Boll. Zool. agr. Bachic.
Ser. II, 40 (2): 117-144

30 agosto 2008

F. KOZÁR, Z. KONCZNÉ BENEDICTY

Description of three new genera, five new species and some additional data on the taxonomy and distribution of Neotropic Eriococcidae (Homoptera Coccoidea Eriococcidae)

Abstract - Three new genera, five new species are described, two genera are resurrected, two species are redescribed, nine new combinations are proposed. Some new data are given to the knowledge of the family Eriococcidae from Chile, Costa Rica, Ecuador, Paraguay, and Peru. These new data show that the family needs a wider study in the region.

Riassunto - Vengono rimossi da sinonimia 3 nuovi generi, con descrizione di 5 nuove specie; sono rivalutati 2 generi e vengono ridescritte 2 specie. Sono inoltre proposte 9 nuove combinazioni. Sono forniti alcuni ulteriori dati relativi alle conoscenze della famiglia Ericoccidae da Cile, Costa Rica, Ecuador, Paraguay,e Perù. Questi nuovi dati evidenziano come la famiglia richieda ulteriori studi nella regione.

Key words: scale insects, Hemiptera, Coccoidea, Eriococcidae, new genera, new species, new combinations, redescription, *Acanthococcus*, key for genera and species.

In the exploration of the Eriococcidae fauna of South America a rapid progress could be noticed in the last years. The computer database ScaleNet (the family Eriococcidae last updated 10 October 2006) (Miller & Gimpel, 2006), and World Catalogue (Miller & Gimpel, 2000) contain 52 species from 17 genera. Recently several new publications have appeared, such as Hodgson & Miller (2002), Hodgson et al (2004), Kondo et al (2006), Foldi & Kozár (2007), whilst others are in preparation (De Willink, 2008). According to published data till now 60 species is known from 19 genera from this Region. In the present work the generic system introduced by Borchsenius (1949), and followed by Kosztarab & Kozár (1988), Köhler (1998), Tang & Hao (1995) and others is used.

The aim of this work is to describe new genera and new species of the Eriococcidae from Neotropical Region and to present a few new regional records.

MATERIAL AND METHODS

This study presents the results of the analyses of materials from the Nearctic Region deposited in different museums. The collectors are mentioned in the descriptions. The mounting techniques 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), Foldi & Kozár (2007), Kozár et al (2007), and others.

Acronyms used in the text: BMNH - British Museum Natural History (London, UK), PPI HAS - Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary), MNHU - Museum für Naturkunde der Humbold Universitat zu Berlin, Germany, DEI - ZALF, Deutsches Entomologisches Institut, Müncheberg, Germany.

RESULTS AND REMARKS

Eighteen species of the family was studied in detail in the present work from the Neotropical Region. Three genera and five species appeared to be new for science. Nine new combinations are proposed. Two species were redescribed and redrawn. Keys are given for the genera and species.

Nine species were found in 5 countries (Brazil, Chile, Costa Rica, Ecuador, Peru), in Chile by two new species the number of known species increased to 16. In Peru the two new species found are the first member of this family. In Costa Rica with the new species, the number increased to three. The two new species in the fauna of Ecuador are the first members of this family. *A. jorgenseni* is a new species for the fauna of Brazil, which has now 23 species. Concerning new genera and species and the species richness in the Nearctic Region (90 species in 13 genera) and of Neotropical Region (65 species in 24 genera) clearly shows that countries in Central and S-America need much more study.

The present study shows that further morphological studies of some characters are necessary in all species found in this Region too, because establishing the presence or absence of spinulae on coxae, number of setae on the basal segment of labium, presence of frontal lobes or tubercles and cauda, length of stylet loops, presence of microtubular ducts at the base of spines, etc are necessary for the better understanding of generic and species relationships.

Genus: *Coxicoccus* Kozár gen. n.

Type species: ***Coxicoccus foldi*** Kozár and Konczné Benedicty sp. n.

Generic diagnosis: adult female.

Venter: Antennae seven segmented, frontal lobe, or tubercle absent. Labium one segmented, basal segment of labium with one pair of setae. Venter with macrotubular

ducts and five locular pores in small number scattered on all over the surface. Legs long, tibia shorter than tarsus. All coxae with spinulae, posterior coxae harbour numerous small pores, too. Microtubular ducts present. Cruciform pores absent. Part of ventral setae on last abdominal segments capitate, suranal setae longer than lobe, capitate, ventral surface of anal lobes with one short apical and a capitate subapical setae.

Dorsum: Spine-like setae present on whole body. Anal lobes well developed, dorsal surface with three strong curved spines. Anal ring sclerotized, not well developed, with eight setae twice longer than diameter of ring, few anal ring pores present. Cauda absent. Macrotubular ducts narrow, long, the inner ductule ends with a flower-like, terminal gland. Microtubular ducts few, long, with bifurcate orifice, very often dorsal spines with one microtubular ducts at the base.

Derivato nominis: The new genus is named after Dr. Jennifer M. Cox (UK London, BMNH), acknowledging her Eriococcidae collections in S-America, and her substantial results in coccidology.

Affinities: *Coxicoccus* genus similar to *Eriococcus* by one pair of labial setae on basal segment, by long, bifurcated microtubular ducts, by absence of cruciform pores. It is also similar to *Acanthococcus* genus, having enlarged spine-like setae on dorsum, by presence of micro- and macrotubular ducts. *Coxicoccus* differs from *Eriococcus* by absence of enlarged tubular ducts, by absence of frontal lobes, by presence of pores on the posterior coxae, femur and tibia. It differs from *Acanthococcus* by absence of cruciform pores, by absence of frontal lobes and cauda, by presence one pair of setae on basal segment of labium. It differs from both genera by clavate ventral setae, and longer than anal lobe clavate suranal setae.

Description

Coxicoccus foldi Kozár and Konczné Benedicty sp. n. (Fig. 1)

Type data: Chile, I. 1986, coll. J. Cox, 7699. Holotype, female. Three paratypes with the same data, female, deposited in BMNH and one paratype in PPI.

Mounted female. Body elongate oval. 1. 373 (1.166-1.394) mm long and 0. 932 (751-958) wide. Antenna 7 segmented, the size of the segments: 1st – 35 (35-39) μm, 2nd - 35 (28-35) μm, 3rd – 45 (31-45)μm, fourth –36 (31-43) μm, fifth – 17 (15-20) μm sixth 20 (18-20), and seventh 38 (30-38) μm. There is one sensory pore on the 2nd segment of the antenna. The 3rd segment is almost parallel sided. Apical setae of antenna 60 (45-60) μm. On apical segment three 25 (22-32) μm long sensory falcate setae are found. On the two preapical segments 22 (12-30) μm long, falcate sensory setae are present. The segments of the antenna are covered with few hairlike setae, the longest 33 μm. Frontal lobe or, tubercle absent. Eye visible, situated on venter.

Venter. Labium apparently one-segmented, 58 (58-65) μm long. On undeveloped basal segment one pair of setae present. Stylet loop long, reaches the third segment of abdomen. Legs long: coxa of anterior legs 65 (57-67), trochanter 38 (24-38), femur 103 (100-111), tibia 79 (61-79), tarsus 96 (78-96), claw 26 μm long. Coxae of middle

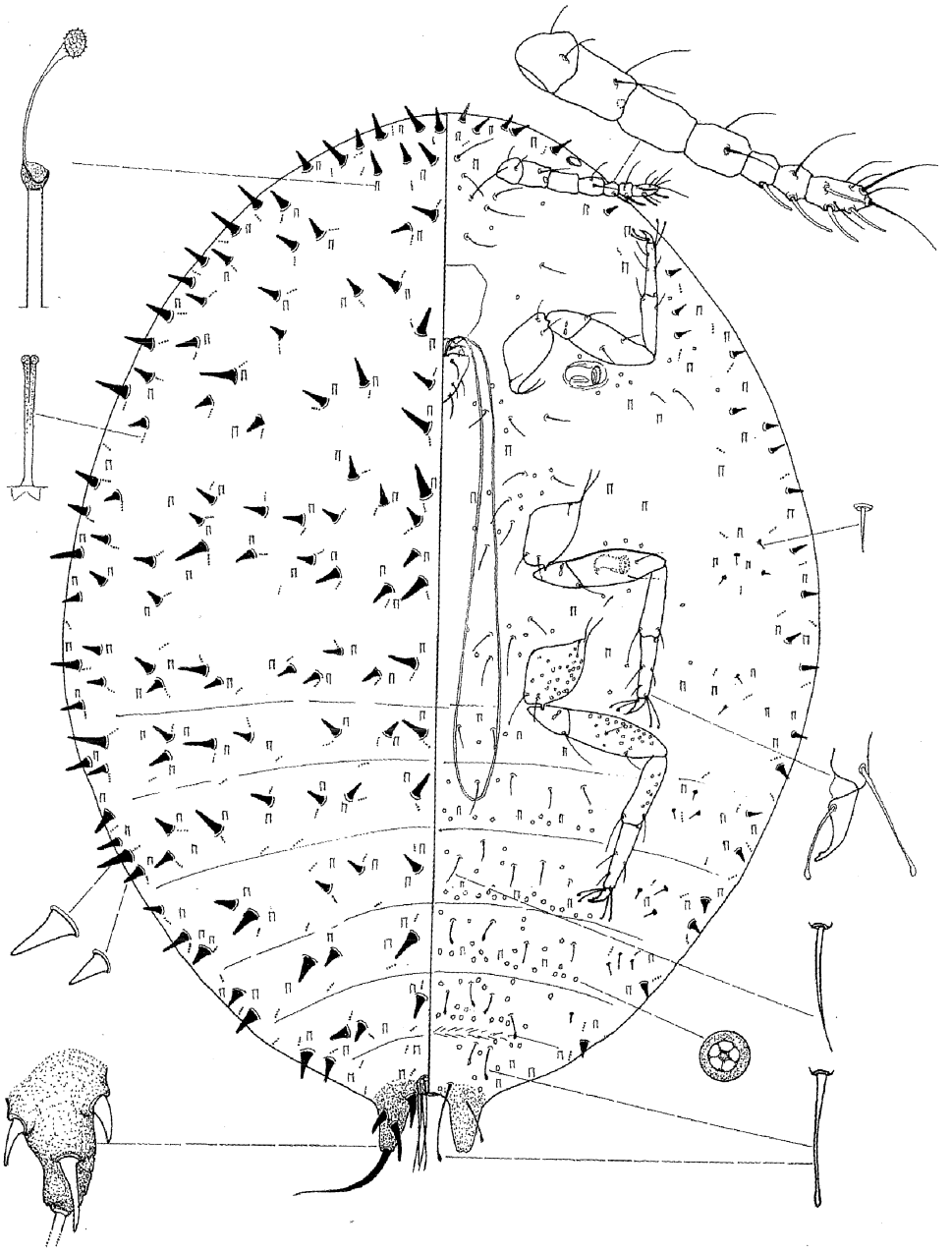

Fig. 1 - *Coxicoccus foldi* genus and species nova, adult female.

legs 67 (55-67), trochanter 46 (25-46), femur 108 (90-108), tibia 86 (60-86), tarsus 98 (74-98), claw 24 (18-24)μm long. Coxae of posterior legs 74 (58-74), trochanter 48 (28-48), femur 120 (102-120), tibia 94 (75-94), tarsus 106 (86-106), tarsal digitules knobbed, 33 (31-35), claw 22 (20-23) μm, claw digitules, 26 (20-26) μm long, slightly knobbed. Coxae with spinulae, posterior coxae, femur, and tibia with high number of translucent 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 rare bands on all segments of abdomen and thorax, 4 μm in diameter. The diameter of anterior spiracles 16 (14-16) μm. Venter with a small number of scattered, hair-like setae, 18-65 μm long, on last abdominal segments they are clavate, longest is 91 μm long μm. Cruciform pores absent. Microtubular duct present. Macrotubular ducts of two sizes, about 3-4 μm wide and 17 and 25-28 μm long, present in a small number on all segments. Internal genital organ not clearly seen.

