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A NEW SPECIES OF *GEOCOCCUS* (HOMOPTERA: COCCOIDAE: PSEUDOCOCCIDAE)

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A new species of the *Geococcus* genus is described from Papua New Guinea in the Austro-Oriental Region. A key for the species is given. Distribution maps presented for the species of *Geococcus* for *G. coffeae* are presented.

Key words: Homoptera, Coccoidea, Pseudococcidae, Rhizoecini, new species, key, distribution

INTRODUCTION

The genus *Geococcus*, including 14 species, belongs to a group of small hypogeic mealybugs, which feed, on roots of different plants. *G. radicum* was recorded and described by GREEN (1902) from Ceylon. Due to misidentifications it was recorded from different countries. *G. oryzae* and *G. citrinus* were recorded by KUWANA (1907, 1923) from Japan. Later *G. coffeae* was described by GREEN (1933) from Surinam, however it had been recorded by FULLAWAY (1910), under the name of *G. radicum* from Hawaii. The distribution map of this species was published by Commonwealth Institute of Entomology (ANON 1971). Afterwards *G. johorensis* and *G. lawrencei* were described by WILLIAMS (1969) from Malaysia and the Solomon Islands. In the meantime some more species were described, all from South East Asia. The latest species belonging to the genus, *G. detonsus* was collected by MAHUNKA and MAHUNKA Papp, and described by WILLIAMS (2004) from Thailand. Some more information about this study are presented in work of KIANEK (2001)

MATERIAL AND METHODS

The material studied originates from the collections of late Prof. J. BALOGH and of Prof. S. MAHUNKA. This study presents the results of the analyses of about 5000 samples from many parts of the World from which 38 contained *Geococcus* specimens (49 female and 79 larval stages). The specimens were separated from the roots of host plants (Bryophyta) using Berlese funnel. Records of the distribution of *G. coffeae* are given in the zoogeographic part of the paper. For identification the following literature was used: GREEN (1902), KUWANA (1923), GREEN (1933), WILLIAMS (1969,

2004), LIT (1992), BEN-DOV (1994), BEN-DOV & GERMAN (2002), HAMBLETON (1946, 1976), MILLER *et al.* (2001), TANG (1992), WILLIAMS & GRANARA DE WILLINK (1992).

DESCRIPTION OF THE NEW SPECIES

Geococcus baloghi KIANEK et KONCZNÉ BENEDICTY sp. n. (Fig. 1)

Type material – The holotype, female (Fig. 1). Papua New Guinea, Wau, 19. 08. 1868, from litter. This slide contains one first and one second instar larvae, also. Collected by J. BALOGH, No. NG B 14. Five more larvae were collected from Papua New Guinea, Wau, 25. 09. 1969, by J. BALOGH, No. NG B 126, and from New Caledonia, Lifou, 13. 01–28. 02, 1977, collected by J. BALOGH, NC. B 10. Deposited in the Collection of Hungarian Natural History Museum (Budapest, Hungary).

Description: Body elongate oval. Slide-mounted specimen (Fig. 1) 1. 236 mm long and 0.41 mm wide. Antenna 6 segmented, the length of segments: 1st – 38, 2nd – 22, 3rd – 24, 4th – 17, 5th – 17, 6th – 55 μm long. There is one sensory pore on the 2nd segment of the antenna. The 3rd segment is almost parallel sided. The apical segment has three sensory falcate setae. The 5th segment has one short, narrow sensory seta 16 μm long. Most segments of the antenna have a few hair-like setae, 25 μm long. Eye not visible. Anal lobe well developed, with a spine-like seta, 66 μm long.

