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F. KOZÁR, Z. KONCZNÉ BENEDICTY

Description of four new species from Australian, Austro-oriental, New Zealand and South Pacific regions (Homoptera, Coccoidea, Pseudococcidae, Rhizoecinae), with a review, and a key to the species *Ripersiella*

Abstract - Four new species (*Ripersiella australiensis, R. caledoniensis, R. guineensis,* and *R. tillierorum*) are described. The internal structure of female genital organ was studied in some species. The rate and shape of chitinisation is also used as a specific character. A review of the genus Worldwide and a key for the species in the regions is given.

Riassunto - *Descrizione di quattro nuove specie di Homoptera, Coccoidea, Pseudococcidae, Rhizoecinae dalle regioni Australiana, Austro-orientale e della Nuova Zelanda con una revisione ed una chiave delle specie di* Ripersiella.

Vengono descritte quattro nuove specie (*Ripersiella australiensis, R. caledoniensis, R. guineensis,* e *R. tillierorum*). L'anatomia interna dei genitali femminili viene studiata in alcune specie. L'aspetto della chitinizzazione è utilizzato come carattere specifico. Viene infine fornita una chiave delle specie con la revisione del genere.

Key words: Homoptera, Coccoidea, Pseudococcidae, Rhizoecinae, sp. nova, Australian, Austro-oriental, New Zealand and South Pacific, review, key.

Important works on the subfamily Rhizoecinae include Hambleton (1946, 1976). The subfamily was studied in detail by Tang (1992), Williams & Granara Willink (1992), Williams (1998), and Ben Dov (1994), Kozár & Konczné Benedicty (2002), and others. 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; Williams, 1998). While others consider it to be valid (Williams & de Boer, 1973; Matile Ferrero, 1976; Tang, 1992; and Kozár & Konczné Benedicty, 2002). The computer database ScaleNet (the Pseudococcidae family last updated in 06 November 2002) (Ben Dov & German, 2002; Miller, *et al.*, 2001) contains the most important information (taxonomy, distribution, biology, etc). The World fauna of the subfamily

is not well known and the distribution of described species is usually based on small number of records. Several species are important pest of various food crops and ornamentals, and are becoming invasive pests in some regions of the World.

The aim of the present work is to continue the study of the subfamily Rhizoecinae on a worldwide scale, to prepare a revision of the genus *Ripersiella* and to learn more about the distribution patterns of the included species. During the course of this study several new species have been found, four of which 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), and Kozár & Konczné Benedicty (2002).

The insects were collected by visual survey from soil, from Berlese funnel, Dvac and shifting samples (Kozár & Miller, 2000; Kozár and Konczné Benedicty, 2002). The collectors are mentioned in the descriptions. Most of the insects are from the scale insect collection of the Plant Protection Institute, Hungarian Academy of Sciences, Budapest, Hungary (PPI), from the collection of Arachnida of the Hungarian Natural History Museum, Budapest, Hungary (HNHM) and Museum National d'Histoire Naturelle, Laboratoire d'Entomologie, Paris, France (MNHN).

For this work collections, and type materials of USDA (Beltsville) and British Museum (London) were studied in detail. Through the courtesy of D. J. Williams we were able to study the species that is currently treating in his submitted manuscript on the mealybugs of Southern Asia.

RESULTS

In the course of the present work 138 species belonging to the tribe Rhizoecini tribe were analysed. In several cases type material was examined, but in other cases only the original drawings and descriptions were studied. On the base of this analysis 46 species are considered to belong in the genus *Ripersiella*. In addition four new species were discovered and are described below.

Genus: *RIPERSIELLA* Tinsley, 1899

Type species: ***Ripersia rumicis*** Maskell, 1892

The genus, as treated here, has 5, or 6-segmented antennae. The tritubular pores (cerores) absent. Most of the species has bitubular pores (cerores). Some species, which

morphological similar to the generic type species (*R. rumicis*), but lacking bitubular pores, are tentatively also included in the *Ripersiella* genus (Kozár & Konczné Benedicty, 2002).

Ripersiella australiensis Kozár and Konczné Benedicty sp. n. (Fig. 1)

Type material: The holotype, female (on the slide marked by red), Australia, ACT Black Mt. Dry Schlero, L. C. 2200 ft RWT, 29. 12. 1966, ANIC No 7. Two paratype females on the same slide as holotype, with the same data of collection. Deposited in the Collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 1) 0. 99 mm long and 0.47 mm wide. Antenna 6 segmented, the length of the segments: 1st - 24, 2nd - 14, 3rd - 22, fourth - 17, fifth - 14, sixth - 38 µm long. There is one sensory pore on the 2nd segment of the antenna. The 3rd segment is almost parallel sided. The 5th segment has one short, (16 µm long) blunted sensory seta. The apical segment has four falcate setae. Most segments of the antenna have a few, long, hair-like setae. Eye is clearly visible. Anal lobe is slightly developed with three hair-like setae.

