

The rice mealybug, *Brevennia rehi* (Lindinger, 1943) : new synonyms, and new distribution records (Hemiptera, Coccoidea, Pseudococcidae)

Yair Ben-Dov

Résumé

La Cochenille farineuse du riz, *Brevennia rehi* (Lindinger, 1943) : nouvelles synonymies et nouvelles données biogéographiques (Hemiptera, Coccoidea, Pseudococcidae).

Brevennia rehi (Lindinger, 1943) est signalé pour la première fois d'Israël, d'Iraq, d'Azerbaïdjan, du Tadjikistan et du Brésil. *Rhizoecus cynodontis* Bodenheimer, 1943, et *Brevennia femoralis* Borchsenius, 1949, sont mis en synonymie avec *B. rehi*. La Cochenille farineuse du riz est signalée d'Israël comme un parasite nuisible à la Graminée des pelouses, *Dactyloctenium australe* (Poaceae).

Abstract

Brevennia rehi (Lindinger) is newly recorded from Israel, Iraq, Azerbaijan, Tajikistan and from Brazil. *Rhizoecus cynodontis* Bodenheimer, 1943, and *Brevennia femoralis* Borchsenius, 1949, are synonymized with *Brevennia rehi* (Lindinger, 1943). The rice mealybug is recorded from Israel as a pest to lawn grasses, *Dactyloctenium australe* (Poaceae).

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The rice mealybug, *Brevennia rehi* (Lindinger, 1943) : new synonyms, and new distribution records (Hemiptera, Coccoidea, Pseudococcidae)

by Yair BEN-DOV

Department of Entomology, Agricultural Research Organization, Bet Dagan 50250, Israel
<yairbd@netvision.net.il>

Summary. – *Brevennia rehi* (Lindinger) is newly recorded from Israel, Iraq, Azerbaijan, Tajikistan and from Brazil. *Rhizoecus cynodontis* Bodenheimer, 1943, and *Brevennia femoralis* Borchsenius, 1949, are synonymized with *Brevennia rehi* (Lindinger, 1943). The rice mealybug is recorded from Israel as a pest to lawn grasses, *Dactyloctenium australe* (Poaceae).

Résumé. – La Cochenille farineuse du riz, *Brevennia rehi* (Lindinger, 1943) : nouvelles synonymies et nouvelles données biogéographiques (Hemiptera, Coccoidea, Pseudococcidae). *Brevennia rehi* (Lindinger, 1943) est signalé pour la première fois d'Israël, d'Iraq, d'Azerbaïdjan, du Tajikistan et du Brésil. *Rhizoecus cynodontis* Bodenheimer, 1943, et *Brevennia femoralis* Borchsenius, 1949, sont mis en synonymie avec *B. rehi*. La Cochenille farineuse du riz est signalée d'Israël comme un parasite nuisible à la Graminée des pelouses, *Dactyloctenium australe* (Poaceae).

Key words. – Coccoidea, scale insects, Pseudococcidae, *Brevennia rehi*, *B. femoralis*, *Rhizoecus cynodontis*, Poaceae, Israel, Iraq, Azerbaijan, Tajikistan, Brazil

Lawn grasses in Israel are planted of several variants of the Bermuda grass, *Cynodon dactylon*. For several decades these grasses in this country were infested and damaged by the Rhodes grass mealybug, *Antonina graminis* Maskell (Coccoidea, Pseudococcidae) and by the Bermuda grass scale, *Odonaspis ruthae* Kotinsky (Coccoidea, Diaspididae). Since 2006 an additional mealybug species was found in Israel infesting lawn grasses, *Dactyloctenium australe*, and causing damage. Following a study of the Israeli records of the latter mealybug these were identified as the rice mealybug, *Brevennia rehi* (Lindinger, 1943). While studying the Israeli samples of the rice mealybug, it became pertinent to compare their taxonomic characters with those of two mealybug species, originally described from the Palearctic region, namely, *Rhizoecus cynodontis* Bodenheimer, 1943, and *Brevennia femoralis* Borchsenius, 1949.

