## SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

# Three New Species of Phytoseiid Mites (Acari: Phytoseiidae) from Brazil

ANTONIO C. LOFEGO[1], GILBERTO J. DE MORAES[2] AND JAMES A. MCMURTRY[3]

[1]Depto. Zoologia, Inst. de Biociências, Universidade de São Paulo, 05508-900, São Paulo, SP, Brazil.
[2]Depto. Ent., Fitop. e Zool. Agrícola, ESALQ/ Universidade de São Paulo, 13418-900, Piracicaba, SP, Brazil.
[3]Oregon State University, Corvallis, OR 97331, and University of California, Riverside, USA.

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Três Espécies Novas de Ácaros Fitoseídeos (Acari: Phytoseiidae) do Brasil

RESUMO - Três novas espécies de fitoseídeos do Brasil são descritas: *Amblyseius neochiapensis* sp. n. sobre *Manihot* sp. e *Amblyseius bahiensis* sp. n. sobre planta não identificada, ambos provenientes do Estado da Bahia, e *Typhlodromalus feresi* sp. n. sobre *Mabea* sp. proveniente do Estado de São Paulo.

PALAVRAS-CHAVE: Taxonomia, *Amblyseius*, *Typhlodromalus*, ácaro, predador.

ABSTRACT - Three new species of phytoseiid mites from Brazil are described: *Amblyseius neochiapensis* sp. n. from *Manihot* sp. and *Amblyseius bahiensis* sp. n. from unidentified plant, both collected in the State of Bahia, and *Typhlodromalus feresi* sp. n. from *Mabea* sp. collected in the State of São Paulo.

KEY WORDS: Taxonomy, *Amblyseius*, *Typhlodromalus*, mite, predator.

Most Mesostigmata mites found on plants belong to the family Phytoseiidae Berlese. Species of this family are predominantly predaceous, and many have been extensively studied for practical use in the control of pest mites. Three new species of phytoseiid mites, subfamily Amblyseiinae, from Brazil are described. The nomenclature used in this paper is that of Rowell *et al.* (1978) for the dorsal setae and of Chant & Yoshida-Shaul (1991) for the ventral setae. Measurements are given in micrometers. Measurements of related species mentioned under the diagnoses were taken from Denmark & Muma (1973, 1989). The following abbreviations are used: ESALQ/USP - Universidade de São Paulo, Escola Superior de Agricultura "Luiz de Queiroz", Departamento de Entomologia, Fitopatologia e Zoologia Agrícola, 13418-900 Piracicaba-

SP, Brazil"; USNMNH/FSCA – United States National Museum of Natural History, in the Florida State Collection of Arthropods, Entomology Section, Division of Plant Industry, Florida Department of Agriculture and Consumer Services, Gainesville, Florida, USA.

### *Amblyseius neochiapensis* Lofego, Moraes & McMurtry sp. n. (Figs. 1-7)

**Diagnosis.** *A. chiapensis* DeLeon and *A. compositus* Denmark & Muma are similar to this new species, but *A. chiapensis* has longer Z5 (219-251), Sge IV (86-99) and Sti IV (59-63) setae (Denmark & Muma, 1989), whereas *A. compositus* has shorter Z5 (104) (Denmark & Muma, 1973).

**Female.** (Figs 1-5) (19 specimens measured)
*Dorsum* - Dorsal shield smooth, 331 (310-366) long, 194 (175-215) wide at level of s4, j1 28 (25-33), j3 48 (43-59), j4 7 (6-9), j5 5 (4-6), j6 7 (6-9), J2 7 (6-9), J5 7 (6-9), z2 12 (10-15), z4 10 (9-15), z5 5 (4-6), Z1 8 (6-9), Z4 99 (87-105), Z5 161 (143-183), s4 86 (75-94), S2 10 (7-13), S4 9 (7-11), S5 9 (6-12), r3 21 (16-25), R1 10 (7-14). All Setae smooth, except Z4 and Z5 which are serrate.
*Peritreme*- Extending forward to level of j1.
*Venter*- All shields smooth. Sternal shield with three pairs of setae and two pairs of pores. Distances between St1-St3 61 (56-64), St2-St2 75 (72-80), St5-St5 69 (62-76). Two pairs of metapodal plates. Ventrianal shield nearly pentagonal, with lateral margins slightly concave, 118 (105-127) long, 74 (64-80) wide at ZV2 level and 73 (70-78) wide at anus level, with three pairs of setae and one pair of preanal pores (gv3) mesad and slightly posterior to JV2.
*Chelicera*- Fixed digit 33 (31-34) long, with 11 to 12 teeth; movable digit 38 (36-40) long, with three to four teeth.
*Spermatheca*- Calyx cup-shaped, 6 (5-8) long and 8 (7-9) in diameter; atrium small.
*Legs*- With setaceous macrosetae of the following lengths: Sge I 33 (27-38), Sge II 33 (29-37), Sge III 34 (30-40), Sti III 28 (22-37), Sge IV 71 (60-78), Sti IV 41 (33-48), St IV 67 (57-76); chetotactic formula of genu II 2-2/1,2/0-1; genu III 1-2/1,2/0-1.