VENTER

Labium seems two-segmented, 58 µm long. Stylet loop 2-3 times longer than labium. Cephalic plate not visible. Legs robust: coxa of anterior legs 41, trochanter 26, femur 60 µm, tibia 48, tarsus 46 µm, and claw 14 µm. Coxa of middle legs 38 µm, trochanter 26, femur 60 µm, tibia 48, tarsus 43 µm, and claw 14 µm long. Coxa of posterior legs 41 µm, trochanter 34, femur 65 µm, tibia 55 and tarsus 50 µm, and claw 17 µm, tarsal digitules absent, claw digitules knobbed, longer than claw. Trochanter with two pores on each side. Claw without denticle. Legs with few hair-like setae, 14 µm long, tibia and tarsus with 10 µm long setae. On the ventral segments bitubular pores mostly only on the margin. Multilocular pores few, with 12 loculi, situated on the last two abdominal segments. The diameter of anterior spiracles 11 µm. Venter with a small number of scattered hair-like setae. Circulus absent. Tubular ducts present in small number on all segments. Trilocular pores few, scattered on the venter. Internal genital organ chitinized, forming a cross-shaped structure.

DORSUM

Ostioles present, not sclerotized. Multilocular pores absent. Anal ring oval, 50 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, with one small spicules. Tubular ducts present in small number on all segments, 4 µm long. Hair-like setae (11 µm long) and trilocular pores (3 µm wide) scattered on the dorsum. Bitubular ducts in small number on margin and midline of the dorsum, 6 µm long.

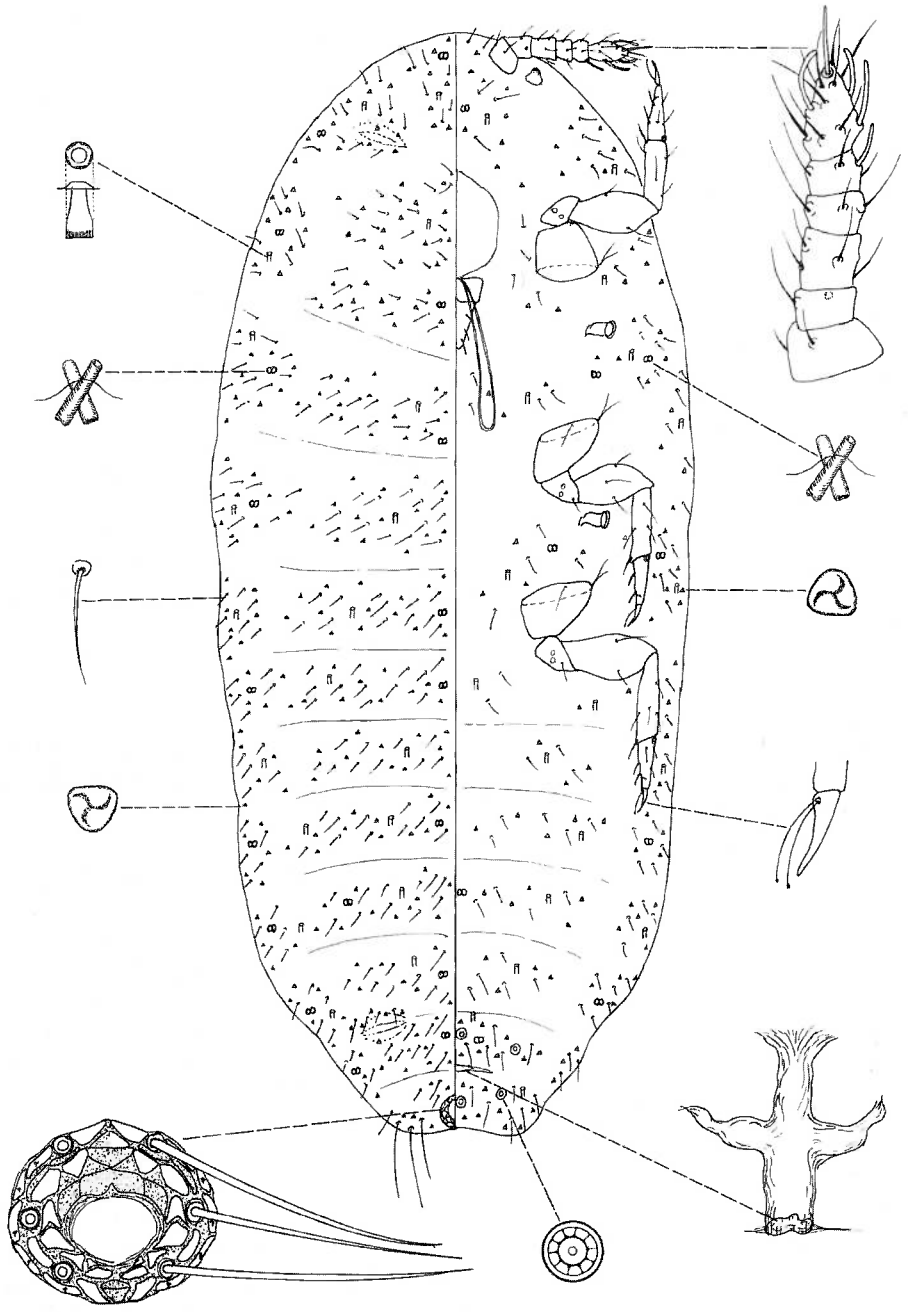

Fig. 1 - *Ripersiella australiensis* sp. n.

