Russia**, *Astrakhan*, semi-desert near Tinaki Lake, on thin roots of Artemisia vulgaris, 13 May 2004, coll. I.A. Gavrilov.

Paratype. ZIN; female, same data as holotype.

Description. Adult female. Ostioles poorly developed. Circulus conical. Multilocular pores located on three posterior abdominal sternites. Bitubular ducts very small, comparable to trilocular pores in size. Basing on the available material, it is hard to judge the location of bitubular and tritubular ducts. They seem to form transverse rows on ventral body surface. Tubular ducts wide, dilating to strongly sclerotized apex.

Comparative Remarks. The new species differs from the other Palaearctic species of the genus *Rhizoecus* in structure of the bitubular ducts of a very small size (see Fig. 12); their size is similar to the size of trilocular pores.

Etymology. Species name is derived from the main diagnostic character of the new species, small size of the bitubular ducts.

Mode of life. Collected in the beginning of oviposition period.

13. ***Rhizoecus parvus*** **Danzig, 1985** (Fig. 13)

Rhizoecus parvus Danzig, 1985: 121 (Russia: Northern Caucasus).
Rhizoecus parvus: Kozár & Benedicty, 2007: 511.

Material. Holotype and paratypes (ZIN).

Description. Adult female. Ostioles poorly developed. Circulus flat. Multilocular pores located on V–VII abdominal terg-

