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Additions to the Scale Insect Fauna (Homoptera, Coccinea) of Kazakhstan

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Abstract—*Seyneria oligocerarifera* **sp. n.** and *Trionymus sengirkumensis* **sp. n.** (Pseudococcidae) are described based on the material collected in Mangystau and Atyrau provinces of Kazakhstan. Five other species of mealybugs and one species of armored scale insects (Diaspididae) are recorded for the first time for Kazakhstan. Color photographs of all the reported species taken under the natural conditions are provided.

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Systematic investigations of the scale insects of Kazakhstan were carried out in the second half of the XX century by G.Ya. Matesova, a specialist of Institute of Zoology, Academy of Sciences of the Kazakh Soviet Socialist Republic, and later by her pupil R.V. Yashchenko (mainly for the family Margarodidae). A complete list of G.Ya Matesova's publications can be found in R.V. Yashchenko's paper (2004). In addition, extensive material of armored scale insects (Diaspididae) and mealybugs (Pseudococcidae) of the Kazakhstan fauna, collected by various entomologists and deposited in the collection of the Zoological Institute of the Russian Academy of Sciences in St. Petersburg, were entirely used in the monographic reports on the fauna of Russia and adjacent countries (Danzig, 1993) and on the Palaearctic fauna (Danzig and Gavrilov-Zimin, 2014, 2015). In total, about 200 species of scale insects are known at present for the territory of Kazakhstan. This number could not be considered final as many species known from the adjacent territories similar in the environment were not recorded for Kazakhstan only because this large country has been insufficiently and irregularly investigated. This especially applies to the species which lead reserved mode of life on the roots and in the leaf axils of herbaceous perennials and thus require special collecting methods. During A.S. Kurochkin's expedition to Western Kazakhstan (in Mangystau and Atyrau provinces) in 2016, specimens of 8 species of mealybugs, 2 species of soft scales, and 1 species of armored scales were collected. All the species collected are characteristic representatives of the Southern Palaearctic fauna, but most of them have not been recorded in Kazakhstan earlier, and two mealybug species have turned out to be new to science and are described below.

The whole material collected, including the types, is deposited in the collection of the Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZIN).

The numbers marked with "K" designate uniform numbers of the ethanol series and corresponding series of microscopic slides in the ZIN collection.

DESCRIPTIONS OF NEW SPECIES

1. Family **PSEUDOCOCCIDAE**

2. Genus ***SEYNERIA*** GOUX, 1990

Seyneria oligocerarifera
Gavrilov-Zimin et Kurochkin, sp. n.
(Figs. 1–5)

Description. Female. Body widely oval, about 2 mm long. Antennae 9-segmented. Legs normally developed, without translucent pores; claw with denticle; claw digitules with clavate apices. Anal apparatus usual, with inner row of pores, outer row of spinulae, and 6 setae