The species is named after the country of origin.

Affinities: The species is similar to *R. deboerae*, but differs by the absence of multilocular pores on the dorsum, by the small number of multilocular pores on venter and by the absence of the circulus. There is some similarity with *R. aloae*, but it has a circulus and a large number of long hair-like setae on the body.

Ripersiella caledoniensis Konczné Benedicty and Kozár sp. n. (Fig. 2)

Type material: The holotype, female (on the slide marked by red), New Caledonia (coll. J. Balogh B 11), 25. 08. 1982, from litter. Two paratype females on the same slide as holotype, with the same data of collection. Deposited in the Collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 2) 1. 24 mm long and 0.72 mm wide. Antenna 6 segmented, the length of the segments: 1st - 24, 2nd - 14, 3rd - 19, fourth - 10, fifth - 10, sixth - 31 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, (12 µm long) blunted sensory seta. Most segments of the antenna have a few 19 µm long hair-like setae. Eye is clearly visible. Anal lobe is slightly developed with three hair-like setae.

VENTER

Labium seems two-segmented, 50 µm long. Stylet loop 2-3 times longer than labium. Cephalic plate absent. Legs robust: coxa of anterior legs 36, trochanter 29, femur 58 µm, tibia 46, tarsus 41 µm, and claw 14 µm. Coxa of middle legs 43 µm, trochanter 29, femur 62µm, tibia 48, tarsus 38 µm, and claw 16 µm long. Coxa of posterior legs 45 µm, trochanter 34, femur 70 µm, tibia 62 and tarsus 48 µm, and claw 18 µm, tarsal digitules absent, claw digitules 18 µm long. Trochanter with two pores on each side. Claw without denticle. Legs with few hair-like setae, tibia and tarsus with 11 µm long setae. On the ventral segments 2-6 bitubular ducts, 2 µm in diameter, 6 µm long. Multilocular pores 7 µm in diameter, with 12 loculi, situated on the last two abdominal segments. The diameter of anterior spiracles 12 µm. Venter with a small number of scattered hair-like setae. The last three segments of the abdomen with some scattered multilocular pores. Circulus absent. Tubular ducts present in small number on all segments. Trilocular pores scattered on the venter. Internal genital organ slightly chitinized but only in entrance.

DORSUM

Ostioles present, not sclerotized. Multilocular pores absent. Anal ring oval, 40 µm wide and 36 µm long. Anal ring with six, 50 µm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, with one small spicules. Bitubular ducts one size, 6-8 on each segments. Tubular ducts present in small numbers