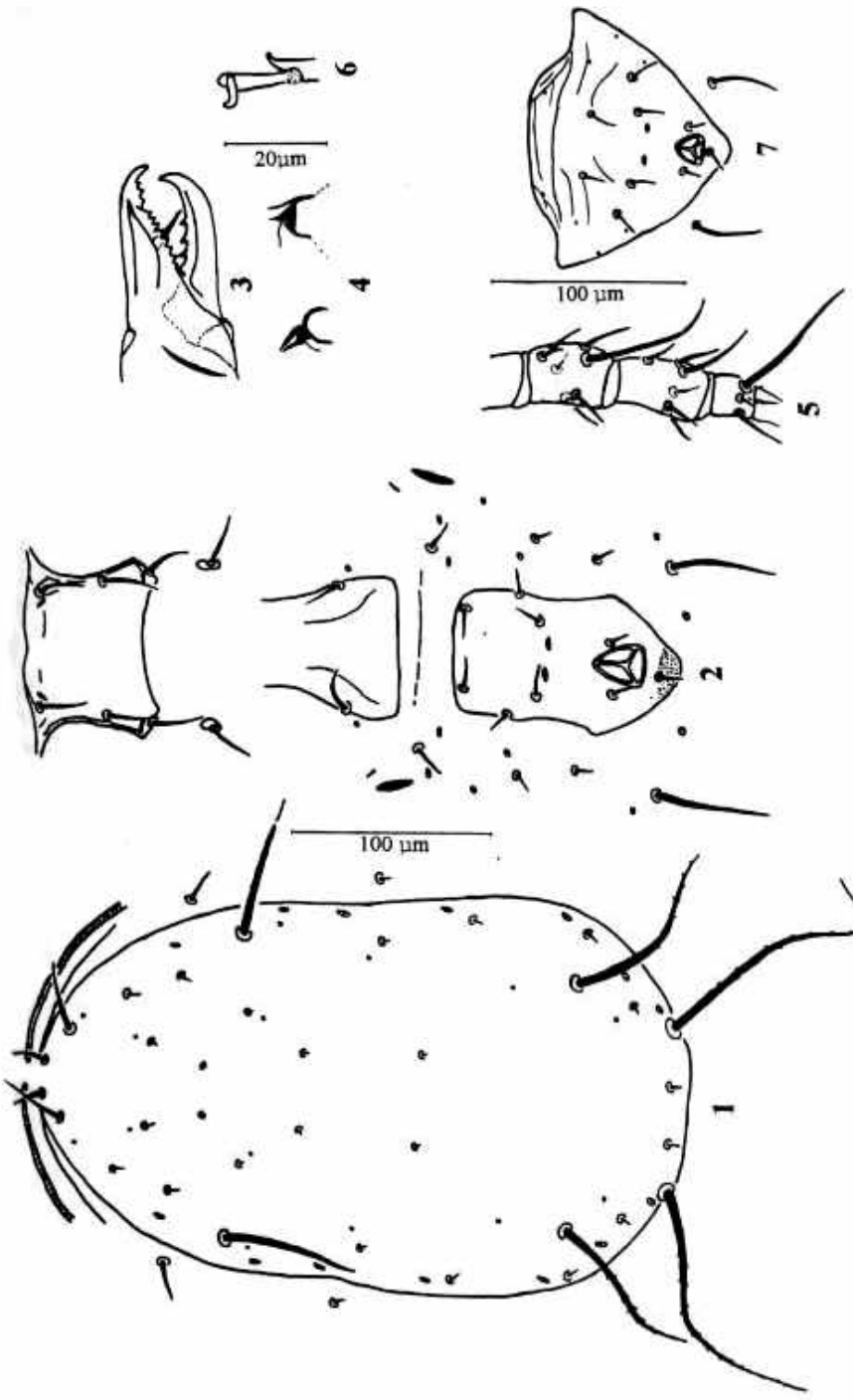
**Male.** (Figs 6-7) (seven specimens measured)
*Dorsum*- Dorsal shield smooth, 241 (230-248) long, 163 (149-178) wide at level of s4, j1 24 (22-27), j3 42 (41-43), j4 6 (5-8), j5 4 (3-5), j6 6 (5-9), J2 6 (4-8), J5 6 (5-8), z2 13 (11-16), z4 10 (8-12), z5 4 (4-5), Z1 8, Z4 69 (57-78), Z5 110 (100-116), s4 64 (62-68), S2 10 (8-14), S4 8 (7-11), S5 9 (7-11), r3 16 (14-16), R1 10 (8-11). All setae smooth, except Z4 and Z5 which are serrate.
*Peritreme*- Extending forward to level of j1.
*Venter*- Sternogenital shield smooth. Ventrianal shield subtriangular, lightly striated, 104 (97-108) long and 136 (130-140) wide at anterior corners, with three pairs preanal setae; pores gv3 mesad and slightly posterior to bases of JV2; four additional pairs of minute pores at locations shown in Fig. 7.
*Spermadactyl*- Shaft 17 (16-19) long.
*Legs*- With setaceous macrosetae of the following lengths: Sge I 24, Sge II 24 (22-24), Sge III 25 (22-27), Sti III 20 (19-22), Sge IV 47 (43-54), Sti IV 27 (22-30), St IV 48 (46-51); chetotactic formula of genus II and III as in females.