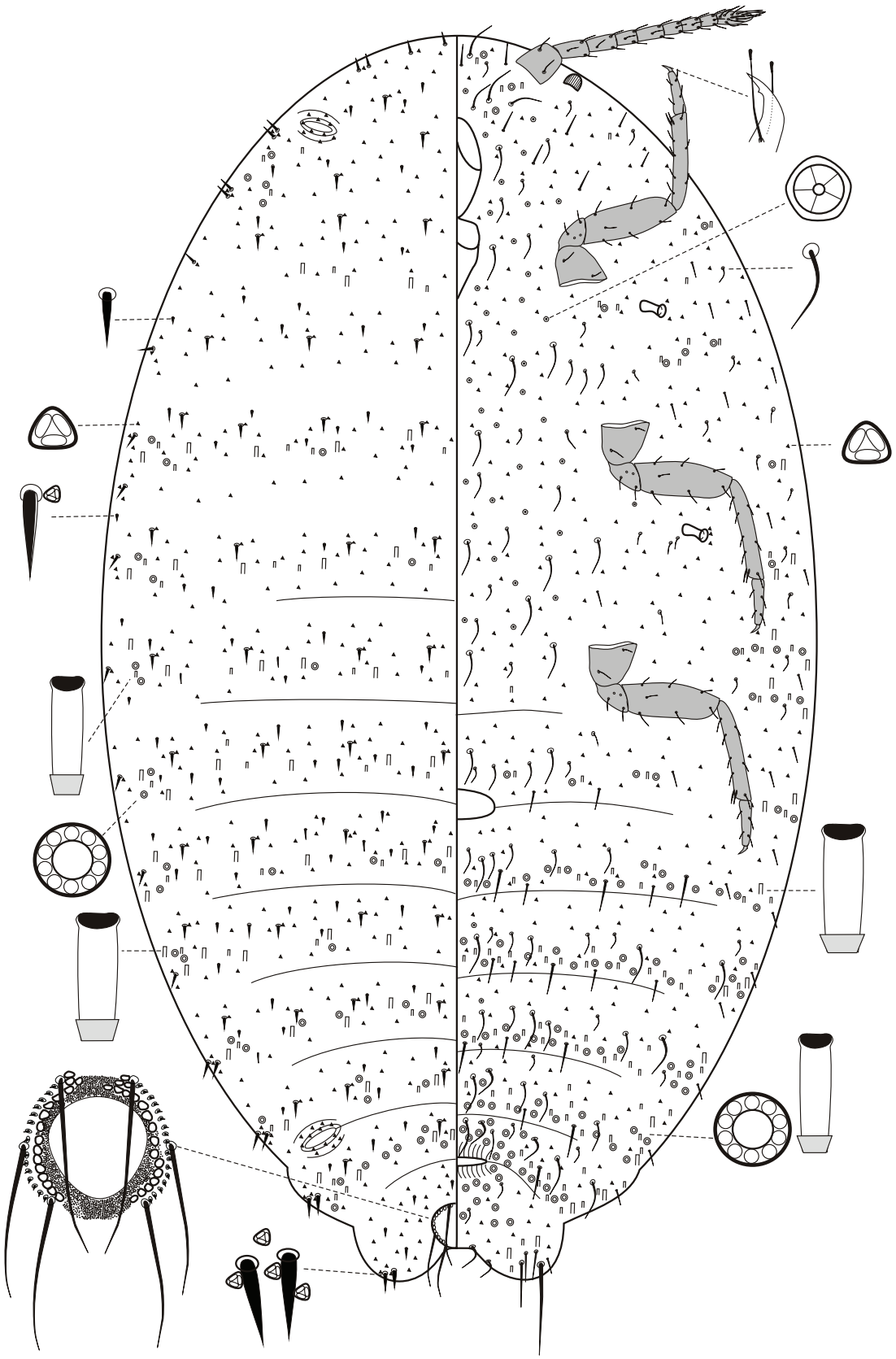


Fig. 1. *Seyneria oligocerarifera* sp. n., holotype, dorsal and ventral view.

Figs. 2–5. *Seyneria oligocerarifera* sp. n.: (2) biotope (Caspian Sea coast), (3) host plant (*Artemisia kelleri*), (4) localization of an adult female on the root of *A. kelleri*, (5) an adult female on the root *of A. kelleri*.

each of which slightly longer than diameter of anal ring. Ostioles forming 2 pairs. Circulus one, oval. Multilocular pores (each about 8 μm in diameter) and tubular ducts forming together clusters at each side body; these clusters most abundant along margin of body, merging into transverse continuous stripes in median zone of ventral surface of abdomen. Quinquelocular pores (each about 5 μm in diameter) numerous in median zone of ventral surface of cephalothorax. Trilocular pores (each about 3 μm in diameter), numerous, regularly scattered over entire surface of body. Tubular ducts with small collars, of two sizes, together with multilocular pores forming clusters, also present separately on both sides of body (Fig. 1). Larger ducts (each about 15 μm long and 4 μm wide) present on dorsal surface of body and in marginal zone of ventral surface; small ducts (each about 10 μm long and 2 μm wide) scattered over entire surface of body but most numerous in median zone of abdominal sternites. Cerarii forming 7 pairs (3 on head and 4 on posterior segments of abdomen); other cerarii replaced by single conical setae each of which bearing trilocular pore attached to base. Dorsal surface of body covered with conical setae of various sizes; largest conical setae similar in size to those of cerarii, each with trilocular pore attached to base.

Males unknown.

Larva (probably, of last instar) differing from adult in smaller size of body (about 1 mm long), 7-segmented antennae, shortened tibiae subequal in length to tarsi, and absence of multilocular pores and tubular ducts.

Taxonomic notes. The species of the genus *Seyneria* differ from the other species of the *Peliococcus* Borchsenius, 1948 genus-group in the presence of tubular ducts with collars. Until recently, such species were known only from Southern Europe (see the revision of the genus *Seyneria*: Danzig and Gavrilov-Zimin, 2014); later, one of the species was found in Morocco (Gavrilov-Zimin, 2016). *Seyneria oligocerarifera* sp. n., described here, is the first Asian representative of this genus. The new species is most closely related in morphology to *S. porticcia* Goux, 1990 known from the French Department of Var and from Corsica Island but differs from it in the presence of numerous quinquelocular pores and in reduction of the majority of the cerarii which remained only on the head and posterior abdominal segments.

Etymology. The name of the species is derived from Latin and Latinized Greek words: “oligo”—few, poor, “cerariae”—cerarii (groups of setae and wax glands

along the margin of body in mealybugs), and "fero"—to bear.

Material. Holotype, female: K 1464, *Mangystau Prov.*, Karakiyanskii District, 23.86 km S of Fetisovo Vill., 42°32′35.8″N, 52°40′54.1″E, cliffy shore of Caspian Sea, scree debris, on main root of *Artemisia kelleri* Krasch., 22.V.2016 (A.S. Kurochkin).

Distribution. Kazakhstan (Mangystau Prov.).

1. Genus ***TRIONYMUS*** BERG, 1899

Trionymus sengirkumensis
Gavrilov-Zimin et Kurochkin, sp. n.
(Figs. 6–12)

Description. Female. Body oblong-oval, about 3 mm long, rose-red in living individuals. Antennae 7- or 8-segmented. Legs normally developed, without translucent pores; claw without denticle; claw digitules with clavate apices. Anal apparatus usual, with inner row of pores, outer row of spinulae, and 6 setae which slightly longer than diameter of anal ring. Ostioles forming 2 pairs. Circulus absent. Multilocular pores (each about 8 μm in diameter) forming transverse rows on 4 posterior sternites, single pores occurring on posterior abdominal tergites. Trilocular pores (each about 3 μm in diameter) numerous, regularly scattered over entire surface of body. Simple discoidal pores (each about 2 μm in diameter) occurring on all segments of body. Tubular ducts simple, of two sizes, very numerous, forming wide stripes on all segments of body. Larger ducts about 8 μm long and 3 μm wide; small ducts about 7 μm long and 2 μm wide. Cerarii forming two pairs (C_{17} and C_{18}); C_{16} replaced by pseudo-cerarii: with flagellate setae instead of conical setae. C_{18} situated on small, weakly sclerotized plate, represented by 2 thick conical setae, several hair-like setae, and group of trilocular pores. In series of paratypes K 1470, sclerotized plate of last pair of cerarii absent. Short fine flagellate setae scattered over entire surface of body.

Males and larvae unknown.