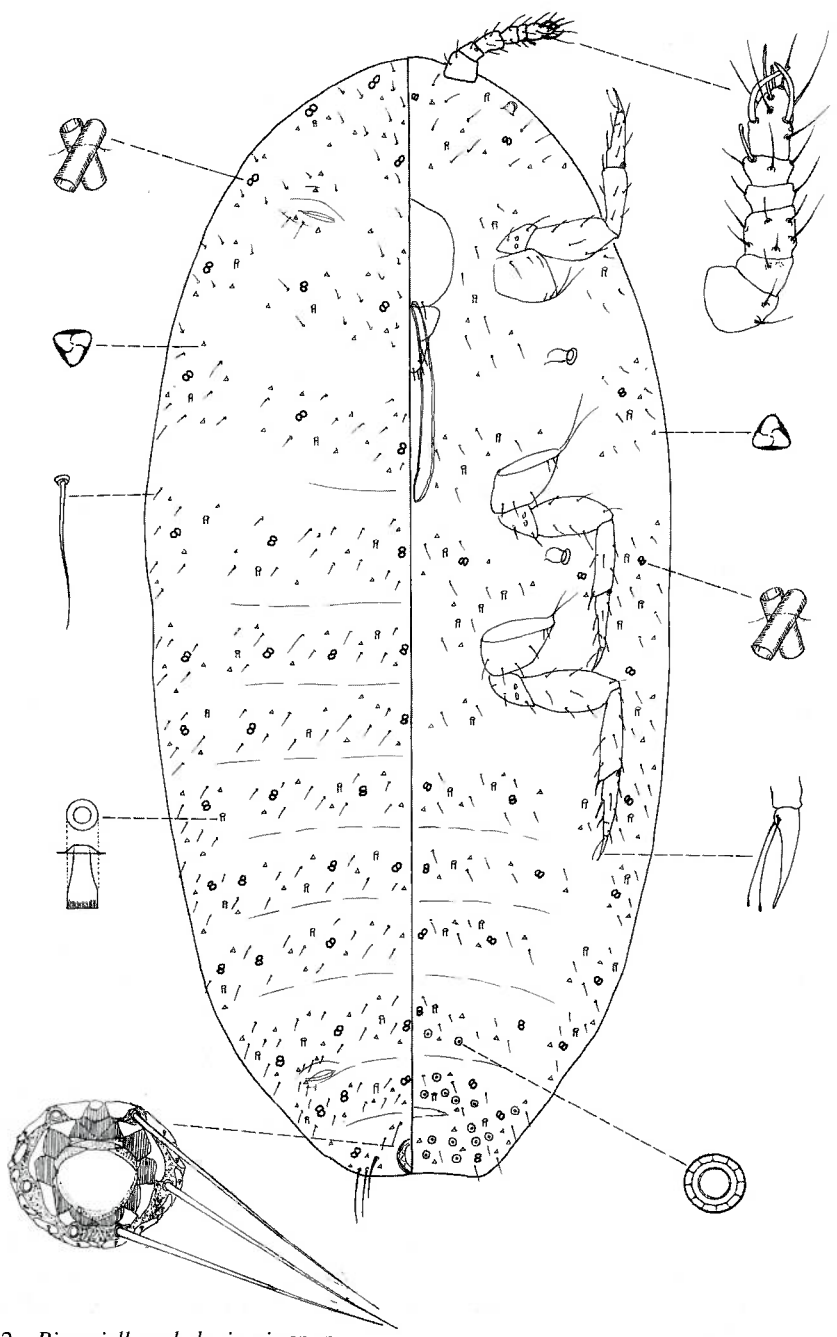

Fig. 2 - *Ripersiella caledoniensis* sp. n.

on all segments, 4 µm long. Hair-like setae (13 µm long) and trilocular pores (3 µm wide) scattered on the dorsum.

The species is named after the country of origin.

Affinities: The species is similar to *R.. carolinensis* but differs by the small number of multilocular pores and presence of the tubular ducts. There is some similarity *with R. mediatlantica*, but it has a circulus and a large number of long hair-like setae on the body.

Ripersiella guineensis Konczné Benedicty and Kozár sp. n. (Fig. 3)

Type material: The holotype, female, two paratype female and a larva on the same slide, New Guinea, Wau 25. 09. 1969, (coll. J. Balogh, B 126). Paratypes, female, New Guinea, road to Lae-Bulalo (coll. J. Balogh, B 91), 06. 09. 1968, from litter. One paratype female and a larva on the same slide, New Guinea, Kiunga, (coll. J. Balogh, NGK B 10), 22. 07. 1969, from moss and litter. One paratype female, New Guinea, Wau, Mt. Kaindi (coll. J. Balogh, NG-W B 29), 27. 08. 1968, from moss and litter. Deposited in the Collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 3) 0. 94 mm long and 0.42 mm wide. Antenna 6 segmented, the length of the segments: 1st - 22, 2nd - 10, 3rd - 31, fourth - 14, 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, 12 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 slightly visible. Legs robust: coxa of anterior legs 46, trochanter 29, femur 84 µm, tibia 62, tarsus 50 µm, and claw 19 µm. Coxa of middle legs 41 µm, trochanter 31, femur 78 µm, tibia 53, tarsus 48 µm, and claw 20 µm long. Coxa of posterior legs 48 µm, trochanter 34, femur 86 µm, tibia 82 and tarsus 70 µm, and claw 23 µm, tarsal digitules absent, claw digitules almost as long as claw. Trochanter with two pores on each side. Claw without denticle. Legs with few hair-like setae, tibia and tarsus with 11 µm long setae. On the ventral segments few bitubular duct present on margin. Multilocular pores absent. The diameter of anterior spiracles 10 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, mostly only on margin of the body. Trilocular pores scattered on the venter. Internal genital organ chitinized, forming an elongated cross-shaped structure.