Dorsum. Dorsal setae spine-like, strong, short, 2-3 times longer than wide, of two sizes, 19-33 μm long, found in one row on most segments. On the margin 2-4 setae present. Macrotubular ducts present in small number on all segments. Microtubular ducts 10-12 μm long, and 1 μm wide, with bifurcated end, scattered among dorsal setae, and one usually situated at the base of spines. Disc pores absent. Anal ring not well seen, 55 (46-55) μm wide, situated between venter and dorsum. Anal ring with eight, 120 (102-126) μm long hairlike setae. Anal lobes short, strong, twice longer than wide, with two spine-like setae along inner margin, 28-45 (20-45) μm long, and one 28 (22-28) μm long setae on outer margin. Apical setae 96 (96-110) μm long. Anal lobes heavily sclerotized. Suranal setae hair-like, blunted. Cauda absent.

Derivato nominis: The new species named after Dr. Imre Foldi (France, Paris, MNHN), acknowledging his Eriococcidae collections in S. America, and his substantial results in different fields of coccidology.

Affinities: There are some similarities with *A. adenostomae* (Ehrhorn, 1898), but the latter has much shorter tubular ducts, and there are no clavate hairlike setae on venter.

Genus: *ERIOBALACHOWSKYA* Kozár, gen. n.

Type species: ***Eriococcus valenzuelae*** Balachowsky, 1959 (Fig. 2)

Eriobalachowskya valenzuelae Balachowsky, 1959a: 363. comb. n.

Type material: Syntype material from Columbia, deposited in NHMN (France, Paris) was studied. Additional material, originating from Ecuador was found in BMNH (Azuay Pante, *Inga* sp., ACF.V.84 126/84 15, III. 84 G. Onore, 126/84, ACF. 05,84, 15, 14 deposited in BMNH, on five slides, one female and 12 different larval instar). No 7746, deposited in BMNH and one female in PPI.

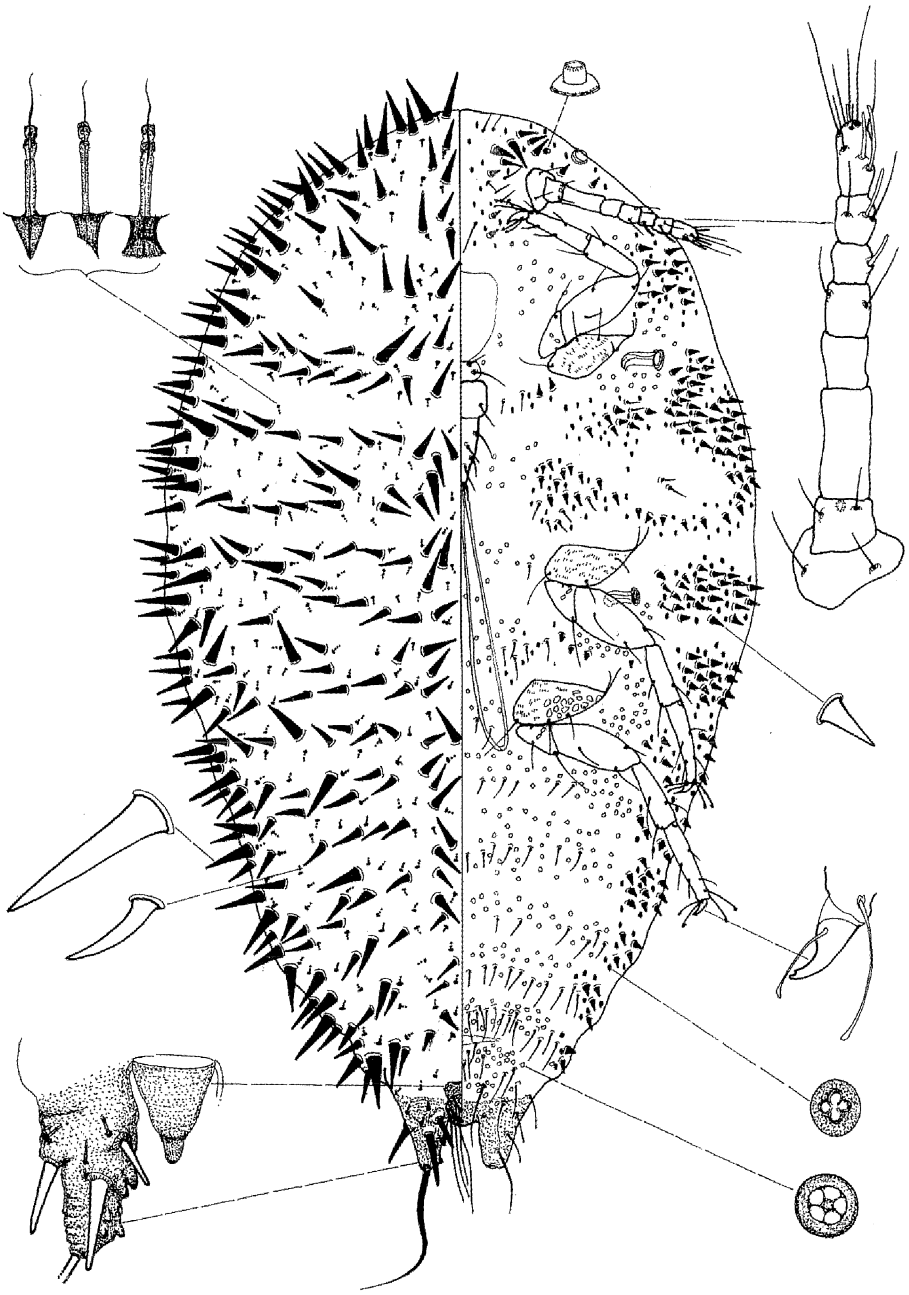

Fig. 2 - *Eriobalachowskya valenzuelae* (Balachowsky, 1959), (after Balachowsky, 1959, with additions), genus nova, adult female.

Generic diagnosis: adult female

Venter: Antennae eight segmented, frontal tubercle present. Labium two segmented, basal segment of labium with two pairs of setae. Stylet loop long, reaching behind posterior coxae. Macrotubular ducts absent. Discoidal pores five-locular, on all over the surface. Legs long, tibia shorter than tarsus. Coxae of all legs with spinulae, posterior coxae harbour numerous big pores. Microtubular ducts absent. Cruciform pores numerous along margin. Ventral setae hairlike, about half long as the width of a segment.

Dorsum: Spine-like setae present on whole surface, forming five longitudinal bands. Anal lobes well developed, inner surface with sclerotized teeth, dorsal surface with three strong spines, ventral surface with 4 setae. Anal ring sclerotized, well developed, with eight setae twice longer than diameter of ring, few anal ring pores present. Cauda special form, heavily sclerotized. Macrotubular ducts absent. Microtubular ducts with special structure, with wide round orifice, and narrow segmented tube originated from middle and with a short ductule, numerous on all segments.

Derivato nominis: The new genus is named after Dr. A. Balachowsky adding a prefix erio-, acknowledging his collecting activity in S-America, too, and his substantial results in coccidology.

Affinities: *Eriobalachowskya* genus different from all genera of Eriococcidae by having eight segmented antennae. Otherwise it is similar to *Acanthococcus*, *Eriococcus*, *Gossyparia* having enlarged spine-like setae on dorsum, but differs from them by absence of macrotubular ducts, and by presence of frontal tubercles. The structure of microtubular ducts, and cauda also unique in Eriococcidae family. According to Miller and Gimpel (2000) this species is new for the ecuadorian fauna. These data shows, that the species more widely distributed in Nearctic Region. First and second instar larvae of female do not have macrotubular ducts only microtubular ducts, however the second instar male larvae have it.

Hempelicoccus Kozár, genus nova

Type species: ***Hempelicoccus paranaensis*** (Foldi and Kozár, 2007), comb. n. (Fig. 3)

Eriococcus paranaensis Foldi and Kozár, 2007: 59.

Generic diagnosis: adult female.

Venter: Antennae seven segmented, frontal lobe, or tubercle present. Labium one segmented, basal segment of labium with two pairs of setae. Venter with macrotubular ducts of different sizes, five, or multilocular pores numerous on all over the surface. Legs long, tibia and tarsus about the same size. Coxae of median and posterior legs with spinulae, posterior coxae and femur harbour numerous big pores. Microtubular ducts absent. Cruciform pores numerous along margin. Ventral setae hairlike, about half long as the width of a segment.

Dorsum: Spine-like setae present on whole surface. Anal lobes well developed, dorsal

