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Revision of *Gossypariella* Borchsenius with description of new species (Homoptera Coccoidea Eriococcidae)

Abstract - The genus *Gossypariella* is revised with the description of two new species and redescription of two species, and designation of lectotype of the generic type.

Riassunto - *Revisione del genere* Gossypariella *e descrizione di nuove specie (Homoptera Coccoidea Eriococcidae).*

Viene effettuata la revisione del genere *Gossypariella* con descrizione di due nuove specie, la ridescrizione di altre due e la designazione del lectotipo del tipo generico.

Key words: scale insects, Homoptera, Coccoidea, Eriococcidae, *Gossypariella*, new species, revision, key.

The family Eriococcidae treated differently by different Authors: Ben-Dov, Hodgson & Miller (1997), Borchsenius (1949, 1960), Cook & Gullan (2004), Danzig (1980), Ferris (1957), Foldi (1997), Hodgson (1994, 2001), Hodgson & Miller (2002), Hodgson et al (2004), Hoy (1962, 1963), Kosztarab & Kozár (1988), Miller (1991), Miller & Gimpel (1996), Miller & Miller (1992), Tang & Hao (1995), Williams & Watson (1992), etc. We follow here he system used by Borchsenius (1960), Kosztarab and Kozár (1988) and others.

The Internet site ScaleNet (the family Eriococcidae last updated 7 March 2005) contains most important information's (taxonomy, distribution, biology, etc) (Miller & Gimpel, 2005).

The World fauna of the family is not well explored and the species number of described new species continuously increasing (Miller & Gimpel, 2000; Kozár & Drozdják, 1986. In addition described species from South-East Asia, Australia and Brazil are still known from poor original descriptions, and unavailability of type materials.

The aim of this study is to revise the genus *Gossypariella*, based on redescription of two species and description of two new species.

MATERIAL AND METHODS

This study presents the results of the analyses of materials from Oriental Region deposited in different Museums. The collectors are mentioned in the descriptions. The mounting technics of microscopic slides follows the method described by Kosztarab & Kozár (1988). The descriptions follow the terminology of morphological characters as used in the works of Miller & Miller (1992), Williams (1985) and others.

The acronyms used in the text are the next: BMNH - British Museum Natural History (London, UK), PPI HAS - Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary), MNHN – Museum National d[1]Histoire naturelle (Paris, France), ZMAS – Zoological Museum, Academy of Science (St. Petersburg, Russia), UCDC – The Bohart Museum of Entomology, University of California, CA (Davis, USA), USNM – United States National Entomological Collection, U.S. National Museum of Natural History, DC (Washington, USA).

RESULTS

Four species of the genus was studied in the present work from Oriental Region. Two species appeared new for sciences. The type species of the genus was redescribed and redrawn. One species *(G. phyllanthi)* needs further study.

Genus: *GOSSYPARIELLA* Borchsenius, 1960

Type species: ***Rhizococcus siamensis*** Takahashi, 1942

Borchsenius (1960) described this genus and indicated it is close to *Gossyparia*, while differing from the latter in presence of macrotubular ducts on margin and submargin of the dorsum, and in the hair-like dorsal and anal lobe setae. Note: We have studied original specimen, collected by Borchsenius, of this species (China, Yunnan, Symao, 22. V. 1957, No. 3878, N. Borchsenius), deposited in the BMNH collection.

Description

Gossypariella crematogastri Kozár and Konczné Benedicty sp. n. (Fig. 1)

Type data: India: Gudalur, Nilgiris, from nest of ants, Crematogaster sp., coll. E.E.G. IV. 1910 (BM, 1940, 180). Holotype, female, marked with red, and five paratypes, on one slide. Additional ten paratypes were mounted from dry material at BMNH, some more are in the dry collection and in alcohol, from the same collection. Holotype, paratypes, dry and alcohol-preserved material are deposited in BMNH, one paratype deposited in PPI HAS.