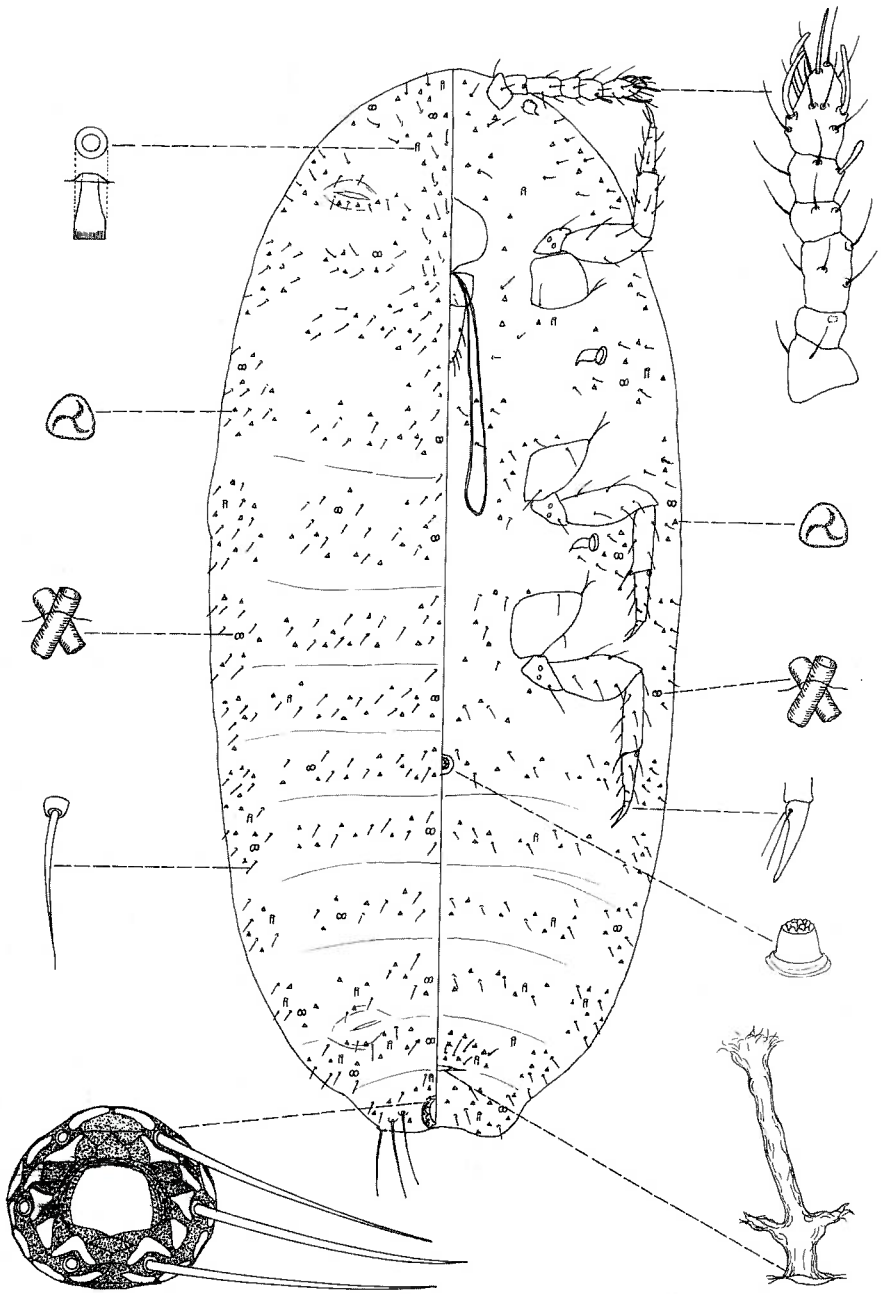

Fig. 3 - *Ripersiella guineensis* sp. n.

DORSUM

Ostioles present, not sclerotized. Multilocular pores absent. Anal ring oval, 43 μm wide and 38 μm long. Anal ring with six, 58 μm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, spicules not visible. Bitubular ducts one size, 3-5 on each segments 2 μm in diameter, 5 μm long. Few tubular duct present on margin, 2 μm long. Hair-like setae 11 μm long, trilocular pores 2 μm wide, scattered on the dorsum.

The species is named after the country of origin.

Affinities: The species is similar to *R. loicmatilei,* but the latter has two, elongated circuli.

Ripersiella tillierorum Kozár and Konczné Benedicty sp. n. (Fig. 4)

Type material: The holotype, female, New Caledonia, Mt. Neponkoni (Canala) 490 m. alt. (coll. A. & S. Tillier), 30. 10. 1986, from Berlese funnel, wet forest, MNHN, No. 10773-3. Eight paratype females on eight slides (1773-1,2,4,5,6,7,10,11), and three larvae on three slides (10773-8,9,12), with the same collection as the holotype. One female paratype, female, New Caledonia, Prov. Sud. Yaté, Dolines de Yaté, 280 m. alt., (coll. L. Deharveng & A. Bedos), 05. 12. 1995, MNHN 1364-1, and two larvae from the same collection, from Berlese funnel. Holotype and paratypes are deposited in Museum National d'Histoire Naturelle (Paris, France). One paratype deposited in the Collection of Plant Protection Institute, Hungarian Academy of Sciences (Budapest, Hungary).