Taxonomic notes. The large, world-wide distributed genus *Trionymus* Berg, 1899 was recently revised within the limits of the Palaearctic fauna (Danzig and Gavrilov-Zimin, 2015); this monograph includes a key to 47 species. The new species described here is closely related in morphology to *Trionymus vaginatus* Matesova, 1968 known only from the description and from the type series collected in Eastern Kazakhstan from the leaf axils of perennial herbs of the family Asteraceae (Matesova, 1968). *Trionymus sengirkumensis* sp. n. differs from this species in the presence of only 2 (instead of 4 or 5) pairs of true cerarii, in a small, weakly sclerotized, or absolutely not developed plate of the last pair of cerarii, and in the presence of dorsal multilocular pores on the posterior abdominal segments. These dorsal pores are singular in the specimens from the series of the holotype (K 1467) but form transverse rows on several posterior abdominal tergites in the series of the paratypes (K 1470).

Etymology. The species name is derived from the toponym of the type locality—the Sengirkum Sands.

Material. Holotype, female, K 1467: *Mangystau Prov.*, Mangystau Distr., 47.59 km N of Senek Vill., 43°47′15.3″N, 53°29′20.4″E, Sengirkum Sands, within old central trunk and main root of *Seriphidium terrae-albae* (Krasch.) Polyakov, 26.V.2016 (A.S. Kurochkin). Paratypes: 1 female on glass together with holotype; 6 females, with same data of labels but on 5 separate slides; 2 females on two glasses, K 1470: *Atyrau Prov.*, Inderskii Distr., 22.9 km WNW of Esbol (Kulagino) Vill., 48°27′11.6″N, 51°16′23.6″E, Ryn-Sands, on main roots (at root neck) of *Seriphidium terrae-albae* (Krasch.) Polyakov, in their traceries and cracks (at sand surface), 9.VI.2016 (A.S. Kurochkin).

Distribution. Kazakhstan (Mangystau and Atyrau provinces).

NEW FAUNISTIC DATA

Family **PSEUDOCOCCIDAE**

Phenacoccus tergrigorianae Borchsenius, 1956
(Figs. 13–23)

Material. *Mangystau Prov.* Beineuskii Distr.: K 1451, K 1452, 15.48 km NW of Eset Vill., 45°51′56.6″N, 54°42′50.2″E, sandy massif, in axils of leaves of root rosette and first pair of stem leaves of *Ferula* sp., 03.V.2016 (A.S. Kurochkin). Karakiyanskii Distr.: K 1455, 25.37 km N of Kyzylsai Aul, 43°40′27.6″N, 53°07′44.5″E, Bostankum Sands, in axils of leaves of root rosette of *Eremurus inderiensis* (M. Bieb.) Regel, 09.V.2016 (A.S. Kurochkin); same data, in axils of leaves of root rosette of *E. inderiensis*; K 1456, 28.42 km NE of Kyzylsai Aul, 43°40′25.9″N, 53°13′30.2″E, Bostankum Sands, under dry leaves and