Unmounted female. Dried specimens of female are brown; body subcircular, with some white wax under the body and around the margin.

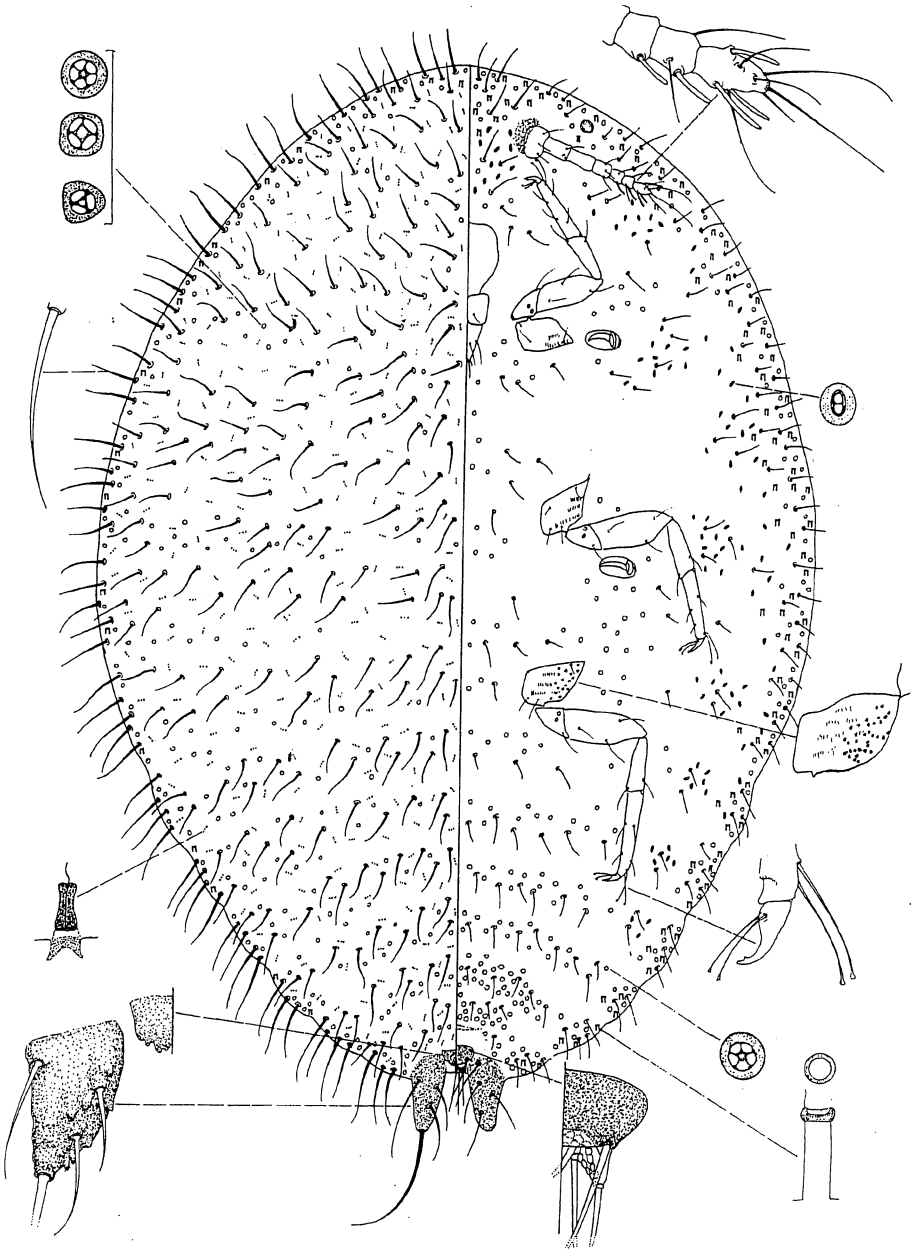

Fig. 1 - *Gossypariella crematogastri* Kozár and Konczné Benedicty species nova, adult female.