**Type Material.** Holotype female, five paratype females, one allotype and one paratype male (ESALQ/USP), from *Manihot* sp., Piritiba, State of Bahia, 19-IV-1993, I.A. Almeida; two paratype females and one paratype male (USNMNH/FSCA), same data as holotype.

**Etymology.** *neochiapensis*, referring to the similarity of this new species with *A. chiapensis*.

### *Amblyseius bahiensis* Lofego, Moraes & McMurtry sp. n. (Figs. 8-13)

**Diagnosis.** This species is similar to




Figures 1-7. *Amblyseius neochiapensis* sp. n. Female: 1, Dorsal shield; 2, Ventral surface; 3, Chelicera; 4, Spermathecae; 5, Setation of femur, genu and basitarsus of leg IV. Male: 6, Spermadactyl; 7, Ventrianal shield.

*Amblyseius franzellus* Athias-Henriot and *Amblyseius cinctus* Corpuz & Rimando; *A. franzellus* has longer Z4 (68) and Z5 (130), and gv3 mesad and posterior to JV2; *A. cinctus* has longer s4 (62), Z4 (79), Z5 (173) and Sge IV (89) setae (Denmark & Muma, 1989).

**Female.** (Figs 8-11) (12 specimens measured)
*Dorsum*- Dorsal shield with a few antero-lateral striae, 321 (302-334) long, 193 (175-204) wide at level of s4, j1 24 (20-25), j3 35 (31-38), j4 7 (6-7), j5 7 (6-7), j6 8 (7-9), J2 10 (8-11), J5 8 (7-10), z2 13 (12-16), z4 9 (9-11), z5 8 (7-9), Z1 11 (10-12), Z4 53 (48-56), Z5 103 (94-108), s4 41 (38-46), S2 17 (15-19), S4 18 (17-22), S5 11 (9-12), r3 14 (12-16), R1 13 (12-14). All setae smooth, except Z4 and Z5 which are serrate.
*Peritreme*- Extending forward to level of j1.
*Venter*- Sternal shield smooth with three pairs of setae and two pairs of pores. Distances between St1-St3 59 (56-62), St2-St2 66 (64-70), St5-St5 64 (62-65). Two pairs of metapodal plates. Ventrianal shield slightly striate, nearly pentagonal, with lateral margins slightly concave, 107 (99-121) long, 88 (80-92) wide at ZV2 level, 76 (72-81) wide at anus level, with three pairs of setae and one pair of preanal pores (gv3) mesad to JV2.
*Chelicera*- Fixed digit 24 (24-25) long, with 10-11 teeth; movable digit 28 (27-29) long, with 3-4 teeth.
*Spermatheca*- Calyx 9 (8-11) long. The shape of the calyx vary from cylindrical to conical, even in the same individual, probably because of its light sclerotization. Atrium distinguishable as a darker region, apparently flattened on one side, at the proximal end of the calyx.
*Legs*- With setaceous macrosetae of the following lengths: Sge I 26 (24-27), Sge II 27 (24-30), Sge III 29 (27-32), Sti III 22 (21-24), Sge IV 45 (41-49), Sti IV 35 (32-40), St IV 54 (48-57); chetotactic formula of genu II 2-2/0,2/0-1; genu III 1-2/1,2/0-1.