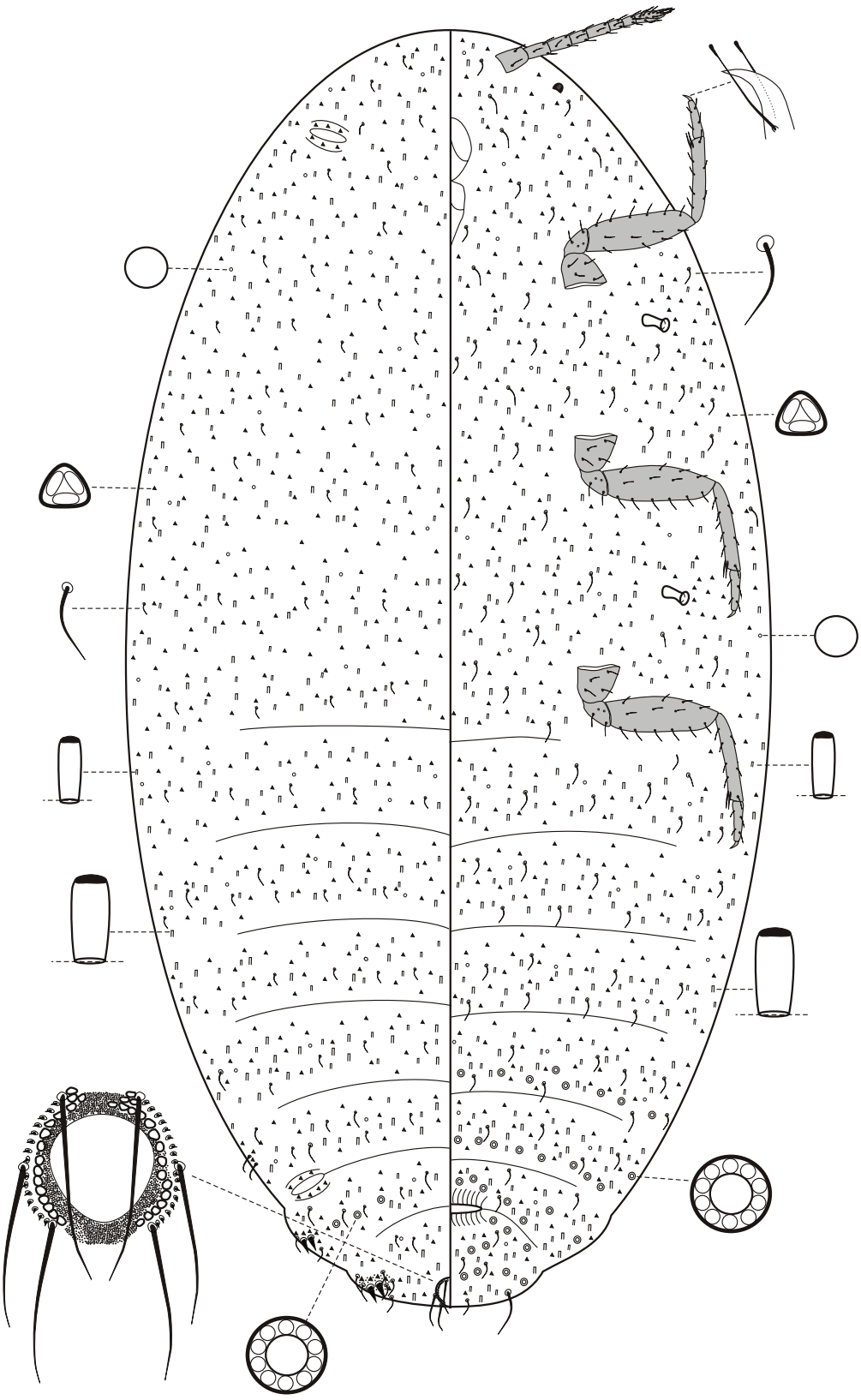
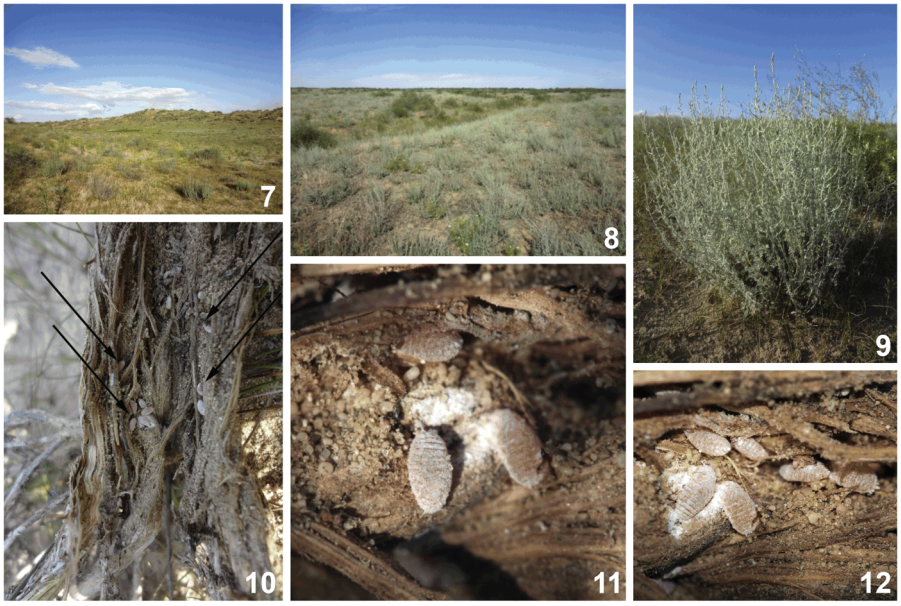
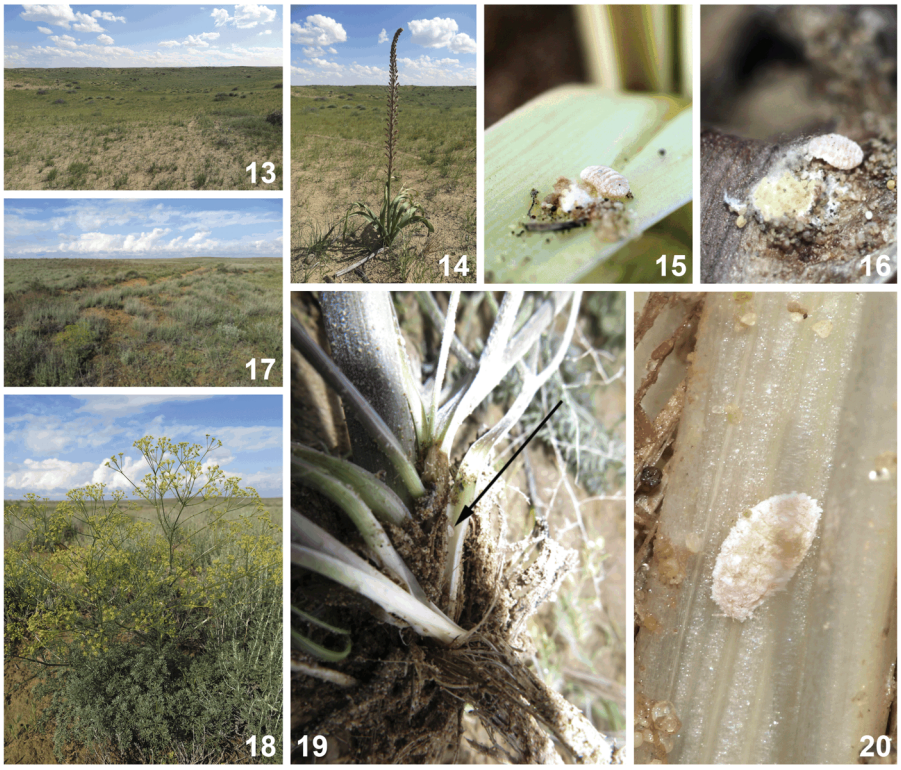


Fig. 6. *Trionymus sengirkumensis* sp. n., holotype, dorsal and ventral view.



Figs. 7–12. *Trionymus sengirkumensis* sp. n.: (7) biotope Sengirkum Sands, (8) biotope Ryn-Sands, (9) host plant (*Seriphidium terrae-albae*), (10) localization of adult females within the main root of *S. terrae-albae*, (11) adult females within the main root of *S. terrae-albae*, (12) a colony of females within the main root of *S. terrae-albae*.