Mounted female. Body elongate oval. 1,5-mm long and 1,1 wide. Antenna 7 segmented, measurements of segments: 1st – 38 μm, 2nd - 26 μm, 3rd - 34 μm, fourth - 34 μm, fifth - 17 μm sixth 22μm, and seventh 38 μm. With one sensory pore on the 2nd segment of the antenna. Third segment almost parallel sided. Apical setae of antenna 65 μm. Apical segment with three sensory falcate setae. On the two preapical segment 15-17 μm long, falcate sensory setae present. Antennal segments with few hair-like setae, the longest 41 μm. Eye visible, situated on venter.

Venter. Labium seems two-segmented, 108 μm long. Stylet loop almost as long as body. Legs small: coxa of anterior legs 55, trochanter 35, femur 98, tibia 70, tarsus 97, claw 25 μm long. Coxa of middle legs 53, trochanter 38, femur 96, tibia 62, tarsus 95, claw 24 μm long. Coxa of posterior legs 65, trochanter 38, femur 100, tibia 76, tarsus 110, tarsal digitules knobbed, 43, claw 29 μm, claw digitules, 29 μm long, slightly knobbed. Middle coxae with some some reticulation, posterior with reticulation and small pores. Trochanter with two pores on each side. Claw with denticle. Legs with few hairlike setae, and with one sensory pore on tarsus. Five-locular pores distributed in bands in small number on all segments of abdomen and thorax, 4-5 μm in diameter, some six loculi. The diameter of peritrema of anterior spiracles 23 μm. Venter with a small number of scattered, hair-like setae. Microtubular ducts absent. Macrotubular ducts of two sizes, about 5-7 μm wide and 15-20 μm long, present in a submarginal band. Sessile pores 4 μm long, scattered on margin and form groups in submarginal band, absent from median area of thorax.

Dorsum. Hair-like setae, 60-110 μm long, placed in double rows on all segments. With 3-5 setae placed on margin. Macrotubular ducts absent. Microtubular ducts with double apex, present only on dorsum, 5 μm long, scattered among dorsal setae. Disc pores with 3, 4 or 5 loculi, scattered on all segments. Anal ring not clearly seen, situated between venter and dorsum. Anal lobes with two hair-like setae along inner margin. Apical setae 225 μm long. Anal lobes heavily sclerotized. Suranal setae hair-like. Penultimate segments, anterior to anal ring, with a sclerotized cauda with several teeth, 59 μm wide.

DISTRIBUTION. Oriental: India (Nilgiris).

Derivato nominis: The species epithet is the Manuscript Name, which E.E. Green used on the original slide.

Affinities: Morphologically, this species is similar to *G. phyllanthi* (Ferris, 1957). Since no type material was available to us, we compared *G. crematogastri* with the illustration of the *G. phyllanthi*. These species differ in the number of pores on the dorsal margin, in the shape of cauda and anal lobes, longer setae on dorsum. This question needs further study, if the type material of *G. phyllanthi* will be found.

Gossypariella phyllanthi (Ferris, 1957) (Fig. 2)

Eriococcus phyllanthi Ferris, 1957c: 86. Type data: India: Kerala, Bangalore, on *Phyllanthus umbilicus*, by T.S. Muthukrishnan. Unknown type status, type designation