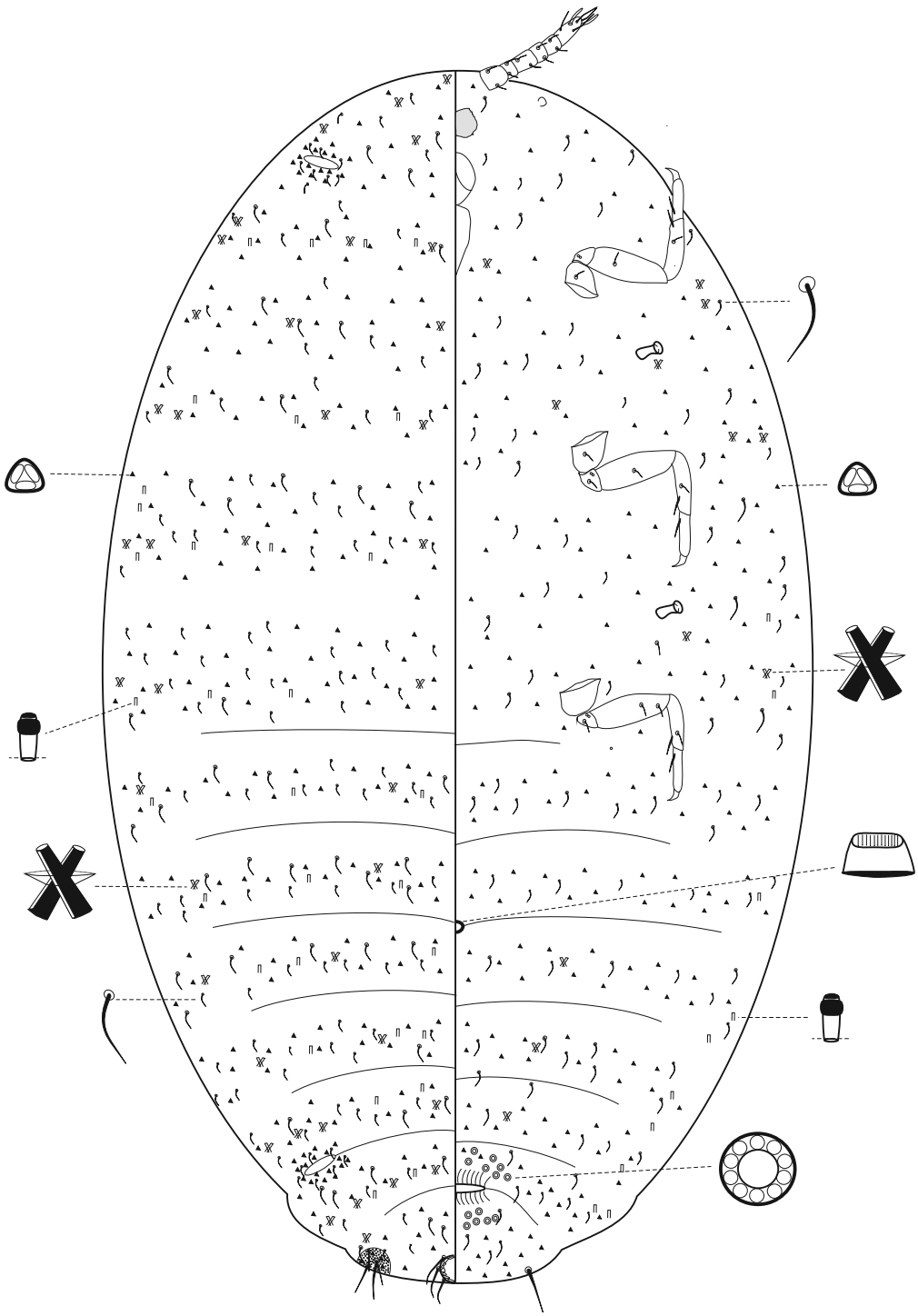

Fig. 10. *Rhizoecus ornatus*, female, holotype.

