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New species and a key of the species of the *Ripersiella* genus (Homoptera, Coccoidea, Pseudococcidae, Rhizoecini), with zoogeographic and phylogenetic considerations

Abstract - Eight new species (*Ripersiella hambletoni, R. kaydani, R. loksae, R. madagascarella, R. monticola, R. ruandaensis, R. salvatorei,* and *R. seychelliella*) are described, *R. periolana* redescribed and 15 new combinations proposed. The internal structure of female genital organ was studied in some species and the rate and shape of chitinisation are also used as a specific character. A review of the genus, a key for the 73 species, a map of distribution, with some phylogenetic and zoogeographic comments are given.

Riassunto - *Nuove specie del genere* Ripersiella *(Homoptera, Coccoidea, Pseudococcidae, Rhizoecini), chiave per la determinazione e considerazioni zoogeografiche e filogenetiche.*

Vengono descritte otto nuove specie (*Ripersiella hambletoni, R. kaydani, R. loksae, R. madagascarella, R. monticola, R. ruandaensis, R. salvatorei,* e *R. seychelliella*), è ridescritta *R. periolana* e sono proposte 15 nuove combinazioni. La struttura interna dei genitali femminili è stata studiata in alcune specie; l'aspetto e l'estensione della chitinizzazione sono stati utilizzati come carattere specifico. E' stata effettuata la revisione del genere *Ripersiella*, con predisposizione della chiave per la determinazione delle 73 specie note e della mappa della loro distribuzione. Infine vengono fatte alcune considerazioni filogenetiche e zoogeografiche.

Key words: Homoptera, Coccoidea, Pseudococcidae, Rhizoecinae, *Ripersiella*, new species, review, key, zoogeography, phylogeny.

The Rhizoecinae is a well-separated subfamily of the Pseudococcidae. The members of the subfamily were studied widely by Hambleton (1946, 1976). The subfamily was studied in detail by Tang (1992), Williams & Granara Willink (1992), Williams (1998, 2004), and Ben Dov (1994), Kozár & Konczné Benedicty (2002), and others. The computer database ScaleNet (the Pseudococcidae family last updated in 06 November 2002) (Miller, Ben Dov & Gimpel, 2001; Ben Dov & German, 2002)

contains the most important information (taxonomy, distribution, biology, etc). The World fauna of the subfamily is not well explored, as it was underlined by several publications (Kozár & Konczné Benedicty, 2002, 2003; Kozár & Foldi, 2004; Williams, 2004), describing new genera and species in the last years.

The distribution of the species is not well known. Several species are important pests of different crops and ornamentals, they are spreading in some regions and need further study.

The genus *Ripersiella* was analysed in great detail by Matile Ferrero (1976). The status of *Ripersiella* has changed several times, and is currently treated differently by different authors. Some authors treat it as a junior synonym of *Rhizoecus* (Ben Dov, 1994; Jansen, 2001, 2003; Williams, 1998, 2004), while others consider it to be valid (Williams & de Boer, 1973; Matile Ferrero, 1976; Tang, 1992; and Kozár & Konczné Benedicty, 2002, 2003). The character reduction is widely known in scale insect groups (Danzig, 1980). Jansen (2001) found a character reduction in *Ripersiella hibisci*, and Williams (2004) in *Ripersiella malschae*. These examples could help the clarification of the *Ripersiella – Rhizoecus* question.

The internal female genitalia were not used as a character to discriminate species; we have studied them in some species. De Marzo *et al.* (1990) studied the different types of female reproductive system of Coccoidea referring to 28 species of 11 families, including one *Rhizoecus* species, found eight basic types and their evolutionary trends was discussed. A recent description on the general organisation of the reproductive system of a soft scale based on the scanning observations was reported by Foldi (1997) serving basis to recognise the cuticular structures of the KOH treated genitalia visible on slides.

The aim of the present work is to study the subfamily Rhizoecinae on a world-wide scale, to prepare a revision of the genus *Ripersiella* and to learn more about the distribution patterns of the species. During the course of this study several new species have been found, some of them are described here.

MATERIALS AND METHODS

This study presents the results of the analyses of about 5000 samples from many parts of the World. The descriptions follow the terminology of morphological characters as given in the works of Hambleton (1946, 1976), Williams (1998, 2004); Kozár & Konczné Benedicty (2002, 2003) and Kozár & Foldi (2004).

The insects were collected by visual survey from soil, by Berlese funnel, Dvac and shifting samples (Kozár & Miller, 2000; Kozár & Konczné Benedicty, 2002, 2003). The collectors are mentioned in the descriptions. Most of the insects are from the collection of Arachnida of the Hungarian Natural History Museum, Budapest, Hungary (HNHM), from the soil sample collection of Eötvös Lóránt University, and from the scale insect collection of the Plant Protection Institute, Hungarian Academy of Sciences, Budapest, Hungary (PPI). The insects including some larval stages are

preserved on microscopic slides in the PPI. For this work collections, and type materials of USDA (Beltsville), British Museum (London) and MNHN (Paris) were studied, too.

A new morphological character, the female internal genitalia was studied in some species. Usually, in the traditional mounting process the internal genitalia of females are not preserved, and often even all their cuticular parts are destroyed. However, in most of the Rhizoecini species the ectodermic parts of internal genitalia are heavily sclerotized and may be observed in microscopic slides. The shape and size of vagina and locations of vaginal glands are variable, thus they can be useful complementary characters to separate species.

RESULTS

In the course of the present work 162 species belonging to the Rhizoecini tribe were analysed. For most species type material was examined, but in some cases only the original drawings and descriptions were available. On the base of this analysis 73 species are considered to belong to the genus *Ripersiella*, among them 8 new species were discovered and are described below.

Genus: ***Ripersiella*** Tinsley, 1899

Type species: ***Ripersiella rumicis*** (Maskell, 1892)

The genus, as treated here, has 5, or 6-segmented antennae. The tritubular pores (cerores), in the female stage absent. Most of the species have bitubular pores (cerores). Some species, which are morphologically similar to the generic type species (*R. rumicis*), but lack bitubular pores in thefemale stage, are tentatively also included in the *Ripersiella* genus (Kozár & Konczné Benedicty, 2002).

Ripersiella hambletoni Kozár & Konczné Benedicty sp. n. (Fig. 1)

Type material: The holotype, female, Mexico, Estado guerro Chilpancingo, Cerro de Jasmines al SE of the city, 1550-1910 m. alt (Fig. 10). On the pass pine plantation. *Polytrycheum* sp., 1996, 06. 18 (coll. S. Mahunka 339). Deposited in the Collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 1) 0. 97 mm long and 0.47 mm wide. Antenna 6 segmented, the length of the segments: 1st - 34, 2nd - 17, 3rd - 17, fourth - 14, fifth - 12, sixth - 38 μm long. There is one sensory pore on the

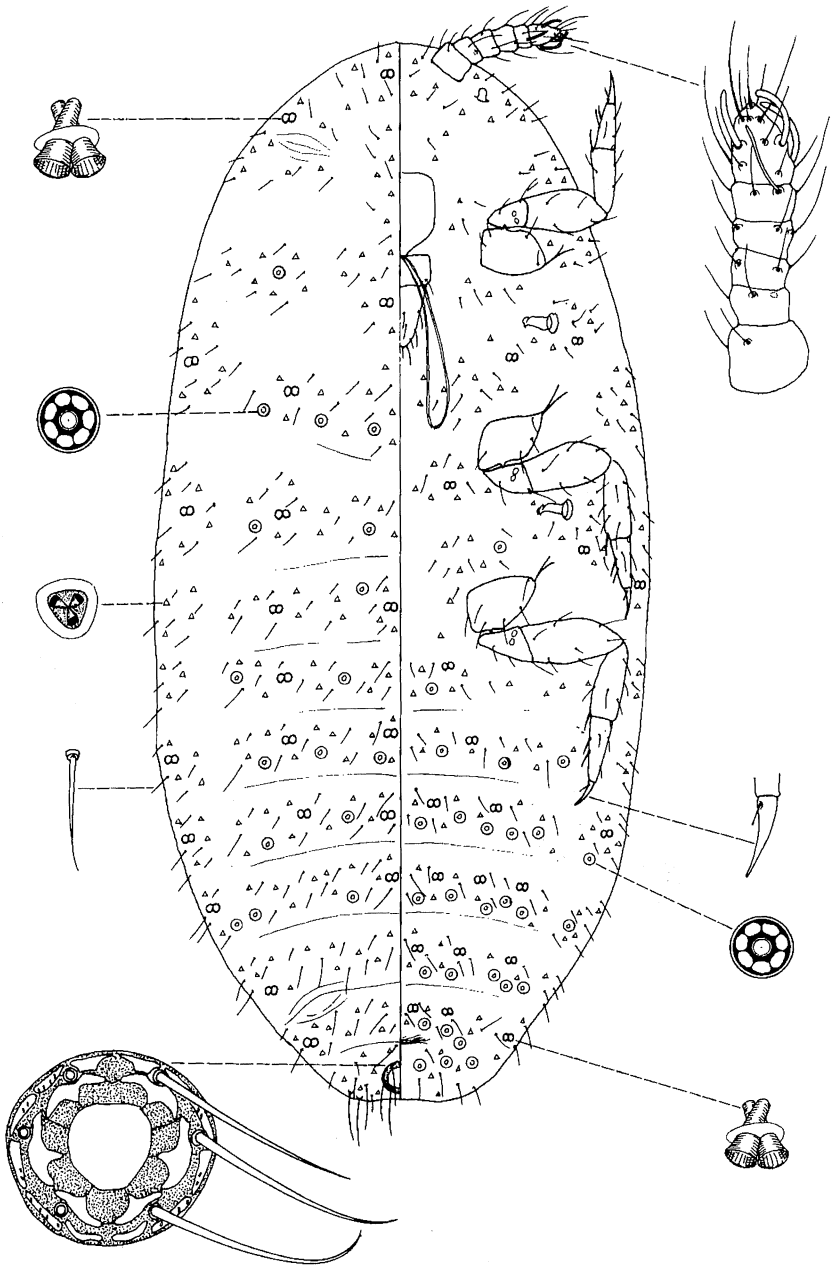

Fig. 1 - *Ripersiella hambletoni* sp. n.

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, 34 μm long, narrow sensory seta. Most segments of the antenna have a few hair-like setae, 26μm long. Eye is clearly visible. Anal lobe is slightly developed with three hair-like setae.