Venter. Labium seems to be two-segmented, 70 μm long. Stylet loop long, reaching the posterior legs. Cephalic plate visible. Legs robust: coxa of anterior legs 34 μm long, trochanter 29 μm long, femur 77 μm long, tibia 50 μm long, tarsus 55 μm long, and claw 25 μm long. Coxa of middle legs 46 μm long, trochanter 34 μm long, femur 72 μm long, tibia 48 μm long, tarsus 53 μm long, and claw 25 μm long. Coxa of posterior legs 55 μm long, trochanter 36 μm long, femur 86 μm long, tibia 67 μm long and tarsus 62 μm long, tarsal digitules absent, claw digitules of two sizes, one is 3 μm long, another is 10 μm long. Legs with few hair-like setae, tibia and tarsus with 22 μm long setae. On the ventral segments tritubular pores present on several segments, arranged in rows. Multilocular pores with 5–6 loculi, present on all segments, 5 μm in diameter. The diameter of anterior spiracles 13 μm. Venter with a small number of scattered hair-like setae. Two well developed circuli present, 24 μm in diameter. Tubular ducts absent. Trilocular pores scattered on the venter. Internal genital organ narrow, long, as long as twice the width of two segments.

Dorsum. Ostioles present, not sclerotized, without multilocular pores. Multilocular pores present in small numbers on most of the segments. Anal ring 40 μm wide, anal ring setae 45 μm long. Tritubular pores one size, scattered on each segment, 8 μm in diameter. Tubular duct absent. Hair-like setae 12–40 μm long, trilocular pores 3 μm wide, scattered on the dorsum. Two spine-like setae present anterior of the anal ring, 27 μm long. On the head four strong (but not so strong as on the abdomen), curved setae present, 38 μm long (Fig. 1).

Distribution – Papua New Guinea, New Caledonia (Fig. 4).

Etymology – The species is named after the collector Professor JÁNOS BALOGH.

Remarks – This species differs from all known species having four setae-in-row on the head. It differs by having two tritubular pores in first instar larvae, not