This paper provides new information on the taxonomy, geographical distribution and economic importance of the rice mealybug, *Brevennia rehi*.

The acronym ICVI is used here for the Coccoidea Collection, Department of Entomology, The Volcani Center, Bet Dagan, Israel.

Taxonomy and nomenclature. – The nomenclatural history of the rice mealybug is summarized in the following list of synonyms and combinations, together with the two new synonyms.

Brevennia rehi (Lindinger)

Ripersia sacchari oryzae Fletcher, 1917 : 177, homonym of *Ripersia oryzae* Kuwana, 1907.

Ripersia oryzae Green, 1931 : 557, homonym of *Ripersia oryzae* Kuwana, 1907.

Ripersia rehi Lindinger, 1943a : 152, replacement name for *Ripersia oryzae* Green, 1931.

Tychea rehi; LINDINGER, 1943b : 265, change of combination.

Rhizoecus cynodontis Bodenheimer, 1943 : 16, n. syn.

Brevennia femoralis Borchsenius, 1949 : 270, n. syn.

Heterococcus femoralis; MILLER & MCKENZIE, 1970 : 443, change of combination.

Heterococcus rehi; WILLIAMS, 1970 : 141, change of combination.

Heterococcus tuttlei Miller & McKenzie, 1970 : 447, synonymy by MILLER, 1973 : 372.

Brevennia rehi; MILLER, 1973 : 372, change of combination.

Brevennia cynodontis; BEN-DOV, 1991 : 6, change of combination.

While studying the identity of the mealybugs on lawn grasses in Israel, their morphological characters were compared with other species of *Brevennia*, and the following new synonymies are established.

The taxonomic characters of *Rhizoecus cynodontis* Bodenheimer, 1943, were studied in its type-series, and found to agree with the features of *B. rehi*, and the consequent synonymy is here introduced.

The mealybug *Brevennia femoralis* Borchsenius, 1949, is also synonymized here with *B. rehi*. This conclusion is based on a study of a series of five females, which are part of the original material collected in Azerbaijan by N.S. Borchsenius. Previously, BEN-DOV (1991) has synonymized *Brevennia femoralis* with *Rhizoecus cynodontis*.

The currently accepted senior synonym of the rice mealybug, *Ripersia rehi* was introduced in 1943 by Lindinger, as a Replacement Name for *Ripersia oryzae* Green, 1931 (junior homonym of *Ripersia oryzae* Kuwana, 1907). However, on the same year Bodenheimer (1943) described *Rhizoecus cynodontis*, which is here synonymized with *Brevennia rehi*; hence a priority issue might have been considered. The name *Brevennia rehi* has been well established for more than 60 years in scale insect nomenclature for the rice mealybug, which is of economic importance. Therefore, priority is here given to *Ripersia rehi* Lindinger, 1943, since a change in the name of this mealybug is needless, as it might harm stability and cause confusion.

General appearance

In Israel, populations of the rice mealybug on Bermuda grass occur under leaf sheaths and within the folded leaf blades.

Young adult female elongate-oval, while fully-developed female is broadly ovate; length 1.5 - 3.0 mm, width 0.8 - 1.5 mm; body colour varies from bright yellow to light pink. The body of nymphal stages and the adult female is covered with loose, white mealy secretion, which does not form distinct wax-filaments. The mealy secretion is also massed on surface of the host plant (fig. 1).

Males are present in Israel in populations of the rice mealybug on *Dactyloctenium australe*.