VENTER

Labium seems two-segmented, 82 μm long. Stylet loop 2 times longer than labium. Cephalic plate not visible. Legs robust: coxa of anterior legs 36, trochanter 24, femur 58 μm, tibia 43, tarsus 43 μm, and claw 21 μm. Coxa of middle legs 31 μm, trochanter 24, femur 55 μm, tibia 41, tarsus 41 μm, and claw 20 μm long. Coxa of posterior legs 36 μm, trochanter 26, femur 67 μm, tibia 50 and tarsus 46 μm, and claw 21 μm, tarsal digitules absent, claw digitules 6 μm long. Legs with few hair-like setae, tibia and tarsus with 18 μm long setae. On the ventral segments few bitubular pores present on all segments. Multilocular pores with 7 loculi, present on all abdominal segments 10 μm in diameter. The diameter of anterior spiracles 12 μm. Venter with a small number of scattered hair-like setae. Circulus absent. Tubular ducts absent. Trilocular pores scattered on the venter. Internal genital organ not clearly seen.

DORSUM

Ostioles present, not sclerotized. Multilocular pores present in small number on most of the segments. Anal ring oval, 58 μm wide and 55 μm long. Anal ring with six, 55 μm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, small blunted spicules present on some pores. Bitubular pores one size, 3-5 on each segments 6 μm in diameter, 14 μm long. Tubular duct absent. Hair-like setae 20 μm long, trilocular pores 4 μm wide, scattered on the dorsum.

Derivatio nominis: The species is named after the late Edson J. Hambleton, the best expert of the Rhizoecini group of mealybugs.

Affinities: The species is similar to *R. salvatorei,* but the latter has multilocular pores on all segments. The similar *R. hibisci* has five segmented antennae.

Ripersiella kaydani Konczné Benedicty & Kozár sp. n. (Fig. 2)

Type material: The holotype, female (on the left side, marked), two paratype females on the same slide, Turkey, Bornova-Izmir (coll. Akbulut) (Fig. 10), (No. 4508, from F. Kozár collection). 18. 09. 1995, on *Narcissus*. Eight paratype, female, on three slides (including two larva), with the same data as the holotype. Deposited in the collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 2) 1. 53 mm long and 0.67 mm wide. Antenna 6 segmented, the length of the segments: 1st - 34, 2nd - 17,

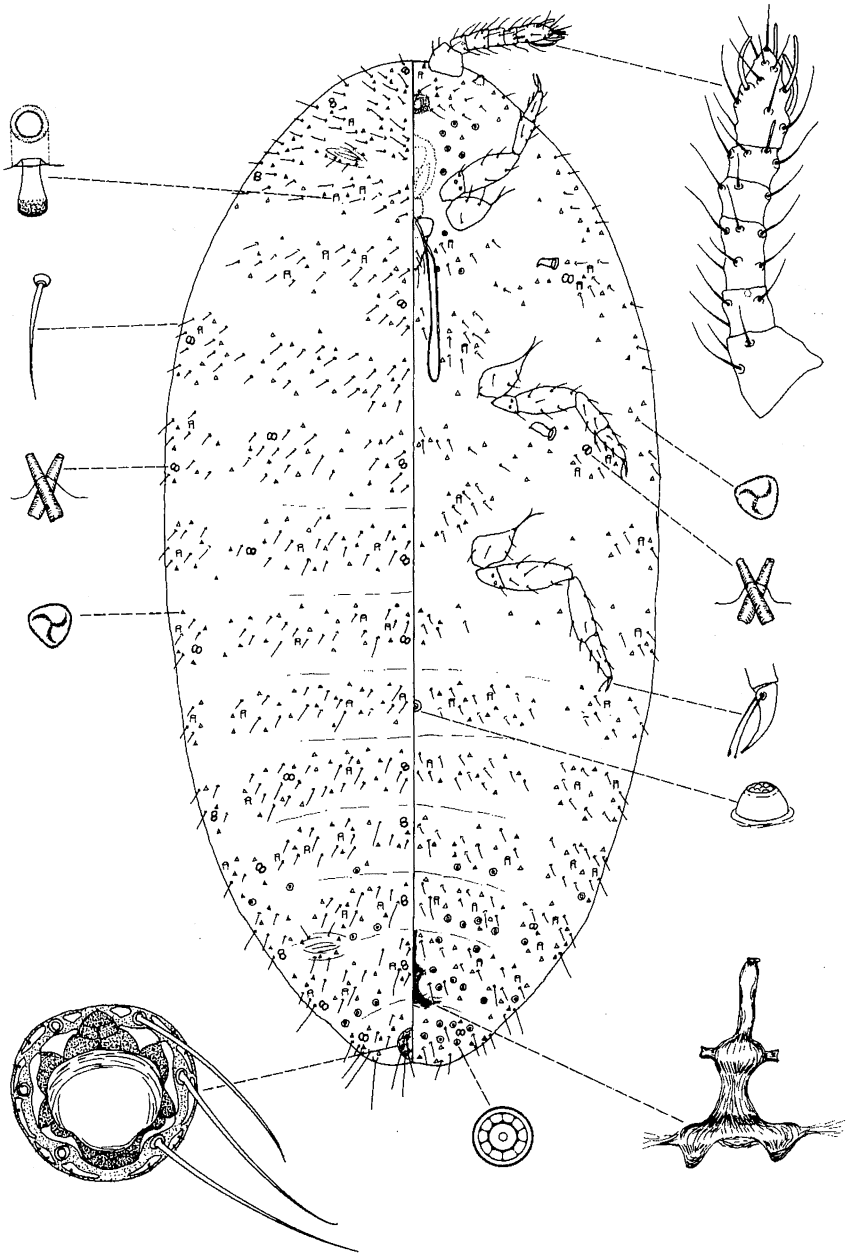

Fig. 2 - *Ripersiella kaydani* sp. n.

3rd - 29, fourth - 19, fifth - 12, sixth - 43 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 four sensory falcate setae. The 5th segment has one short, 14 μm long, blunted sensory seta. Most segments of the antenna have a few hair-like setae, one of them on fifth segment 24 μm long. Eye is clearly visible. Anal lobe is slightly developed with three hair-like setae.

VENTER

Labium seems two-segmented, 62 μm long. Stylet loop about 3 times longer than labium. Cephalic plate visible, round shaped. Legs robust: coxa of anterior legs 43, trochanter 29, femur 74 μm, tibia 62, tarsus 48 μm, and claw 17 μm. Coxa of middle legs 43 μm, trochanter 31, femur 72 μm, tibia 60, tarsus 48 μm, and claw 17 μm long. Coxa of posterior legs 48 μm, trochanter 34, femur 79 μm, tibia 77 and tarsus 50 μm, and claw 18 μm, tarsal digitules absent, claw digitules longer than claw. Legs with few hair-like setae, tibia and tarsus with 15 μm long setae. On the ventral segments very few bitubular pores present. Multilocular pores, with 8-10 pores, present on the last abdominal segments, and on segments of head and thorax, 7 μm in diameter. The diameter of anterior spiracles 14 μm. Venter with a small number of scattered hair-like setae. Circulus present, 25 μm in diameter. Tubular ducts present in small number. Trilocular pores scattered on the venter. Internal genital organ chitinized, elongated, as long as width of one segment.

DORSUM

Ostioles present, not sclerotized. Some multilocular pore present on last abdominal segments. Anal ring oval, 55 μm wide and 46 μm long. Anal ring with six, 58 μm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, outer row with spicules. Bitubular pores one size, 3-5 on each segments 2 μm in diameter, 9 μm long. Few tubular duct present, 4 μm long. Hair-like setae 13 μm long, trilocular pores 3 μm wide, scattered on the dorsum.

Derivatio nominis: The species is named after Mehmet Bora Kaydan, collector of several zoogeographicaly important scale insect species in Turkey.

Affinities: The species is similar to *R. petiti,* but the latter has higher number of pores (cells) (about 20) in outer margin of anal ring, instead of 12 found on *R. kaydani,* and there is no multilocular pores on head and thorax of venter.

Ripersiella loksae Konczné Benedicty & Kozár sp. n. (Fig. 3)

Type material: The holotype, female (on the right side), and one paratype female on the same slide, Brasilia, (coll. J. Balogh, BR B. 77). One paratypes, female, Brasilia, Campinas (coll. J. Balogh, D-Am 322), 26. 09. 1967, from litter. Two paratype females

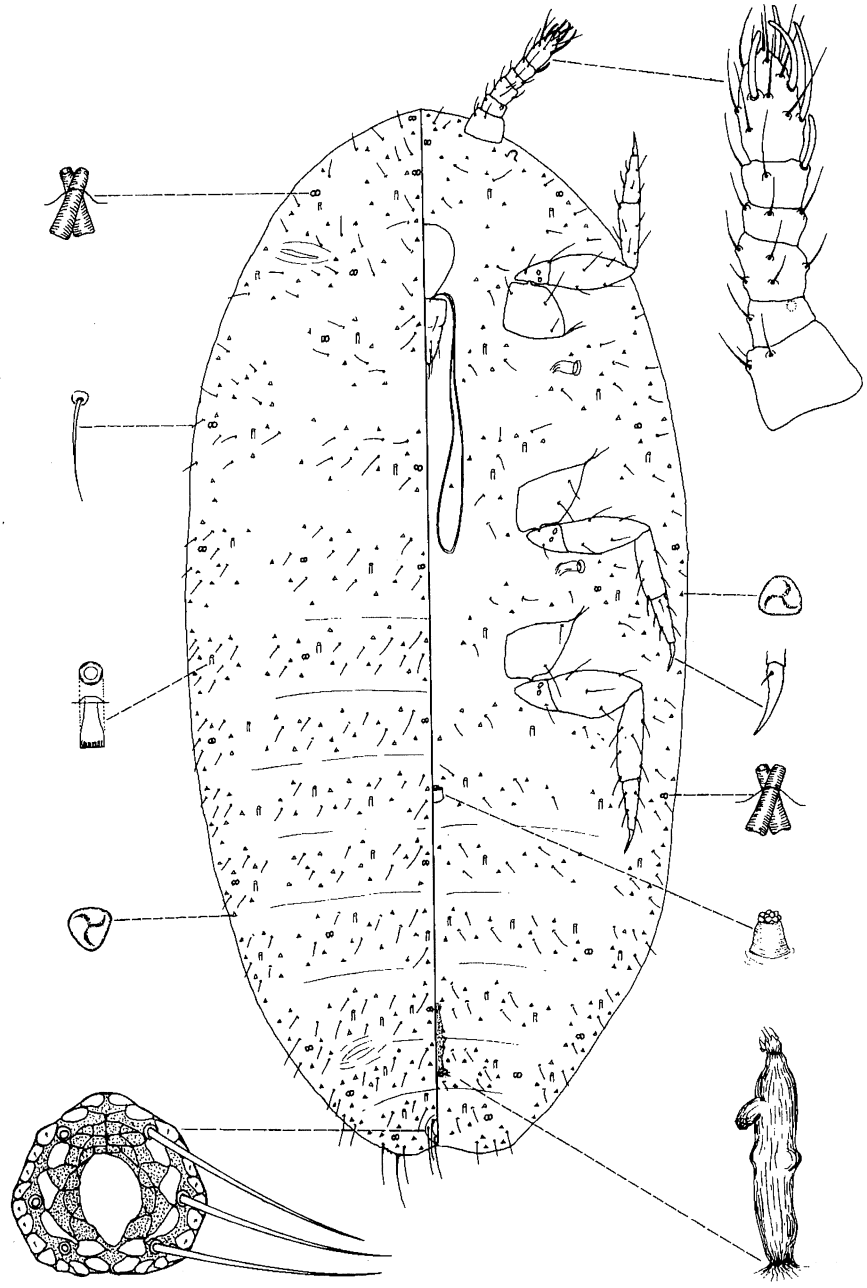

Fig. 3 - *Ripersiella loksae* sp. n.