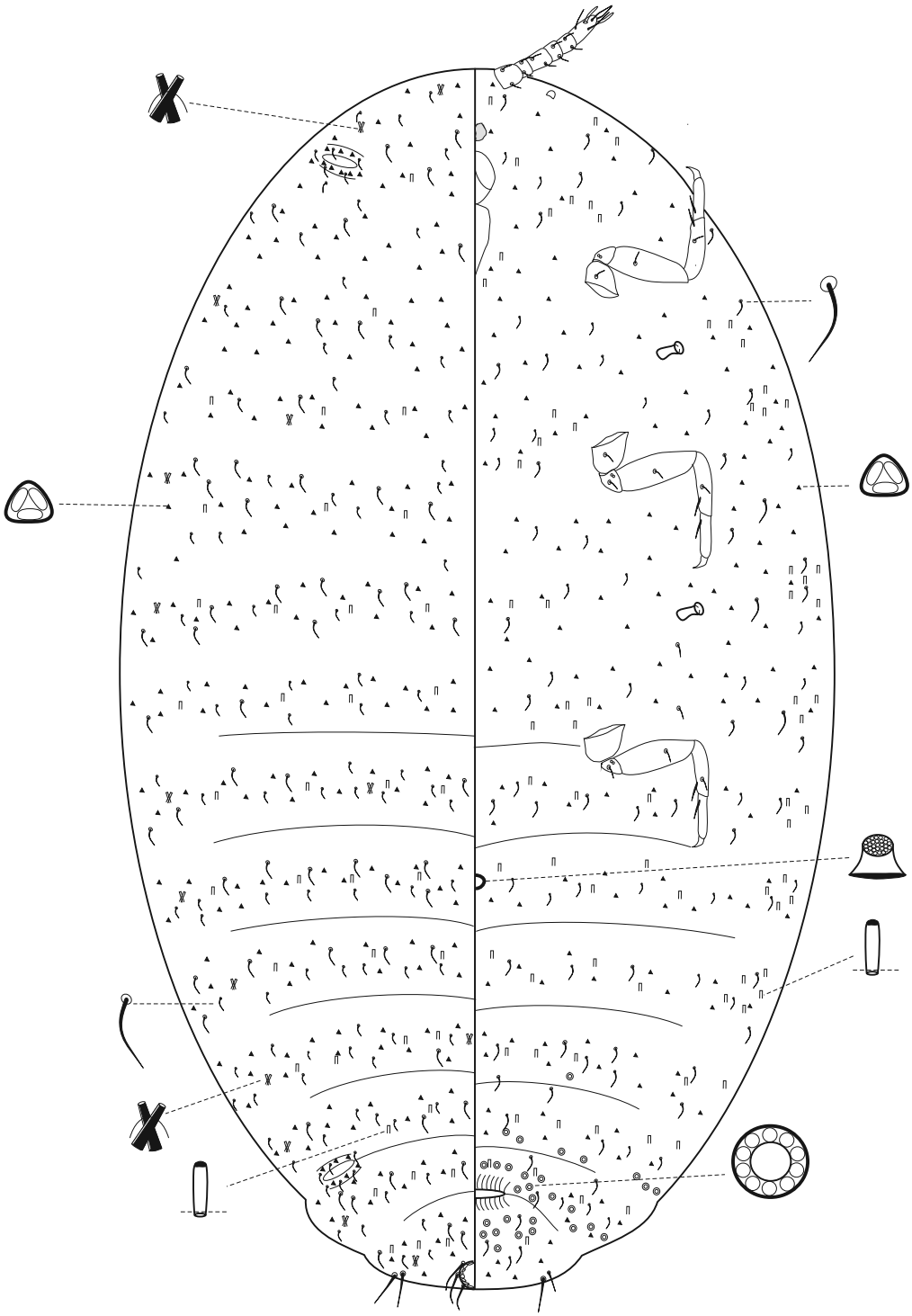

Fig. 11. *Rhizoecus halophilus*, female, Russia: Karelia.