Zoogeographical distribution

The rice mealybug has been previously recorded from territories in the following regions. **Australasian** : Australia (Northern Territory, Queensland, Hawaii, New Britain) ; Papua New Guinea. **Oriental** : Bangladesh, Myanmar, India (Andhra Pradesh, Bihar, Goa, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, West Bengal), Indonesia (Java), Nepal, Pakistan, Philippines, Taiwan, Thailand. **Palaeartic** : Afghanistan, Egypt, Iran. **Nearctic** : USA (Arizona, California, Florida, Texas). **Neotropical** : Puerto Rico and U.S. Virgin Islands (see BEN-DOV, 1994, 2007 ; WILLIAMS, 2004).

Here, *B. rehi* is recorded for the first time from South America, in Bahia, Brazil. The new records from the Palaeartic Region are from Israel and Iraq in the Middle East, and from Azerbaijan and Tajikistan in Central Asia. No material from Tajikistan was available to this study; however the type-series of *Brevennia femoralis* Borchsenius, 1949, was collected from Azerbaijan and Tajikistan. These records may indicate that the rice mealybug is more widely distributed in the Palaeartic region.

Economic importance

The rice mealybug appears to be restricted to monocotyledonous host plants, having been recorded only from the Poaceae (33 species of hosts), Cyperaceae (2 species) and one



Fig. 1 to 2. – 1, *Brevennia rehi* (Lindinger), adult female. – 2. Lawn grass of *Dactyloctenium australe* damaged by *B. rehi*.

species of the family Juncaceae (BEN-DOV, 2007). This mealybug develops mainly on host plants of the Poaceae, including the economically-important agricultural crops, rice, sugarcane, and sorghum (WILLIAMS, 1970).

The rice mealybug was first discovered on 2006 in Israel, and since then it became established and damaging lawn grasses along the Coastal plain and at inland regions. It causes the leaf-blades to turn yellow, shrink and finally to dry up. The damage is very severe during July-August the hot months of summer (fig. 2).

Taxonomic comments

The taxonomic characters of the adult female specimens examined in the course of this study agree well with the modern redescriptions and illustration by WILLIAMS (1970, 2004) and by MILLER (1973). Nevertheless, notes are added on two characters.

Table 1 is given here to elucidate the range in number of antennal segments of the adult female

Table 1. Variation in number of antennal segments in adult female of *Brevennia rehi*.

Source	# of specimens	% specimens with 6-6 antennal segments	% specimens with 6-7 antennal segments	% specimens with 7-7 antennal segments
Type-series				
<i>Rhizoecus cynodontis</i>	15	100	0	0
<i>Brevennia femoralis</i>	5	60	40	0
Israel	67	85	13.5	1.5
Brazil	7	100	0	0

The femur of the hind leg, 110-120 μm long, 50-60 μm wide, is conspicuously larger than femora on the middle and front legs, 80-90 μm long, 30-36 μm wide.

Material examined. – All specimens listed here are deposited in ICVI.

ISRAEL (all records from Israel were collected on *Dactyloctenium australe* (Poaceae): Tel Aviv, 30.viii.2006, *H. Gavrieli*; Gedera, 31.x.2006, *Y. Ben-Dov*; Rehovot, 27.x.2007, *Y. Ben-Dov*; Rehovot, 23.x.2007, *A. Protasov*; Rehovot, 4.xi.2007, (*Uri Lavi*; Nir David, 1.xi.2007, *Z. Mendel*; Rehovot, 30.xi.2007, *A. Yardeni*).

IRAQ: Lectotype (has been designated by BEN-DOV, 1991) and 11 paralectotypes, of *Rhizoecus cynodontis* Bodenheimer, 1943. Basra, on *Cynodon dactylon*, collected 20.x.1942, *F.S. Bodenheimer*.

AZERBAIJAN: Original material of *Brevennia femoralis* Borchsenius, Lenkoransk Region, on *Cynodon dactylon*, 22.vi.1947, N.S. Borchsenius.

BRAZIL: Bahia, Feira de Santana, 23.xii.1998, on *Zoysia* sp. (Poaceae), Vera Wolff.

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