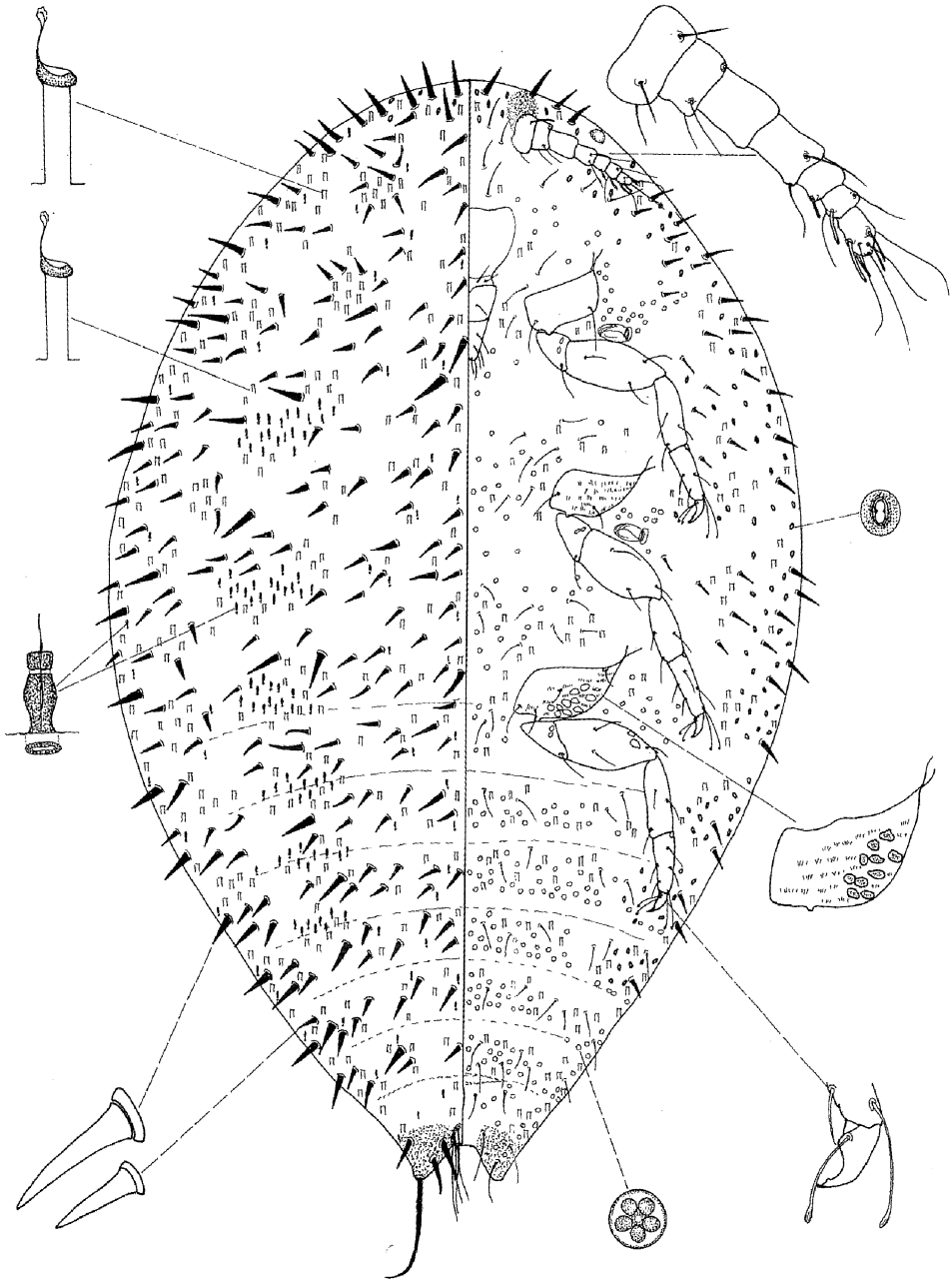

Fig. 3 - *Hempelicoccus paranaensis* (Foldi and Kozár, 2007), (after Foldi and Kozár, 2007, with additions), genus nova, female.

surface with three-four strong spines, ventral surface with 3-5 setae. Anal ring sclerotized, well developed, with eight setae twice longer than diameter of ring, few anal ring pores present. Cauda not developed. Macrotubular ducts narrow, long, the inner ductule ends with a flower-like, terminal gland. Microtubular ducts few, long, with oval, or bifurcate orifice forms large groups of several segments.

Derivato nominis: The new genus is named after Dr. A. Hempel, acknowledging his collecting activity in S-America, and his substantial results in coccidology.

Affinities: *Hempelicoccus* genus similar to *Eriococcus*, having enlarged spine-like setae on dorsum, by long, bifurcated microtubular ducts, by presence of frontal lobes,. It is similar to *Acanthococcus* genus, by two pairs of labial setae on basal segment, by presence of cruciform pores, by presence of frontal lobes, to *Coxicoccus* by enlarged spine-like setae on dorsum, by long, bifurcated microtubular ducts. *Hempelicoccus* differs from *Eriococcus* by absence of enlarged tubular ducts, by two pairs of labial setae on basal segment, by presence of cruciform pores and by presence of groups of microtubular ducts on dorsum. It differs from *Acanthococcus* by presence of groups of microtubular ducts on dorsum, from *Coxicoccus* by presence of frontal lobes, by presence two pair of setae on basal segment of labium, by absence clavate ventral setae.

Species included in the *Hempelicoccus* genus:
H. brasiliensis (Cockerell, 1900). Comb. n., with redescription
H. mendozae Morrison, 1919. Comb. n.
H. leguminicola Morrison, 1919. Comb. n.
H. paranaensis (Foldi and Kozár), 2007. Comb. n.

Redescription

Hempelicoccus brasiliensis (Cockerell, 1900):363. Comb. n. (Fig. 4)

Eriococcus brasiliensis Cockerell, 1900: 363.
Nidularia brasiliensis; Lindinger, 1933a: 108.
Acanthococcus brasiliensis; Miller and Gimpel, 1996: 599.

Type data: Brazil, Ypiranga, on *Baccharis* sp., by H. von Ihering, from the collection of MNHU (marked as „Type", in alcohol). Lectotype, female, mounted by Z. Konczné Benedicty, No 7573. Paralectotype female, no 7573 with the same data as lectotype, deposited in PPI. Five paralectotype female on four slides, without locality data (probably Brazil), however identified by A. Hempel (dry material) from the collection of DEI, mounted by Z. Konczné Benedicty, No 7678, deposited in DEI and PPI.

Mounted female. Body elongate oval. 1. 891 (1.891-2.020) mm long and 1.243 (1.243-1.295) wide. Antenna 7 segmented, the size of the segments: 1st – 40 (30-40) μm, 2nd - 29 (28-29) μm, 3rd – 38 (38-41)μm, fourth –40 (30-40) μm, fifth – 22 (19-22) μm sixth 20 (18-20), and seventh 31 (31-31) μm. There is one sensory pore on the 2nd segment of the antenna. The 3rd segment is almost parallel sided. Apical setae of antenna

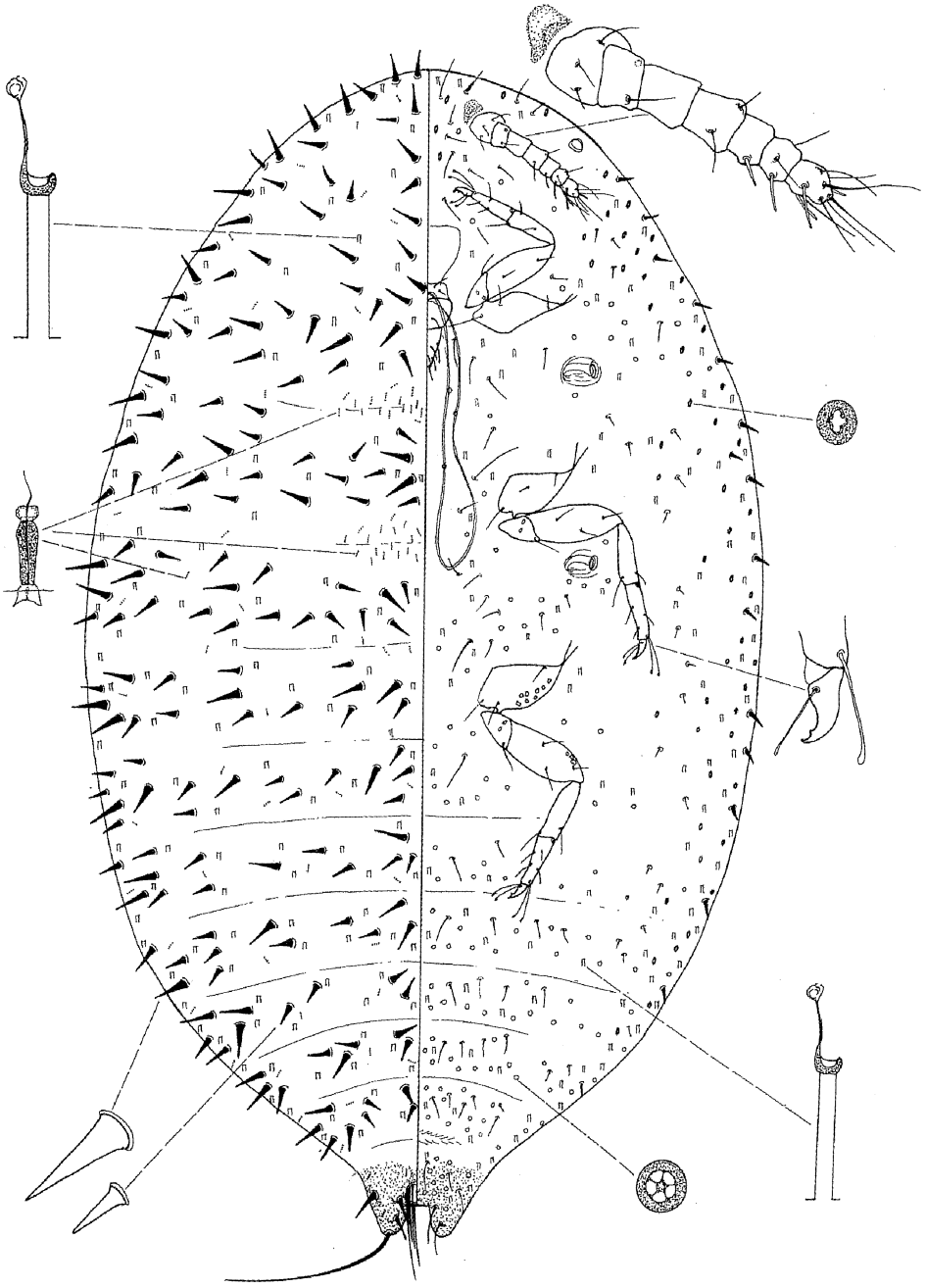

Fig. 4 - *Hempelicoccus brasiliensis* (Cockerell, 1900), adult female, redrawing.

58 (59-60) μm. On apical segment three 32 (31-31) μm long falcate sensory setae are found. On the two preapical segments 20-28 (20-32) μm long, falcate sensory setae are present. The segments of the antenna are covered with few hairlike setae, the longest 35 μm. Frontal lobe present. Eye visible, situated on venter.

Venter. Labium apparently one-segmented, 108 (105-108) μm long. On undeveloped basal segment two pair of setae present. Stylet loop long, reaches the second coxae. Legs long: coxa of anterior legs 60 (60-64), trochanter 55 (50-55), femur 120 (110-120), tibia 89 (84-89), tarsus 113 (107-113). Coxae of middle legs 67 (67-70), trochanter 53 (53-62), femur 120 (108-120), tibia 96 (93-96), tarsus 120 (110-120), claw 38-40 (37-40)μm long, tarsal digitules 58-63, claw digitules 39-48. Coxae of posterior legs 77 (76-77), trochanter 58 (57-58), femur 132 (125-132), tibia 108 (90-108), tarsus 120 (110-120). Posterior coxae, and femur, with small number of translucent 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 rare bands on all segments of abdomen and thorax, 6 μm in diameter. The diameter of anterior spiracles 32 (30-32) μm. Venter with a small number of scattered, short hair-like setae. Cruciform pores present in a submarginal band. Microtubular duct absent. Macrotubular ducts of one sizes, about 3-4 μm wide and 30-40 μm long, present in a small number on all segments. Internal genital organ not clearly seen.