**Male.** (Figs. 12-13) (seven specimens measured)
*Dorsum*- Dorsal shield with a few antero-lateral striae, with 248 (243-259) long, 165 (157-178) wide at level of s4, j1 18 (16-19), j3 31 (27-32), j4 6 (5-7), j5 5, j6 6 (5-8), J2 7 (5-8), J5 6 (5-8), z2 13 (11-14), z4 9 (8-11), z5 5, Z1 9 (8-11), Z4 41 (38-43), Z5 82 (73-86), s4 33 (30-35), S2 16, S4 19 (16-19), S5 8 (8-11), r3 12 (11-14), R1 14. All Setae smooth, except Z4 and Z5 which are serrate.
*Peritreme*- Extending forward to level of j1.
*Venter*- Sternogenital shield smooth. Ventrianal shield subtriangular, striated; 104 (95-108) long, 131 (124-138) wide at anterior corners, with three pairs of preanal setae; gv3 mesad to bases of JV2; four additional pairs of minute pores at locations shown in Fig. 13.
*Spermadactyl*- Shaft 16 (14-19) long.
*Legs*- With setaceous macrosetae of the following lengths: Sge I 14 (14-15), Sge II 14 (12-15), Sge III 12, Sti III 12, Sge IV 20 (19-22), Sti IV 16 (15-17), St 26 (26-27); chetotactic formula of genus II and III as in females.

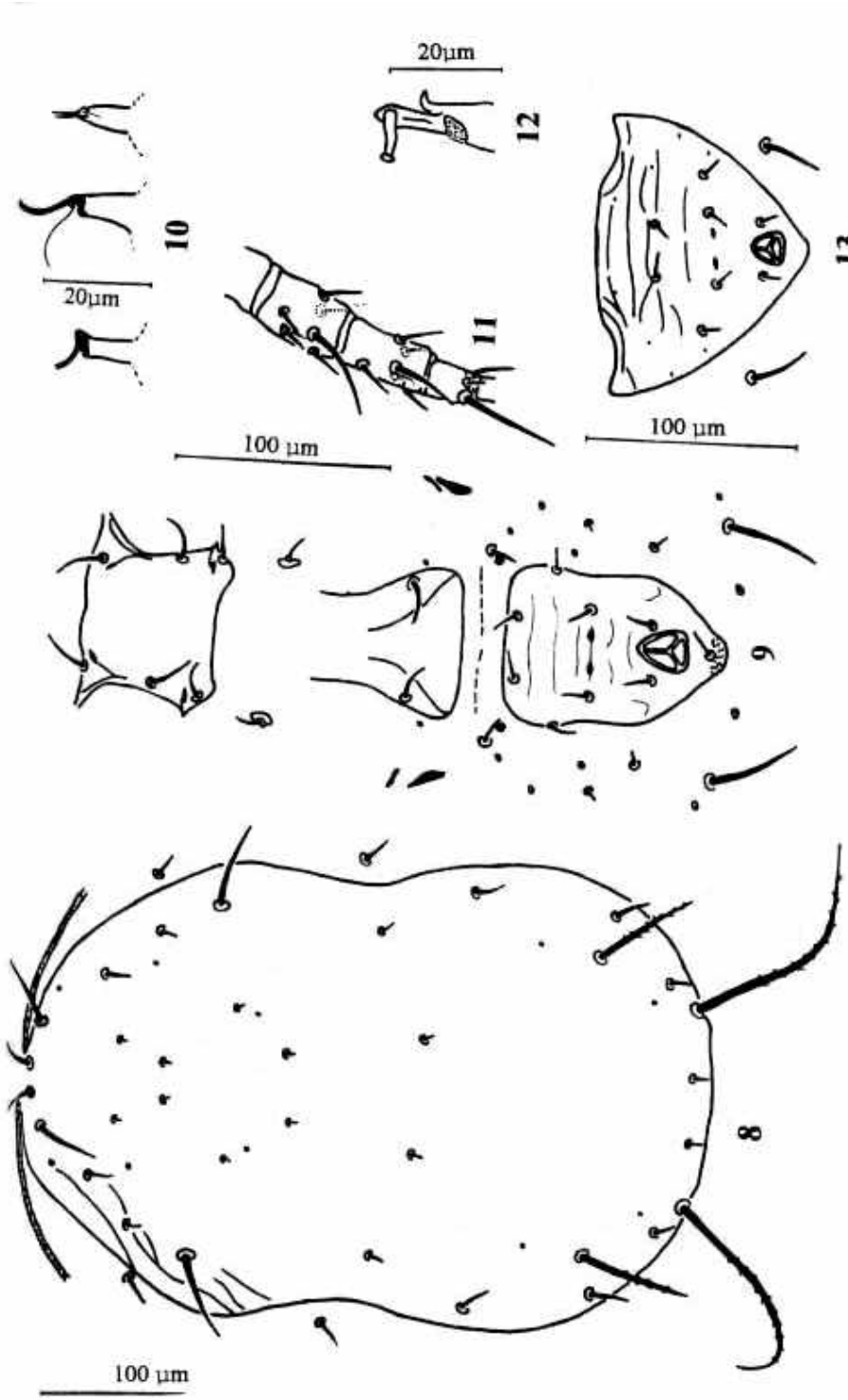
**Type Material.** Holotype female, one paratype female, one allotype and two paratype males (ESALQ/USP), from unidentified plant, Piritiba, State of Bahia, 13-V-1994, R.S. Oliveira; five paratypes females (ESALQ/USP), from unidentified plant, Piritiba, State Bahia, 07-VI-1994, R.S. Oliveira; two paratype females and one paratype male (USNMNH/FSCA), same data as for holotype.

