

DESCRIPTION OF SOME PHYTOSEIID MITES FROM BRAZIL (ACARINA : PHYTOSEIIDAE)

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MICROFAUNA
FROM
BRAZIL
PHYTOSEIIDAE

MICROFAUNE
DU
BRÉSIL
PHYTOSEIIDAE

ABSTRACT : Ten new species, 7 in the genus *Amblyseius* Berlese, one in the genus *Typhlodromus* Scheuten and 2 in the genus *Phytoseius* Ribaga collected from the natural reserve of Sooretama in the east of Brazil, are described. *A. ipomeai* (Narayanan, Kour & Ghai) comb. nov., is recorded for the first time and *T. regularis* (De Leon) is redescribed.

RÉSUMÉ : Dix nouvelles espèces capturées dans la réserve naturelle située à l'est du Brésil sont décrites : 7 du genre *Amblyseius* Berlese, une du genre *Typhlodromus* Scheuten et 2 du genre *Phytoseius* Ribaga. *A. ipomeai* (Narayanan, Kour & Ghai) comb. nov., y est signalée pour la première fois et *T. regularis* (De Leon) est redécrise.

INTRODUCTION

The first report on phytoseiid mites from Brazil was that of EHARA (1966) who recorded 8 species, 4 of them were new. Following this work other phytoseiid species were described (DENMARK and MUMA, 1970, 1973 ; EL-BANHAWY, 1975, 1976, 1978). The present work adds to the known Brazilian phytoseiids 10 new species, one first record and redescription of another.

The descriptions based on the author's collection mainly from the natural park of Sooretama in the State of Spirito Santo. According to CHANT (1965), and CHANT *et al.* (1978) the species are belonging to the genera *Amblyseius* Berlese, *Typhlodromus* Scheuten, and *Phytoseius* Ribaga. Setal nomenclature is followed after

ROWELL *et al.* (1978), legs chaetotaxy after EVANS (1963) and ROWELL and CHANT (1979) & organotaxy after ATHIAS-HENRIOT (1975). All measurements are in microns (μm) and based on average when more than one specimen is available. Examinations and illustrations were made with a camera lucida on a Wild Phase-Contrast microscope. For comparative purposes, illustrations were drawn at the same magnifications (objective \times eyepieces \times drawings tube) : dorsal view, ventral view, and legs ($\times 400$) ; peritremal shield ($\times 800$) ; chelicera, insemination apparatus and cheliceral digits ($\times 1200$, with oil immersion). Determination of a new species was based only on the comparison with the holotype of the related species. Type specimens are deposited in the Canadian national collection.

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Amblyseius ipomeai (Narayanan, Kour & Ghai)
Comb. Nov.
(Figs 1-8)

- Typhlodromus (Amblyseius) orientalis* : NARAYANAN, KOUR & GHAI, 1960, p. 394, fig. 2.
- Paraphytoseius multidentatus* : SWIRSKI & SHECHTER, 1961, p. 115, figs 26-28.
- Amblyseius (Ptenoseius) horrifer* : PRITCHARD & BAKER, 1962, p. 295, figs 63-64.
- Paraphytoseius santurcensis* : DE LEON, 1965a, p. 130, fig. 12.
- Paraphytoseius orientalis* (Narayanan, Kour & Ghai) new Comb. : EHARA, 1966b, p. 25.
- Paraphytoseius multidentatus* Swirski & Shechter : EHARA, 1966c, p. 25.
- Amblyseius (Paraphytoseius) urumanus* : EHARA, 1967, p. 76, figs 31-35.
- Paraphytoseius narayanani* Ehara & Ghai, n. nom. : EHARA, 1967, p. 77.
- Paraphytoseius santurcensis* De Leon : DE LEON, 1967, p. 17, fig. 23.
- Amblyseius (Paraphytoseius) multidentatus* Swirski & Shechter : VAN DER MERVE, 1968, p. 168.
- Amblyseius (Paraphytoseius) multidentatus* Swirski & Shechter : EHARA & LEE, 1971, p. 69-70, figs 26-31.
- Amblyseius (Paraphytoseius) subtropicus* : TJIYING, 1972, p. 1-2, figs 1-16.
- Amblyseius narayanani* Ehara & Ghai : PRASAD, 1974, p. 168.
- Amblyseius narayanani* Ehara & Ghai : GUPTA, 1975, p. 39.
- Paraphytoseius santurcensis* De Leon : DENMARK & MUMA, 1975, p. 283-284.
- Paraphytoseius multidentatus* Swirski & Shechter : BLOMMERS, 1975, p. 87-89, figs 14-15.
- Amblyseius (Paraphytoseius) multidentatus* Swirski & Shechter : EHARA & BHANDHUFALCK, 1977, p. 79-80, figs 131-133.