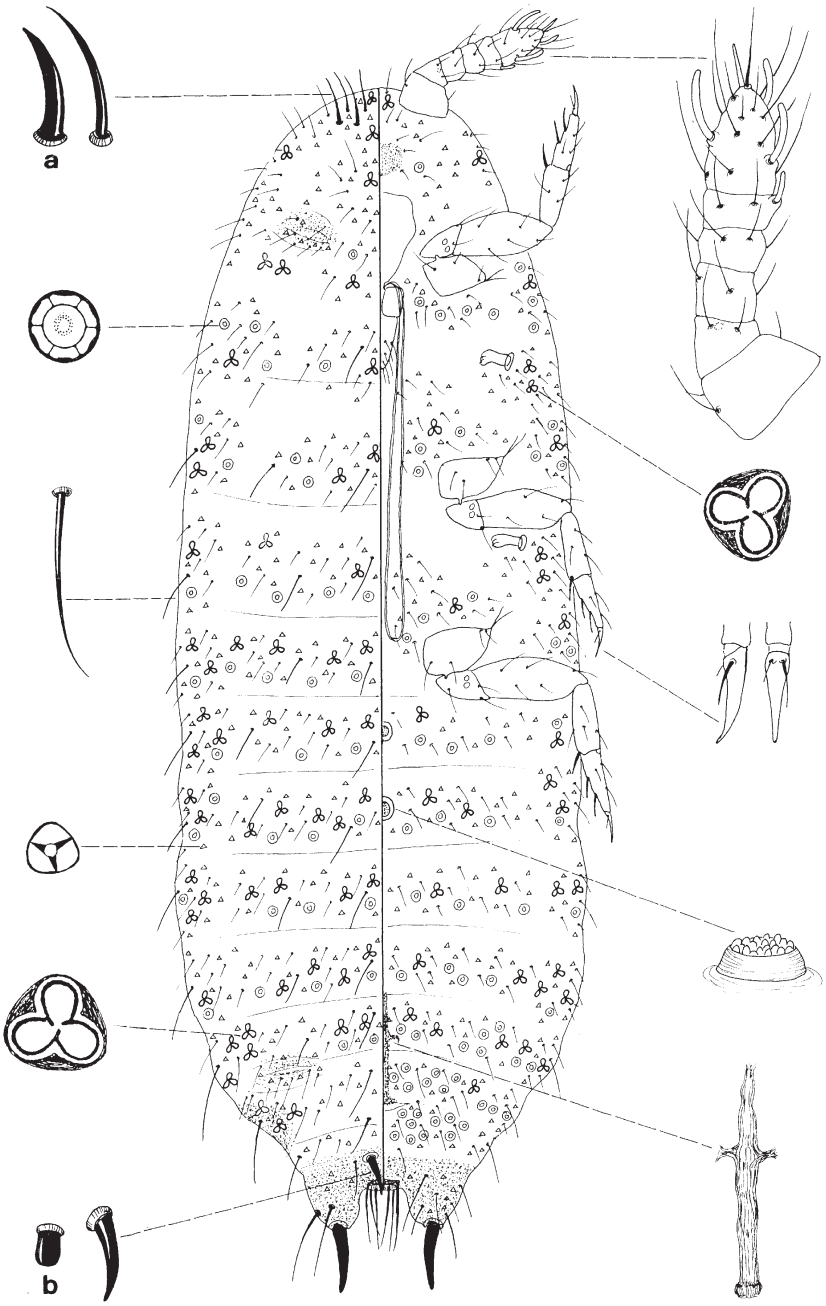

Fig. 1. Adult female of *G. baloghi* KIANEK et KONCZNÉ BENEDICTY sp. n., with an addition of a stout, blunted seta on the head of *G. coffeae* (a), and a blunted seta on anal lobes of the *G. radicum* (b)

only one as it was found by JANSEN (2002) in *Rhizoecus hibisci.* The second instar larvae from New Caledonia are morphologically identical with the second instar larvae of holotype, on this base it was included in the paratype series.

Second instar larva (Fig. 2)

Description – Body elongate oval. Slide-mounted specimen (Fig. 2) 1.060 mm long and 0.402 mm wide. Antenna not seen. Eye not visible. Anal lobe well developed, with a spine-like seta 46 µm long.

Venter. Labium seems to be two-segmented, 48 µm long. Stylet loop long, it reaches the posterior legs. Cephalic plate not visible. Legs robust: coxa of anterior legs 31 µm long, trochanter 28 µm long, femur 60 µm long, tibia 43 µm long, tarsus 38 µm long, and claw 22 µm long. Coxa of middle legs 38 µm long, trochanter 31 µm long, femur 57 µm long, tibia 43 µm long, tarsus 41 µm long, and claw 22 µm long. Coxa of posterior legs 43 µm long, trochanter 41 µm long, femur 60 µm long, tibia 55 µm long and tarsus 53 µm long, tarsal digitules absent, claw digitules of two sizes, one is 2 µm long, another is 7 µm long. Legs with few hair-like setae, tibia and tarsus with 22 µm long setae. On the ventral segments tritubular pores present only on the margin. Fourlocular pores, scattered, on all segments, 5 µm in diameter. The venter with a small number of scattered hair-like setae. Two well-developed circuli present, diameter of posterior spiracles 14 µm. Tubular ducts absent. Trilocular pores scattered on the venter.

Dorsum. Ostioles present, not sclerotized. Fourlocular pores present in small number on most of the segments. Anal ring 30 µm wide, anal ring setae 35 µm long. Tritubular pores one size, scattered on each segment, 8 µm in diameter. Tubular duct absent. Hair-like setae 10–37 µm long, trilocular pores 3 µm wide, scattered on the dorsum. Fivelocular pores, scattered, on all segments, 5 µm in diameter. Two strong setae present anterior of the anal ring, 26 µm long. On the head four robust (but not so robust as on the abdomen), curved setae present, 34 µm long.

Comment – Without additional material, or rearing of this species, we can not be sure that is it a second instar, or third instar larva.

First instar larva (Fig. 3)

Description – Body elongate oval. Slide-mounted specimen (Fig. 3) 0.485 mm long and 0.184 mm wide. Antenna not clearly seen. Eye not visible. Anal lobe well developed, with a spine-like seta 41 µm long.