Dorsum. Dorsal setae spine-like, strong, short, 4-5 times longer than wide, of two sizes, 18-50 μm long, found in two rows on most segments. On the margin 2-3 setae present. Macrotubular ducts present in small number on all segments. Microtubular ducts 8 μm long, with bifurcated end, forming two great groups containing more than 30 ducts on mid dorsum on meso-, and meta- segments of thorax, and scattered among dorsal setae elsewhere. Disc pores absent. Anal ring not well seen, 65 (64-65) μm wide, situated between venter and dorsum. Anal ring with eight, 110 μm long hairlike setae. Anal lobes short, strong, as long as wide, with two spine-like setae along inner margin, and one on outer margin. Apical setae 247 μm long. Anal lobes heavily sclerotized. Suranal setae hair-like. Cauda absent.

Affinities: *H. brasiliensis* differs from all species included in the genus by presence of groups of microtubular ducts in one row on midline of the dorsum, not in two submedian rows.

KEY TO SPECIES

1. Groups of microtubular ducts present in one row on midline of the dorsum .... *H. brasiliensis*
   – Groups of microtubular ducts present in two submedian rows 2

2. On the submedian part of the dorsum eight pore groups present, including macro- and microtubular ducts ..... *H. paranaensis*
   – On the submedian part of the dorsum four-five pore groups present, including only microtubular ducts 3

3. Frontal lobe present, submarginal band of spines on venter present, anal lobes with three spines ..... *H. mendozae*
   – Frontal tubercle present, submarginal band of spines on venter absent, anal lobes with four spines ..... *H. leguminicola*

Genus: *ACANTHOCOCCUS* Signoret, 1875

Type species: ***Acanthococcus aceris*** Signoret, 1875

Detailed descriptions were given by Borchsenius (1949), Kosztarab & Kozár (1988), Tang & Hao (1995) and others. Borchsenius (1949) and Kosztarab & Kozár (1988) differentiated it by the presence of enlarged macrospines on the dorsum, by absence of enlarged tubular ducts on dorsum, by absence of heavily sclerotized, discoidal pores (mostly five-locular), or pore groups and cruciform pores on dorsum, anal lobes sometimes strongly nodulose (serrate) with sclerotized teeth on inner margin. Labium with two well developed segments and a weekly developed basal segment with two pairs of setae.

Description

Acanthococcus microspinus Kozár and Konczné Benedicty sp. n. (Fig. 5)

Type data: Brazil, Goyar, 24, 11, 1933, coll. R. Spitz, No 15. Holotype female (marked), with one paratype female on the same slide, three paratype females on two slides with the same data as the holotype (all were identified by E. E. Green in 1934 as *Eriococcus perplexus* (Hempel, 1900). Dry syntype material preserved in DEI. Holotype and two paratypes are deposited in DEI and two paratypes on one slide in PPI.

Mounted female. Body elongate oval. 2. 616 (2.124-3.497) mm long and 1. 709 (1.450-1.709) wide. Antenna 7 segmented, the size of the segments: 1st – 40 (40-58) μm, 2nd - 42 (36-42) μm, 3rd – 56 (56-67) μm, fourth –37 (26-37) μm, fifth – 18 (18-28) μm, sixth 24 (22-28) μm and seventh 34 (31-46). There is one sensory pore on the 2nd segment of the antenna. The 3rd segment is almost parallel sided. Apical setae of antenna 59 (59-77) μm. On apical segment three sensory falcate setae are found, the longest 31 (22-31) μm. On the two preapical segments 18-27 (16-29) μm long, falcate sensory setae are present. The segments of the antenna are covered with few hairlike setae, 30-35 μm long. Frontal lobe present. Eye visible, situated on venter.

Venter. Labium two-segmented, 139 (139-149) μm long. Basal segment with two pairs of setae. Stylet loop reaches behind median coxae. Legs long: coxa of anterior legs 88 (88-110), trochanter 64 (64-84), femur 161 (161-175), tibia 129 (129-144), tarsus 132 (132-144). Coxae of middle legs 91 (91-110), trochanter 77 (68-77), femur 168 (168-184), tibia 144 (144-172), tarsus 149 (149-172), tarsal digitules 64 (60-67), claw

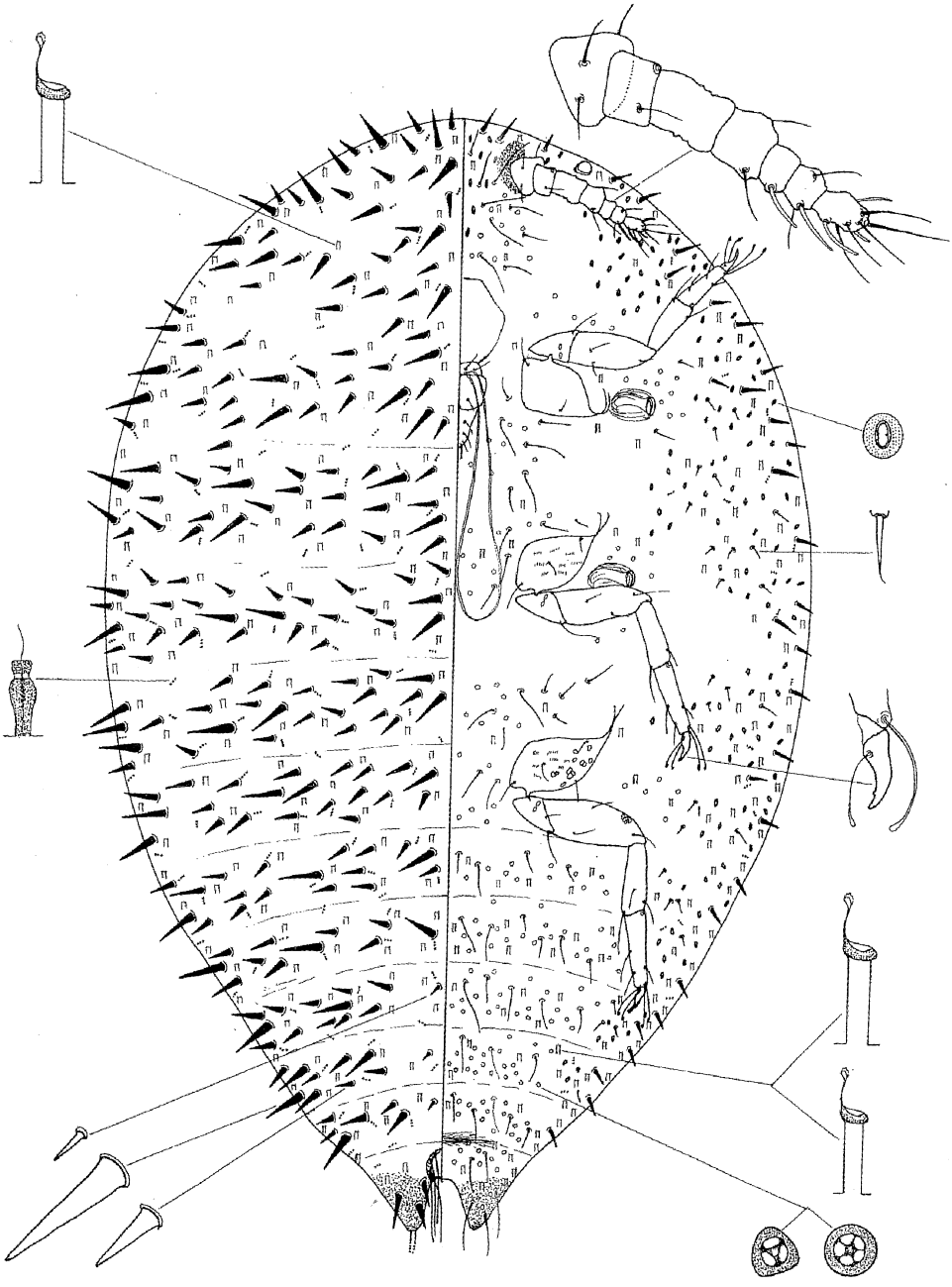

Fig. 5 - *Acanthococcus microspinus* species nova, adult female.

44 (38-46), claw digitules 51 (50-54). Coxae of posterior legs 110 (100-119), trochanter 72 (72-79), femur 168 (168-206), tibia 158 (158-185), tarsus 154 (154-175) μm long. All coxae with spinulae, posterior coxae, with small number of big translucent pores. Trochanter with two pores on each side. Claw with denticle. Legs with few hairlike setae, longest 30 (28-30) μm and with one sensory pore on tarsus. Disc pores 3-, and 5-locular, distributed in rare bands on all segments of abdomen and thorax, 5-7 μm in diameter. The diameter of anterior spiracles 36 (35-38) μm. Venter with a small number of scattered, hair-like setae, of two sizes. In submarginal band setose hair-like setae present 13 (11-13) μm long, in groups of 2-10 setae. Microtubular duct present only on the margin. Macrotubular ducts of two sizes, about 2-3 μm wide, and 13-19 μm long present in a small number on all segments. Cruciform pores numerous in a submarginal band 6 μm long. Internal genital organ not clearly seen.

Dorsum. Dorsal setae spine-like, very strong, wide, 5-6times longer than wide, of different sizes, 36-67 μm long, found in groups of 3-5 spines on abdominal margin. On the middorsum setae about the same size, in bands. On the penultimate three segments in midline 2-2 17 μm long spines present. Macrotubular ducts present in small number on all segments, 5 μm wide and 24 μm long. Microtubular ducts, 6 μm long, with simple opening, scattered among dorsal setae, one present on the base of spines. Disc pores absent. Anal ring not well seen, 74 (67-74) μm wide, 79 (79-94) μm long with eight, 103-130 μm long hairlike setae. Anal lobes long, as long as wide, with three equal long spine-like setae. Apical setae broken. Anal lobes sclerotized. Suranal setae hair-like. On penultimate segments, before of anal ring, sclerotized plate absent. Cauda not seen.

Derivato nominis: The new species named after the three pairs of microspines on midline of penultimate segments.

Affinities: This species is similar to *A. perplexus* (Hempel, 1900), but differs by longer spines on dorsal margin and middorsum, greater number of marginal spines, by equal sizes of tibia and tarsus, and especially by presence of three pair of small microspines in middorsum on three penultimate dorsal segments. From *A. venezuelaensis* (Foldi et Kozár, 2007) differs by presence of three pair of small microspines in middorsum on three penultimate dorsal segments, by longer spines on dorsum, larger sizes of legs and antennae, and by absence of spinulae on first legs.

Redescription

Acanthococcus perplexus (Hempel, 1900). (Fig. 6)

Eriococcus perplexus Hempel, 1900a: 381.
Nidularia perplexus; Lindinger, 1933a: 116.
Acanthococcus perplexus; Miller & Gimpel, 1996: 603.

Type data: Brazil, Minas Gerais, Belo Horizonte. Lectotype, female, paralectotype female with the same data as the lectotype, from the collection of MNHU (marked as „Type", in alcohol), mounted by Z. Konczné Benedicty, No 7572. Lectotype deposited in MNHU, and a paratype in PPI.