on two slide, Paraguay, Asuncion, (coll. I. Loksa, Am 292), 02. 01. 1966, from moss and litter. One paratype female, Chile, Asapa, Prov. Tarapaca (Fig. 10), (coll. I. Loksa, Am. 268), 02. 12. 1965. Deposited in the Collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Other material: Five female on one slide from Brasilia, 1995 (coll. J. Balogh, Br. B 15).

Description: Body elongate oval. Mounted specimen (Fig. 3) 0. 99 mm long and 0.48 mm wide. Antenna 6 segmented, the length of the segments: 1st - 36, 2nd - 14, 3rd - 22, fourth - 12, fifth - 14, sixth - 41 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 four sensory falcate setae. The 5th segment has one short, 14 μm long, blunted sensory seta. Most segments of the antenna have a few hair-like setae. Eye is clearly visible. Anal lobe is slightly developed with three hair-like setae.

VENTER

Labium seems two-segmented, 79 μm long. Stylet loop 3 times longer than labium. Cephalic plate not visible. Legs robust: coxa of anterior legs 48, trochanter 24, femur 72 μm, tibia 60, tarsus 50 μm, and claw 17 μm. Coxa of middle legs 46 μm, trochanter 26, femur 67 μm, tibia 58, tarsus 41 μm, and claw 17 μm long. Coxa of posterior legs 48 μm, trochanter 31, femur 79 μm, tibia 79 and tarsus 50 μm, and claw 19 μm, tarsal digitules absent, claw digitules not seen. Legs with few hair-like setae, tibia and tarsus with 15 μm long setae. On the ventral segments few bitubular pores present on margin. Multilocular pores absent. The diameter of anterior spiracles 12 μm. Venter with a small number of scattered hair-like setae. Circulus present, 14 μm in diameter, and 17 μm long. Tubular ducts present in small number. Trilocular pores scattered on the venter. Internal genital organ chitinized, forming an elongated, longer than width of the segment, with unusual form in the genus.

DORSUM

Ostioles present, not sclerotized. Multilocular pores absent. Anal ring oval, 60 μm wide and 53 μm long. Anal ring with six, 65 μm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, spicules very small, hardly visible. Bitubular pores one size, 3-5 on each segments 3 μm in diameter, 9 μm long. Few tubular duct present, 3 μm long. Hair-like setae 10 μm long, trilocular pores 3 μm wide, scattered on the dorsum.

Derivatio nominis: The species is named after the collector, a famous Hungarian zoologist, Dr. Imre Loksa (Hungary, Budapest).

Affinities: The species is similar to *R. madagascarella,* but the latter has longer spiculae on anal ring pores. *R. loksae* has longer genital organ, and bitubular pores present on venter.

Comment: There are some similar specimens from Brazil (B 15), which differ in the internal genital organ, were not included in to the paratype series.

Ripersiella madagascarella Kozár & Konczné Benedicty sp. n. (Fig. 4)

Type material: The holotype, female, Madagascar, Central e. Madagascar, Degraded heath forest, 4 km S. of Moramanga, near Antsaha Tsoka village at 950-980 m. alt. (Fig. 10), with many *Cladonia*, *Leucobryum* and *Diphastium* on ground, 1994, 10. 08 (coll. T. Pócs, in the collection of S. Mahunka, No. 9489). Deposited in the Collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 4) 0. 93 mm long and 0.41 mm wide. Antenna 6 segmented, the length of the segments: 1st - 31, 2nd - 17, 3rd - 26, fourth - 17, fifth - 19, sixth - 28 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 four sensory falcate setae. The 5th segment has one short, 10 μm long, blunted sensory seta. Most segments of the antenna have a few hair-like setae. Eye is clearly visible. Anal lobe is slightly developed with three hair-like setae.

VENTER

Labium seems two-segmented, 62 μm long. Stylet loop 3 times longer than labium. Cephalic plate not visible. Legs robust: coxa of anterior legs 34, trochanter 24, femur 65 μm, tibia 53, tarsus 46 μm, and claw 17 μm. Coxa of middle legs 34 μm, trochanter 29, femur 65 μm, tibia 48, tarsus 43 μm, and claw 17 μm long. Coxa of posterior legs 38 μm, trochanter 31, femur 72 μm, tibia 65 and tarsus 50 μm, and claw 19 μm, tarsal digitules absent, claw digitules longer than claw. Legs with few hair-like setae, tibia and tarsus with 14 μm long setae. On the ventral segments bitubular pores absent. Multilocular pore few, on last abdominal segment. The diameter of anterior spiracles 12 μm. Venter with a small number of scattered hair-like setae. Circulus short, 22 μm in diameter. Tubular ducts present in small number. Trilocular pores scattered on the venter. Internal genital organ heavily chitinized, as long as width of a segment.

DORSUM

Anterior ostioles not seen, posterior present, not sclerotized. Multilocular pores absent. Anal ring oval, 53 μm wide and 53 μm long. Anal ring with six, 65 μm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, with sharp, long spicules on pores present, spinelike. Bitubular pores one size, 3-5 on each segments, 6 μm long. Few tubular duct present, 4 μm long. Hair-like setae 12 μm long, trilocular pores 3 μm wide, scattered on the dorsum.

Derivatio nominis: The species is named after the country of origin.

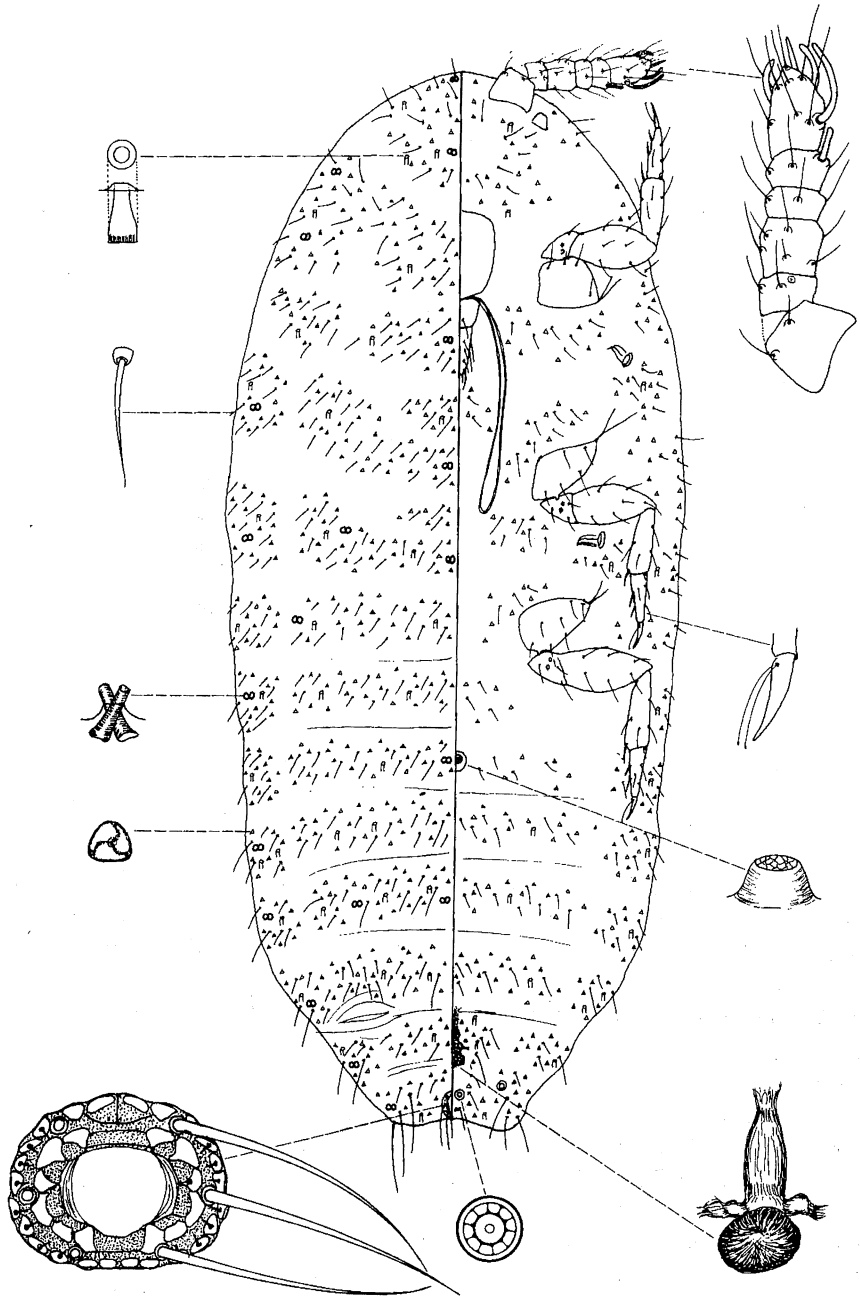

Fig. 4 - *Ripersiella madagascarella* sp. n.

Affinities: The species is similar to *R. loksae,* but the latter has very small spiculae on anal ring pores. Bitubular pores on venter absent.