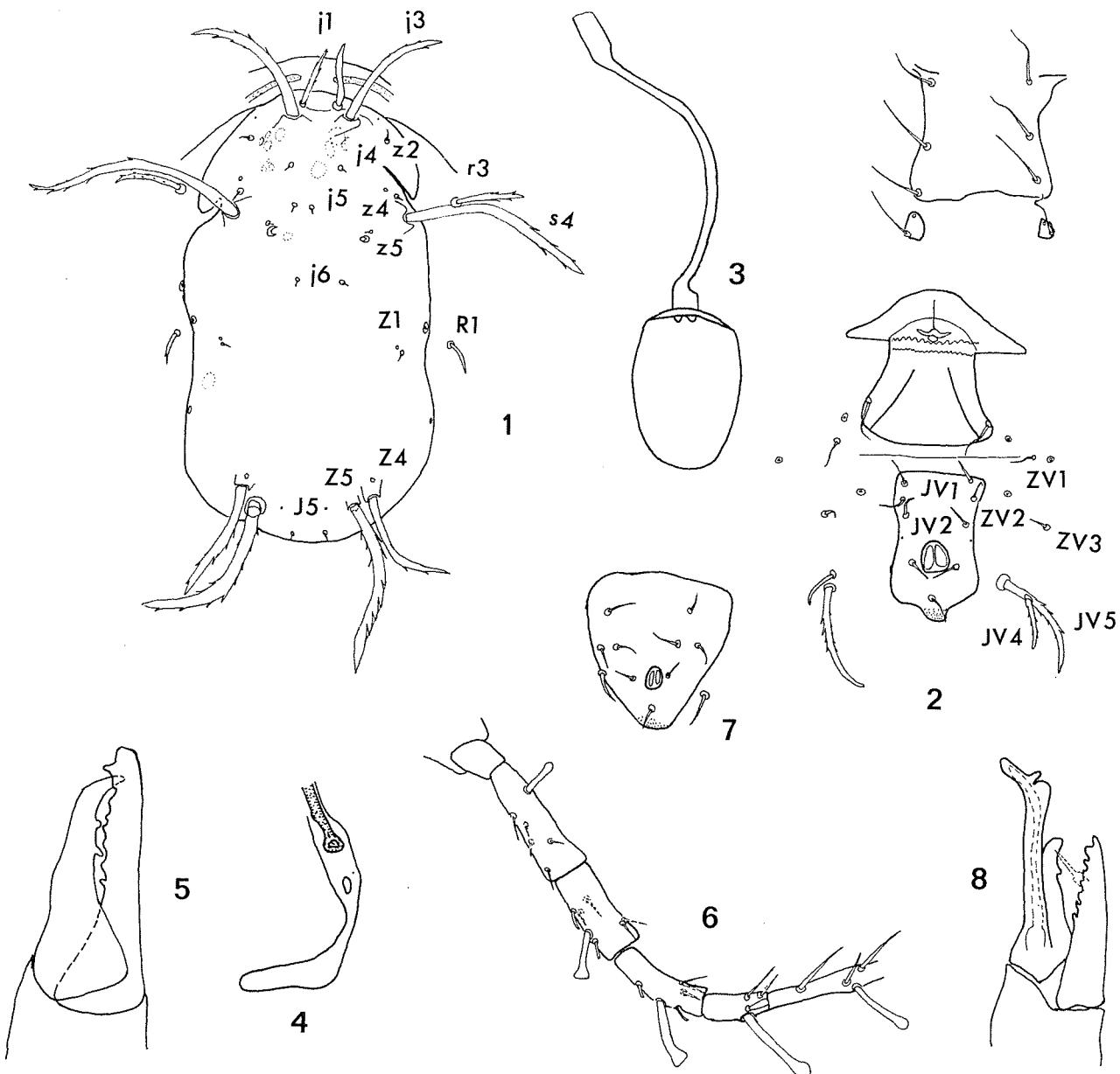
■ *Female* : Dorsal shield smooth, with distinct notches near s4, 270 long and 140 wide. Nine pairs of setae on podonotum : 5j (j1, j3, j4, j5, j6), 3z (z2, z4, z5), s4 ; 4 pairs on opisthonotum : J5, 3Z (Z1, Z4, Z5) ; 2 pairs on lateral integument : r3, R1. j1, j3, Z4, Z5, s4, r3 long and strongly serrated ; remaining setae very short and smooth. Measurements of dorsal setae : j1 34, j3 83 ; j4, j5, j6, J5, z2, z4, z5, Z1 4-6 ; Z4 76, Z5 99, s4 124, r3 38 ; R1 25 (Fig. 1).

At least 7 pairs of solenostomes, 10 pairs of poroides present on dorsal shield, muscle marks

(sigillotaxy) as shown in fig. 1. Sternal shield with 3 pairs of setae. Metasternal setae on oval platelets with a pair of solenostomes. Genital shield width 92. Ventrianal shield with lateral margin lightly concave, a tiny para-anal gland (gV3) near margin, 3 pairs of preanal setae (JV1, ZV2, JV2), 94 long and 59 wide at para-anal level. A thin elongate sigillar sclerite present between ventrianal and genital shields, and 4 pairs of setae (ZV1, ZV3, JV4, JV5), and 3 pairs of small sclerites surrounding ventrianal shield. JV5 serrated and 73 long (Fig. 2). Insemination apparatus with long ductus major ; cup shaped cervix and visible sacculus (Fig. 3). Peritreme extending anteriorly to level of j1 ; peritremal shield simple as in Fig. 4. Fixed digit of chelicera multidentate ; movable digit bidentate (Fig. 5). One macroseta present on genu II (13), femur IV (20), genu IV (29), tibia IV (36), telotarsus IV (33) ; 2 on basitarsus (11 and 42). Macrosetae on genu II, femur IV, and the shortest on basitarsus IV bulbous ; remaining macrosetae spatulate (Fig. 6). Chaetotactic formula : genu II (1-2/1, 2/0-1) ; genu III (1-2/1, 2/0-1).

■ *Male* : Dorsal shield 230 long and 130 wide. Ventrianal shield 84 long and 90 wide, with 3 pairs of preanal setae (Fig. 7). Spermatostylus bilobate (Fig. 8).

A. ipomeai is characterized by the presence of notches on dorsal shield near s4, spatulate macrosetae, 2 macrosetae on basitarsus IV, one on telotarsus, a pair of tiny para-anal gland (gV3) near margin, position of JV2 on ventrianal shield and absence of S2, S4, S5, and J2 on dorsal shield. We examined the holotype of *A. orientalis*, *A. multidentatus*, *A. santurcensis*, *A. urumanus*, *A. narayanani* and the original description of *A. subtropicus*. Should we exclude the slight variations, that may exist, in the lengths of j3, Z4, Z5 and s4, the difference is diminished so that the so-called species simply represent a single species. Taking the right of priority, therefore, NARAYANAN, KOUR and GHAI are considered the authors of the species and with the same right *A. ipomeai* is suggested to be the new name of the species since the first name was preoccupied (*A. orientalis* Ehara, 1959)).



FIGS. 1-8 : *Amblyseius ipomeai* (Narayanan, Kour & Ghai).

Female : dorsal shield (1), ventral shields (2), insemination apparatus (3), peritremal shield (4), chelicera (5), genu, tibia, tarsus IV (6). Male ventrianal shield (7) and spermatostylus (8).

The female halotype was collected from Chembur, Bombay on leaves of *Ipomea* Dec. 3, 1959 (R. B. KOUR) and is in care of Dr. S. GHAI, Division of Entomology, Indian Agric. Research Inst., New Delhi, India. Additional records from Hong Kong, Japan, Puerto Rico, Zaire and Tai-

wan. Brazilian records 3 females and 2 males from Sooretama, Spirito Santo, Nov. 20, 1976 and female from Mato Grosso April 22, 1977 (E. M. EL-BANHAWY). All materials were collected from plant leaves.

Amblyseius sooretamus sp. n.