Venter. Labium seems to be two-segmented, 27 µm long. Cephalic plate not visible. Legs robust: coxa of anterior legs 17 µm long, trochanter 17 µm long, femur 38 µm long, tibia 29 µm long, tarsus 33 µm long, and claw 17 µm long. Coxa of middle legs 21 µm long, trochanter 18 µm long, femur 34 µm long, tibia 30 µm long, tarsus 28 µm long, and claw 15 µm long. Coxa of posterior legs 43 µm long, trochanter 41 µm long, femur 60 µm long, tibia 55 µm long and tarsus 53 µm long, tarsal digitules absent, claw digitules 5 µm long. Legs with few hair-like setae, tibia and tarsus with 18–29 µm long setae. On the ventral segments tritubular pores absent. Fivelocular pores, only two near to spiracles, 4 µm in diameter. The venter with a small number of scattered hair-like setae. One circulus present, diameter 6 µm. Tubular ducts absent. Trilocular pores scattered on the venter.

Dorsum. Ostioles present, not sclerotized. Anal ring 22 µm wide, and 28 µm long, anal ring setae 19 µm long. Tritubular pores one size, on first and second segments, 7 µm in diameter. Tubular duct absent. Hair-like setae 12–19 µm long, trilocular pores 3 µm wide, scattered on the dorsum. Strong setae anterior of the anal ring absent. On the head four strong, curved setae present, 18 µm long.