Ripersiella monticola Konczné Benedicty & Kozár sp. n. (Fig. 5)

Type material: The holotype, female, in the middle of slide, marked by red. Kilimanjaro T. T. George Salt (Fig. 10), 11. 28, on moss. Paratypes, two female on the same slide as the holotype. Deposited in the Collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 5) 1. 29 mm long and 0.75 mm wide. Antenna 6 segmented, the length of the segments: 1st - 36, 2nd - 22, 3rd - 34, fourth - 17, fifth - 17, sixth - 46 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 four sensory falcate setae. The 5th segment has one short, 17 μm long, blunted sensory seta. Most segments of the antenna have a few hair-like setae. Eye is clearly visible. Anal lobe is slightly developed with three hair-like setae.

VENTER

Labium seems two-segmented, 70 μm long. Stylet loop two times longer than labium. Cephalic plate not visible. Legs robust: coxa of anterior legs 41, trochanter 36, femur 77 μm, tibia 62, tarsus 60 μm, and claw 26 μm. Coxa of middle legs 48 μm, trochanter 36, femur 77 μm, tibia 70, tarsus 53 μm, and claw 26 μm long. Coxa of posterior legs 48 μm, trochanter 43, femur 82 μm, tibia 86 and tarsus 62 μm, and claw 31 μm, tarsal digitules absent, claw digitules different sizes, one setose 6 μm long, and one hairlike 14 μm long. Legs with few hair-like setae, tibia and tarsus with 19 μm long setae. On the ventral segments bitubular pores present on margin. Multilocular pores few, on last abdominal segments. The diameter of anterior spiracles 15 μm. Venter with a small number of scattered hair-like setae. Circulus short, 17 μm in diameter. Tubular ducts present in small number. Trilocular pores scattered on the venter. Internal genital organ heavily chitinized, as long as the width of a segment.

DORSUM

Ostioles present, not sclerotized. Multilocular pores absent. Anal ring oval, 72 μm in diameter. Anal ring with six, 84 μm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, with sharp, short spicules. Bitubular pores one size, 3-5 on each segments, 7 μm long, and 2 μm wide. Few tubular duct present, 3 μm long and 2 μm wide. Hair-like setae 22 μm long, trilocular pores 3 μm wide, scattered on the dorsum.

Derivatio nominis: The species is named after the mountain locality of origin.

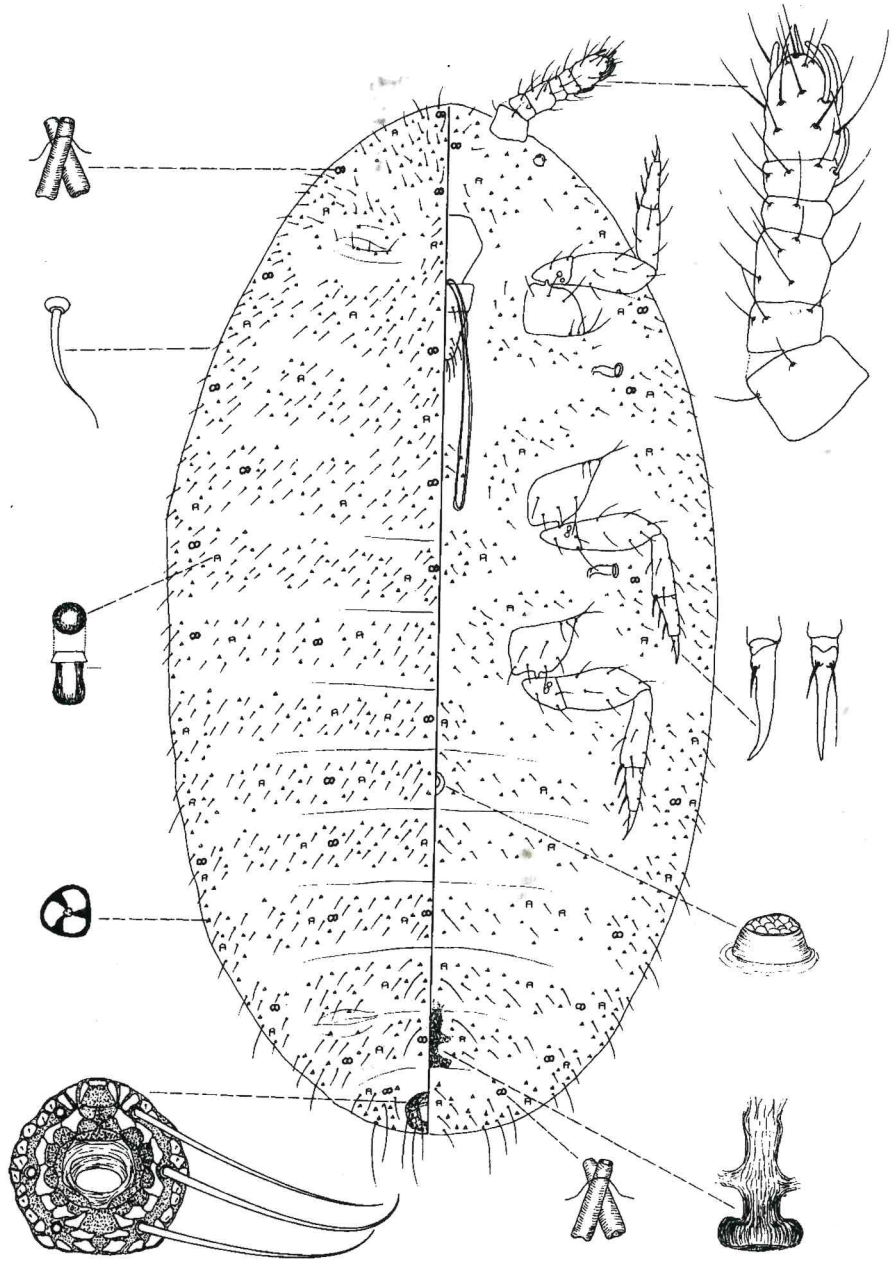

Fig. 5 - *Ripersiella monticola* sp. n.

Affinities: The species differs from other species having claw digitules of different sizes. This species is similar to *R. loksae*, but the latter has higher number of pores on the anal ring, and the shape of circuli and internal genital organ is different.

Ripersiella periolana Goux, 1985, redescription (Fig. 6)

Material: Female, Hungary, Csorna, from litter of Alnus, 2-5 09. 1997 (coll. E. Horváth, 3713, No. 6268 in Kozár collection); Szentgyörgyhegy, 06. 10. 2001. (coll. B. Kiss, 6306); Bárand, 04. 10. 1981, roots of *Festucae* (coll. G. Vinis); Bárand, 24. 10. 1981, *Chrysanthemum leucanthemum* (coll. G. Vinis). Turkey, Ankara (Fig. 10), Stipa sp., 16. 05, 2003, (No 912 from B. Kaydani collection). Deposited in the Collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 6) 1.07 mm long and 0.46 mm wide. Antenna 6 segmented, the length of the segments: 1st - 36, 2nd - 22, 3rd - 34, fourth - 24, fifth - 22, sixth - 53 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, 17 µm long, blunted sensory seta. Most segments of the antenna have a few hair-like setae, 34 µm long. Eye is clearly visible. Anal lobe is slightly developed with three hair-like setae.

VENTER

Labium seems two-segmented, 67 µm long. Stylet loop 2 times longer than labium. Cephalic plate slightly visible. Legs robust: coxa of anterior legs 43, trochanter 34, femur 96 µm, tibia 70, tarsus 58 µm, and claw 21 µm. Coxa of middle legs 46 µm, trochanter 41, femur 86 µm, tibia 67, tarsus 55 µm, and claw 23 µm long. Coxa of posterior legs 48 µm, trochanter 46, femur 103 µm, tibia 91 and tarsus 62 µm, and claw 27 µm, tarsal digitules absent, claw digitules as long as claw. Legs with few hair-like setae, tibia and tarsus with 20 µm long setae. On the ventral segments few bitubular pores present on all segments. Multilocular pores with 10-12 loculi, present on last three abdominal segments, in small number, 7 µm in diameter. The diameter of anterior spiracles 15 µm. Venter with a small number of scattered hair-like setae. Circulus present, conical. Tubular ducts present in small number on all segments. Trilocular pores scattered on the venter. Internal genital organ wide, sclerotized, shorter than the width of a segment.

DORSUM

Ostioles present, slightly sclerotized. Multilocular pores absent. Anal ring oval, 46 µm wide and 46 µm long. Anal ring with six, 67 µm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, in small numbers, small spicules present on some pores. Bitubular pores one size, 3-7 on each segments 3 µm

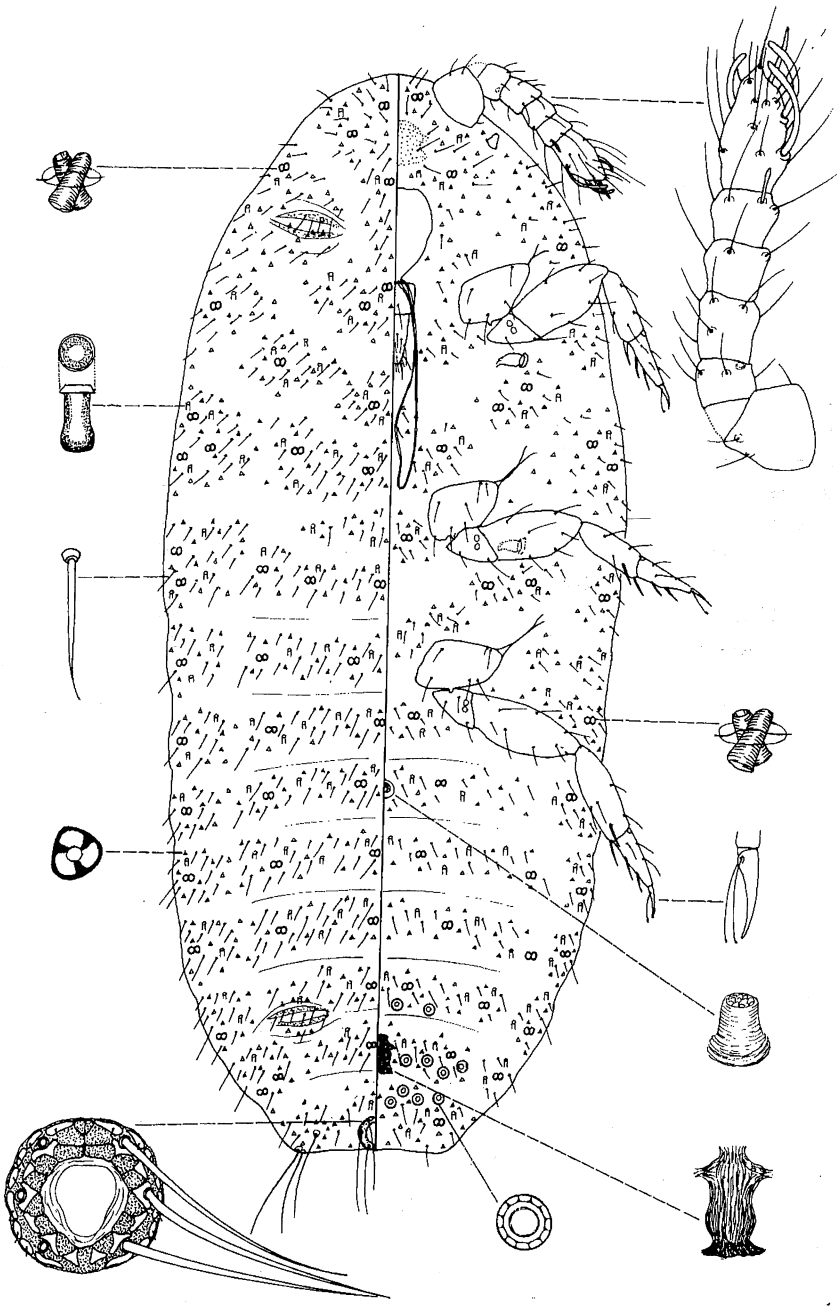

Fig. 6 - *Ripersiella periolana* Goux, 1985 (new drawing).

in diameter, 8 μm long. Tubular duct present, 4 μm long. Hair-like setae 14 μm long, trilocular pores 3 μm wide, scattered on the dorsum.