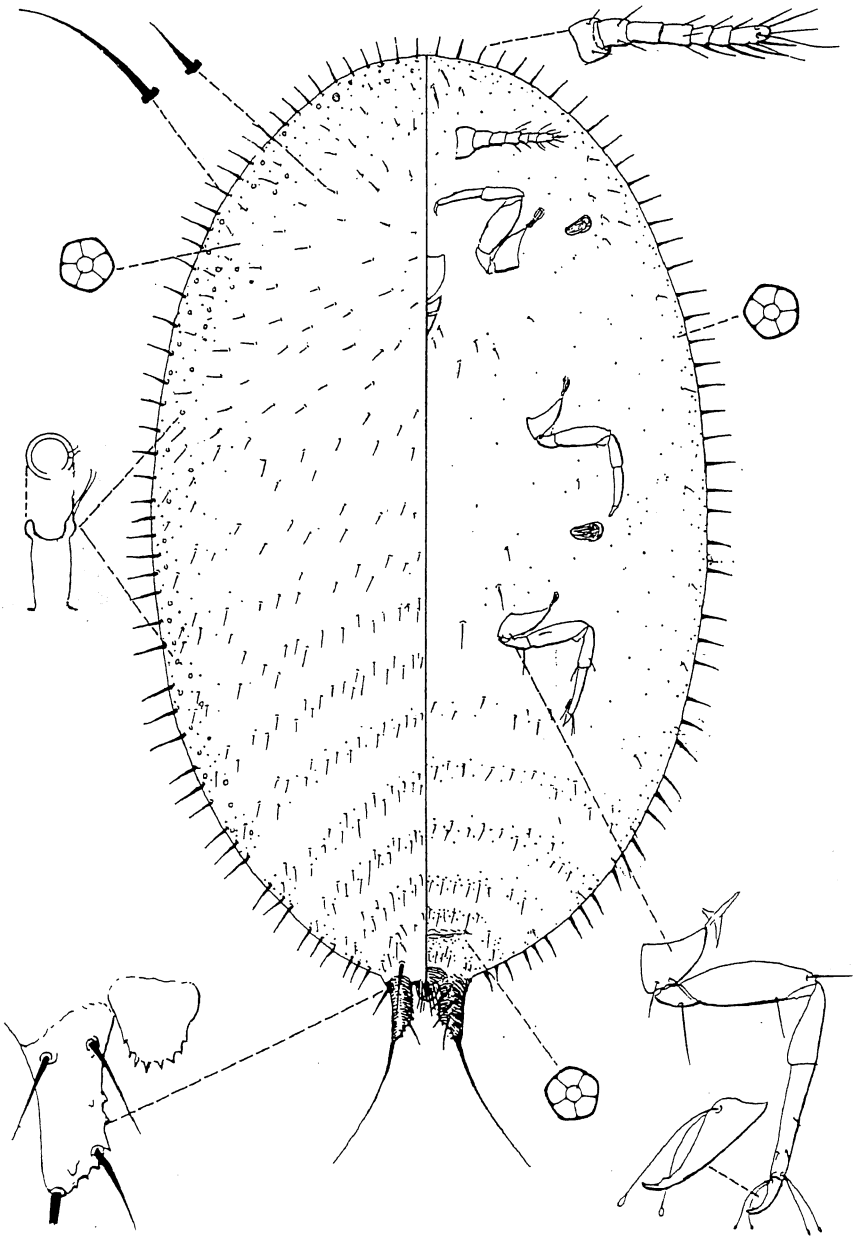

Fig. 2 - *Gossypariella phyllanthi* (Ferris, 1957) (Fig. 2) (after Ferris, 1957).

unknown. Described: female. **Notes:** No type material has been found till now either in the BMNH, MNHN, ZIAS, and UCDC or in the USNM collections.

Gossypariella phyllanthi; Tang & Hao, 1995: 504, change of combination

Description

Unmounted female. Ferris (1957) noted that according to the mounted slide the insect partially enclosed within a sac that is entirely open along the back, with secretion occurring as a wall along the sides of body.

Mounted female. Body broadly oval, 1.0-mm long. Antenna 7 segmented; the segments covered with few setae.

Venter. Labium apparently two-segmented. Legs small, tarsus twice as long as tibia. Claw with denticle. Legs with few setae. Five-locular pores distributed in small number on all segments of abdomen and thorax. With a small number of scattered, spine-like setae. Macro- and microtubular duct not shown or mentioned by Author.