(Figs 9-16)

■ *Female* : Dorsal shield smooth, with slight notches near s4, 292 long and 147 wide. Nine pairs of setae on podonotum : 5j (j1, j3, j4, j5, j6) ; 3z (z2, z4, z6), s4 ; 7 pairs on opisthonotum : 2J (J2, J5), 3Z (Z1, Z4, Z5), 2S (S2, S5) 2 pairs on lateral integument : r3, R1. j3, D4, Z4, Z5 stout and serrated ; remaining setae smooth. Measurements of dorsal setae : j1 36, j3 68, j4 6, j5 5, j6 4, J2, J5 7, z2 14, z4 17, z5 5, Z1 9, Z4 103, Z5 125, s4 134, S2, S5 16, r3 34, R1 16 (Fig. 9). At least 5 pairs of solenostomes, 7 pairs of poroides present on dorsal shield ; muscle marks as shown in Fig. 9. Sternal shield with 3 pairs of setae. Metasternal setae on small oval platelets. Genital shield 83 width. Ventrianal shield with a pair of tiny gV3 on the level of paraanal setae, 3 pairs of preanal setae, 101 long and 72 wide. A thin elongate sigillar sclerite present between ventrianal and genital shields and 4 pairs of setae, 5 pairs of small rounded or elongate sclerites and 2 pairs of metapodal platelets surrounding ventrianal shield. JV5 stout, serrated and 84 long (Fig. 10). Insemination apparatus with long ductus major : small atrium, and cup shaped cervix (Fig. 16). Peritreme extending anteriorly to level of j1 ; peritremal shield as in Fig. 12 with posterior longitudinal suture. Chelicera with 7 teeth on fixed digit and 5 on movable (Fig. 13). Macrosetae present on genu IV (59), tibia IV (93) and tarsus IV (70), stout with deep insertion near the top and narrow terminal (Fig. 14). Chaetotactic formula : genu II (1-2/1, 2/1-1) ; genu III (1-2/0, 2/1-1) ; genu IV (1-2/1, 2/0-1).

■ *Male* : Dorsal shield 256 long and 130 wide. Ventrianal shield 96 long, 125 wide, with 4 pairs of preanal setae, and a pair of tiny gV3 (Fig. 15) ; spermatostylus bilobate (Fig. 16).

A. sooretamus can be distinguished from the closely allied species, *A. ipomeai* and *A. cracentis* Corpus & Rimando (CORPUZ and RIMANDO, 1966) by the presence of S2, 8 setae on genu II,

the shape of macrosetae and the position of JV2 on ventrianal shield.

Holotype, Allotype, 16 females and 2 males were collected from plant leaves, Sooretama, Espírito Santo, Nov. 20, 1976 (E. M. EL-BANHAWY).

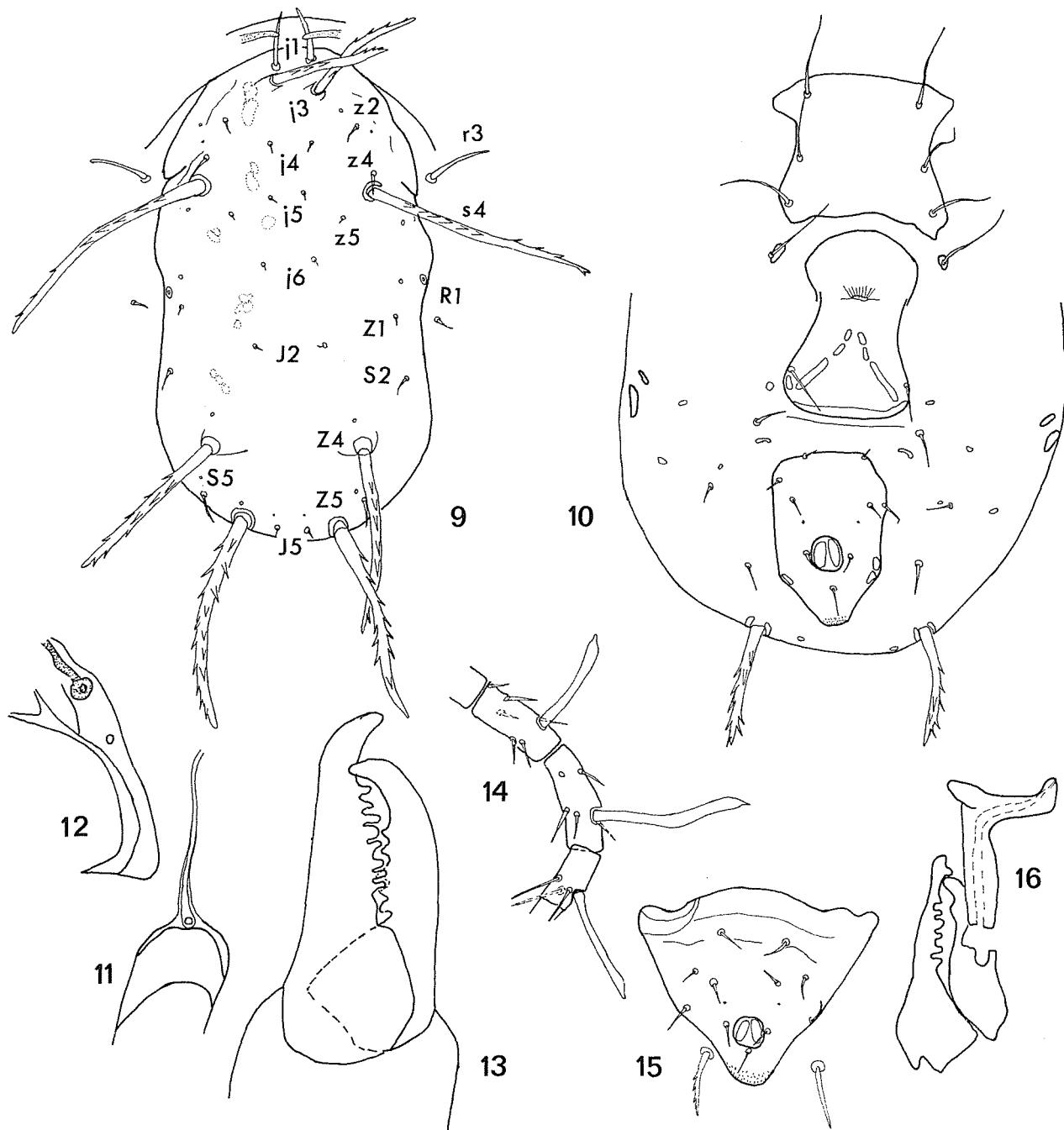
Amblyseius jasmini sp. n.