Comments: The species was known only from Italy (Goux, 1985). The Hungarian and Turkish records are new for its distribution (Fig. 10). The new drawing and description was prepared from Hungarian specimens. Daniele Matile Ferrero and F. Kozár compared the drawing with type material.

Ripersiella petiti (Goux, 1941)

Material: Tanzania, Uluguru, 15. 11. 1970 (No. 64, coll. T. Pócs), Tanzania, Uluguru, 23. 01, 1971 (No. 70, coll. T. Pócs), Tanzania, Uluguru, 06. 12. 1971 (No. 71, coll. T. Pócs), Tanzania, Uluguru, 18. 05, 1972 (No. 108, coll. T. Pócs), Tanzania, Kilimanjaro, Kibo, 3890 m. alt., 01. 07, 1972, roots of grass, (No. 119, coll. T. Pócs), Tanganyika, (No. 164, coll. Szunyoghy), Ethiopia, Addis Abeba, 28. 09, 1980, from grass roots, (No. 328, coll. A. Demeter), Ethiopia, Menegesha, 03. 12, 1980, from litter (No. 375, coll. A. Demeter), Ethiopia, 1980, (No. 394, coll. A. Demeter), Tanzania, Amani, 07. 02, 1987, (No. 540, coll. S. Mahunka and T. Pócs), Tanzania, N. Pare Mts., 04. 05, 1990 (No. 683, coll. T. Pócs), Kenya (Fig. 10), 1992, (No. 794, coll. S. Mahunka).

Comment: This species was known only from France (Foldi, 2002), now several specimens were found in different countries of Africa, which were tentatively assigned to this species and needs further study (Fig. 10).

Ripersiella ruandaensis Konczné Benedicty & Kozár sp. n. (Fig. 7)

Type material: The holotype, female (coll. T. Pócs, No. 91112). No. 777, Rwanda, Nyugve (former Rugegeg) Forest Reserve, Uwinka station in Cyangugu prefecture. Montane rain forest in valley, near waterfalls, at 2000-2150 m. alt. with *Newtonia parinari*, *Entandophragma boscia* scheffleri, *Carapa* and *Symphonia*, 1991, 08. 14 (coll. T. Pócs). Paratype, female and two larvae on the same slide, No. 778 Rwanda, Nyugve (former Rugegeg) Forest Reserve, Uwinka station in Cyangugu prefecture (Fig. 10). Mesic evergreen forest on slopes at 2150-2420 m. alt., dominated by *Podocarpus latifolius*, *Belschmiedia ruandaensis*, 1991, 08. 14. from S. Mahunka collection (coll. T. Pócs). Deposited in the collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 7) 1. 42 mm long and 0.75 mm wide. Antenna 6 segmented, the length of the segments: 1st - 34, 2nd - 19, 3rd - 29, fourth - 19, fifth - 17, sixth - 48 μm long. There is one sensory pore on the

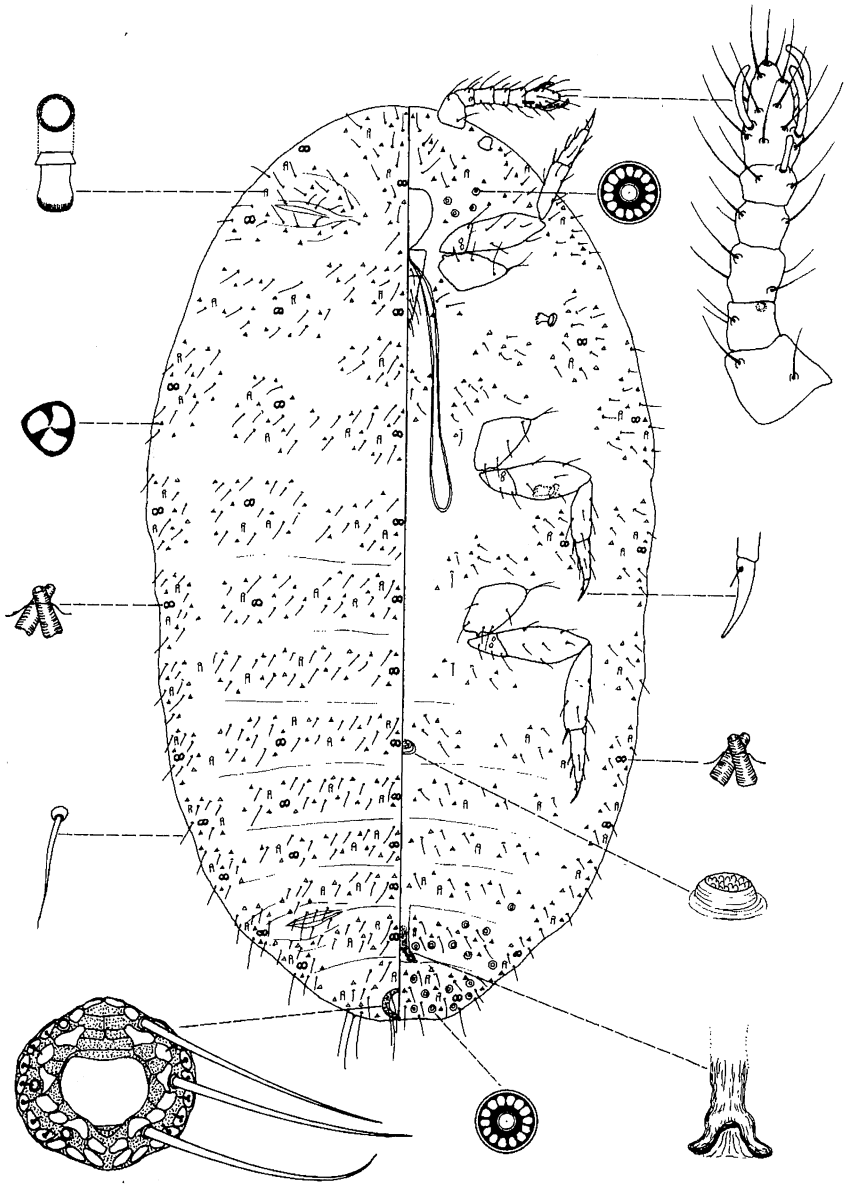

Fig. 7 - *Ripersiella ruandaensis* sp. n.

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, 19 μm long, blunted sensory seta. Most segments of the antenna have a few hair-like setae, one of them on fifth segment 49 μm long. Eye is clearly visible. Anal lobe is slightly developed with three hair-like setae.

VENTER

Labium seems two-segmented, 76 μm long. Stylet loop about 4 times longer than labium. Cephalic plate not visible. Legs robust: coxa of anterior legs 43, trochanter 37, femur 72 μm, tibia 60, tarsus 60 μm, and claw 22 μm. Coxa of middle legs 53 μm, trochanter 34, femur 74 μm, tibia 50, tarsus 55 μm, and claw 19 μm long. Coxa of posterior legs 53 μm, trochanter 36, femur 82 μm, tibia 70 and tarsus 55 μm, and claw 22 μm, tarsal digitules absent, claw digitules 5 μm long. Legs with few hair-like setae, tibia and tarsus with 14 μm long setae. On the ventral segments few bitubular pores present on the margin. Multilocular pores, with 12 pores, present on the last abdominal segments, and forms a group in front of the anterior legs, 6 μm in diameter. The diameter of anterior spiracles 13 μm. Venter with a small number of scattered hair-like setae. Circulus present, 38 μm in diameter. Tubular ducts present in small number. Trilocular pores scattered on the venter. Internal genital organ chitinized, elongated, as long as half of a segment, with reverse U shaped, sclerotized atrium.

DORSUM

Ostioles present, not sclerotized. Multilocular pores absent. Anal ring oval, 53 μm wide and 48 μm long. Anal ring with six, 74 μm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, outer row with spicules. Bitubular pores one size, 3-5 on each segments 2 μm in diameter, 8 μm long. Few tubular duct present, 4 μm long. Hair-like setae 19 μm long, trilocular pores 3 μm wide, scattered on the dorsum.

Derivatio nominis: he species is named after the country of collection.

Affinities: The species is similar to *R. mediatlantica* but it has high number of long hairlike setae on all segments.

Ripersiella salvatorei Kozár & Konczné Benedicty sp. n. (Fig. 8)

Type material: the holotype, female (marked), Zaire, Kahuzi-Biega, National Park, NW from Bukavu town, in Kivu Province (Fig. 10). *Erica rugegensis* heath forest, covering the main Biega ridge from 2600 m to summit at 2750 m. alt., 1991, 08. 28 (coll. T. Pócs, from collection of Mahunka Afr. 784). One paratype female on the same slide.