**Etymology.** *bahiensis*, referring to Bahia, the state where the types were collected.

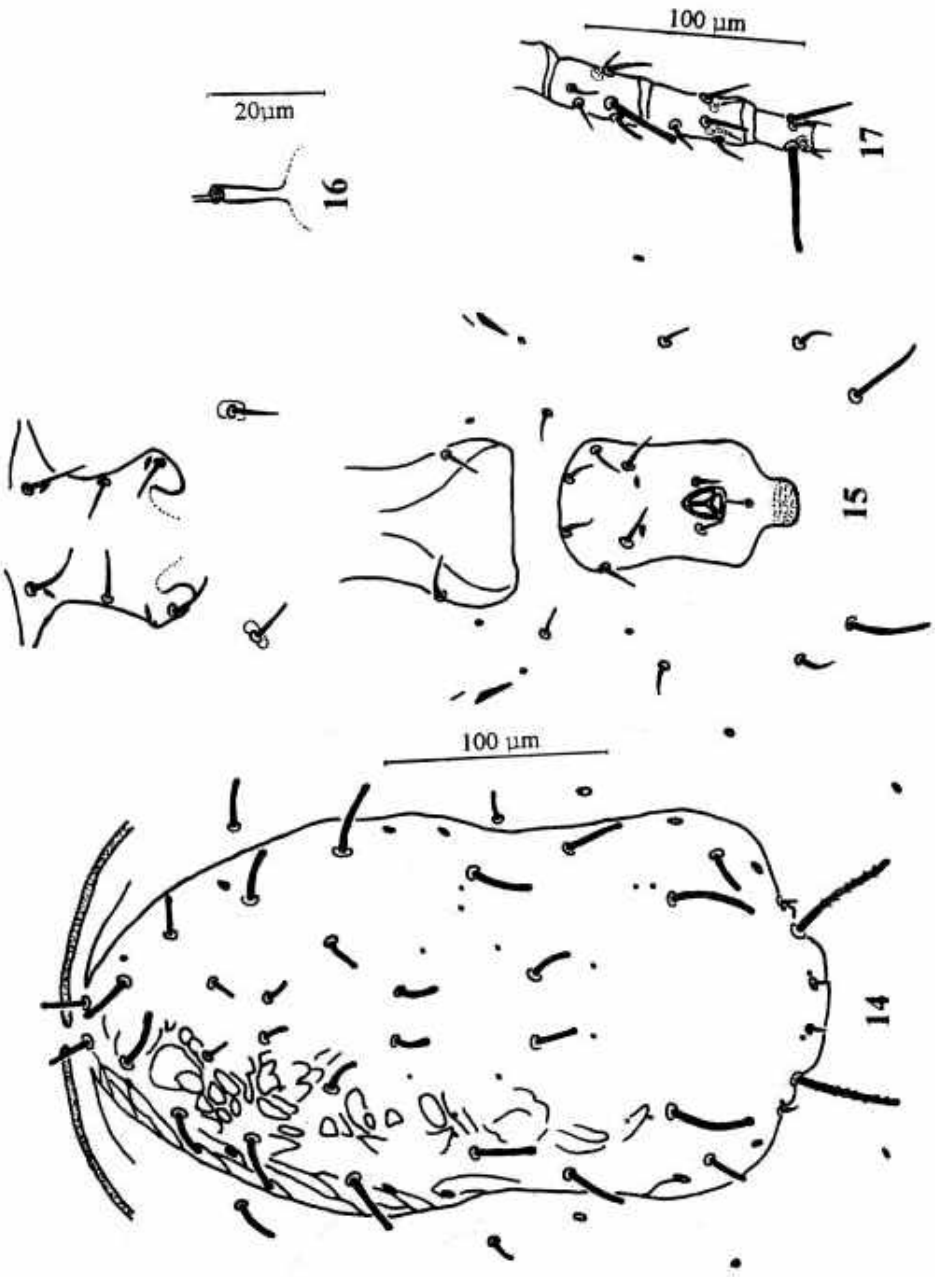
### *Typhlodromalus feresi* Lofego, Moraes & McMurtry sp. n. (Figs. 14-17)