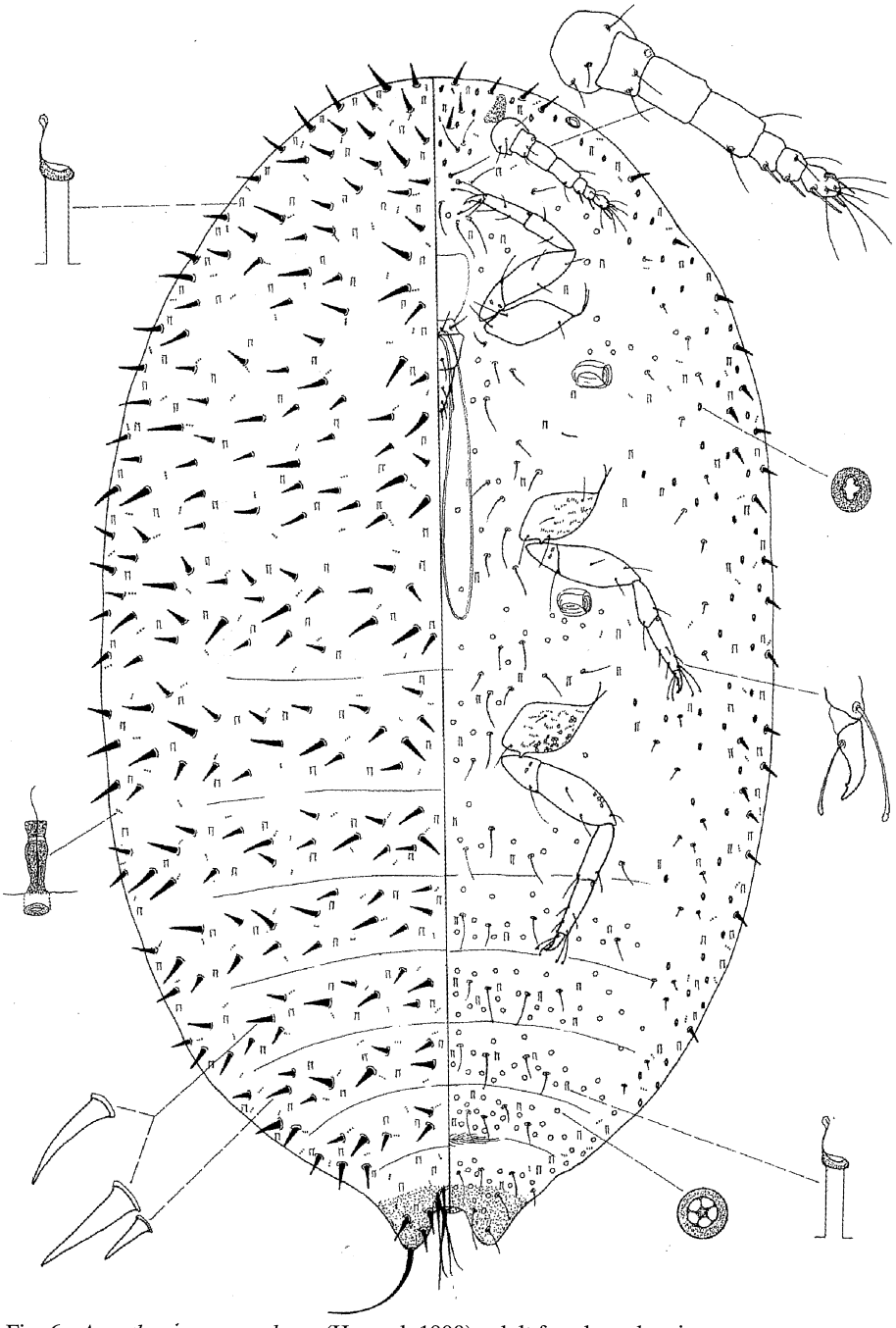

Fig. 6 - *Acanthocóccus perplexus* (Hempel, 1900), adult female, redrawing.

Mounted female. Body elongate oval. 3.108 (1.994-3.108) mm long and 1. 735 (1.217-1.735) wide. Antenna 7 segmented, the size of the segments: 1st – 46 (43-46) μm, 2nd - 40 (36-40) μm, 3rd – 56 (55-56) μm, fourth –58 (55-58) μm, fifth – 23 (22-23) μm, sixth 23 (22-23) μm and seventh 35 (34-35). There is one sensory pore on the 2nd segment of the antenna. The 3rd segment is almost parallel sided. Apical setae of antenna 52 (52-53) μm. On apical segment three sensory falcate setae are found, the longest 31 (31-31) μm. On the two preapical segments 16-24 (16-24) μm long, falcate sensory setae present. The segments of the antenna are covered with few hairlike setae, 30-35 μm long. Frontal lobe present. Eye visible, situated on venter.

Venter. Labium two-segmented, 137 (137-139) μm long. Basal segment with two pairs of setae. Stylet loop reaches behind median coxae. Legs long: coxa of anterior legs 101 (96-101), trochanter 72 (67-72), femur 168 (163-168), tibia 125 (115-125), tarsus 120 (120-130). Coxae of middle legs 101 (100-101), trochanter 77 (65-77), femur 171 (158-171), tibia 134 (120-134), tarsus 134 (132-134), tarsal digitules 60-62 (59-64), claw 39-42 (39-42), claw digitules 49-55 (49-55). Coxae of posterior legs 110 (108-110), trochanter 84 (70-84), femur 168 (168-168), tibia 144 (134-144), tarsus 142 (142-144) μm long. Median and posterior coxae with spinulae, posterior coxae, with small number of big translucent pores in groups. Trochanter with two pores on each side. Claw with denticle. Legs with few hairlike setae, longest 28 (22-28) μm and with one sensory pore on tarsus. Disc pores 3-, and 5-locular, distributed in rare bands on all segments of abdomen and thorax, 5-6 μm in diameter. The diameter of anterior spiracles 35 (35-36) μm. Venter with a small number of scattered, hair-like setae, of two sizes. In submarginal band few setose hair-like setae present. Microtubular duct absent. Macrotubular ducts of two sizes, about 2-4 μm wide, and 12-22 μm long present in a small number on all segments. Cruciform pores numerous in a submarginal band 4-5 μm long. Internal genital organ not clearly seen.

Dorsum. Dorsal setae spine-like, 3-4 times longer than wide, of different sizes, 31-64 μm long, found in groups of 2-3 spines on abdominal margin. On the middorsum setae about the same size, in bands. On the penultimate three segments in midline spines are the same size as elsewhere. Macrotubular ducts present in small number on all segments, 6 μm wide and 25 μm long. Microtubular ducts, 4-6 μm long, with simple oval opening, scattered among dorsal setae, one present on the base of some spines. Disc pores absent. Anal ring not well seen, 82 (70-82) μm wide, 82 μm long with eight, 120 (118-120) μm long hairlike setae. Anal lobes long, as long as wide, with three equal long spine-like setae. Apical setae 210 μm long. Anal lobes slightly sclerotized. Suranal setae hair-like. On penultimate segments, before of anal ring, sclerotized plate absent. Cauda not seen.

Affinities: This species is similar to *A. venezuelaensis* (Foldi et Kozár, 2007), but differs by shorter tibia than tarsus, larger sizes of legs and antennae, and by absence of spinulae on first legs.

Description

Acanthococcus pseudolongisetosus Konczné Benedicty and Kozár sp. n. (Fig. 7)

Type data: Peru: Huanuco (3400 m a.s.l.), 02, 12, 1972, bush, litter, coll. Prof. J. Balogh, PH-4 b 7769. Holotype, female (on the left side of the slide, marked), deposited in PPI, one larva on separate slide from the same collection.

Mounted female. Body elongate oval. 1. 632-mm long and 0. 803 wide. Antenna 6 segmented, the size of the segments: 1st – 34 μm, 2nd - 34 μm, 3rd – 101 μm, fourth –24 μm, fifth – 22 μm, and sixth 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 36 μm. On apical segment three sensory falcate setae are found, the longest 24 μm. On the two preapical segments 22-24 μm long, falcate sensory setae are present. The segments of the antenna are covered with few hairlike setae, the longest 29 μm. Frontal lobe present. Eye visible, situated on venter.

Venter. Labium two-segmented, 96 μm long, basal segment with two pairs of setae. Stylet loop reaches the posterior coxae. Legs long: coxa of anterior legs 70, trochanter 46, femur 134, tibia 106, tarsus 118, claw 29 μm long. Coxae of middle legs 77, trochanter 52, femur 140, tibia 113, tarsus 125, claw not measurable. Coxae of posterior legs 74, trochanter 58, femur 168, tibia 120, tarsus 139, tarsal digitules knobbed, 50, claw 37 μm, claw digitules, 39 μm long, slightly knobbed. Coxae without spinulae, posterior coxae, small number of translucent pores. Trochanter with two pores on each side. Claw with denticle. Legs with few hairlike setae, longest 19 μm and with one sensory pore on tarsus. Disc pores 7-9 locular, distributed in rare bands on all segments of abdomen and thorax, 5 μm in diameter. The diameter of anterior spiracles 26 μm. Venter with a small number of scattered, hair-like setae, of two sizes, the longest 58 μm long. Microtubular duct present only on the margin. Macrotubular ducts of one sizes, about 4-5 μm wide, present in a small number on all segments. Sessile pores present in a submarginal band 5 μm long. Internal genital organ not clearly seen.

Dorsum. Dorsal setae spine-like, 3-6 times longer than wide, of different sizes, 50 μm long, found in one row on abdominal margin. On the abdominal margin 2 setae present. On the middorsum setae much shorter, 8-14 μm long. Macrotubular ducts present in small number on all segments. Microtubular ducts, 6 μm long, with cruciform opening, scattered among dorsal setae. Disc pores absent. Anal ring not well seen, with eight, 103 μm long hairlike setae. Anal lobes short, twice longer than wide, with two spine-like setae along inner margin, and one setae on outer margin. Apical setae 168 μm long. Anal lobes not sclerotized. Suranal setae hair-like. On penultimate segments, before of anal ring, a sclerotized plate absent. The cauda not well developed.

Etymology: The species is named after the long setae(up to 58 μm) on midventer, which are much shorter than in case of *A. longisetosus* Foldi et Kozár 2007, which has setae up to 135 μm.

Derivato nominis: The new species named after the similar *A. longisetosus* with an addition of pseudo.