Figs. 13–20. *Phenacoccus tergrigorianae* Borchsenius: (13) biotope (Bostankum Sands), (14) host plant (*Eremurus inderiensis*), (15) an adult female with ovisac in leaf sheath of *E. inderiensis*, 16) adult female with an ovisac in the axil of a dry leaf of *E. inderiensis*, (17) biotope (15.48 km NW of Eset Vill.), (18) host plant (*Ferula* sp.), (19) localization of an adult female in a leaf axil of *Ferula* sp., (20) an adult female in a leaf axil of *Ferula* sp.

in axils of old leaves (underground part) *Iris songarica* Schrenk, 11.V.2016 (A.S. Kurochkin).

Distribution. It is known from Greece, Armenia, and Turkey, recorded for Kazakhstan for the first time.

Phenacoccus emansor
Williams et Kozarzhevskaya, 1988
(Figs. 24–27)

Material. K 1454, *Mangystau Prov.*, Mangystau Distr., Buzachi Peninsula, 19.69 km NW of Tushchykudyk Vill., 44°52′10.0″N, 51°46′39.3″E, Sholshagylkum Sands, under flaking off bark, in cracks and on decayed areas of trunk (at base) and under flaking off bark, in cracks, and on decayed areas of central root of *Astragalus ammodendron* Bunge, 7.V.2016 (A.S. Kurochkin).

Distribution. It is known from Greece, Turkey, Israel, and Turkmenistan, recorded for Kazakhstan for the first time.

Fonscolombia sp. pr. ***setigera*** (Borchsenius, 1949)
(Figs. 28–32)

Taxonomic notes. The large genera *Fonscolombia* Lichtenstein, 1877 and *Phenacoccus* Cockerell, 1893, very close in morphology, comprise numerous hardly distinguishable species. The borders between these species, as well as between the genera, are rather obscure because of very significant morphological variability which is manifested in differences between individuals of one population and between populations from different regions. The recent revision (Danzig and Gavrilov-Zimin, 2015) of the Palaearctic species of these genera only partly structured the current diversity of the collection material and of the morphotypes described in the literature. However, it is not yet possible to clearly identify some specimens, for example, the two series of females from Kazakhstan listed below. According to the majority of the characters, these females are closely related to the widely distributed Southern Palaearctic species *Fonscolombia setigera* but differ from it in the presence of dorsal tubular ducts of two sizes (large and small), which in itself is a character rather rare in *Fonscolombia* and *Phenacoccus*.

Material. *Mangystau Prov.*, Karakiyanskii Distr., Karynzharyk Sands: K 1459, 13.54 km S of Akkudyk Vill., 42°50′57.8″N, 54°05′11.8″E, in main roots of *Seriphidium gurganicum* (Krasch.) Bremer et Humphries ex Y.R. Ling, 16.V.2016 (A.S. Kurochkin); K 1461, 21.45 km S of Akkudyk Vill., 42°46′55.6″N, 54°09′04.9″E, within trunk (at root neck) and within main root of *S. gurganicum*, 17.V.2016 (A.S. Kurochkin).

Trabutina crassispinosa Borchsenius, 1941
(Figs. 33–36)

Material. *Mangystau Prov.*, Karakiyanskii Distr.: K 1458, 11.69 km SE of Senek Vill., 43°19′09.5″N, 53°31′08.3″E, argillo-cretaceous desert near Kulandy Terrace, on branches of *Tamarix* sp., 15.V.2016 (A.S. Kurochkin); K 1468, 27.38 km N of Akkudyk Vill., 43°12′53.3″N, 54°02′58.1″E, Karynzharyk Sands, ravine with stream (Ashchysajkudyk Well), on branches of *Tamarix* sp., 30.V.2016 (A.S. Kurochkin).

Distribution. It is widely distributed in the Southern Palaearctic Region, has not been recorded in Kazakhstan earlier.

Mirococcus longiventris Borchsenius, 1949
(Figs. 37–39)

Material. K 1462, 1463, *Mangystau Prov.*, Karakiyanskii Distr., 12.19 km S of Akkudyk Vill., 42°51′42.5″N, 54°04′55.1″E, Karynzharyk Sands, in axils of dried up and dry leaves of root rosette of *Stipa arabica* Trin. et Rupr., 18.V.2016 (A.S. Kurochkin).

Distribution. It is known from Armenia, Turkey, and Uzbekistan, recorded for Kazakhstan for the first time.

Nudicauda nigra (Matesova, 1957)
(Figs. 40–42)