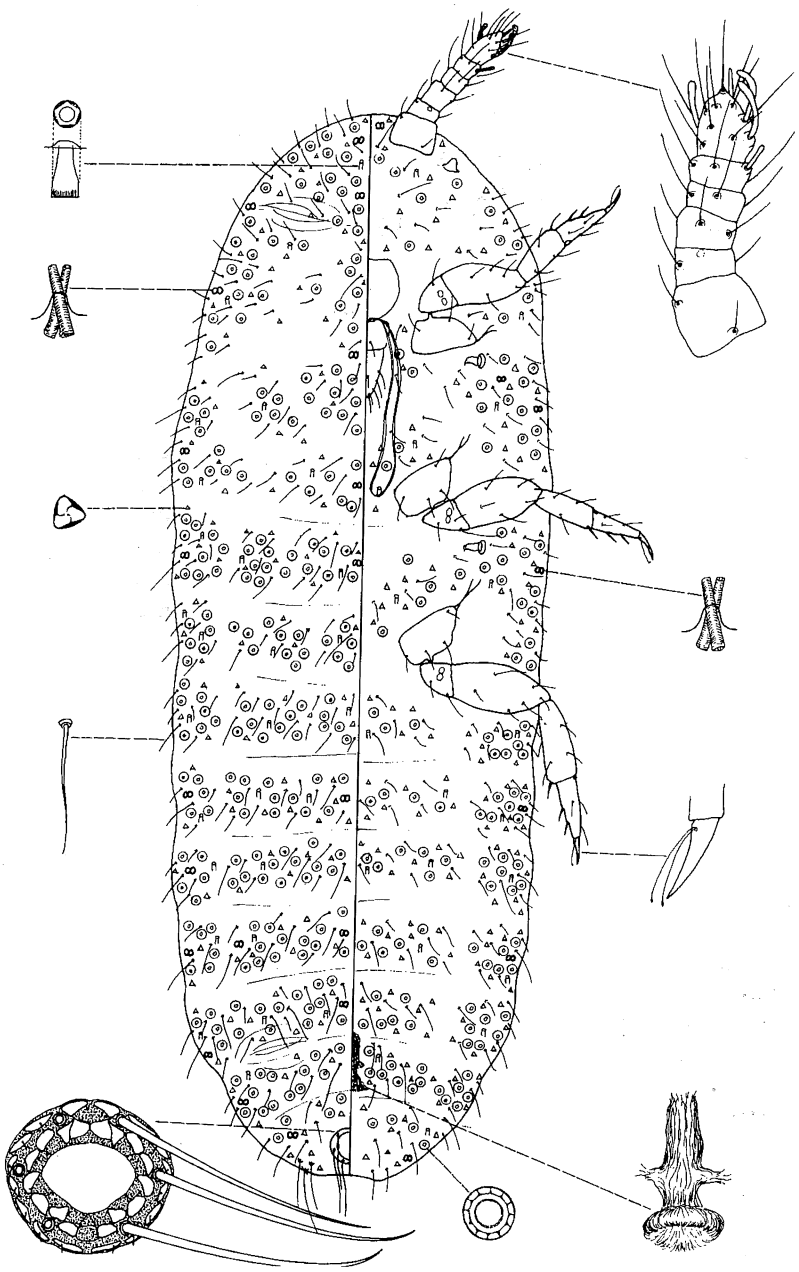

Fig. 8 - *Ripersiella salvatorei* sp. n.

Other material: Nigeria, Banchi state, Yanhari reserve, 500 m from river Gaji (Fig. 10), from litter under *Combretum* bush. 09. 07. 1978. No. 200 in Mahunka collection, collected by A. Demeter). Deposited in the Collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 8) 0.85 mm long and 0.31 mm wide. Antenna 6 segmented, the length of the segments: 1st - 29, 2nd - 12, 3rd - 19, fourth - 12, fifth - 10, sixth - 34 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 four sensory falcate setae. The 5th segment has one short, 11 μm long, blunted sensory seta. Most segments of the antenna have a few hair-like setae, some of them 34 μm long. Eye clearly visible. Anal lobe is slightly developed with three hair-like setae.

VENTER

Labium seems two-segmented, 56 μm long. Stylet loop two times longer than labium. Cephalic plate not visible. Legs robust: coxa of anterior legs 34, trochanter 24, femur 60 μm, tibia 38, tarsus 46 μm, and claw 18 μm. Coxa of middle legs 34 μm, trochanter 26, femur 60 μm, tibia 46, tarsus 41 μm, and claw 17 μm long. Coxa of posterior legs 36 μm, trochanter 31, femur 70 μm, tibia 50 and tarsus 50 μm, and claw 18 μm, tarsal digitules absent, claw digitules longer than claw. Legs with few hair-like setae, tibia and tarsus with 15 μm long setae. On the ventral segments few bitubular pores present on margin. Multilocular pores present on all segments, 6 μm in diameter. The diameter of anterior spiracles 10 μm. Venter with a small number of scattered hair-like setae. Circulus absent. Tubular ducts present in small number. Trilocular pores scattered on the venter. Internal genital organ chitinized, as long as width of a segment.

DORSUM

Ostioles present, not sclerotized. Multilocular pores present on all segments. Anal ring oval, 55 μm wide and 50 μm long. Anal ring with six, 70 μm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, spicules spine-like. Bitubular pores one size, 3-5 on each segments 1 μm in diameter, 6 μm long. Few tubular duct present, 3 μm long. Hair-like setae 18 μm long, trilocular pores 3 μm wide, scattered on the dorsum.

Derivatio nominis: The species is named after the island where it was collected.

Affinities: The species is similar to *R. hibisci,* but differs having multilocular pores on whole body and having six segmented antennae.

Comment: In the collection one female and larva specimen present from Nigeria. They are very similar, but have circulus, and because of this they were not included as paratype, may be they represent a different species.

Ripersiella seychelliella Konczné Benedicty & Kozár sp. n. (Fig. 9)

Type material: The holotype, female (on the left side, marked), two paratype females on the same slide, Seychelles (coll. Fjellberg and Hagen) (No. 429, from S. Mahunka collection). 03. 12. 1975, from moss. One paratype, female, Seychelles, Monte Seychelles (coll. Fjellberg and Hagen), (No. 427, from S. Mahunka collection). 07. 12. 1975. Tanzania, S. Pare Mts. (Fig. 10), 12. 05, 1990, No. 685. (coll. T. Pócs). Deposited in the collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 9) 0. 66 mm long and 0.30 mm wide. Antenna 6 segmented, the length of the segments: 1st - 34, 2nd - 14, 3rd - 19, fourth - 17, fifth - 17, sixth - 41 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 four sensory falcate setae. The 5th segment has one short, 14 μm long, blunted sensory seta. Most segments of the antenna have a few hair-like setae, one of them on fifth segment 29 μm long. Eye is clearly visible. Anal lobe is slightly developed with three hair-like setae.

VENTER

Labium seems two-segmented, 62 μm long. Stylet loop about 5 times longer than labium. Cephalic plate not visible. Legs robust: coxa of anterior legs 46, trochanter 29, femur 65 μm, tibia 50, tarsus 46 μm, and claw 22 μm. Coxa of middle legs 43 μm, trochanter 29, femur 70 μm, tibia 46, tarsus 43 μm, and claw 20 μm long. Coxa of posterior legs 46 μm, trochanter 34, femur 79 μm, tibia 74 and tarsus 48 μm, and claw 26 μm, tarsal digitules absent, claw digitules 5 μm long. Legs with few hair-like setae, tibia and tarsus with 11 μm long setae. On the ventral segments few bitubular pores present on the margin. Multilocular pores, with 12-14 pores, present on the last abdominal segments, 6 μm in diameter. The diameter of anterior spiracles 11 μm. Venter with a small number of scattered hair-like setae. Circulus present, 24 μm in diameter. Tubular ducts present in small number. Trilocular pores scattered on the venter. Internal genital organ chitinized, elongated, as long as width of two segments, with U shaped, sclerotized atrium.

DORSUM

Ostioles present, not sclerotized. Multilocular pores absent. Anal ring oval, 48 μm wide and 43 μm long. Anal ring with six, 67 μm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, outer row with spicules. Bitubular pores one size, 3-5 on each segments 2 μm in diameter, 7 μm long. Few tubular duct present, 4 μm long. Hair-like setae 10 μm long, trilocular pores 3 μm wide, scattered on the dorsum.

Derivatio nominis: The species is named after the country of collection.

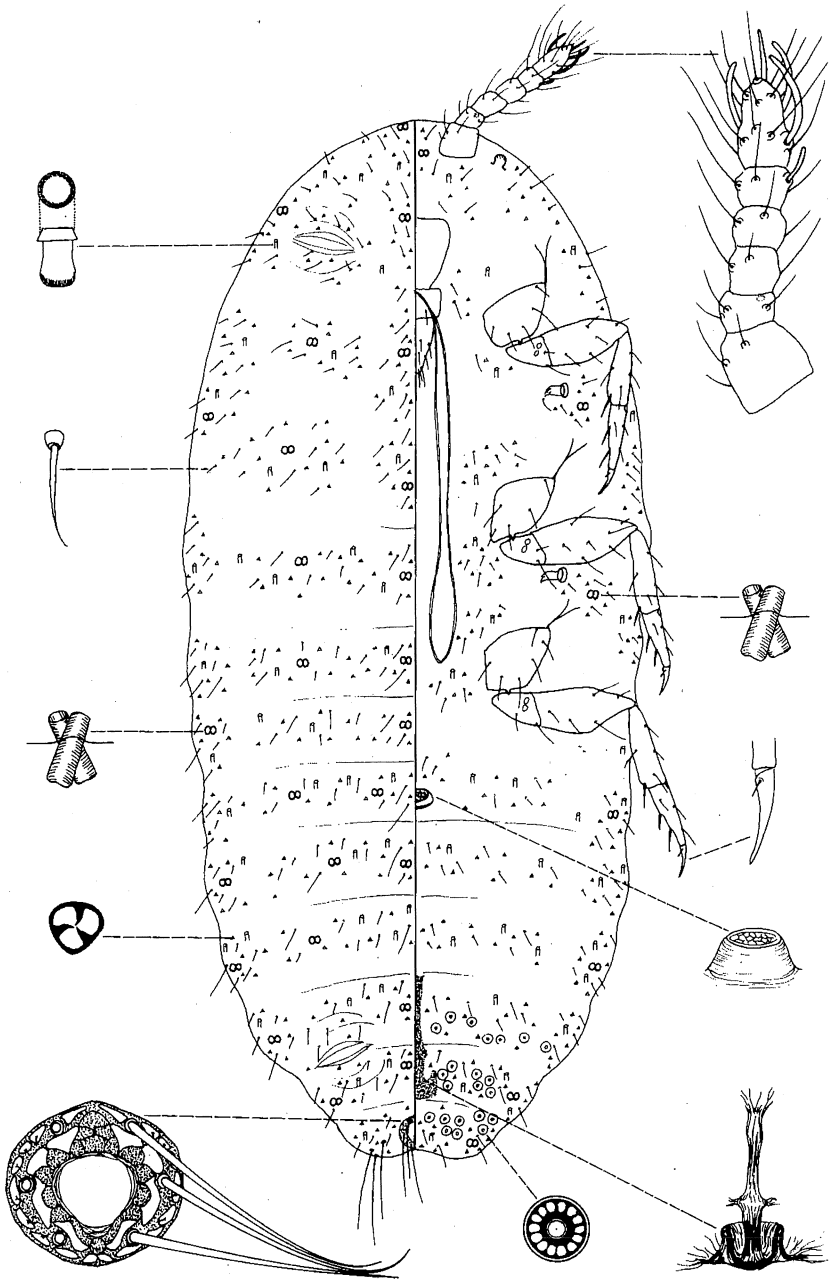

Fig. 9 - *R. seychelliella* sp. n.