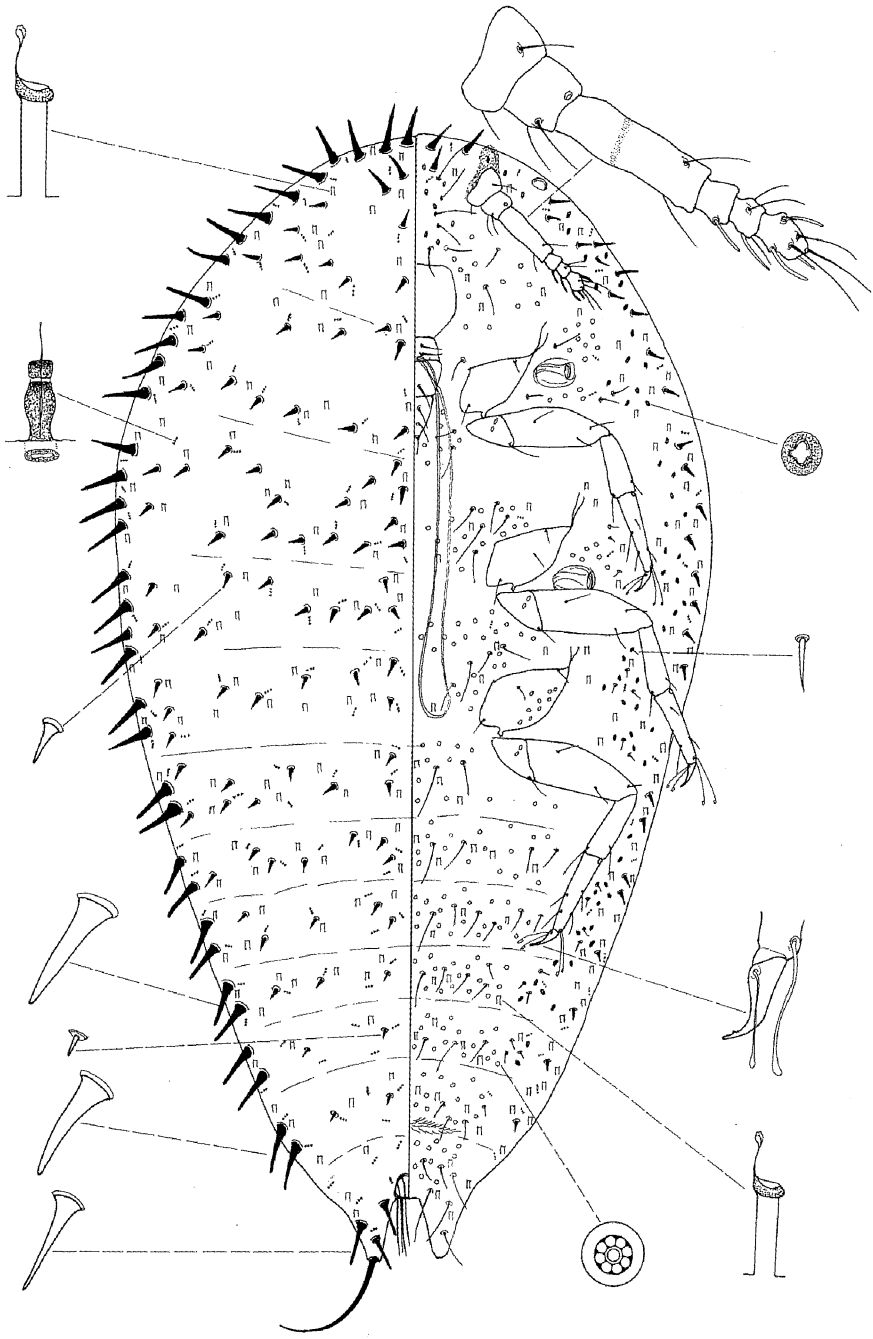

Fig. 7 - *Acanthococcus pseudolongisetosus* species nova, adult female.

Affinities: This species is similar to *A. dubius* (Cockerell, 1896) (in sense of Miller & Miller, 1992, Fig. 11), too, the latter has shorter and wider spines on dorsum and dorsal margin and a lot of very small spines all over on dorsum, especially on margin among large spines.

Description

Acanthococcus ventrispinus Kozár and Konczné Benedicty sp. n. (Fig. 8)

Type data: Chile, Alerce National Park, *Weinmania trichosperma*, 15, 01, 1986, coll. K. Tetu, from the collection of J. M. Cox (537), 7700. Holotype, female, three paratype female on three slides, with the same data, holotype and two paratypes deposited in BMNH and one paratype in PPI.

Mounted female. Body elongate oval. 2. 435 (1.968-2.435) mm long and 1. 450 (1.114-1.450) wide. Antenna 7 segmented, the size of the segments: 1st – 32 (32-44)μm, 2nd - 39 (36-39) μm, 3rd – 57 (46-57) μm, fourth –35 (32-35) μm, fifth – 17 (17-22) μm, sixth 26 (19-26) μm and seventh 36 (34-36). There is one sensory pore on the 2nd segment of the antenna. The 3rd segment is almost parallel sided. Apical setae of antenna 82 (56-82) μm. On apical segment three sensory falcate setae are found, the longest 32 (26-32) μm. On the two preapical segments 29-32 (24-32) μm long, falcate sensory setae are present. The segments of the antenna are covered with few hairlike setae, 35-40 μm long. Both frontal lobe and frontal tubercles present. Eye visible, situated on venter.

Venter. Labium two-segmented, 105 (87-105) μm long. Basal segment with two pairs of setae. Stylet loop not seen. Legs long: coxa of anterior legs 64 (53-64), trochanter 33 (32-38), femur 120 (96-120), tibia 74 (71-77), tarsus 112 (88-112), tarsal digitules 46, claw 31, claw digitules 33 μm long. Coxae of middle legs 68 (55-68), trochanter 31 (27-36), femur 110 (90-110), tibia 88 (68-88), tarsus 109 (96-109), tarsal digitules 46 (40-46), claw 32 (22-32), claw digitules 31 (31-36). Coxae of posterior legs 60 (60-66), trochanter 40 (35-40), femur 108 (93-108), tibia 81 (80-88), tarsus 108 (106-110), tarsal digitules knobbed, 41, claw 33 μm, claw digitules, 31 μm long, slightly knobbed. All coxae with spinulae, posterior coxae, with high number of small translucent pores. Trochanter with two pores on each side. Claw with denticle. Legs with few hairlike setae, longest 32 (14-32) μm and with one sensory pore on tarsus. Disc pores 5 locular, distributed in rare bands on all segments of abdomen and thorax, 4 μm in diameter. The diameter of anterior spiracles 22 (22-31) μm. Venter with a small number of scattered, hair-like setae, of two sizes. In submarginal band spine-like setae in groups of 2-10 setae. Microtubular duct present only on the margin. Macrotubular ducts of two sizes, about 3-6 μm wide, and 20-32 μm long present in a small number on all segments. Cruciform pores present in small number in a submarginal band 4-5 μm long. Internal genital organ not clearly seen.

Dorsum. Dorsal setae spine-like, very strong, wide, 1-2 times longer than wide, of different sizes, 16-30 μm long, found in one row on abdominal margin. On the abdominal margin 2-3 setae present on each segment. On the middorsum setae about the same

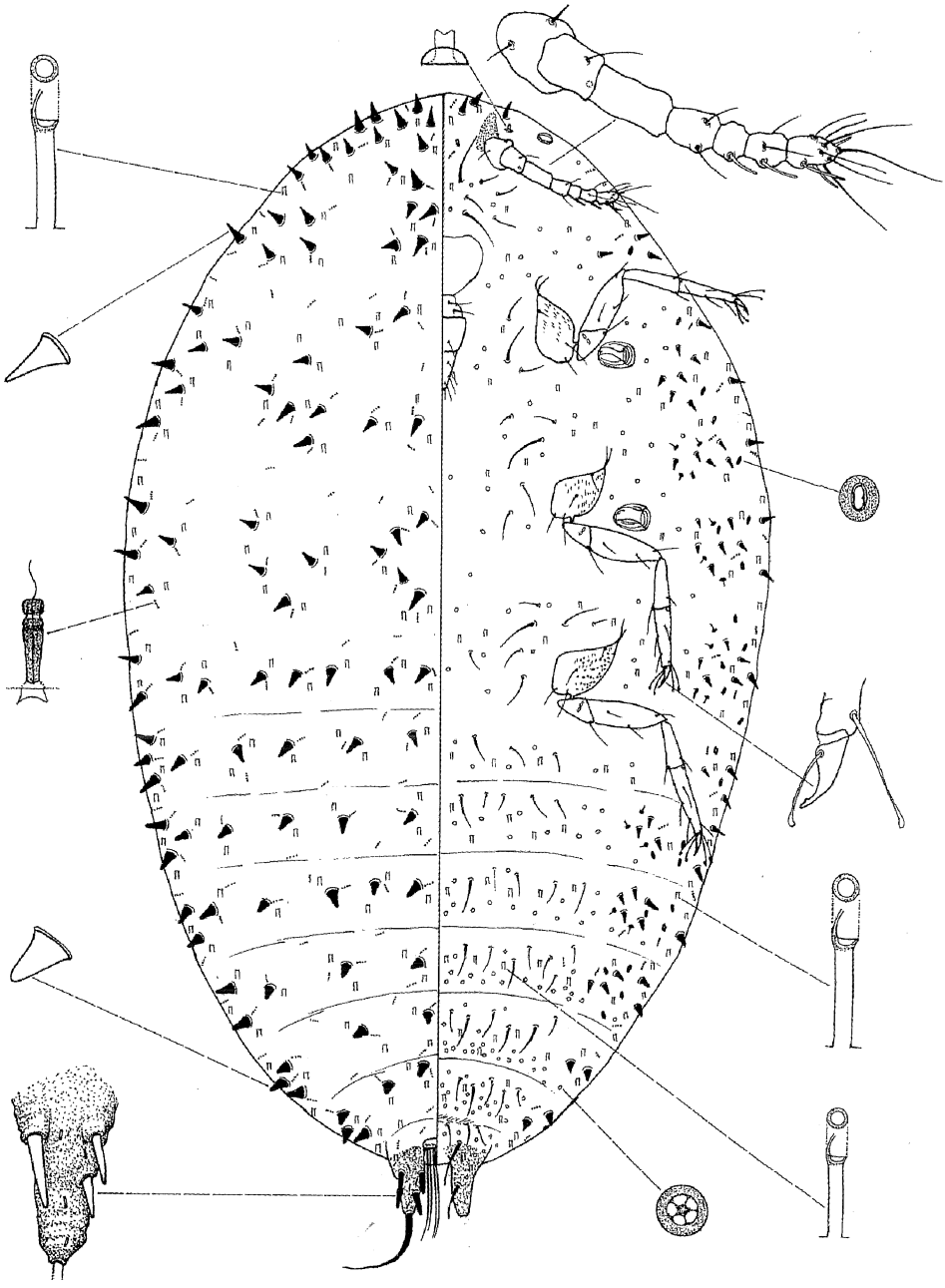

Fig. 8 - *Acanthococcus ventrispinus* species nova, adult female.

size, in a rare row. Macrotubular ducts present in small number on all segments, 6 μm wide and 24-30 μm long. Microtubular ducts, 7 (6-7) μm long, with bifurcated opening, scattered among dorsal setae, one present on the base of spines. Disc pores absent. Anal ring not well seen, 53 (53-55) μm wide, 40-43 μm long with eight, 150 (101-150) μm long hairlike setae. Anal lobes long, 2-3 longer than wide, with two short spine-like setae along inner margin, 30-37 (19-37) μm long and one setae on outer margin, 52 (36-52) μm long. Apical setae 142 (98-142) μm long. Anal lobes sclerotized. Suranal setae hair-like. On penultimate segments, before of anal ring, a sclerotized plate absent. The cauda not seen.

Derivato nominis: The new species named after the groups of spines in submarginal band on venter.