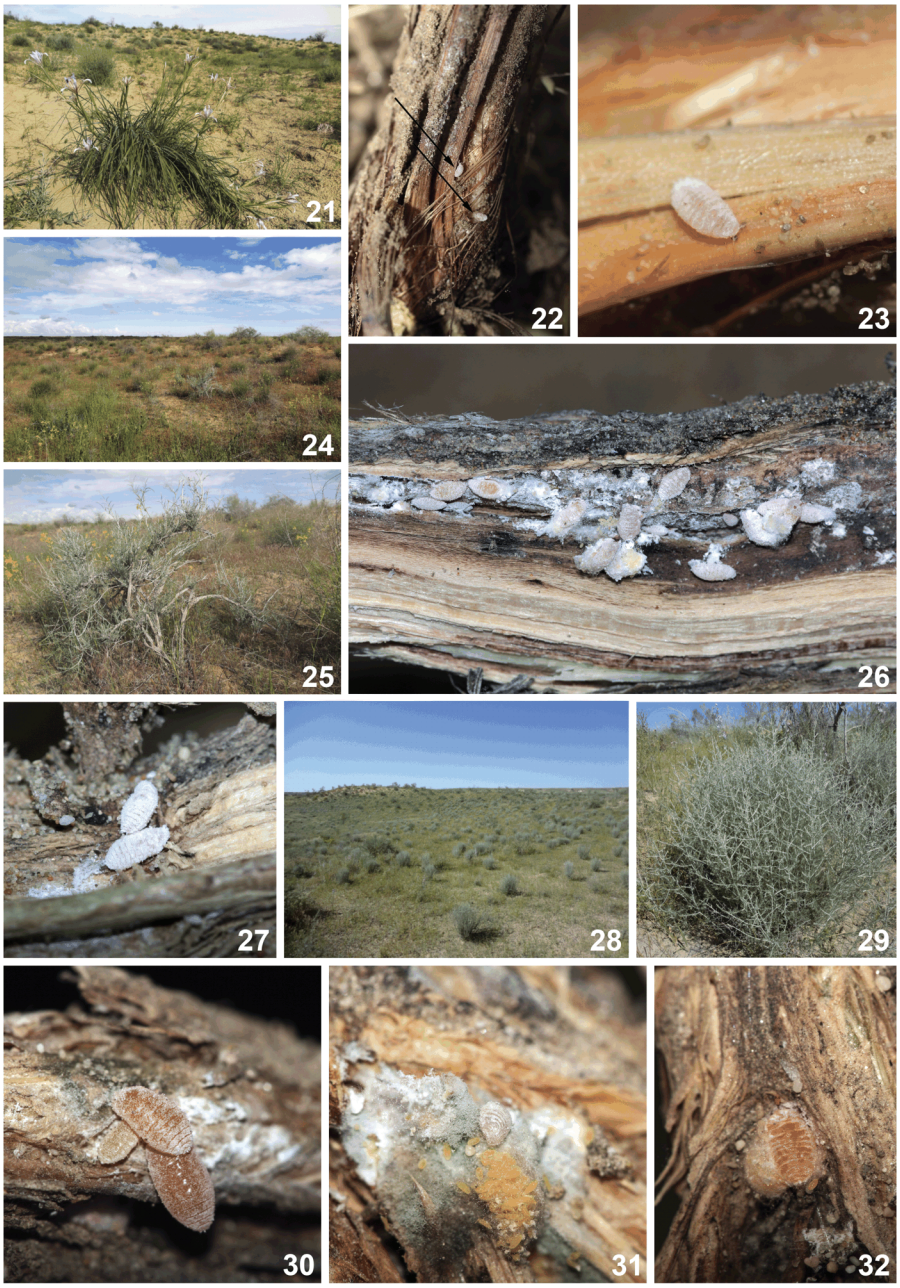
Material. K 1469, *Atyrau Prov.*, Inderskii Distr., 22.9 km WNW of Esbol (Kulagino) Vill., 48°27′11.6″N, 51°16′23.6″E, Ryn-Sands, among weavings of main roots at root neck of *Seriphidium terrae-albae* (Krasch.) Polyakov, 8.VI.2016 (A.S. Kurochkin).

Distribution. It is described from Eastern Kazakhstan; later it was also recorded for Astrakhan Province of Russia and for Mongolia; here it is recorded for Western Kazakhstan for the first time.

Family **COCCIDAE**

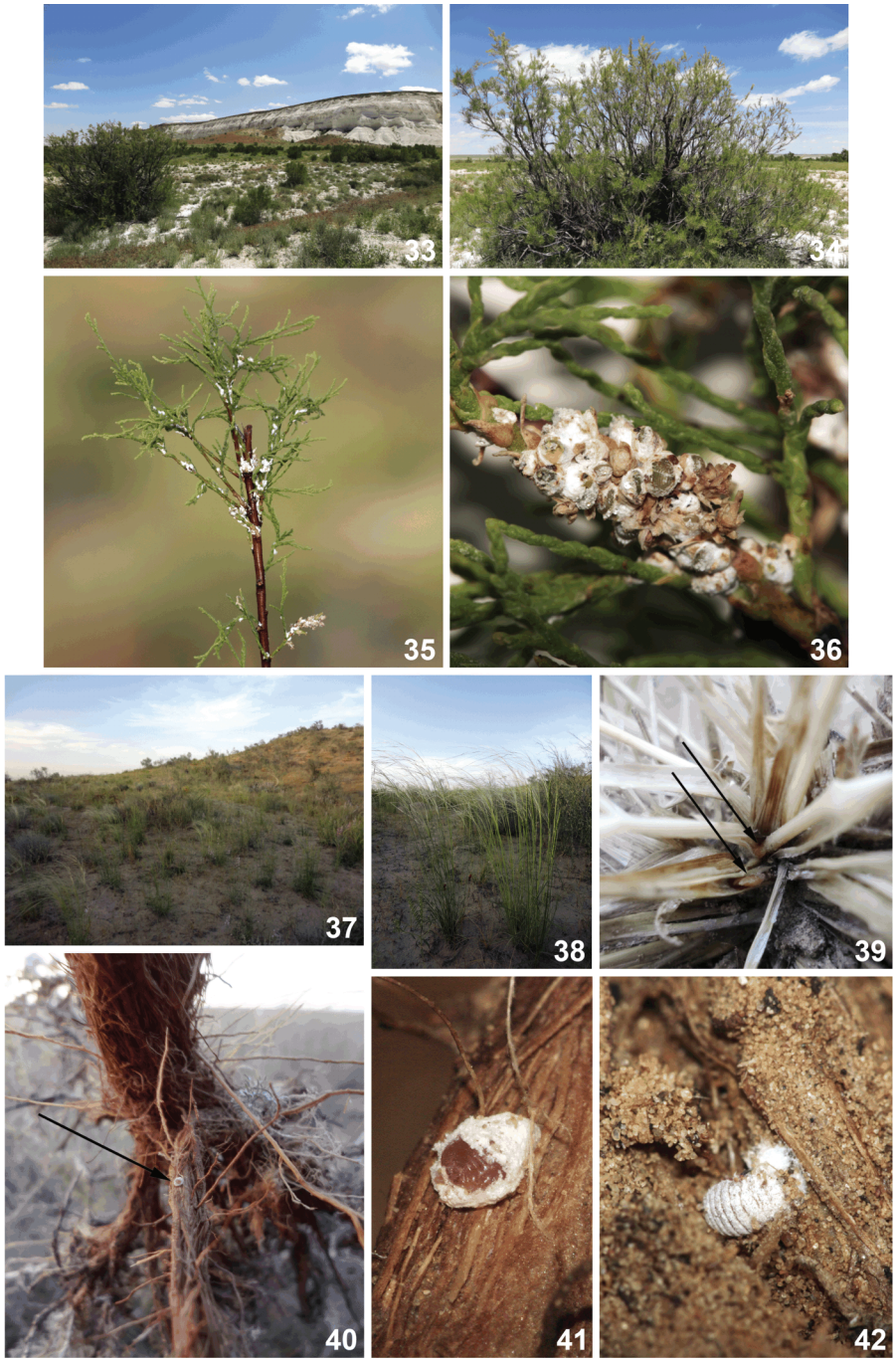
Acanthopulvinaria orientalis (Nasonov, 1908)
(Figs. 43–45)