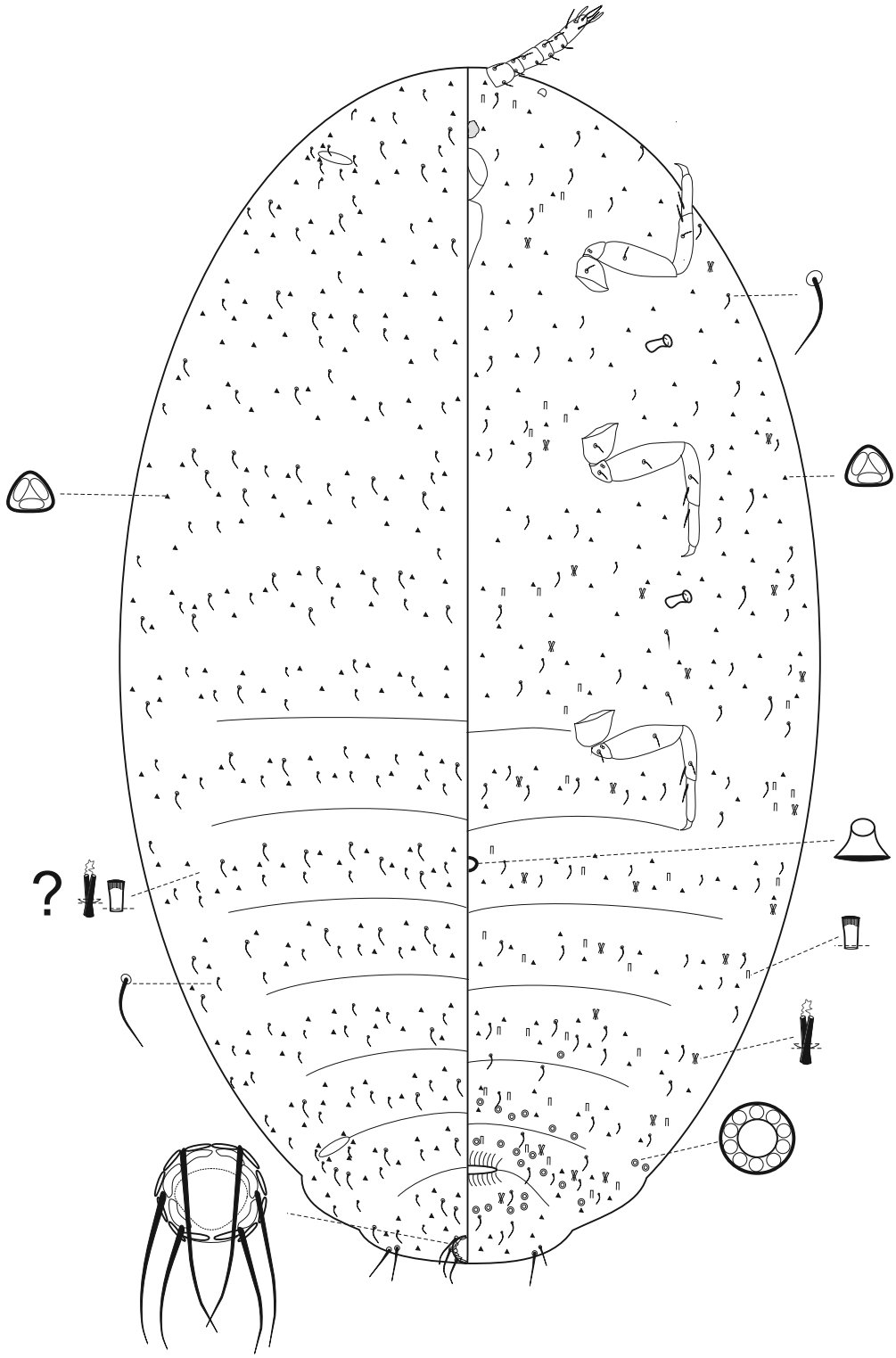

Fig. 12. *Rhizoecus microtubulatus*, **sp. nov.**, female.

