

New Afrotropical scale insect pests (Homoptera: Coccinea) under glass in St Petersburg, Russia

Новые афротропические кокциды-вредители (Homoptera: Coccinea) в закрытом грунте Санкт-Петербурга, Россия

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Two Afrotropical scale insect species, *Trochiscococcus speciosus* (De Lotto, 1961) and *Ripersiella aloes* (Williams et Pellizzari, 1997), are recorded for the first time in Russia, St Petersburg, under glass on the roots of *Gasteria* sp. (Asphodelaceae). The first species is morphologically described and illustrated by a standard total coccidological figure and by the photograph; a study of the reproductive biology of this species revealed an obligate ovoviviparity, parthenogenesis (thelytoky) and the chromosomal number $2n=10$. The quarantine status for both species is advised on the territory of Russia and neighbouring countries.

Два афротропических вида кокцид, *Trochiscococcus speciosus* (De Lotto, 1961) и *Ripersiella aloes* (Williams et Pellizzari, 1997) впервые отмечены в России (Санкт-Петербург) в закрытом грунте на корнях *Gasteria* sp. (Asphodelaceae). Дано морфологическое описание первого вида, а также его фотография и рисунок, выполненные на основе изучения микроскопического препарата. Исследование репродуктивной биологии этого же вида показало, что он является облигатно яйцеживорождающим и размножается партеногенетически (телитокция), а его диплоидное число хромосом равно десяти. Службам защиты растений рекомендуется включить оба вида в список карантинных вредителей для открытого грунта Черноморского побережья Кавказа и Крыма и для закрытого грунта на всей территории России и сопредельных стран.

Key words: scale insects, mealybugs, quarantine pests, morphology, reproductive biology, karyotype

Ключевые слова: мучнистые червецы, кокциды, карантинные вредители, морфология, репродуктивная биология, кариотип

Scale insects as a whole and in particular, the family Pseudococcidae (mealybugs), are one of the most important and well known pests of the decorative and agricultural plants – outdoors as well as under glass. A lot of adventive tropical species of mealybugs from the different regions of the world are now widely distributed in the subtropical zone of Palaearctic and in the greenhouses of the more northern territories (Danzig

& GavriloV-Zimin, 2014). Two Afrotropical adventive species, *Trochiscococcus speciosus* (De Lotto, 1961) and *Ripersiella aloes* (Williams et Pellizzari, 1997) have been recorded for the first time in Europe in 1997 by the famous coccidologists Dr. Douglas Williams and Dr. Giuseppina Pellizzari (Williams & Pellizzari, 1997) on the roots of different Asphodelaceae plants. *T. speciosus* was originally described from Belgian Congo (now the Democratic Republic of the Congo) in the unrecognizable genus *Ripersia* Signoret,

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Fig. 1. General view of *Gasteria* sp. on roots of which *Trochiscococcus speciosus* and *Ripersiella aloes* were found.

1875 and then it was transferred by Williams and Pellizzari (1997) into the monotypic genus *Trochiscococcus* Williams and Pellizzari, 1997. *Ripersiella aloes* was initially described by Williams and Pellizzari (1997) in the genus *Rhizoecus* Künkel d'Herculeis, 1878. Its specimens were collected under glass in England from the roots of *Aloe glauca* Miller, 1768, presumably introduced directly from Africa. Then Kozár & Konczné Benedicty, 2003 transferred this species to the related genus *Ripersiella* Tinsley, 1899.

In September 2016, Dr Dmitry A. Gapon found both discussed species together on the roots of decorative *Gasteria* sp. (Fig. 1) in the main building of the Zoological Institute, Russian Academy of Sciences.

The origin of the host plant is unfortunately unknown. The peculiar genus *Trochiscococcus* is unfamiliar to Russian plant protection services, and to facilitate the identification of the species we provide the morphological description, total figure with microscopic structures of an adult female and the photo of live females on the roots. Additionally, we have studied the reproductive biology of *T. speciosus* for the first time and report the results below.

Numerous species of *Ripersiella* and *Rhizoecus* are described in details and illustrated in the works of Russian and other European authors (e.g. in the review of Palearctic fauna of Danzig & Gavrilov-Zimin, 2015), and we suppose unnecessary to ad-



Fig. 3. *Trochiscococcus speciosus*, females and larvae in life on roots of host plant.

ditionally discuss these genera here. However, we repeat the diagnostic characters of *Ripersiella aloes* according to Williams and Pellizzari (1997) below.

All material is deposited in the Zoological Institute, Russian Academy of Sciences.