Material. *Karaganda Prov*., western cliff of Ustyurt, burial ground of Elshibek, on *Nanophyton erinaceum*



Figs. 21–32. *Phenacoccus tergrigorianae* Borchsenius (21–23) [(21) biotope (Bostankum Sands) and host plant (*Iris songarica*), (22) adult females under old leaves of *I. songarica*, (23) an adult female at the base of a leaf of *I. songarica*], *Phenacoccus emansor* Williams et Kozarzhevskaya 24–27) [(24) biotope (Sholshagylkum Sands), (25) host plant (*Astragalus ammodendron*), (26) a colony of adult females with ovisacs under the flaked off bark and in crack of the trunk of *A. ammodendron*, (27) adult females in a crack of the trunk of *A. ammodendron*], *Fonscolombia* sp. prope *setigera* (Borchsenius) (28–32) [(28) biotope (Karynzharyk Sands), (29) host plant (*Seriphidium gurganicum*), (30) adult females and a larva on the main root of *S. gurganicum*, (31) an adult female and larvae of the first instar within the trunk of *S. gurganicum*, (32) an adult female, beginning of oviposition on the root of *S. gurganicum*].

(Pall.) Bunge, 23.V.1973 (E.P. Nartshuk). *Zhambylsky Prov.*, Moiynkumskii Distr., shore of Balkhash near Chiganak, saline, on saltwort, 18.VI. 1978 (E.M. Danzig). *Mangystau Prov.*, Karakiyanskii Distr., 5.9 km NE of Senek Vill., 43°38′27.9″N, 53°48′43.6″E, Sengirkum Sands (at Akpan Saline), on branches of *Haloxylon ammodendron* (C.A. Mey.) Bunge ex Fenzl, 27.V.2016 (A.S. Kurochkin); Karynzharyk Sands: K 1460, 13.45 km S of Akkudyk Vill., 42°51′00.6″N, 54°05′17.2″E, semi-fixed sands, on branch of *Haloxylon persicum* Bunge, 16.V.2016 (A.S. Kurochkin); 13.54 km S of Akkudyk Vill., 42°50′57.8″N, 54°05′11.8″E, on trunk of *Se-*



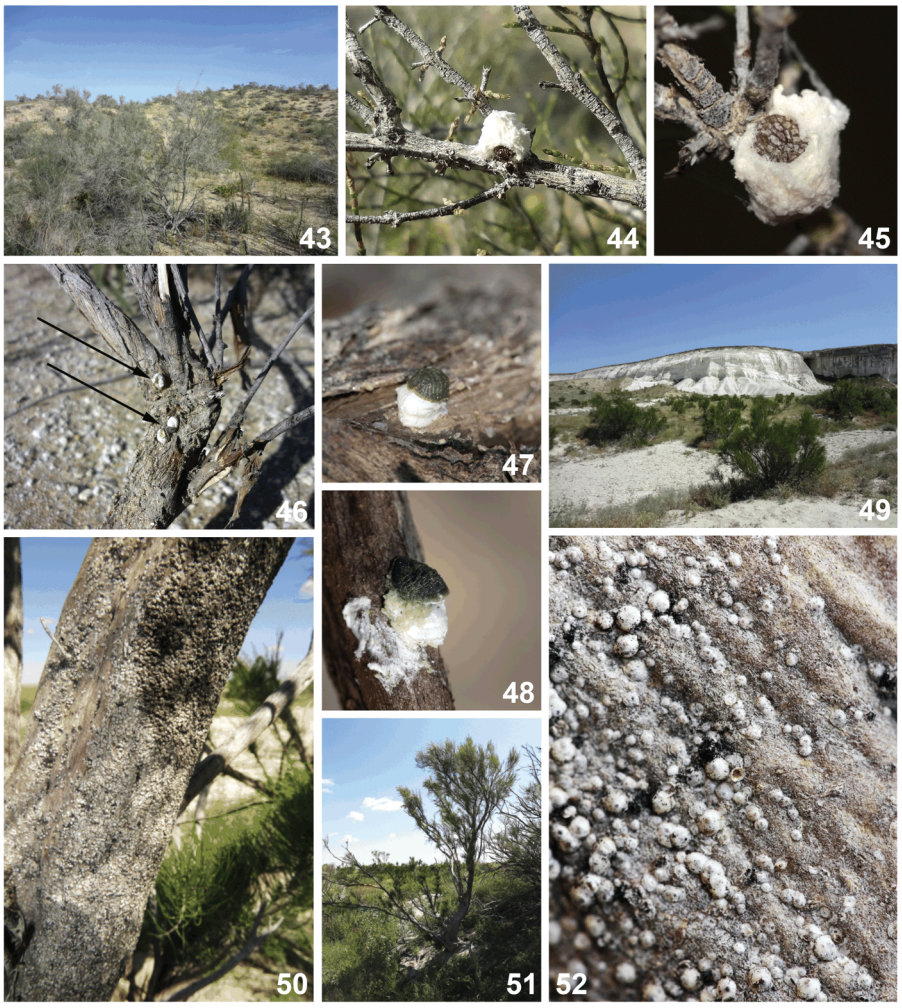
Figs. 33–42. *Trabutina crassispinosa* Borchsenius (33–36) [(33) biotope (near the Kulandy Terrace), (34) host plant (*Tamarix* sp.), (35) a colony on branches of *Tamarix* sp., (36) adult females on a branch of *Tamarix* sp.], *Mirococcus longiventris* Borchsenius (37–39) [(37) biotope (Karynzharyk Sands), (38) host plant (*Stipa arabica*), (39) an adult females in leaf axils of *S. arabica*], *Nudicauda nigra* (Matesova) (40–42) [(40) localization of an adult female on the root of *Seriphidium terrae-albae*, (41) an adult female in a wax sac on the root of *S. terrae-albae*, (42) an adult female on the root of *S. terrae-albae*].