(Figs 17-21)

■ *Female* : Dorsal shield smooth, 302 long and 230 wide. Nine pairs of setae on podonotum : 5j (j1, j3, j4, j5, j6), 3z (z2, z4, z5), s4 ; 7 pairs on opisthonotum : J5, 3Z (Z1, Z4, Z5), 3S (S2, S4, S5) ; 2 pairs on lateral integument : r3, R1. j1, j3, s4, Z4, Z5 long ; z2, z4 short ; remaining setae minute. Measurements of dorsal setae : j1 37, j3 44, z2 12, z4 10, Z4 150, Z5 178, s4 154, r3 12, R1 5 (Fig. 17). At least 4 pairs of solenostomes, 8 pairs of poroides present on dorsal shield ; muscle marks as shown in Fig. 9. Sternal shield with 3 pairs of setae. Metasternal setae on quadrate platelets. Genital shield 102 wide. Ventrianal shield reticulated, with a pair of crescentic gV3, 3 pairs of preanal setae, 120 long and 97 wide at ZV2 level. Two pairs of elongate sigillar sclerites present between genital and ventrianal shields and 4 pairs of small rounded sclerites surrounding ventrianal shield. JV5 85 long (Fig. 18). Insemination apparatus with a bifid atrium, elongate cervix constricted near the middle and flared near the base (Fig. 19). Peritreme extending anteriorly to level of j1 ; peritremal shield broad as in Fig. 20. Chelicera undiscernible. Macrosetae present on genu I (35), genu II (33), genu III (50), genu IV (102), tibia IV (65) and tarsus IV (79) (Fig. 21). Chaetotactic formula of genu II (1-2/1, 2/0-1) ; genu III (1-2/1, 2/0-1).

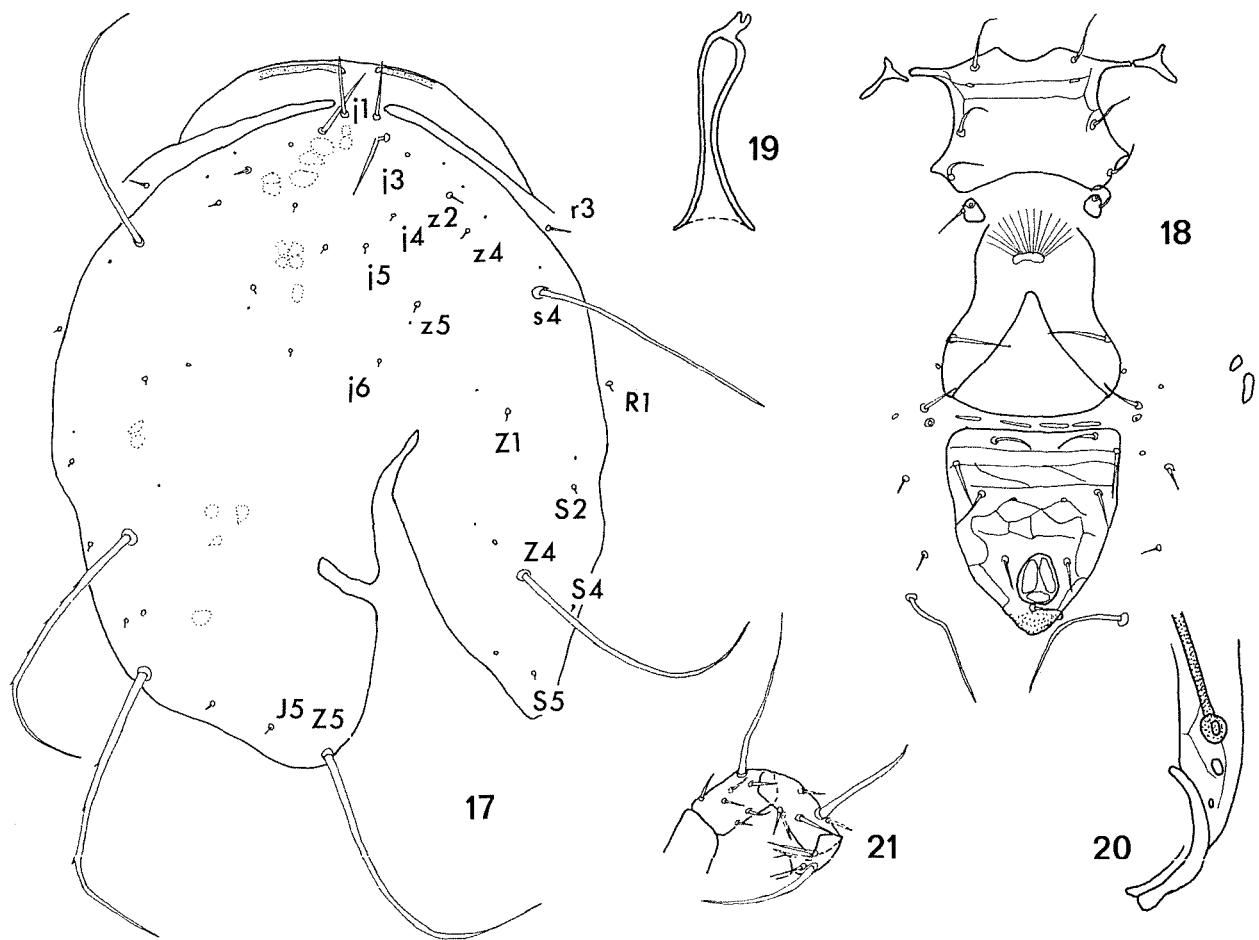
■ *Male* : Unknown.

A. jasmini could be compared with *A. borealis* Chant & Hansell (CHANT and HANSELL, 1971), *A. messor* Wainstein (WAINSTEIN, 1960) and *A. macrosetae* Muma (MUMA, 1962). Number of setae on genu II readily separate it from *A. borealis*. Position of paraanal gland (gV3) and differences in lengths of Z5 (much longer in *A.*



FIGS. 9-16 : *Amblyseius sooretamus* sp. n.

Female dorsal shield (9), ventral shields (10), insemination apparatus (11), peritremal shield (12), chelicera (13), genu, tibia, tarsus IV (14). Male ventrianal shield (15) and spermatostylus (16).



Figs. 17-21 : *Amblyseius jasmini* sp. n., female.

17. — Dorsal Shield ; 18. — Ventral shields ; 19. — Insemination apparatus ; 20. — Peritremal shield ; 21. — Genu, tibia, tarsus IV.

messor) and s4, Z4, Z5 (shorter in *A. macrosetae*) separate it from both species.