Dorsum. Short setae, found in small number on all segments, and in 2-3 rows on the margin. Macrotubular ducts present only on the margin. Microtubular ducts not shown or mentioned. Five-locular pores scattered mostly on the last abdominal segments. Anal ring not clearly illustrated, and not mentioned in description. Anal lobes sclerotized, with teeth on margin, slender, with two setae along inner margin, and one setae on outer margin. Apical setae longer than lobe. Anal plate heavily sclerotized, surface with reticulation. Sclerotized plates present on penultimate segment, anterior to anal ring. Cauda triangular, with several teeth on posterior margin (Ferris, 1957).

DISTRIBUTION. Oriental: India (Kerala).

Affinities: See under *G. siamensis*.

Gossypariella siamensis (Takahashi, 1942), (Fig. 3)

Rhizococcus siamensis Takahashi, 1942b: 6-8. Type data: Thailand: Chiengmai, on *Ficus* sp., 06/04/1940, by R. Takahashi. Lectotype female, here designated (marked with red), and paralectotype female on one, together with female of Coccidae species. Type depository: Taichung: Taiwan Agricultural Research Institute, Entomology Collection, Taiwan.

Gossypariella siamensis; Borchsenius, 1960e: 920, change of combination.

Description

Unmounted female. Not seen, according to Takahashi (1942) description blackish brown in dried specimens, body subcircular, about 1.25 times longer than wide.

Mounted female. Body elongate oval. 1,9-mm long and 1,5 wide. Antenna 7 segmented, measurements of the segments: 1st – 31 μm, 2nd - 36 μm, 3rd – 34 μm, fourth –34 μm, fifth – 19 μm sixth 21, and seventh 31 μm. There is one sensory pore on the 2nd segment of the antenna. The 3rd segment is almost parallel-sided. Apical setae of antenna 56 μm.