Description: Body elongate oval. Mounted specimen (Fig. 4) 0. 79 mm long and 0.35 mm wide. Antenna 6 segmented, the length of the segments: 1st - 31, 2nd - 19, 3rd - 24, fourth - 19, fifth - 22, sixth - 44 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 (20 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, 58 μm long. Stylet loop 3-4 times longer than labium. Cephalic plate not visible. Legs robust: coxa of anterior legs 48, trochanter 24, femur 77 μm, tibia 60, tarsus 55 μm, and claw 20 μm. Coxa of middle legs 48 μm, trochanter 29, femur 77 μm, tibia 67, tarsus 53 μm, and claw 20 μm long. Coxa of posterior legs 50 μm, trochanter 34, femur 82 μm, tibia 77 and tarsus 55 μm, and claw 24 μm, tarsal digitules absent, claw digitules much shorter than claw. Trochanter with two pores on each side. Claw without denticle. Legs with few hair-like setae, tibia and tarsus with 18 μm long setae. On the ventral segments few bitubular ducts around margin. Multilocular pores with 12-14 loculi, situated on the last three abdo-

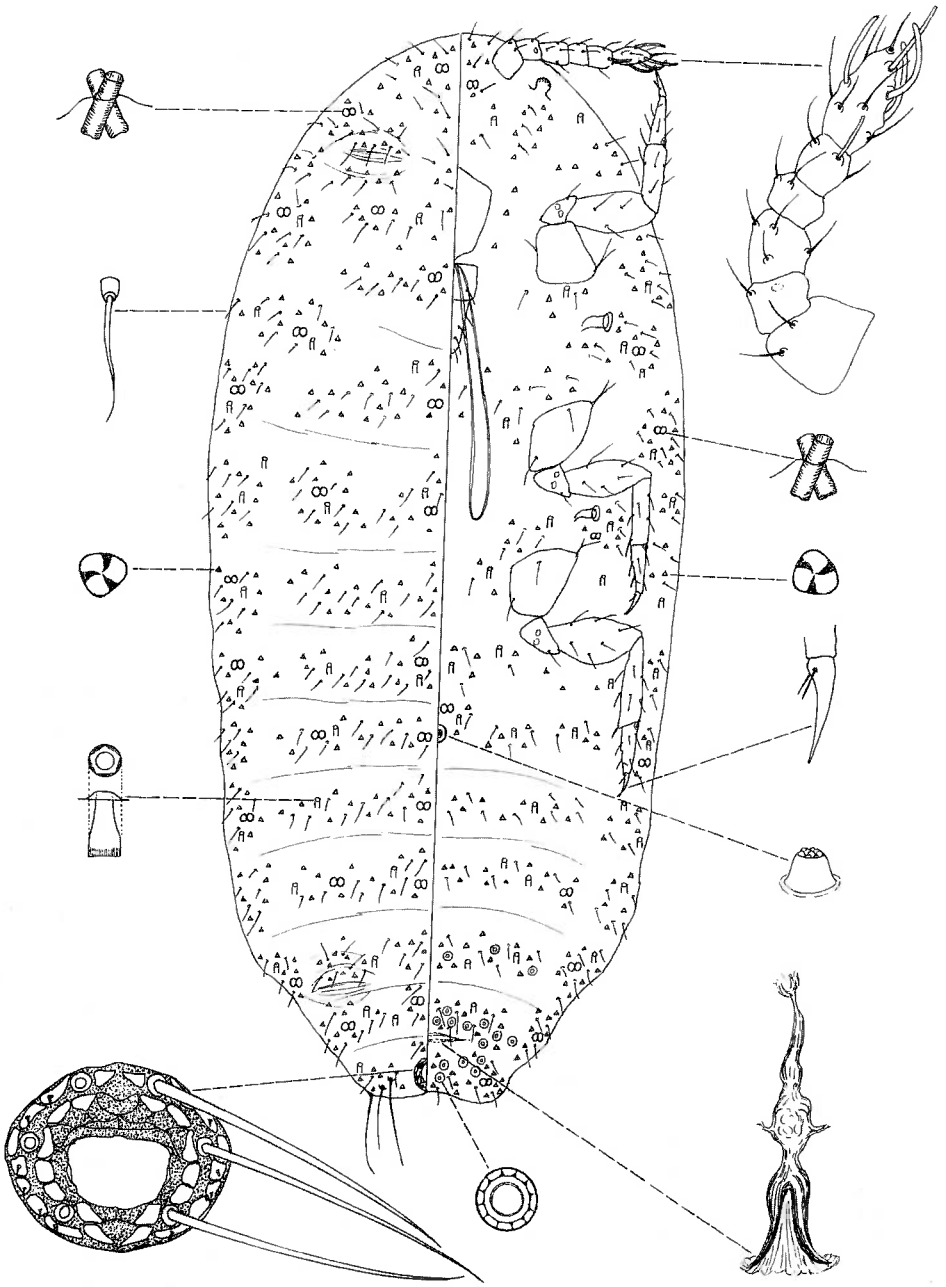

Fig. 4 - *Ripersiella tillierorum* sp. n.

minal segments. The diameter of anterior spiracles 10 µm. Venter with a small number of scattered hair-like setae. The last three segments of the abdomen with some scattered multilocular pores. Circulus present 12 µm in diameter, 10 µm long. Few tubular duct present on all segments. Trilocular pores scattered on the venter. Internal genital organ chitinized, forming a reverse V shape entrance.