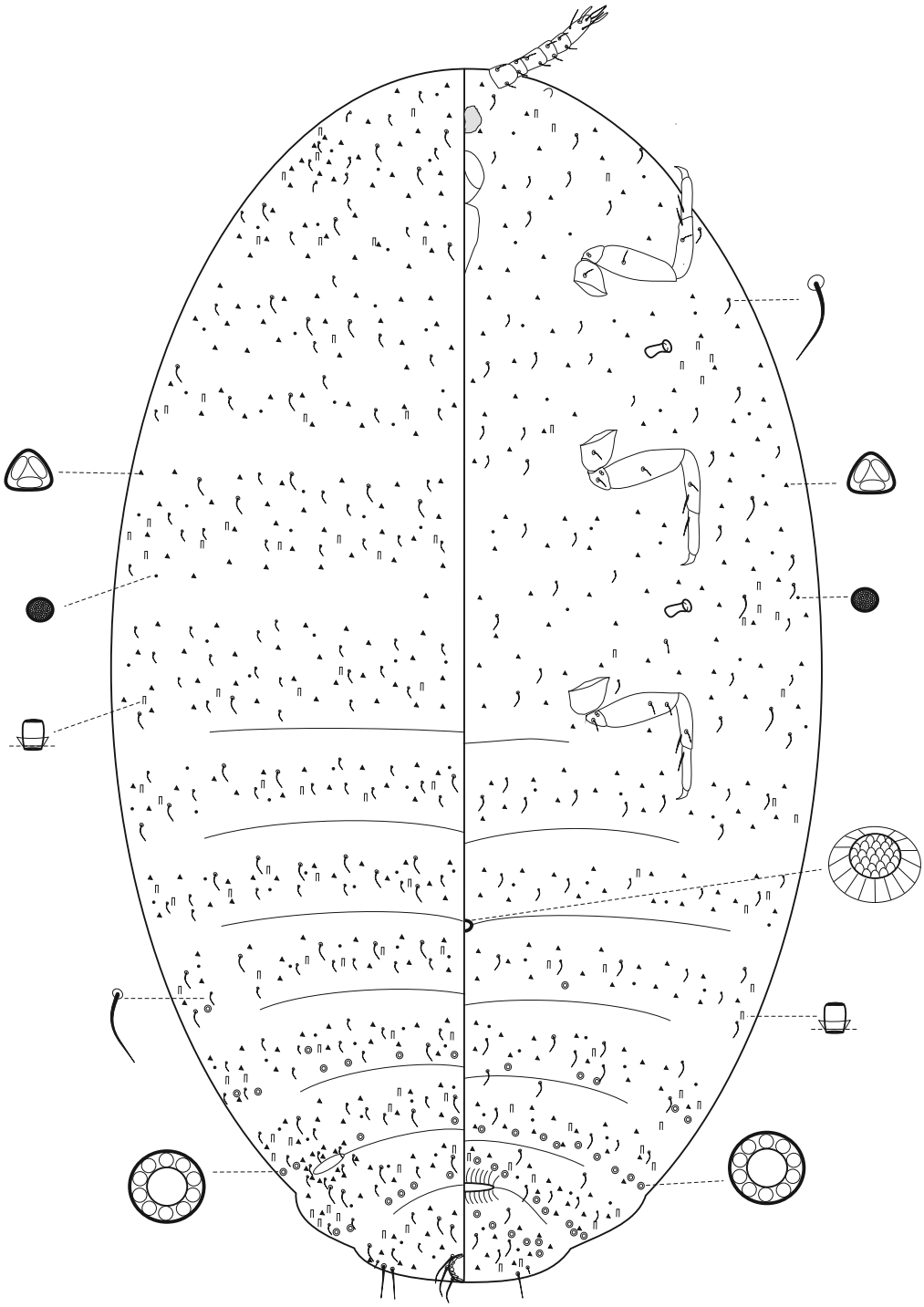

Fig. 13. *Rhizoecus parvus*, female, holotype.

ites and IV–VIII abdominal sternites. Bi- and tritubular ducts not found, irregular strongly sclerotized pores present. Tubular ducts dilating to strongly sclerotized apex, numerous on both body sides.

Distribution. Known from the type locality only.

Mode of life. Collected from Sempervivum caucasicus and Artemisia vulgaris.

KEY TO SPECIES

1(6). Occur in greenhouses only.
2(5). Tritubular ducts present, bitubular ducts absent.
3(4). Multilocular pores present. Circulus and tubular ducts absent . . . . . .*Rh. dianthi*
4(3). Multilocular pores absent. Circulus and tubular ducts present . . . . . *Rh. cacticans*
5(2). Tritubular ducts absent, bitubular ducts present . . . . . .*Rh. mexicanus*
6(1). Occur in open ground conditions.
7(24). Tritubular or bitubular ducts present, sclerotized irregular pores absent. Tubular ducts of different types.
8(15). Tritubular ducts present.
9(14). Single circulus present. Antennae 6-segmented.
10(13). Multilocular pores present.
11(12). Tubular ducts broad, dilating towards apex. Anal plate not always visible . . . . . .*Rh. kazachstanus*
12(11). Tubular ducts narrow, with parallel sides . . . . . *Rh. inconspicuus*
13(10). Multilocular pores absent . . .*Rh. albidus*
14(9). 3 circuli present. Antennae 5-segmented . . . . . *Rh. vitis*
15(8). Bitubular ducts present, sometimes few.
16(23). Bitubular ducts of common size; their length equal or close to diameter of multilocular pores. Tubular ducts narrow or broad, with parallel sides.
17(18). Multilocular pores numerous on both body sides . . . . . .*Rh. poltavae*
18(17). Multilocular pores located only on last abdominal segments.
19(20). Anal plate well-developed, sclerotized . . . . . *Rh. ornatus*
20(19). Anal plate not developed.
21(22). Tubular ducts broad, with collar at the base. Circulus slightly convex . . . . .*Rh. tritici*
22(21). Tubular ducts narrow, without collar at the base. Circulus strongly convex . . . . . .*Rh. halophilus*
23(16). Bitubular ducts small, in size comparable with trilocular pores (Fig. 12). Tubular ducts broad, dilating towards heavily sclerotized apex . . . . . .*Rh. microtubulatus* **sp. nov.**
24 (7). Tritubular and bitubular ducts absent, sclerotized irregular pores with obscure structure present. Tubular ducts short, with collar at the base . . . . . .*Rh. parvus*

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