Affinities: This species is similar to *A. adenostomae* (Ehrhorn, 1898). But the latter has no cruciform pores and the structure of microtubular ducts is different. There is some similarities with *A. arenariae* Miller and Miller, 1993, but this species has longer spines on dorsum and the groups of spines on ventral submargin not developed, antennae six segmented, and the microtubular ducts is short. The *A. microtrichus* Miller and Miller, 1993 is different by shorter spines on dorsum and six segmented antennae.

Description

Acanthococcus willinkae Kozár and Konczné Benedicty sp. n. (Fig. 9)

Type data: Peru: Huanuco (3400 m a.s.l.), 02, 12, 1972, bush, litter, coll. Prof. J. Balogh, PH-4 a 7769. Holotype, female (on the right side of the slide, marked), deposited in PPI.

Mounted female. Body elongate oval. 1. 606 mm long and 0. 803 mm wide. Antenna apparently 6 segmented, with slight sign of division on the 3rd segment, the size of the segments: 1st – 38 μm, 2nd - 36 μm, 3rd – 103 μm, fourth –26 μm, fifth – 17 μm, and sixth 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 36 μm. On apical segment three sensory falcate setae are found, the longest 24 μm. On the two preapical segments 22-26 μm long, falcate sensory setae are present. The segments of the antenna are covered with few hairlike setae, the longest 31μm. Frontal lobe present. Eye visible, situated on venter.

Venter. Labium two-segmented, 110 μm long. Stylet loop reaches behind the second coxae. Legs long: coxa of anterior legs 84, trochanter 48, femur 130, tibia 108, tarsus 118, claw 34 μm long. Coxae of middle legs 79, trochanter 50, femur 142, tibia 113, tarsus 130, claw 35 μm long. Coxae of posterior legs 89, trochanter 58, femur 142, tibia 120, tarsus 140, tarsal digitules knobbed, 57, claw 37 μm, claw digitules, 36 μm long, slightly knobbed. Coxae without spinulae, posterior coxae with small number of translucent pores. Trochanter with two pores on each side. Claw with denticle. Legs with few hairlike setae, longest 26 μm and with one sensory pore on tarsus. Disc pores 7-9 locular, distributed in rare bands on all segments of abdomen and thorax, 6 μm in diameter. The diameter of anterior spiracles 25 μm. Venter with a small number of scattered, hair-like

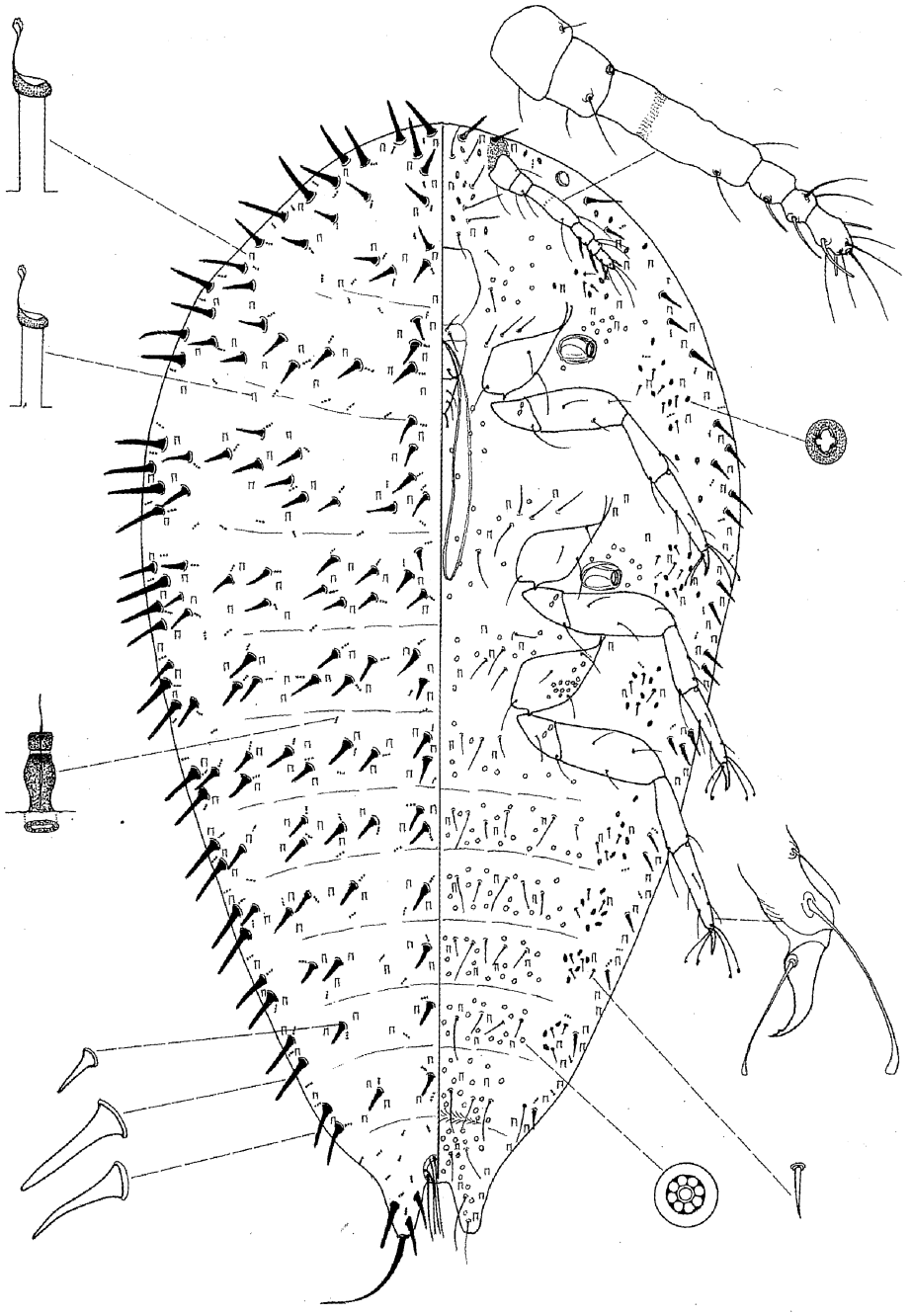

Fig. 9 - Acanthococcus willinkae species nova, adult female.

setae, of two sizes. Microtubular duct present only on the margin. Macrotubular ducts of two sizes, about 3-5 μm wide present in a small number on all segments. Sessile pores present in a submarginal band. Internal genital organ not clearly seen.

Dorsum. Dorsal setae spine-like, 3-6 times longer than wide, of different sizes, 24-53 μm long, found in one row on most segments. On the margin 2-4 setae present. Macrotubular ducts present in small number on all segments. Microtubular ducts 6 μm long, scattered among dorsal setae. Disc pores absent. Anal ring with eight, 115 μm long hairlike setae. Anal lobes short, twice longer than wide, with two spine-like setae along inner margin, 28-45 μm long, and one 28 μm long setae on outer margin. Apical setae 170 μm long. Anal lobes not sclerotized. Suranal setae hair-like. On penultimate segments, before of anal ring, a sclerotized plate absent. Cauda not seen.

Derivato nominis: The new species is named after Dr. M. Cristina Granara de Willink, acknowledging her collecting activity in S-America, and her substantial results in coccidology.

Affinities: This species is similar to *A. dubius* (Cockerell, 1896) in sense of Miller and Miller (1992, Fig. 10), but differs with smaller number of dorsal setae, especially on dorsal margin, by presence of multilocular pores and smaller number of cruciform pores. There are some similarity with *A. eriogoni* (Ehrhorn, 1911), which has much shorter spines, more heavily sclerotized rim around multilocular pores and smaller number of cruciform pores.

ADDITIONAL DATA

***Rhizococcus* (?) *kemptoni* (?)** (Parrott, 1900), comb. n. Ecuador, Cotopaxi (4000 m a.s.l.), 1973, Paramo vegetacio, No. 7770, EC-1, coll. Prof. J. Balogh, two larvae, or preadult female deposited in PPI. This species was not mentioned from Ecuador, however for final identification female should be studied. Frontal tubercle present, median setae on tip of labium short, spine-like, cauda present (called by Miller and Miller, 1992 as "raised area").

Acanthococcus costaricaensis (Cockerell and Robinson, 1915). Costa Rica, Cerro de la Muerte, *Hypericum iraguense*, 17, 03, 1990, J. M. Cox, 134, 12 females, deposited in BMNH and one of the in PPI. On the base of studied females we can add some details to Ferris (1955) description. Frontal lobes present. Basal segment of labium with two pairs of pores. Median setae on tip of labium long, hair-like. Stylet loop reaches median legs. Cruciform pores present in a submarginal band. All coxae with spinulae and with few, small pores on the posteriors. Cauda present. Microtubular ducts short, present on dorsum and in submarginal band. Microtubular ducts absent at the base of dorsal setae.

Acanthococcus jorgenseni (Morrison, 1919). Brazil, S. P. Araras, ?*Eugenia* sp., 23, 04,1984, coll. F. D. Bennett CIBC, BRA-84. 36, CIE A. 15977, two females, No 7702, deposited in PPI. Brazil, Santa Catarina, Sao Joaquim, Bom Jesus Rd 15 km, ?*Laurus* sp., 28, 12, 1972, coll. V. F. Eastop, 13/898, 1/73, female, No 7701, deposited in BMNH.. Brazil, *Baccharis* sp., Coll. J. Noaek, four females, No 7703, deposited in BMNH. Some

additional morphological character: Frontal lobes present, basal segment of the labium with two setae. All coxae with spinulae, posterior coxae and femur with numerous large pores. Slightly sclerotized cauda present. Microtubular ducts in some samples short, in others longer, in some cases 1-3 microtubular ducts present around base of dorsal setae. According to Miller and Gimpel (2000) this species is new for the brazilian fauna.

Key to species of *Acanthococcus* found in this survey

1. Discoidal pores with 7-9 loculi 2
   – Discoidal pores with 3-5 loculi 3

2. Middorsal spines about the same size as marginal ones ..... *A. willinkae* sp. n.
   – Middorsal spines much shorter than marginal ones ... *A. pseudolongisetosus* sp.n.