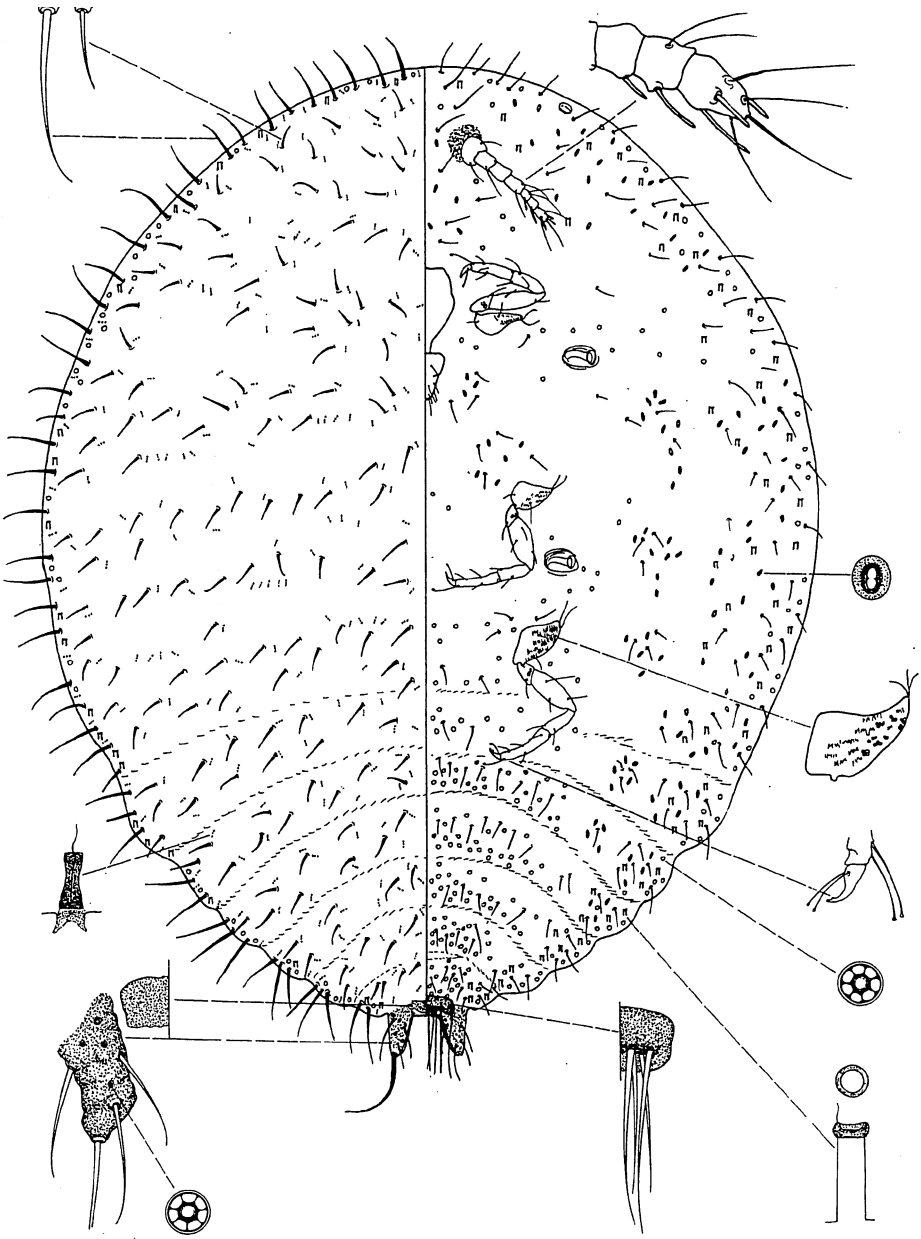

Fig. 3 - *Gossypariella siamensis* (Takahashi, 1942), lectotype, adult female, redrawing.

Apical segment with three sensory falcate setae. Two preapical segments with falcate sensory setae, 12-24 μm long. The segments of the antenna are covered with few long hair-like setae. The base of the antennae with some sclerotization. Eye visible, situated on venter.

Venter. Labium apparently two-segmented, 119 μm long. Stylet loop almost as long as the body. Legs small: coxa of anterior legs 53, trochanter 34, femur 96, tibia 70, tarsus 86, claw 26 μm long. Coxae of middle legs 53, trochanter 36, femur 91, tibia 70, tarsus 84, claw 26 μm long. Coxae of posterior legs 65, trochanter 34, femur 113, tibia 74, tarsus 96 μm long, tarsal digitules knobbed, 42 μm long, claw 29 μm long, claw digitules, 30 μm long, slightly knobbed. Middle and posterior coxae with some reticulation; posterior coxa with a few pores present. Trochanter with two pores on each side. Claw with a denticle. Legs with few hairlike setae, and with one sensory pore on tarsus. Five-locular pores 4-5 μm in diameter, distributed in bands and rows on all segments of abdomen and thorax. The diameter of peritrema of anterior spiracles 29 μm. With a small number of scattered, hair-like setae. Microtubular ducts absent. Macrotubular ducts of one sizes, about 4 μm wide and 12 μm long, present in a submarginal band. Sessile pores 4 μm long, scattered on margin and form groups in submarginal band, some scattered in the venter of middle of thorax. Multilocular pores with 5, 6 or 7 loculi, 4-5 μm in diameter.

Dorsum. With hair-like setae, 36-92 μm long found in rows on all segments. Margin with 2-3 setae Macrotubular ducts absent. Microtubular ducts double apex, 5 μm long, scattered among dorsal setae. Anal ring not well seen, situated between venter and dorsum. Anal ring with eight, hairlike setae, about 105 μm long. Anal ring pores not seen. Anal lobes with two hair-like setae along inner margin, 42-68 μm long, and one 55 μm long setae on outer margin. Apical setae 193 μm long. Anal lobes heavily sclerotized, surface with reticulation. Suranal setae hair-like. Penultimate segments, anterior to anal ring, with sclerotized plate present, 86 μm wide. The cauda 67 μm wide.