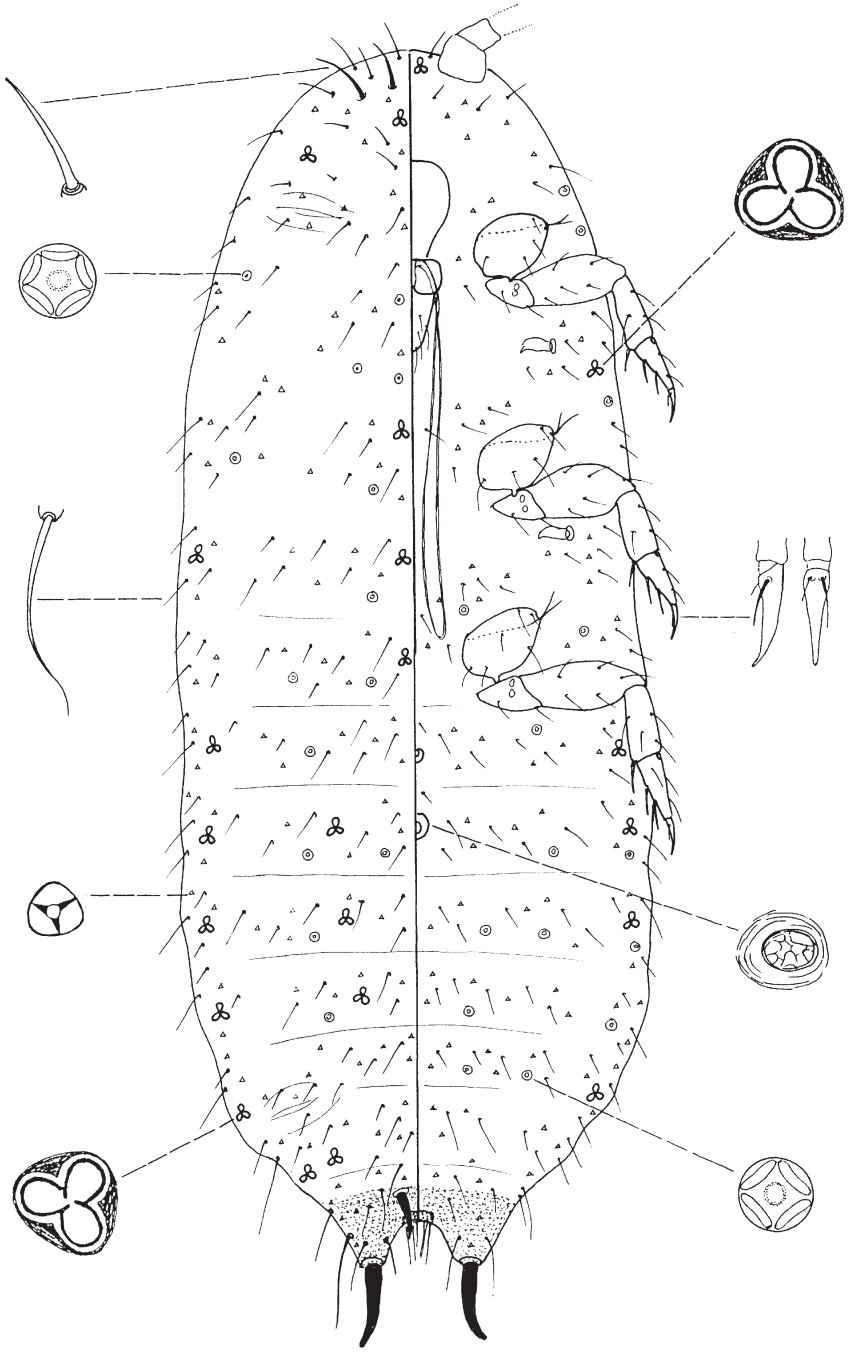

Fig. 2. Second instar larva of *G. baloghi*

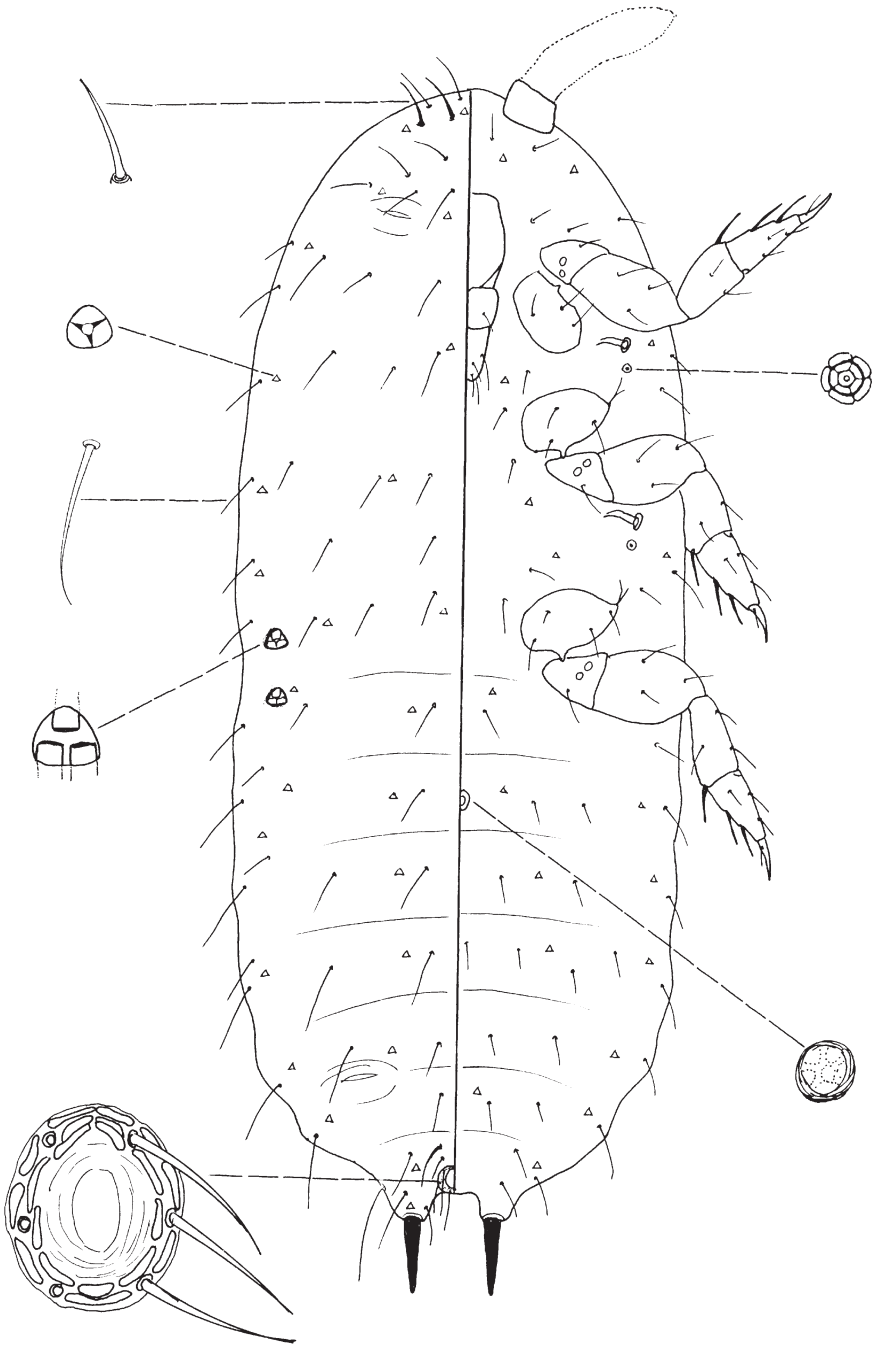

Fig. 3. First instar larva of *G. baloghi*

KEY TO SPECIES OF *GEOCOCCUS*

1	Stout, spine-like setae on dorsum present	2
–	Stout, spine-like setae on dorsum absent	13
2	Stout, spine-like setae (Fig. 1a) present on head and on posterior abdominal segment of dorsum	*G. coffeae*
–	Stout, spine-like setae present only on posterior abdominal segment of dorsum (Fig. 1)	3
3	Stout, spine-like setae blunt (Fig. 1c)	4
–	Stout, spine-like setae not blunt (Fig. 1)	5
4	Stout, spine-like setae short, as long as wide	*G. radicum*
–	Stout, spine-like setae three times longer than wide	*G. eliquatus*
5	Stout, spine-like setae situated on the outher margin of anal lobes	*G. hauseri*
–	Stout, spine-like setae situated on the inner margin of anal lobes	6
6	With two stout, spine-like setae on inner margin of anal lobes	*G. latens*
–	With one stout, spine-like setae on inner margin of anal lobes	7
7	Stout, spine-like setae weakly developed, almost hair-like	8
–	Stout, spine-like setae strongly developed	9
8	Some hair-like setae with a minute seta at the base, all multilocular pores with six loculi	*G. satellitum*
–	Hair-like setae without minute seta at the base, multilocular pores mostly with four loculi	*G. lawrencei*
9	Dorsum of head with several robust, hair-like setae (Fig. 1b)	*G. baloghi*
–	Dorsum of head without robust, hair-like setae	10
10	Lateral dorsal margin of abdominal segment VII sclerotized	11
–	Lateral dorsal margin of abdominal segment VII not sclerotized	12
11	Only a weakly developed circulus present. Tritubular pores on middorsum of venter absent	*G. associatus*

– With two, well developed circuli. Tritubular pores on middorsum present *G. johoriensis*