Affinities: The species is similar to *R. tillierorum,* but the latter has vulva with reverse V shaped sclerotized atrium.

RIPERSIELLA (RHIZOECINI) SPECIES KEY

1. Bitubular pores absent 2
   – Bitubular pores present 11
2. Circulus present 3
   – Circulus absent 8
3. With two circuli ..... *R. kellogi*
   – With one circulus 4
4. Antennae five segmented ..... *R. colombiensis*
   – Antennae six segmented 5
5. Multilocular pores absent ..... *R. malschae*
   – Multilocular pores present 6
6. Multilocular pores on entire body surface 7
   – Multilocular pores present on last abdominal segments ..... *R. parva*
7. Tubular ducts very few on the margin of the dorsum ..... *R. poltavae*
   – Tubular ducts in high number on dorsum ..... *R. brevipes*
8. Multilocular pores on whole dorsum 9
   – Multilocular pores on last abdominal segments of dorsum 10
9. Multilocular pores on thorax and head in high number ..... *R. cobelopus*
   – Multilocular pores on thorax and head in small number ..... *R. helanensis*
10. Multilocular pores only on last ventral abdominal segments ..... *R. andensis*
    – Multilocular pores on dorsal and ventral last abdominal segments ..... *R. tritici*
11. Multilocular pores absent ..... (or only 1-2) 12
    – Multilocular pores present 22
12. With two circuli 13
    – With one circulus 17
13. Tubular ducts absent 14
    – Tubular ducts present 15
14. Antennae five-segmented, body with some long hairlike setae ..... *R. chiangmaiensis*
    – Antenna six-segmented, body setae short ..... *R. gombakensis*
15. Tubular ducts very few, only on venter ..... *R. sumatrensis*
    – Tubular ducts on both surfaces 16
16. Circuli long, cylindrical, bitubular pores short, wide ..... *R. loicmatilei*
    – Circuli shorter, not cylindrical, bitubular pores long, narrow ..... *R. sabahica*
17. Bitubular pores with sharp, long, stouter end ..... *R. cornier*
    – Bitubular pores without sharp, long outer end 18
18. Mid-dorsum without tubular ducts ..... *R. guineensis*
    – Middorsum with tubular ducts 19
19. Number of bitubular pores on abdominal tergites 6-13 ..... *R. sasae*

– Number of bitubular pores on abdominal tergites 2-5 20
20. Anal ring pores with long spiculae, and with some multilocular pores ..... *R. madagascarella* sp. n.
– Anal ring pores with short spiculae, without multilocular pores 21
21. Claw with different sizes of digitules ..... *R. monticola* sp. n.
– Claw with short, equal sizes of digitules ..... *R. loksae* sp. n.
22. Multilocular pores only on venter (or there are some on dorsum, but only on median part of segment VII) 23
– Multilocular pores present on venter and dorsum (at least on median part of two segments of dorsum) 54
23. Without tubular ducts 24
– With tubular ducts 31
24. With two circuli 25
– With one circulus 26
25. Multilocular pores on five abdominal segments ..... *R. cryphia*
– Multilocular pores only on three abdominal segments ..... *R. interpetrensis*
26. Bitubular pores of two sizes ..... *R. carolinensis*
– Bitubular pores of one sizes 27
27. Multilocular pores on whole venter ..... *R. brussieui*
– Multilocular pores only on the last abdominal segments 28
28. Dorsum with scattered, short bitubular pores ..... *R. maasbachi*
– Dorsum with rows of long bitubular pores 29
29. All segments covered by long setae 30
– All segments with rows of short setae ..... *R. cynodontis*
30. All segments covered by wide bands of long setae ..... *R. sepilokensis*
– Segments are covered with narrow band of long setae ..... *R. phangngae*
31. Circuli absent 32
– Circuli present 33
32. Bitubular pores long, narrow ..... *R. boharti*
– Bitubular pores short, wide 32
32. Bitubular pores on dorsum and venter in rows ..... *R. caledoniensis*
– Bitubular pores few, scattered ..... *R. australiensis*
33. With 2-6 circuli ..... *R. campestris*
– With two or fewer circuli 34
34. With two circuli 35
– With one circulus 36
35. Antennae five-segmented ..... *R. kondonis*
– Antennae six-segmented ..... *R. bituberculata*
36. Antennae five-segmented ..... *R. theae*
– Antennae six-segmented 37
37. Dorsum and venter with wide bands and groups of long hairlike setae ..... *R. mediatlantica*
– Dorsum and venter without wide bands and groups of long hairlike setae 38

38. A group of multilocular pores present on venter anterior of the first legs .... *R. ruandaensis* sp.n.
– Group of multilocular pores absent on venter anterior of the first legs.....39
39. Multilocular pores ten, or less..... *R. ficaria*
– Multilocular pores more than ten 40
40. Bitubular pores short, wide, 2-3 times longer than wide 41
– Bitubular pores long, narrow, 3-6 times longer than wide 48
41. Very few bitubular pores present, situated on body margin..... *R. pratensis*
– Bitubular pores present not only on body margin 42
42. Bitubular pores present in rows in midventer..... *R. periolana*
– Bitubular pores present only on margin of venter 43
43. Tubular ducts short, as long as wide.....44
– Tubular ducts long, twice longer than wide.....45
44. Bitubular pores on midline on dorsum of head and thorax present..... *R. menkei*
– Bitubular pores on midline on dorsum of head and thorax absent, ..*R. gracilis*
45. Bitubular pores on dorsum of abdomen form rows.....46
– Some bitubular pores on dorsum of abdomen scattered.....47
46. Circulus elongated, truncated..... *R. callis*
– Circulus small, flat, conical..... *R. seychelliella* sp.n.
47. Circulus large, about same width as anal ring..... *R. mexicana*
– Circulus small, about one half width of anal ring ..... *R. tillierorum*
48. Claw digitules as long as claw 49
– Claw digitules shorter than claw 52
49. Tubular ducts in small number on dorsum, and on venter ..... *R. solani*
– Tubular ducts numerous on dorsum and venter 50
50. Bitubular pores 3-4 times longer than wide.....51
– Bitubular pores narrow, 5-6 times longer than wide.....52
51. Bitubular pores on middorsum absent..... *R. halophila*
– Bitubular pores on middorsum present ..... *R. planetica*
52. Dorsal ostioles not developed..... *R. totonicapana*
– Dorsal ostioles developed 53
53. Tubular ducts on dorsum in high number ..... *R. vidanoi*
– Tubular ducts on dorsum in small number ..... *R. aloes*
54. Multilocular pores only on the last segments of abdomen.....55
– Multilocular pores not only on the last segments of abdomen 63
55. Bitubular pores special looks as unitubular 56
– Bitubular pores typical for the genus 58
56. Bitubular pores with two ducts but one opening, tubular ducts only on abdominal segments ..... *R. spicata*
– Bitubular pores with one duct and one opening, tubular ducts on all abdominal segments 57
57. Bitubular pores short, not heavily sclerotized ..... *R. disjuncta*
– Bitubular pores long heavily sclerotized ..... *R. ovoides*

58. Bitubular pores on middorsum absent ..... *R. graminicola*
– Bitubular pores on middorsum present 59
59. Tubular ducts on middorsum of thorax absent\ *R. deborae*
– Tubular ducts on middorsum of thorax present 60
60. Number of outer cells around anal ring about 20..... *R. petiti*
– Number of outer cells around anal ring less than 15 61
61. Multilocular pores are present on venter anterior of first legs .... *R. kaydani* sp. n.
– Multilocular pores absent on venter anterior of first legs 62
62. Number of bitubular pores about 46-72, bitubular pores absent in midthorax of venter..... *R. puhiensis*
– Number of bitubular pores about 90-117, some bitubular pores scattered on midthorax of venter..... *R. oliveri*
63. Circuli absent 64
– Circuli present 66
64. Multilocular pores in high number all over surfaces..... *R. salvatorei* sp. n.
– Multilocular pores only in some parts of the body 65
65. Multilocular pores are present posterior of first legs, antennae five segmented ... . *R. hibisci*
– Multilocular pores are absent posterior of first legs, antennae six segmented... ..... *R. hambletoni* sp. n.
66. Circuli two or more 67
– Only one circulus present 69
67. Tubular ducts present..... *R. palestineae*
– Tubular ducts absent..... 68
68. Bitubular pores of two sizes ..... *R. saintpauliae*
– Bitubular pores of one size..... *R. bacorum*
69. Tubular ducts on mid-dorsum absent ..... *R. rumicis*
– Tubular ducts on mid-dorsum present..... 70
70. Head without multilocular pores ..... *R. bedosae*
– Multilocular pores present on head 71
71. Multilocular pores on dorsum in bands (3-4 pores wide on most of segments).... ..... *R. geniculata*
– Multilocular pores on dorsum in rows (1-2 on most of the segments)..... 72
72. Multilocular pores form groups on head on both surfaces..... *R. lelloi*
– Multilocular pores do not form groups on head..... *R. caesii*

RIPERSIELLA SPECIES LIST AFTER KOZÁR AND KONCZNÉ BENEDICTY (2003), WITH NEW SPECIES DESCRIBED, NEW COMBINATIONS, REMARKS, ADDITIONS OF THE NEW SPECIES DESCRIBED BY WILLIAMS (2004), AND JANSEN (2003)

1. *Ripersiella aloes* (Williams & Pellizzari, 1997). Holotype was studied.
2. ?*Ripersiella andensis* (Hambleton, 1946). According to description and drawing.