DORSUM

Ostioles present, slightly sclerotized. Multilocular pores absent. Anal ring oval, 55 µm wide and 53 µm long. Anal ring with six, 60 µm long hair-like setae. Anal ring pores (cells) typical, as in other species of the Rhizoecini, some of them in outer row with one small spicules. Bitubular ducts one size, 4-6 on each segments, 2 µm in diameter, 7 µm long. Few tubular duct present on all segments, 5 µm long. Hair-like setae 12 µm long, trilocular pores 3 µm wide scattered on the dorsum.

The species is named after the collectors Annie and Simon Tillier.

Affinities: The species is similar to *R. caledoniensis*, but differs by the small number of multilocular pores and the presence of a circulus, *R. carolinensis* also has 5-segmented antennae, another similar species is *R. aloes* which differs by having very long, narrow bitubular pores and a large number of long hair-like setae.

REVIEW OF THE RHIZOECINAE SUBFAMILY

The family group name Rhizoecinae was established by Williams (1968), and contains 162 species. The tribe Rhizoecini contains 138 species. The genus *Rhizoecus* has 79 species and *Ripersiella* has 50 species. In the studied regions 9 *Rhizoecus* and 10 *Ripersiella* species were found.

In this work four new species of *Ripersiella* are described, 12 new combination are proposed, and several original, or earlier combination are re-established. Of the 50 species here assigned to *Ripersiella*, 6 are questionable because they all lack bitubular ducts and need further study. The World list of species of Ripersiella is presented here:

1. *Ripersiella aloes* (Williams & Pellizzari, 1997), comb. n., according to description and drawing. Holotype was studied.
2. ?*Ripersiella andensis* (Hambleton, 1946), comb. n., according to description and drawing.
3. ***Ripersiella australiensis*** sp. n.
4. *Ripersiella bacorum* (Williams, 1996), comb. n., according to description and drawing. Holotype was studied.
5. *Ripersiella bituberculatus* (McKenzie, 1967). Holotype was studied.
6. *Ripersiella boharti* (McKenzie, 1960), according to description and drawing.
7. ?*Ripersiella brevipes* (Goux, 1943), comb. n., according to description and drawing.

8. *Ripersiella brussieui* Goux, 1985, according to description and drawing.
9. *Ripersiella caesii* (Schmutterer, 1956), according to description and drawing.
10. **Ripersiella caledoniensis** sp. n.
11. *Ripersiella campestris* (Hambleton, 1946), according to description and drawing.
12. *Ripersiella carolinensis* (Beardsley, 1966). Holotype was studied.
13. ?*Ripersiella cobelopus* (Williams, 1987), comb. n., according to description and drawing.
14. ?*Ripersiella colombiensis* (Hambleton, 1946), comb. n., according to description and drawing.
15. *Ripersiella cynodontis* (Green, 1931), according to description and drawing.
16. *Ripersiella deboerae* (Hambleton, 1974). Paratype was studied.
17. *Ripersiella disjunctus* (McKenzie, 1967), comb. n., according to description and drawing. Holotype and paratype were studied.
18. *Ripersiella geniculatus* (James, 1935). Cotype was studied.
19. *Ripersiella gracilis* (McKenzie, 1961). Paratype was studied.
20. *Ripersiella graminicola* (James, 1936). Cotype was studied.
21. ***Ripersiella guineensis*** sp. n.
22. *Ripersiella halophilus* (Hardy, 1868), according to description and drawing of Williams (1962).
23. *Ripersiella helanensis* Tang, 1992, according to description and drawing.
24. *Ripersiella hibisci* (Kawai & Takagi, 1971), according to description and drawing.
25. *Ripersiella kelloggi* Ehrhorn & Cockerell in Cockerell, 1901, according to description and drawing of Williams (1998). Type material was studied.
26. *Ripersiella kondonis* (Kuwana, 1923), according to description and drawing of Williams and Granara de Willink (1992).
27. *Ripersiella lelloi* (Mazzeo, 1995), comb. n., according to description and drawing.
28. *Ripersiella loicmatilei* (Williams, 2001), comb. n., according to description and drawing.
29. *Ripersiella mediatlantica* Matile-Ferrero, 1976, according to description and drawing. Type and paratypes were studied.
30. *Ripersiella menkei* (McKenzie, 1962), according to description and drawing.
31. *Ripersiella mexicana* Hambleton, 1946. Holotype was studied.
32. *Ripersiella oliveri* (Cox, 1978), comb. n. Paratype was studied.
33. *Ripersiella ovoides* (Goux, 1943), according to description and drawing.
34. *Ripersiella palestineae* Hambleton, 1946, according to description and drawing.
35. *Ripersiella parvus* (Danzig, 1985), according to description and drawing.
36. *Ripersiella periolanus* Goux, 1985, according to description and drawing.
37. *Ripersiella petiti* Goux, 1941, according to description and drawing.
38. ?*Ripersiella poltavae* (Laing, 1929), according to description and drawing of Tereznikova (1975).
39. *Ripersiella pratensis* (Borchsenius & Tereznikova, 1959), comb. n., according to description and drawing.
40. *Ripersiella puhiensis* Hambleton, 1974, according to description and drawing.