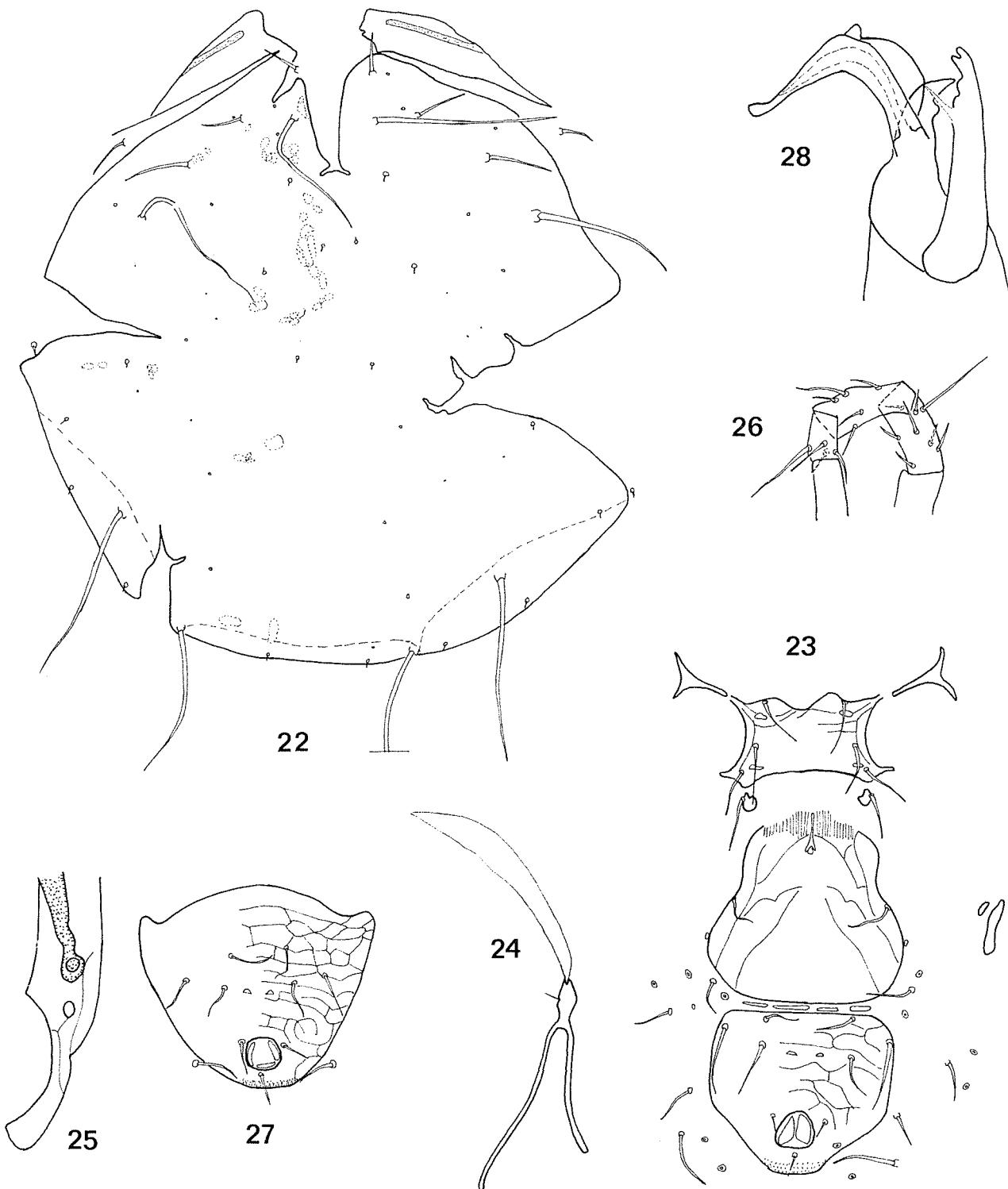
Female holotype was collected from plant leaves, Sooretama, Espírito Santo, Nov. 20, 1976 (E. M. EL-BANHAWY).

Amblyseius dominigos sp. n.

(Figs 22-28)

■ Female : Dorsal shield smooth, 434 long and 316 wide. Nine pairs of setae on podonotum : 5j (j1, j3, j4, j5, j6), 3z (z2, z4, z5), s4 ; 7 pairs on opisthonotum : J5, 3Z (Z1, Z4, Z5), 3S (S2, S4,

S5) ; 2 pairs on lateral integument : r3, R1. j1, j3, z2, z4, Z4, Z5, s4 long ; remaining setae minute. Measurements of dorsal setae : j1 32, j3 116, Z4 126, Z5 120, s4 124 ; r3 24, R1 6 (Fig. 22). At least 4 pairs of solenostomes, 10 pairs of poroides present on dorsal shield ; muscle marks as shown in Fig. 22. Sternal shield with 3 pairs of setae and 2 pairs of large solenostomes. Metasternal setae on cup shaped platelets. Genital shield 145 width. Ventrianal shield reticulated, with a pair of crescentic gV3, 3 pairs of preanal setae, 120 long and 134 wide at ZV2 level. Two pairs of elongate sigillar sclerites present between genital and ventrianal shields and 4 pairs of setae,



FIGS. 22-28 : *Amblyseius dominigos* sp. n.

Female dorsal shield (22), ventral shields (23), insemination apparatus (24), peritremal shield (25), genu, tibia, tarsus IV (26).
Male ventrianal shield (27) and spermatostylus (28).

2 pairs of metapodal platelets and 7 pairs of small rounded sclerites surrounding ventrianal shield (Fig. 23). Insemination apparatus with ductus major long ; bulbous thick atrium, and long thick walled cervix (Fig. 24). Peritreme extending anteriorly to level of j1 ; peritremal shield with longitudinal suture posteriorly (Fig. 25). Chelicera undiscernible. Macrosetae present on genu IV (50), tibia IV (36), and tarsus IV (50) (Fig. 26). Chaetotactic formula of genu II (1-2/1, 2/0-1) : genu III (1-2/1, 2/0-1).

■ *Male* : Dorsal shield 310 long and 246 wide. Ventrianal shield, reticulated, with 3 pairs of preanal setae and a pair of crescentic gV3, 149 long and 174 wide (Fig. 27). Spermatostylus medially curved, with little projection posteriorly and tapering anteriorly (Fig. 28).

A. dominigos, *A. ovatus* Garman (GARMAN, 1958) and *A. peltatus* Van der Merve (VAN DER MERVE, 1968) are very close in the shape of ventral shields, although the dorsal setae and relationship between them are distinctly different. *A. dominigos* has j3 much longer than the distance between its bases and bases of z4, and Z2 shorter than z4 or distance between their bases. In the other 2 species, however, j3 is not as long as above, equal or less than the distance between its bases, and z2 longer than z4 and distance between their bases.