**Diagnosis.** This species differs from other species in the same genus by having all dorsal setae capitate, except S5 and J5, and by having a reduced number of teeth on the fixed digit.

**Female.** (Figs 14-17) (two specimens mea-




Figures 8-13. *Amblyseius bahiensis* sp. n. Female: 8, Dorsal shield; 9, Ventral surface; 10, Spermathecae; 11, Setation of femur, genu and basitarsus of leg IV. Male: 12, Spermadactyl; 13, Ventrianal shield.




Figures 14-17. *Typhlodromalus feresi* sp. n. Female: 14, Dorsal shield; 15, Ventral surface; 16, Spermathecae; 17, Setation of femur, genu and basitarsus of leg IV.

sured).
*Dorsum*: Dorsal shield striate antero-laterally and with a distinct areolate pattern in most of the central region, except for part of the posterior half, 336-326 long, 190-200 wide at level of s4, j1 23-24, j3 25-26, j4 12-16, j5 12-13, j6 18-22, J2 20-21, J5 6-7, z2 20-23, z4 30-32, z5 16-18, Z1 28-30, Z4 39-40, Z5 56-57, s4 38-37, S2 30-31, S4 22-23, S5 8-9, r3 24-26, R1 12-13. All setae capitate and smooth, except S5 and J5 which are setaceous; Z5 serrate.
*Peritreme*: Extending forward to level of j1.
*Venter*: All shields smooth. Sternal shield with three pairs of setae and two pairs of pores. Distances between St1-St3 62-66, St2-St2 60-62, St5-St5 70-72. Two pairs of metapodal plates. Ventrianal shield with lateral margins slightly concave and with a distinct lobe posteriorly; three pairs of preanal setae and one pair of pores, the latter slightly mesad and posterior to JV2; 110-112 long, 64-72 wide at ZV2 level, 62-64 wide at anus level.
*Chelicera*: Fixed digit 25 (24-25) long, with five teeth; movable digit 25 (24-26) long, with two teeth.
*Spermatheca*: Calyx tubular with 28-32 long; atrium nodular.
*Legs*: With slightly capitate macrosetae of the following lengths: Sge I 7, Seg II 9-11, Sge III 14-16, Sge IV 23-25, Sti IV 12-14, St IV 30; chetotactic formula of genu II 2-2/0,2/0-1; genu III 1-2/1,2/0-1.

**Male.** unknown.

**Type Material.** Holotype female and one paratype female (ESALQ/USP) from *Mabea* sp., São José do Rio Preto, São Paulo, 18-VI-1996, R.J.F. Feres.

**Etymology.** *feresi*, in homage to Reinaldo José Fazzio Feres, eminent acarologist of Universidade Estadual Paulista, Brasil, who collected the type specimens.

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