3. Dorsal spines strong, short, about as long as wide ..... *A. ventrispinus* sp. n.
   – Dorsal spines two, or more times longer than wide 4

4. Most of the spines on dorsum much shorter than on margin ..... *A. costaricaensis*
   – Most of the spines on dorsum about the same size as that of on margin 5

5. Middorsal setae on midline of the three penultimate segmentsve ry short ..... *A. microspinus* sp. n.
   – Middorsal setae on midline of the three penultimate segments about the same size as others on dorsum 6

6. Posterior coxae and femur with high number of small pores tibia much longer than tarsus ..... *A. jorgenseni*
   – Posterior coxae and femur with small number of big pores Tibia shorter than tarsus ..... *A. perplexus*

Modified key to genera of the Eriococcidae of Neotropical Region+
(after Hodgson et al., 2004; Kondo et al., 2007)

1 *Legs present, sometimes located near anal opening* 5
Legs absent 2

2(1) Conspicuously enlarged setae present on dorsum 4
– Conspicuously enlarged setae absent from dorsum 3

3(2) Microtubular ducts present; quinquelocular pores restricted to ventral thorax mostly near spiracles, absent from dorsum ..... *Pseudocapulinia* Hempel
– Microtubular ducts absent; quinquelocular pores - on both body surfaces ..... *Carpochloroides* Cockerell

4(3) Enlarged setae of 2 sizes, acorn shaped (on anterior abdomen, thorax, and head), and elongate on posterior abdominal egments ..... *Macracanthopyga* Lizer y Trelles
– Enlarged setae of acorn shape only scattered over dorsum ..... *Apiococcus* Hempel

5(1) Antenna 6-8 segmented 10
– Antennae with 5 or fewer segments 6

6(5) Without ring of tubular ducts surrounding apex of abdomen 7
– With ring of tubular ducts surrounding apex of abdomen. *Capulinia* Signoret

7(6) Legs large, weIl developed; without dermal sclerotization at posterior apex of abdomen 8
– Legs small, abortive; with dermal sclerotization at posterior - apex of abdomen ..... *Aculeococcus* Lepage

8(7) Enlarged setae not grouped in circular area on thorax and head; thorax.....
– and head not sclerotized 9
– Enlarged setae grouped in circular area on thorax and head;
– thorax and head sclerotized ..... *Neotectococcus* Hempel (in part)

9(8) Anal lobes protruding, heavily sclerotized ..... *Pseudotectococcus* Hempel
– Anal lobes absent or very small, unsclerotized .. *Tectococcus* Hempel(in part)

10(5) Anal lobes not protruding from posterior apex of abdomen 21
– Anal lobes protruding from posterior apex of abdomen..... 11

11(10) Macrotubular ducts present on dorsum 13
– Macrotubular ducts absent from dorsum..... 12

12(11) Anal lobes with teeth, cauda present..... *Icelococcus* Miller and González
– Anal lobes without teeth, cauda absent..... *Intenticoccus* Kondo

13(11) Macrotubular ducts on dorsum with conspicuous rim (oral collar) surrounding dermal orifice..... 14
– Macrotubular ducts on dorsum without conspicuous rim (oral collar) surrounding dermal orifice 15

14(13) Venter without tubular ducts; dorsum with numerous simple pores; cruciform pores on venter near body margin ..... *Exallococcus* Miller and González
– Venter with large clusters of tubular ducts on abdomen; dorsum without simple pores; without cruciform pores..... *Stibococcus* Miller and González (in part)

15(13) Macrotubular ducts on dorsum with distinct sclerotic rim surrounding dermal orifice ..... *Orafortis* Kondo
– Macrotubular ducts on dorsum with conspicuous rim (oral collar) surrounding dermal orifice 16

16(15) Antennae eight segmented, cauda large, heavily sclerotized .... *Eriobalachowskya* gen. n.
– Antennae 6-7 segmented, cauda if present not large heavily sclerotized 17

17(16) Ventral setae around vulvae and anal lobes clavate, base of spines ..... with microtubular ducts, frontal lobes absent ..... *Coxicoccus* gen. n.
– Ventral setae around vulvae and anal lobes not clavate, base of spines without microtubular ducts, frontal lobes present 18

18(17) Microtubular ducts on dorsum in well formed groups .... *Hempelicoccus* gen. n.
– Microtubular ducts on dorsum not in well formed groups 19

19(18) Enlarged setae form a marginal row, dorsal spines very short, ... needle-like, frontal lobes absent ..... *Rhizococcus* Signoret
– Enlarged setae present not only on margin but on whole body surface 20

20(19) Enlarged macrotubular ducts on dorsum present . *Eriococcus* Targioni-Tozzetti
– Enlarged macrotubular ducts on dorsum absent ..... *Acanthococcus* Signoret

21(10) Anal-lobe area without conspicuous sclerotization 23
– Anal-lobe area with conspicuous sclerotization 22

22(21) Enlarged setae forming conspicuous band around body margin .... *Chilechiton* Hodgson and Miller
– Enlarged setae not forming conspicuous hand around body margin ..... *Chilecoccus* Miller and González

23(21) Enlarged setae absent or not grouped in circular area on thorax and head; thoracic area unsclerotized 24
– Enlarged setae grouped in circular area on thorax and head; thorax and head sclerotized ..... *Neotectococcus* Hempel (in part)

24(23) Venter without large clusters of tubular ducts on abdomen 25

– Venter with large clusters of tubular ducts on abdomen .... *Stibococcus* Miller and González (in part)

25(24) Largest dorsal macrotubular ducts with 1-3 associated setae; apex of abdomen broadly rounded ..... *Melzeria* Green
– Largest dorsal macrotubular ducts without associated setae; apex of abdomen narrowly rounded ..... *Tectococcus* Hempel (in part)

+ **Comment:** According to present knowledge *Eriococcus* Targioni-Tozzetti sensu stricto absent in Neotropic Region. This conclusion is in accordance with molecular work of Kondo et al (2006). All species cited in ScaleNet and in Catalogue of the World (Miller & Gimpel, 2000) as *Eriococcus* sensu lato belongs to other genera and needs further studies, and should be marked as „Eriococcus s. l.". Several of them belongs to *Acanthococcus* Signoret according to Miller and Miller (1996), some are transferred in this work. In work of Foldi & Kozár (2007) the species *Eriococcus christopherus*, *E. longisetosus*, *E. maximus*, and *E. venezuelaensis* were placed originally in manuscript of the Authors in *Acanthococcus* genus. Latter they were printed as *Eriococcus*. According to present paper they should be transferred to *Acanthococcus*, as follows: *Acanthococcus christopherus* Foldi and Kozár, 2007, comb. n., *Acanthococcus longisetosus* Foldi and Kozár, 2007, comb. n., *Acanthococcus maximus* Foldi and Kozár, 2007, comb. n., and *Acanthococcus venezuelaensis* Foldi and Kozár, 2007, comb. n.

ACKNOWLEDGEMENTS

The authors would like to thank to European Union Synthesys Programmes (GB-TAF-1318, FR-TAF-1319, ES-TAF-2590) for financial help of this study and to Dr. Jon H. Martin for his help our work in BMNH and for loan of the specimens. To Danielle Matile Ferrero and Dr Imre Foldi for their great help to work in collection of MNHN. To the OTKA (Hungarian National Science Found) (Grant No. T 048801) for financial support of this project. Authors are grateful for language correction to Dr. Ferenc Samu. Special thanks to collectors: to late Prof. J. Balogh and to Prof. Sándor Mahunka. To Dr. Jürgen Deckert, Museum für Naturkunde der Humbold Universitat zu Berlin, and Dr. Eckhart Groll, ZALF, Deutsches Entomologisches Institut, Müncheberg, Germany for help of study the collection of Coccoidea and loan of materials.

REFERENCES

BEN-DOV, Y., MILLER, D.R., GIBSON, G.A.P. 2006 - Eriococcidae. ScaleNet. Updated 9 July 2006.

BORCHSENIUS, N. S., 1949 - FAUNA OF USSR. HOMOPTERA, PSEUDOCOCCIDAE. (IN RUSSIAN). AKAD. NAUK. ZOOL INST. (N.S. 38) 7: 1-383.

DE WILLINK, C. G., 2008 - Eriococcidos de la Argentina (Hemiptera: Coccoidea: Eriococcidae). In preparation. 1-13.

FOLDI, I., KOZÁR, F., 2007 - NEW SPECIES AND NEW RECORDS OF ERIOCOCCUS (HEMIPTERA, COCCOIDEA, ERIOCOCCIDAE) FROM SOUTH AMERICA. ZOOTAXA, 1573: 51-64.

HODGSON, C. J., MILLER, D. R., 2002 - A NEW GENUS AND TWO NEW SPECIES OF FELTSCALES (HEMIPTERA: COCCOIDEA: ERIOCOCCIDAE) FROM CHILE, WITH COMMENTS ON ZOOGEOGRAPHICAL AFFINITIES BETWEEN THE ERIOCOCCID FAUNAS OF SOUTHERN SOUTH AMERICA AND NEW ZEALAND. SYSTEMATIC ENTOMOLOGY, 27: 191-209.

HODGSON, C. J., GONCALVES, S. J. M., MILLER, D. R., ISAIAS, R. M. S., 2004 - A key to genera of Eriococcidae (Hemiptera: Coccoidea) from the Neotropical region and a revision of *Pseu-*

dotectococcus Hempel (Eriococcidae), a gall inducing scale insect genus from Brazil, with a description of a new species. Lundiana, 5: 51-72.

KONDO, T., HARDY, N., COOK, L., GULLAN, P., 2006 - DESCRIPTION OF TWO NEW GENERA AND SPECIES OF ERIOCOCCIDAE (HEMIPTERA: COCCOIDEA) FROM SOUTHERN SOUTH AMERICA. ZOOTAXA, 1349, 19-36.

KOSZTARAB, M., KOZÁR, F., 1988 - SCALE INSECTS OF CENTRAL EUROPE. AKADÉMIAI KIADÓ, BUDAPEST, 1-456.

KOZÁR, F., MARTIN, J., KONCZNÉ BENEDICTY, Z., 2007 - REVISION OF *Gossyparíella* Borchsenius with description of new species (Homoptera Coccoidea Eriococcidae). Bollettino di Zoologia agraria e di Bachicoltura, ser. II, 39: 79-90.

KŐHLER, G., 1998 - ERIOCOCCIDAE. IN: KOZÁR, F. (ED.) CATALOGUE OF PALAEARCTIC COCCOIDEA (PP. 371-402).. AKAPRINT, BUDAPEST, 1-526.

MILLER, D. R., GIMPEL, M. E., 2000 - A SYSTEMATIC CATALOGUE OF THE ERIOCOCCIDAE (FELT SCALES) (HEMIPTERA: COCCOIDEA) OF THE WORLD. INTERCEPT LTD., ANDOVER, U.K., 1-589.

MILLER, D. R., GIMPEL, M. E., 1996 - Nomenclatural changes in the Eriococcidae (Homoptera: Coccoidea). Proceedings of the Entomological Society of Washington, 98: 597-606.

MILLER, D. R., MILLER, G. L., 1992 - SYSTEMATIC ANALYSIS OF *Acanthococcus* (Homoptera: Coccoidea: Eriococcidae) in the Western United States. Transactions of the American Entomological Society, 118: 1-106.

Miller, D. R., Miller, G. L. (1993). Eriococcidae of the Eastern United States (Homoptera). Contributions of the American Entomological Institute, 27(4): 1-91.

Tang, F. T., Hao, J., 1995 - The Margarodidae and others of China, Beijing, P. R. China: Chinese Agricultural Science Technology Press, 1-738.

WILLIAMS, D. J.,1985 - THE BRITISH AND SOME OTHER EUROPEAN ERIOCOCCIDAE (HOMOPTERA: COCCOIDEA). BULLETIN OF THE BRITISH MUSEUM (NATURAL HISTORY), 51: 347–393.

DR FERENC KOZÁR, ZSUZSANNA KONCZNÉ BENEDICTY - Plant Protection Institute, Hungarian Academy of Sciences, Herman Ottó út 15. 1022 Budapest, H-1525 P.O.Box 102, Hungary. E-mail: h2405koz@ella.hu

Accepted 20 June 2008