Holotype, Allotype, female and male were collected from plant leaves, Sooretama, Spirito Santo, Nov. 21, 1976 (E. M. EL-BANHAWY).

Amblyseius metapodalis sp. n.

(Figs 29-40)

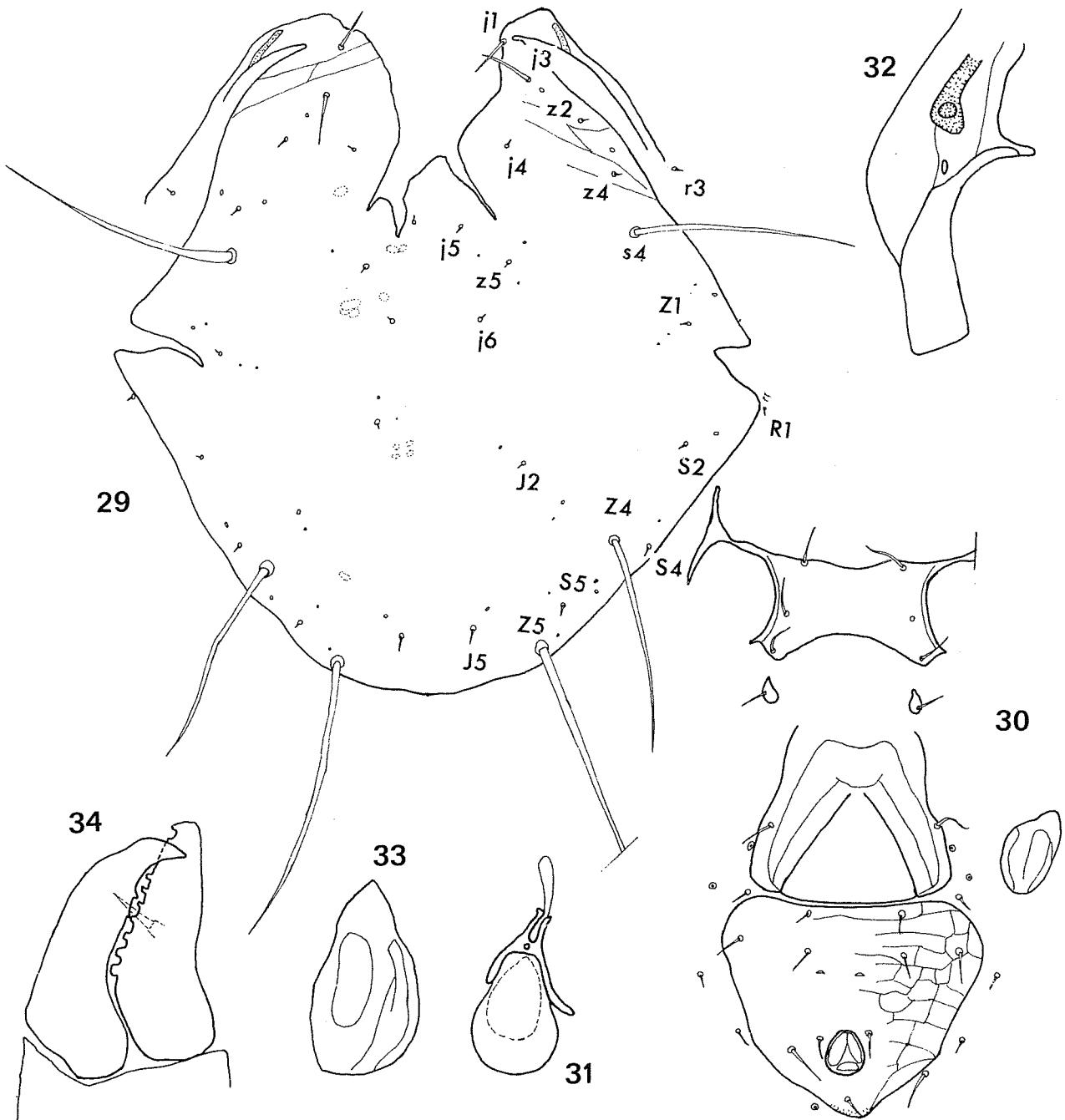
■ *Female* : Dorsal shield smooth, heavily sclerotized, 374 long and 147 wide. Nine pairs of setae on podonotum : 5j (j1, j3, j4, j5, j6), 3z (z2, z4, z5), s4 ; 8 pairs on opisthonotum : 2J (J2, J5), 3Z (Z1, Z4, Z5), 3S (S2, S4, S5) ; 2 pairs on lateral integument : r3, R1. j1, j3, Z4, Z5, s4 long ; remaining setae very short or minute. Measurements of dorsal setae : j1 23, j3 32, Z4 134, Z5 186, s4 144 (Fig. 29). At least

6 pairs of solenostomes, 12 pairs of poroides present on dorsal shield ; muscle marks as shown in Fig. 29. Sternal shield with 3 pairs of setae. Metasternal setae on oval platelets. Genital shield 128 wide. Ventrianal shield reticulated, with a pair of crescentic gV3, 3 pairs of preanal setae, 124 long, 160 broadest width, 116 narrow width. Four pairs of setae, 2 or 3 small rounded sclerites, and a pair of large triangular (57 long, 33 wide) metapodal platelets surrounding ventrianal shield (Figs 30 & 33). Insemination apparatus with short ductus major, conical atrium, cup shaped cervix and distinct sacculus (Fig. 31). Peritreme extending anteriorly to level of j1 ; peritremal shield very broad as in Fig. 32. Chelicera with 8 teeth on fixed digit and 2 on movable (Fig. 34). Two macrosetae present on tarsus I (62, 54), tibia I (38) genu I (65) (Fig. 35) ; genu II (35) (Fig. 36) ; genu III (67), tibia III (31) (Fig. 37) ; genu IV (140), tibia IV (82), tarsus IV (42) (Fig. 38). Chaetotactic formula of genu II (1-2/1, 2/0-1) ; genu III (1-2/1, 2/0-1).

■ *Male* : Dorsal shield 298 long and 220 wide. Ventrianal shield reticulated, with 3 pairs of preanal setae, a pair of crescentic gV3, 126 long, 178 wide, fused anteriorly with peritremal shield (Fig. 39). Spermatostylus tapering anteriorly (Fig. 40).