Trochiscococcus speciosus

(De Lotto, 1961)

(Figs 2–3)

Morphological description. Female. Body yellow or light pinkish, broadly oval, up to 3 mm long. Antennae 6-segmented. Legs small and thin in comparison with body of gravid female; hind tibiae with conspicuous large tranlucent pores; claw without denticle. Anal apparatus complete, with inner ring of pores, outer ring of spinulae and six long setae. Both pairs of ostioles well developed. Circulus small, oval. Multilocular pores few, present around vulva only. Quinquelocular

pores absent. Trilocular pores numerous, scattered on all body surface. Simple discoidal pores of two types: large pores, slightly larger than trilocular pore, present in medial zone of VI–VII abdominal tergites; small simple pores, slightly smaller than trilocular pore, scattered on both body sides. Tubular ducts of two sizes: very large ducts with diameter of the duct slightly wider than diameter of multilocular pore and with collar, forming row along body margin and sparsely present on dorsum; small ducts with diameter of ducts similar to diameter of trilocular pore and without collar, forming transverse rows in medial zone of V–VI abdominal sternites and present occasionally or in small groups in marginal zone of abdominal sternites VII–VIII. Cerarii numbering three pairs (up to six pairs in material of Williams & Pellizzari, 1997) on posterior abdominal segments: C_{18} with 4–5 conical setae, several short flagellate setae