DISTRIBUTION. Oriental: China (Yunnan), Thailand.

Affinities: We have compared the lectotype and paralectotype of *G. siamensis* with material collected by Borchsenius (1960) in China, and conclude that the latter belongs to this species. This species is very similar to *G. phyllanthi* (Ferris, 1957). According to the drawing of Ferris (1957), there are some differences in the number of pores on the dorsal margin, in the shape of cauda and structure of anal lobes. However, this question needs further study, if the type material of *G. phyllanthi* will be found.

Gossypariella sulawesi Kozár and Martin sp. n. (Fig. 4)

Type data: Sulawesi Utara, Dumoga-Bone N.P. at altitude of 400-500 meters above see level. Gunung Mogogonipa (cultivation) *Elmerrilea ovalis* (Magnoliaceae) (Leiden: 7054) 8. IV. 1985, J. H. Martin coll. 4810. Holotype, female, Deposited in the BMNH. One paratype female and a larva on the same slide are from the same collection, deposited in PPI HAS (Budapest).

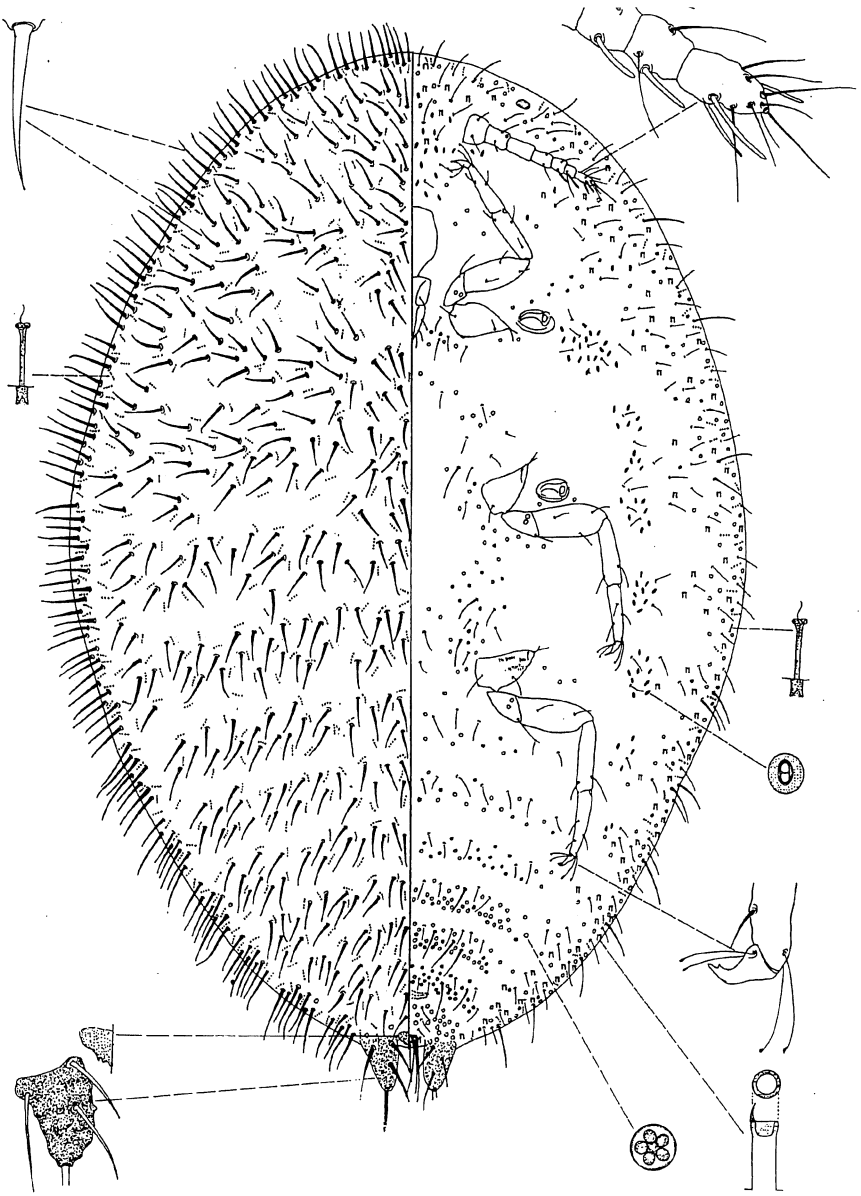

Fig. 4 - *Gossypariella sulawesi* Kozár and Martin species nova, adult female.

Unmounted female. Not seen.

Mounted female. Body elongate oval. 2.1 mm long and 1.4 wide. Antenna 7 segmented, measurements of the segments: 1st – 53 μm, 2nd - 38 μm, 3rd – 65 μm, fourth –38 μm, fifth – 24 μm sixth 29, and seventh 49 μm. With one sensory pore on the 2nd segment of the antenna. The 3rd segment is almost parallel sided. Apical setae of antenna 50 μm long. With three sensory falcate setae on apical segment. On the two preapical segments 23-26 μm long, falcate sensory seta present. The segments of the antenna are covered with few hair-like setae, the longest 48 μm. Eye visible, situated on venter.

Venter. Labium apparently two-segmented, 163 μm long. Stylet loop not seen. Legs well developed, measurements of segments: coxae of anterior legs 60, trochanter 46, femur 125, tibia 86, tarsus 108, claw 31 μm long. Coxae of middle legs 60, trochanter 50, femur 122, tibia 89, tarsus 115, claw 34 μm long. Coxae of posterior legs 67, trochanter 55, femur 132, tibia 86, tarsus 122, tarsal