41. *Ripersiella rumicis* (Maskell, 1892). Paralectotype was studied.
42. *Ripersiella saintpauliae* (Williams, 1985). Holotype was studied.
43. *Ripersiella sasae* (Takagi & Kawai, 1971), according to description and drawing.
44. *Ripersiella solani* Hambleton, 1946. Holotype was studied.
45. *Ripersiella spicatus* (Hambleton, 1979), comb. n. Holotype was studied.
46. *Ripersiella theae* (Kawai & Takagi, 1971), according to description and drawing.
47. ***Ripersiella tillierorum*** sp. n.
48. *Ripersiella totonicapanus* Hambleton, 1946, according to description and drawing of Williams and Granara de Willink (1992).
49. ?*Ripersiella tritici* (Borchsenius, 1949), according to description.
50. *Ripersiella vidanoi* Marotta & Tranfaglia, 1995, according to description and drawing.

NEW RECORDS

In our samples from these regions 7 species of *Ripersiella* and *Rhizoecus* were found, including the four new species of *Ripersiella*. Ripersiella *olivieri* was found in Australia (female, VIC Powers. Lkt. 28 mi NE, Mansfield Ca. 300, ANIC, No 22, 17. 05. 1967; and female, NSW Victoria Pass, Mitchell S. Ik out. 28. 11. 1967), and New Caledonia (Noumea, Mt. Koghi. 11. 06. 1987, from litter, coll. J. Balogh, NC, B 33), where earlier it was not recorded. *Rhizoecus amorphophalli* was collected in Wallis: Uvea Mt. Loka, 110 m. alt. (coll. S. Tillier), No. 10796-1, 10796-3 (two females and three larvae on two slides), new record. *Ripersiella rumicis* was found in New Caledonia: Mt. Do, 1026 m. alt., (coll. D. Matile), 27. 11. 1983, MNHN 9578 (one female), new record.

A list of species of *Rhizoecus* and *Ripersiella* distributed in Austral, Australoriental, New Zealand and Pacific Regions, according to ScaleNet and our additions are given here.

Rhizoecus amorphophalli Betrem, 1940
Rhizoecus cacticans (Hambleton, 1946)
Rhizoecus caladii Green, 1933
Rhizoecus californicus Ferris, 1953
Rhizoecus dianthi Green, 1926
Rhizoecus falcifer Kunckel d'Herculais, 1878
Rhizoecus graminis (Hambleton, 1946)
Rhizoecus hawaiiensis (Hambleton, 1946)
Rhizoecus sphagnii Williams, 1985
***Ripersiella australiensis* sp. n.**
***Ripersiella caledoniensis* sp. n.**
Ripersiella carolinensis (Beardsley, 1966)

Ripersiella cobelopus (Williams, 1987)
Ripersiella deboerae (Hambleton, 1974)
***Ripersiella guineensis* sp. n.**
Ripersiella oliveri (Cox, 1978)
Ripersiella puhiensis Hambleton, 1974
Ripersiella rumicis (Maskell, 1892)
***Ripersiella* tillierorum sp. n.**

KEY TO SPECIES OF *RIPERSIELLA* DISTRIBUTED IN STUDIED REGIONS

1. Multilocular pores absent ..... *R. guineensis* sp. n.
   – Multilocular pores present 2
2. Multilocular pores present on dorsum and venter 3
   – Multilocular pores present only on venter 7
3. All dorsal segments covered by multilocular pores 4
   – Multilocular pores only on last dorsal abdominal segments 5
4. Circulus present ..... *R. rumicis*
   – Circulus absent ..... *R. cobelopus*
5. Bitubular pores in small number, situated on margin ..... *R. deboerae*
   – Bitubular pores in high number, situated on whole dorsum 6
6. Median part of abdominal venter without bitubular pores, total number of bitubular pores on body 46-72 ..... *R. puhiensis*
   – Median part of abdominal venter with bitubular pores, total number of bitubular pores 90-117 ..... *R. olivieri*
7. Antennae five segmented ..... *R. carolinensis*
   – Antennae six segmented 8
8. On median part of dorsum and venter very few, scattered (about 10) bitubular pores present, multilocular pores also very few (4) ..... *R. australiensis*
   – On dorsum bitubular pores more numerous forming rows, multilocular pores about 30 9
9. Circulus present ..... *R. tillierorum* sp. n.
   – Circulus absent ..... *R. caledoniensis* sp. n.

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DR. FERENC KOZÁR and 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

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