riphidium gurganicum (Krasch.) Bremer et Humphries ex Y. R. Ling at root neck, 16.V.2016 (A.S. Kurochkin).

Distribution. Russia (the lower Volga Area); Egypt, Georgia, Armenia, Kazakhstan, Middle Asia, Iran, Afghanistan, Mongolia, China.

Rhizopulvinaria artemisiae (Signoret, 1873)
(Figs. 46–48)

Material. K 1465, *Mangystau Prov.*, Karakiyanskii Distr., 23.9 km S of Fetisovo Vill., 42°32′34.8″N, 52°40′54.3″E, cliffy shore of Caspian Sea, scree debris,



Figs. 43–52. *Acanthopulvinaria orientalis* (Nasonov) (43–45) [(43) biotope (Karynzharyk Sands), (44) an adult female with the ovisac on a branch of host plant (*Haloxylon persicum*), (45) an adult female with the ovisac (dorsal view)], *Rhizopulvinaria artemisiae* (Signoret) (46–48) [(46) localization of adult females on the main root of *Artemisia kelleri* (Caspian Sea coast), (47) an adult female (posterior view) with the ovisac, (48) an adult female (lateral view) with the opened ovisac], *Targionia arthrophyti* (Archangelskaya) (49–52) [(49) biotope (at the Kulandy Terrace), (50) a colony on the trunk of *Haloxylon ammodendron*, (51) host plant (*H. ammodendron*), (52) a colony on the bark of *H. ammodendron*].

on main root of *Artemisia kelleri* Krasch., 22.V.2016 (A.S. Kurochkin).

Distribution. Its is widely distributed over the entire Southern Palaearctic Region. For Kazakhstan, it was recorded earlier (under synonymous species names) from Western Kazakhstan Province and some eastern provinces, recorded for Southwestern Kazakhstan for the first time.

Family **DIASPIDIDAE**

Targionia arthrophyti (Archangelskaya, 1931) (Figs. 49–52)

Material. K 1457, 1466, *Mangystau Prov.*, Karakiyanskii Distr., 11.71 km SE of Senek Vill., 43°19′07.3″N, 53°31′08.1″E, argillo-cretaceous desert at Kulandy Terrace, on trunk and branches of *Haloxylon ammodendron* (C.A. Mey.) Bunge ex Fenzl, 13 and 24.V.2016 (A.S. Kurochkin).

Distribution. It is widely distributed in Middle Asia, recorded for Kazakhstan for the first time.

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REFERENCES

1. Danzig, E.M., *The Suborder Coccoidea (Homoptera, Coccinea). Families Phoenicoccidae and Diaspididae* (Nauka, St. Petersburg, 1991) (Fauna of Russia and Adjacent Countries, New Series, No. 144, Rhynchota) [in Russian].
2. Danzig, E.M. and Gavrilov-Zimin, I.A., *Pseudococcids (Homoptera: Coccinea: Pseudococcidae) of the Palaearctic Region. Part 1. Subfamily Phenacoccinae* (Zoological Institute, Russian Academy of Sciences, St. Petersburg, 2014) (Fauna of Russia and Adjacent Countries, New Series, No. 148. Rhynchota).
3. Danzig, E.M. and Gavrilov-Zimin, I.A., *Pseudococcids (Homoptera: Coccinea: Pseudococcidae) of the Palaearctic Region. Part 2. Subfamily Pseudococcinae* (Zoological Institute, Russian Academy of Sciences, St. Petersburg, 2015) (Fauna of Russia and Adjacent Countries, New Series, No. 149. Rhynchota) [in Russian].
4. Gavrilov-Zimin, I.A., "New and Earlier Unnoted Mealybugs and Felt Scale (Homoptera: Coccinea: Pseudococcidae + Eriococcidae) from Morocco," Annales de la Société Entomologique de France **52** (2), 88–94 (2016).
5. Matesova, G.Ya., "New Mealybug Species (Homoptera, Coccoidea, Pseudococcidae) from Eastern Kazakhstan," Entomologicheskoe Obozrenie **47** (1), 151–159 (1968).
6. Yashchenko, R.V., "Memorable Dates. The 80 Anniversary since Birth of G.Ya. Matesova (1925–1998)," Tethys Entomological Research **10**, 207–214 (2004).