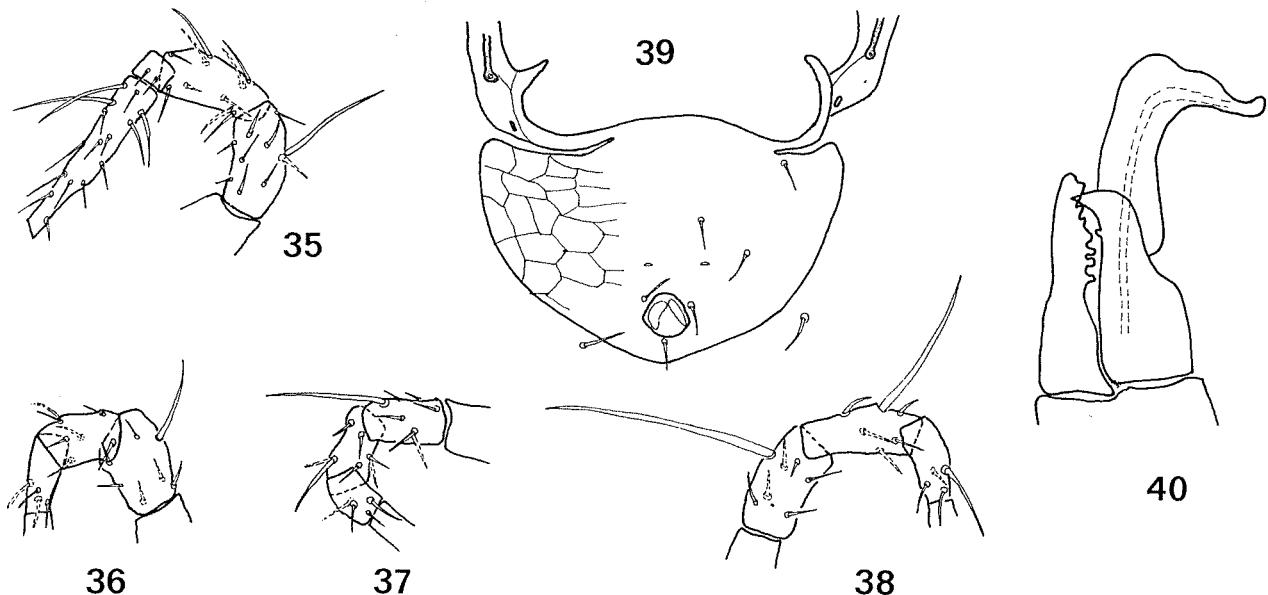
A. metapodalis could be compared with *A. gongylus* (Pritchard & Baker) and *A. glomus* (PRITCHARD and BAKER, 1962), *A. globosus* Gonzalez & Schuster (GONZALEZ and SCHUSTER, 1962), *A. mumai* (Prasad) (PRASAD, 1968), *A. formosanus* (Ehara, 1970), and *Paraamblyseius lunatus* Muma (MUMA, 1962). Width of ventrianal shield, number of preanal setae and dorsal shield chaetotaxy are unlike *A. gongylus*, *A. globosus*, *A. mumai*, *A. formosanus* and *Para. lunatus*. The triangular shape and size of the unique metapodal platelets distinctly separate it from *A. glomus*.

Holotype, Allotype, 3 females and 2 males were collected from coffee plant, Sooretama, Spirito Santo, Nov. 20, 1976 (E. M. EL-BANHAWY).



FIGS. 29-34 : *Amblyseius metapodalis* sp. n., female.

29. — Dorsal shield ; 30. — Ventral shields ; 31. — Insemination apparatus ; 32. — Peritremal shield ; 33. — Metapodal platelets ;
34. — Chelicera.



Figs. 35-40 : *Amblyseius metapodalis* sp. n.

Female : genu, tibia, tarsus I (35), genu, tibia, tarsus II (36), genu, tibia, tarsus III (37), genu, tibia, tarsus IV (38). Male : ventri-anal shield (39) and spermatostylus (40).