digitules knobbed, 48, claw 36 μm, claw digitules, 36 μm long, slightly knobbed. Posterior coxae with some reticulation, but without pores. Trochanter with two pores on each side. Claw with denticle. Legs with few hairlike setae, and with one sensory pore on tarsus. Five-locular pores, each 4 μm in diameter, distributed in bands on last abdominal segments, and scattered elsewhere. The diameter of peritrema of anterior spiracles 36 μm. Venter with a few number of scattered, hair-like setae. Microtubular duct present on the margin. Macrotubular ducts about 7-μm wide and 21 μm long, present in a submarginal band. Sessile pores 4 μm long, form groups in submarginal band, absent on middle of thorax.

Dorsum. Dorsal setae hair-like, 77-94 μm long placed in double rows on all segments. Margin with 5-8 setae. Macrotubular ducts absent. Microtubular ducts 3 μm wide and 14 μm long, with double apex, scattered among dorsal setae. Anal ring not well seen, situated between venter and dorsum. Anal ring about 70 μm wide, with eight, hair-like setae, about 144 μm long. Anal lobes with two hair-like setae along inner margin and one 98 μm long setae on outer margin. Apical setae 187 μm long. Anal lobes heavily sclerotized. Suranal setae hair-like. Penultimate segments of abdomen without sclerotized plate. Cauda 74 μm wide with several teeth.

DISTRIBUTION. Oriental: Sulawesi (Utara).

Derivato nominis: The new species named after the place of the collection of the species.

Affinities: This species differs from all other species of *Gossypariella* genus by the presence of numerous spinose setae on margin.

KEY TO SPECIES

1. Margin of abdomen with 5-8 long, setose spines ..... *G. sulawesi*
   – Margin of abdomen with less than 5 long, setose spines 2
2. Middorsum with disc pores with 3, 4 or 5 loculi ..... *G. crematogastri*
   – Middorsum without disc pores with 3, 4 or 5 loculi 3
3. Anal lobe setae shorter than anal lobe, cauda triangular ..... *G. phyllanthi*
   – Anal lobe setae longer than anal lobe, cauda rectangular ..... *G. siamensis*

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