3. *Ripersiella australiensis* Kozár & Konczné Benedicty, 2003
4. *Ripersiella bacorum* (Williams, 1996). Holotype was studied.
5. *Ripersiella bedosae* (Williams, 2004), comb. n. Paratype was studied.
6. *Ripersiella bituberculata* (McKenzie, 1960). Holotype was studied.
7. *Ripersiella boharti* (McKenzie, 1960). According to description and drawing.
8. ?*Ripersiella brevipes* (Goux, 1943). Type material was studied.
9. *Ripersiella brussieui* Goux, 1985. Type material was studied.
10. *Ripersiella caesii* (Schmutterer, 1956). Type material was studied.
11. *Ripersiella caledoniensis* Konczné Benedicty & Kozár, 2003
12. *Ripersiella callis* (Williams, 2004), comb. n. Paratype was studied.
13. *Ripersiella campestris* (Hambleton, 1946). According to description and drawing.
14. *Ripersiella carolinensis* (Beardsley, 1966). Holotype was studied.
15. *Ripersiella chiangmaiensis* (Williams, 2004), comb. n. Paratypes was studied.
16. ?*Ripersiella cobelopus* (Williams, 1987). Paratype was studied.
17. ?*Ripersiella colombiensis* (Hambleton, 1946). According to description and drawing.
18. *Ripersiella corniger* (Williams, 2004), comb. n. According to description and drawing.
19. *Ripersiella cryphia* (Williams, 2004), comb. n. Paratype was studied.
20. *Ripersiella cynodontis* (Green, 1931). According to description and drawing.
21. *Ripersiella deboerae* (Hambleton, 1974). Paratype was studied.
22. *Ripersiella disjuncta* (McKenzie, 1967. Holotype and paratypes were studied.
23. *Ripersiella ficaria* (Williams, 2004), comb. n. According to description and drawing.
24. *Ripersiella geniculata* (James, 1935). Cotype was studied.
25. *Ripersiella gombakensis* (Williams, 2004), comb. n. According to description and drawing.
26. *Ripersiella gracilis* (McKenzie, 1961). Paratype was studied.
27. *Ripersiella graminicola* (James, 1936). Cotype was studied.
28. *Ripersiella guineensis* Konczné Benedicty & Kozár, 2003
29. *Ripersiella halophila* (Hardy, 1868). According to description and drawing.
30. *Ripersiella hambletoni* sp. n.
31. *Ripersiella helanensis* Tang, 1992. According to description and drawing.
32. *Ripersiella hibisci* (Kawai & Takagi, 1971). According to description and drawing.
33. *Ripersiella interpetrensis* (Williams, 2004), comb. n. Paratype was studied.
34. *Ripersiella kaydani* sp. n.
35. *Ripersiella kelloggi* Ehrhorn & Cockerell in Cockerell, 1901. Type material was studied.
36. *Ripersiella kondonis* (Kuwana, 1923). According to description and drawing
37. *Ripersiella lelloi* (Mazzeo, 1995). Paratype was studied.
38. *Ripersiella loicmatilei* (Williams, 2001). Paratype was studied.
39. *Ripersiella loksae* sp. n.

40. *Ripersiella maasbachi* (Jansen, 2003), comb. n. Holotype was studied.
41. *Ripersiella madagascarella* sp. n.
42. *Ripersiella malschae* (Williams 2004), comb. n. According to description and drawing including female and second instar larvae.
43. *Ripersiella mediatlantica* Matile-Ferrero, 1976. Holotype and paratype were studied.
44. *Ripersiella menkei* (McKenzie, 1962). According to description and drawing.
45. *Ripersiella mexicana* Hambleton, 1946. Holotype was studied.
46. *R. monticola* sp. n.
47. *Ripersiella oliveri* (Cox, 1978). Paratype was studied.
48. *Ripersiella ovoides* (Goux, 1943). Type material was studied.
49. *Ripersiella palestineae* Hambleton, 1946. According to description and drawing.
50. *Ripersiella parva* (Danzig, 1985). According to description and drawing.
51. *Ripersiella periolana* Goux, 1985, A new description and drawing is presented here from Hungarian specimens. D. Matile Ferrero and F. Kozár compared with type material.
52. *Ripersiella petiti* (Goux, 1941). Type material was studied.
53. *Ripersiella phangngae* (Williams, 2004). comb. n. According to description and drawing.
54. *Ripersiella planetica* (Williams, 2004), comb. n. According to description and drawing.
55. ?*Ripersiella poltavae* (Laing, 1929). Syntype was studied.
56. *Ripersiella pratensis* (Borchsenius & Tereznikova, 1959). According to description and drawing.
57. *Ripersiella puhiensis* (Hambleton, 1974). According to description and drawing.
58. *Ripersiella ruandaensis* sp. n.
59. *Ripersiella rumicis* (Maskell, 1892). Paralectotype was studied.
60. *Ripersiella sabahica* (Williams, 2004), comb. n. Paratype was studied.
61. *Ripersiella saintpauliae* (Williams, 1985). Holotype was studied.
62. *Ripersiella salvatorei* sp. n.
63. *Ripersiella sasae* (Takagi & Kawai, 1971). According to description and drawing.
64. *Ripersiella sepilokensis* (Williams, 2004), comb. n. Paratype was studied.
65. *Ripersiella seychelliella* sp. n.
66. *Ripersiella solani* Hambleton, 1946. Holotype was studied.
67. *Ripersiella spicata* (Hambleton, 1979). Holotype was studied.
68. *Ripersiella sumatrensis* (Williams, 2003). comb. n. Paratype was studied.
69. *Ripersiella theae* (Kawai & Takagi, 1971). According to description and drawing.
70. *Ripersiella tillierorum* Kozár & Konczné Benedicty, 2003
71. *Ripersiella totonicapana* Hambleton, 1946. According to description and drawing.
72. ?*Ripersiella tritici* (Borchsenius, 1949). According to description.
73. *Ripersiella vidanoi* Marotta & Tranfaglia, 1995. According to description and drawing.

ZOOGEOGRAPHIC AND PHYLOGENETIC CONSIDERATIONS

The species signed to *Ripersiella* genus is distributed in all zoogeographical regions, with the highest number of species in the Palaearctic, Oriental and Austro-Oriental regions (Fig. 10). Southern areas, such as South Africa, Madagascar, Australia and New Zealand are poor in species.

According to Venn analysis (Fig. 11), the regions are well separated, only some regions shared common species: four common species between the Nearctic and Neotropical regions, two species between the Oriental and Austro-Oriental regions. In this genus, a local trend of speciation was found, as it was mentioned by Beardsley (1971) for Pseudococcidae in Hawaii or by Kozár (1995) for scale insect genera and species of the Palaearctic Region. Some pest species were accidentally distributed in other countries of the World, and the origin is not clear.

The taxonomic uncertainty indicates the deeper study of the phylogenetic relationship of species of the *Ripersiella* and *Rhizoecus* genera. Considering morphological characters we assumed that *Ripersiella* and *Rhizoecus* differ, by having bi- or tritubular pores. There are some additional data about larval morphology. The presence of tritubular pores in first instar larvae of some studied species of both genera could

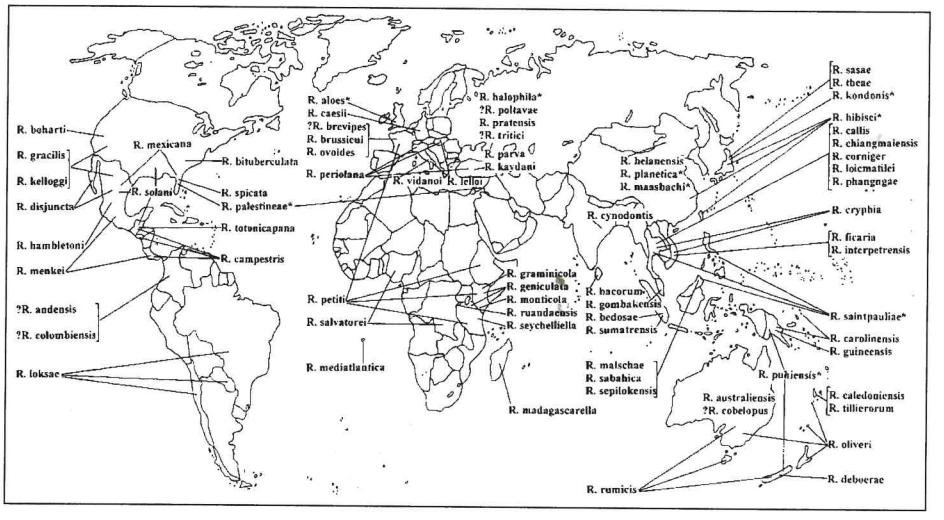

Fig. 10 - Distribution of *Ripersiella* species.

Comments for the species marked with *: *R. halophila* widely distributed in the western countries of the Palaearctic Region. *R. kondonis* was found also in USA, Guatemala. *R. planetica* was found, as an introduced species from China and Sri Lanka to Netherland. *R. maasbachi*, described from Netherland, originated from China, and introduced to England, too. *R. hibisci*, known from Hawai, Puerto Rico and USA, too. *R. saintpauliae* known from Hawai,. too. *R. puhiensis*, known from Seychell Isl., too. *R. palestinae* known in Greece, Israel and Syria, too. *R. aloes* is an introduced species, originated probably from Africa.

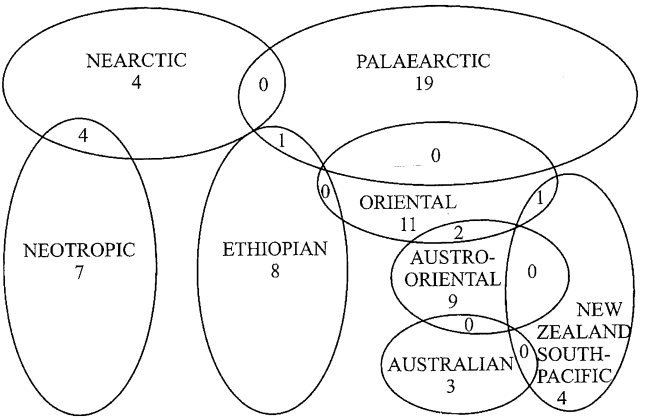

Fig. 11 - Venn diagram of the distribution of the species number of *Ripersiella* genus (the "cosmopolitan-introduced" species marked with * in Fig. 10, was counted, in the suggested Region of origin).

indicate a common root. The reduction of tritubular pores in second, and third instar larvae, and female to bitubular ones, seems a new way of speciation, that was shown by Jansen (2001) studying *Ripersiella hibisci* (Kawai & Takagi, 1971).

Another important example of character reduction is *Ripersiella malschae* (Williams, 2004), where the second instar larva has bitubular pores, but in the female they are absent. This last example shows that the study of larval characters of the species tentatively (under question mark) included in *Ripersiella* genus could help in clarification their status, too.

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