12 Ostioles not surrounded with multilocular pores *G. citrinus*

– Ostioles surrounded with multilocular pores *G. detonsus*

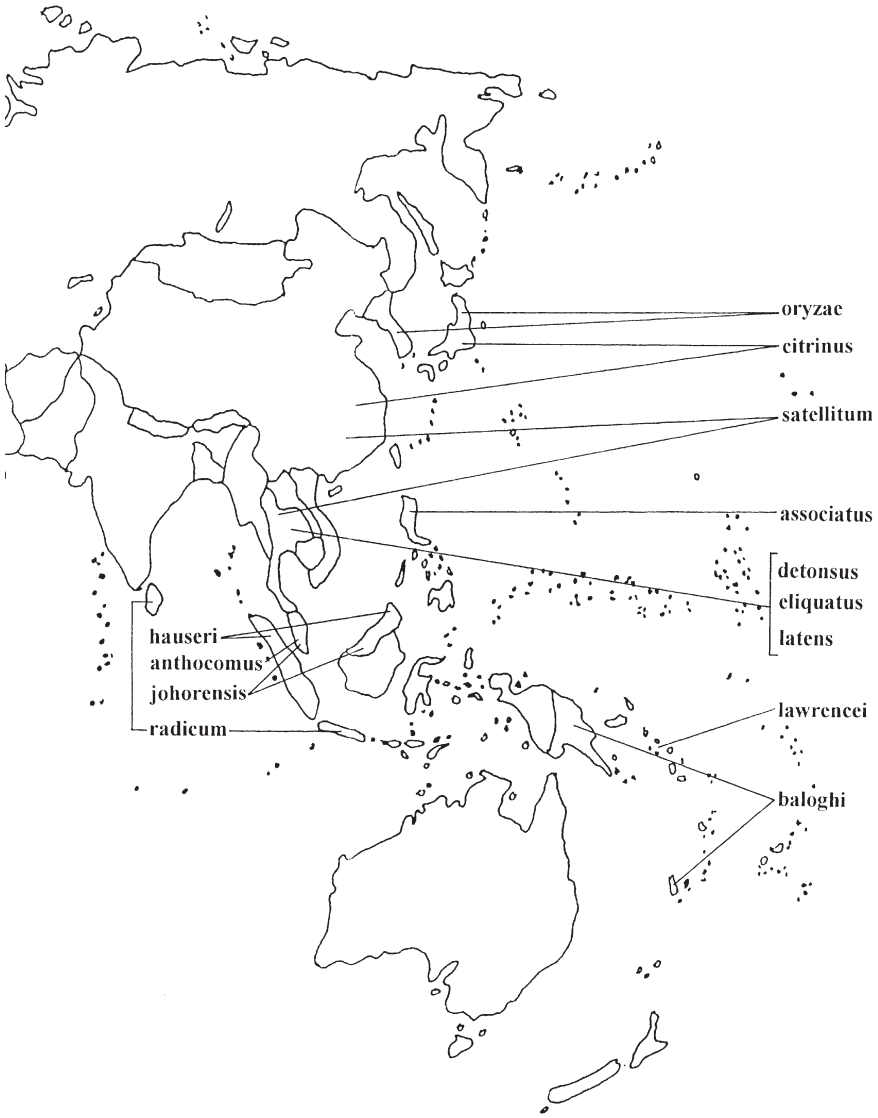

Fig. 4. Distribution map of the species belonging to *Geococcus* genus (except *G. coffeae*)

13 Multilocular pores on dorsum absent *G. oryzae*

– Multilocular pores on dorsum present *G. anthocomus*

Distributional notes

According to WILLIAMS (2004) the genus *Geococcus* is distributed mostly in the Oriental Region, and partly in the Pacific and in the southeast part of the Palaearctic regions (Fig. 4). In other parts of the World in the studied samples only *G. coffeae* was found, giving several new distribution records (Fig. 5). We can suppose that the genus *Geococcus* originated in the Oriental region, only some species appeared in the Pacific and south-east part of the Palaearctic regions, however *Geococcus coffeae* was distributed with different plants, especially with coffee, and now it can be found in several tropical countries, and in North Europe also, on ornamental plants in greenhouses as a pest species. Several new records of this species were provided by our collection (Angola, Luembe, Cossa, 02.04.1964, leg. Luna; Tunisia, Sakiet, 03.04.1977, leg. S. MAHUNKA; Seychelles, Praslin Vallée de Mai, 12.12.1975, leg. FJELLBERG et HAGEN; Comoros Archipelago, Anjuan Island, 12.08.1992, leg. T. PÓCS; Santa Lucia, Castries, 11.07.1980, leg. S. MAHUNKA; Chile, 1965–66, Berl. 132, D-Am-15, leg. J. BALOGH; Ecuador, 1973, EC-G26, leg. J. BALOGH; New Caledonia, Maré, 26.05–09.06.1987, leg. J.

Fig. 5. Distribution map of the *Geococcus coffeae*

BALOGH; Madagascar, 9450, Antongil Bay, Nosy Mangabe Island S of Maroatsetra, Lowland rainforest, Sept. 1994, leg. T. PÓCS). These new data substantially increased the distribution area of this species shown on the CIE map (ANON 1971).

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