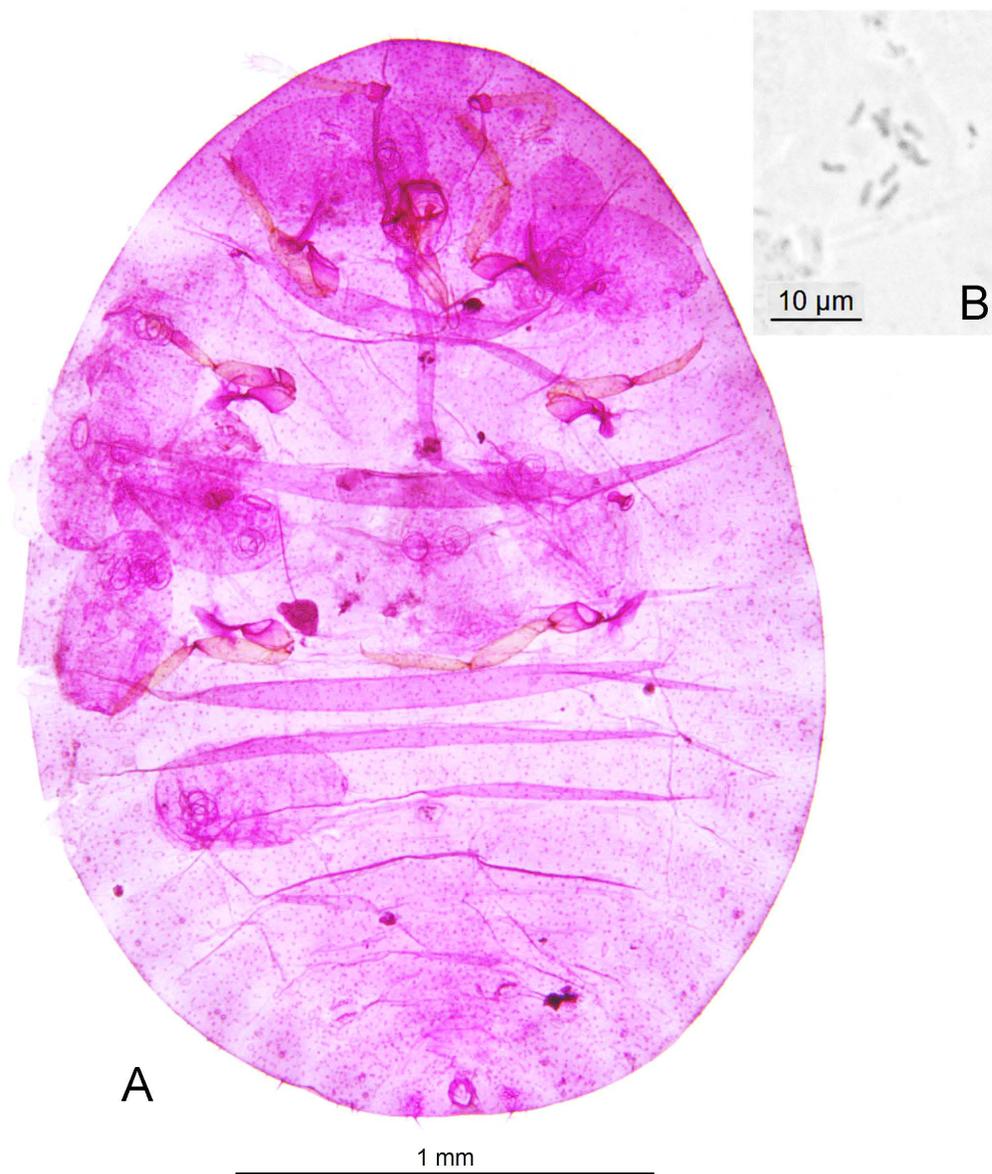


Fig. 4. *Trochiscococcus speciosus*. **A**, prepared ovoviparous female with fully developed larvae inside; **B**, karyotype, $2n=10$.

and group of trilocular pores; C_{17} with 2–3 conical setae and 7–8 trilocular pores; C_{16} with one small conical setae, one long flagellate setae and 5–6 trilocular pores. Flagellate setae of different sizes numerous on both body sides.

Males unknown.

Reproductive biology. Dissections of the adult females have shown that they have fully developed larvae inside their bodies (Fig. 4a), i.e. the species is obligate ovoviparous as many other mealybug genera (Gavrillov-Zimin, 2015). The males or male larvae are absent in the studied population

and were not recorded earlier by Williams & Pellizzari (1997). The cytogenetic study of young embryos also did not reveal the male embryos with Lecanoid paternal genome heterochromatinization which is the diagnostic character of the males in mealybugs (for the detailed explanation see, for example, Gavrilov & Trapeznikova, 2007 or Gavrilov-Zimin, 2016). Therefore, we consider the species as parthenogenetic (thelytocous). The diploid karyotype includes ten chromosomes, similar in size (Fig. 4b).

Ripersiella aloes

(Williams et Pellizzari, 1997)

Comments. The species has very small bitubular ducts; both tubes of the duct are closely appressed to appear unitubular. According to Williams & Pellizzari (1997), the similar bitubular ducts are also present in *Ripersiella geniculata* (James, 1935) from Kenia and in widely distributed *R. palestineae* Hambleton, 1946, but the first species possesses the numerous multilocular pores on dorsum and venter, whereas in *R. aloes* such pores are present around vulva only; multilocular pores in *R. palestineae* are absent. See more detailed discussion, description and figure of *R. aloes* in Williams & Pellizzari (1997).

CONCLUSION

The both discussed Afrotropical species are recorded in the territory of Russia for the first time and should be considered as potential pests of decorative succulent plants, especially of the plant family Asphodelaceae. In the most part of the territory of Russia, these species may damage host plants in greenhouses and private habitations. In the conditions of a subtropical climate of the Black Sea coast of Caucasus (Greater Sochi) and the Crimean peninsula, both species may be found on roots of

succulent plants outdoors. We advise to include *T. speciosus* and *R. aloes* in the lists of quarantine plant pests.

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REFERENCES

- Danzig E.M. & Gavrilov-Zimin I.A.** 2014. Palearctic mealybugs (Homoptera: Coccinea: Pseudococcidae). Part 1. Subfamily Phenacoccinae. *Fauna of Russia and neighbouring countries. New series, No. 148. Insecta: Hemiptera: Arthroidignatha*. St Petersburg: ZIN RAS. 678 p.
- Danzig E.M. & Gavrilov-Zimin I.A.** 2015. *Palearctic mealybugs (Homoptera: Coccinea: Pseudococcidae). Part 2. Subfamily Pseudococcinae*. Fauna of Russia and neighbouring countries. New series, No. 149. Insecta: Hemiptera: Arthroidignatha. St Petersburg: ZIN RAS. 619 p.
- Gavrilov-Zimin I.A.** 2015. System of generic groups in mealybugs (Homoptera: Coccinea: Pseudococcidae). *Zoosystematica Rossica*, **24**(2): 237–260.
- Gavrilov-Zimin I.A.** 2016. Cytogenetic and taxonomic studies of some legless mealybugs (Homoptera: Coccinea: Pseudococcidae). *Comparative Cytogenetics*, **10**(4): 587–601.
- Gavrilov I.A. & Trapeznikova I.V.** 2007. Karyotypes and reproductive biology of some mealybugs (Homoptera: Coccinea: Pseudococcidae). *Comparative Cytogenetics*, **1**(2): 139–148.
- Williams D.J. & Pellizzari G.** 1997. Two species of mealybugs (Homoptera Pseudococcidae) on the roots of Aloaceae in greenhouses in England and Italy. *Bollettino di Zoologia Agraria e di Bachicoltura* (Milano) Ser. II, **29**: 157–166.

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