***Amblyseius constrictatus* sp. n.**
(Figs 41-45)

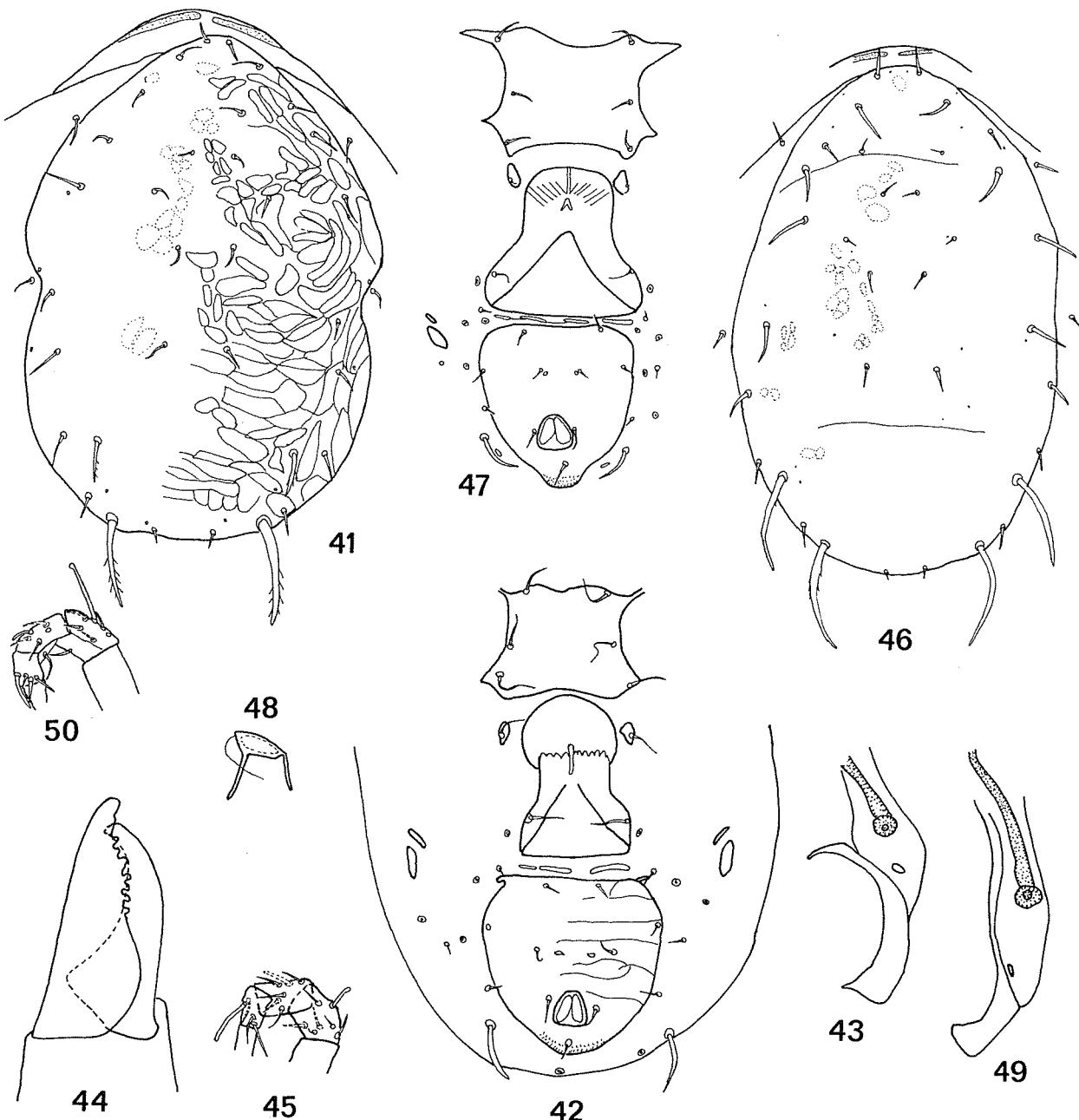
■ *Female* : Dorsal shield with elliptical reticulation, constricted near the middle, 290 long and 188 wide. Nine pairs of setae on podonotum : j5 (j1, j3, j4, j5, j6) (j4 aberrated), 3z (z2, z4, z5), s4 ; 8 pairs on opisthonotum : 2J (J2, J5), 3Z (Z1, Z4, Z5), 3S (S2, S4, S5) ; 2 pairs on lateral integument : r3, R1. Z4, Z5 serrated ; remaining setae smooth. Measurements of dorsal setae : j1 10, j3 14, j4 11, j5 10, j6 16, J2 15, J5 9, z2 14, z4, z5 12, Z1 18, Z4 27, Z5 56, s4, S2 19, S4 14, S5 13, r3 14, R1 12 (Fig. 41). At least 5 pairs of solenostomes present on dorsal shield ; muscle marks as shown in Fig. 41. Sternal shield with 3 pairs of setae. Metasternal setae on quadrate platelets. Genital shield 66 wide. Ventri-anal shield with transverse striation, a pair of conspicuous gV3, 3 pairs of preanal setae, 98 long and 96 wide at ZV2 level. Three elongate sigillar scl-

rites present between genital and ventri-anal shields and four pairs of setae, 4 or 5 pairs of small rounded sclerites and 2 pairs of metapodal platelets surrounding ventri-anal shield (Fig. 42). Insemination apparatus undiscernible. Peritreme extending anteriorly to level of j1, peritremal shield as in Fig. 43. Chelicera with 8 teeth on fixed digit (Fig. 44). Macrosetae present on genu IV (17), tibia IV (14) and tarsus IV (27), with tip slightly enlarged (Fig. 45). Chaetotactic formula of genu II (1-2/1, 2/0-1) ; genu III (1-2/1, 2/0-1).

■ *Male* : Unknown.

A. constrictatus can be distinguished from its nearest species *A. sioux* Chant & Hansell (CHANT and HANSELL, 1971) by the presence of metasternal setae on small platelets, 5 pairs of rounded sclerites, macrosetae on tibia IV and genu III without macrosetae.

Female holotype was collected from plant leaves, Sooretama, Espírito Santo, Nov. 20, 1976 (E. M. EL-BANHAWY).



Figs. 41-45 : *Amblyseius constrictatus* sp. n., female.

41. — Dorsal shield ; 42. — Ventral shields ; 43. — Peritremal shield ; 44. — Chelicera ; 45. — Genu, tibia, tarsus IV.

Figs. 46-50 : *Amblyseius linharis* sp. n., female.

46. — Dorsal shield ; 47. — Ventral shields ; 48. — Insemination apparatus ; 49. — Peritremal shield ; 50. — Genu, tibia, tarsus IV.

Amblyseius linharis sp. n.
(Figs 46-50)

■ **Female** : Dorsal shield smooth, 275 long and 144 wide. Nine pairs of setae on podonotum : 5j (j1, j3, j4, j5, j6), 3z (z2, z4, z5), 3S (S2, S4, S5) ; 8 pairs on opisthonotum : 2J (J2, J5), 3Z (Z1, Z4, Z6), 3S (S2, S4, S5) ; 2 pairs on lateral integument : r3, R1. Z4, Z5 slightly serrated ; remaining setae smooth. Measurements of dorsal setae : j1 20, j3 25, j4, j5 11, j6 15, j2 16, J5 7, z2 12, z4 23, z5 9, Z1 21, Z4 58, Z5 62, s4 33, S2, S4, S5 14, r3 12, R1 10 (Fig. 46). Solenostomes not visible, 8 pairs of poroides present on dorsal shield ; muscle marks as shown in Fig. 46. Sternal shield with 3 pairs of setae. Metasternal setae on oval platelets. Genital shield 100 wide. Ventrianal shield with a pair of rounded gV3, 3 pairs of preanal setae, 92 long and 92-88 wide. Two pairs of elongate sigillar sclerites present between genital and ventrianal shields and four pairs of setae, 6 pairs of small rounded or elongated sclerites, and 2 pairs of metapodal platelets surrounding ventrianal shield (Fig. 47). Insemination apparatus with ductus major short ; elliptical atrium and short cervix (Fig. 48). Peritreme extending anteriorly to level of j1 ; peritremal shield with longitudinal suture as in Fig. 49. Chelicera undiscernible. Macrosetae present on genu IV (33), tibia IV (17), and tarsus IV (26) ; this on genu IV with terminal bulbous (Fig. 50). Chaetotactic formula of genu II (1-2/0, 2/0-2) ; genu III (1-2/1, 2/0-1).

■ **Male** : Unknown.

A. linharis could be compared with *A. clavicus* (Denmark & Muma) and *A. simus* (Denmark & Muma) (DENMARK & MUMA, 1973). The shape of ventrianal shield and spermatheca differentiate it from the former, whereas shape of ventrianal shield, position of gV3, lengths of macrosetae on leg IV and setae on dorsal shield separate it from the latter.

Female holotype was collected from plant leaves, Sooretama, Spirito Santo, Nov. 21, 1976 (E. M. EL-BANHAWY).

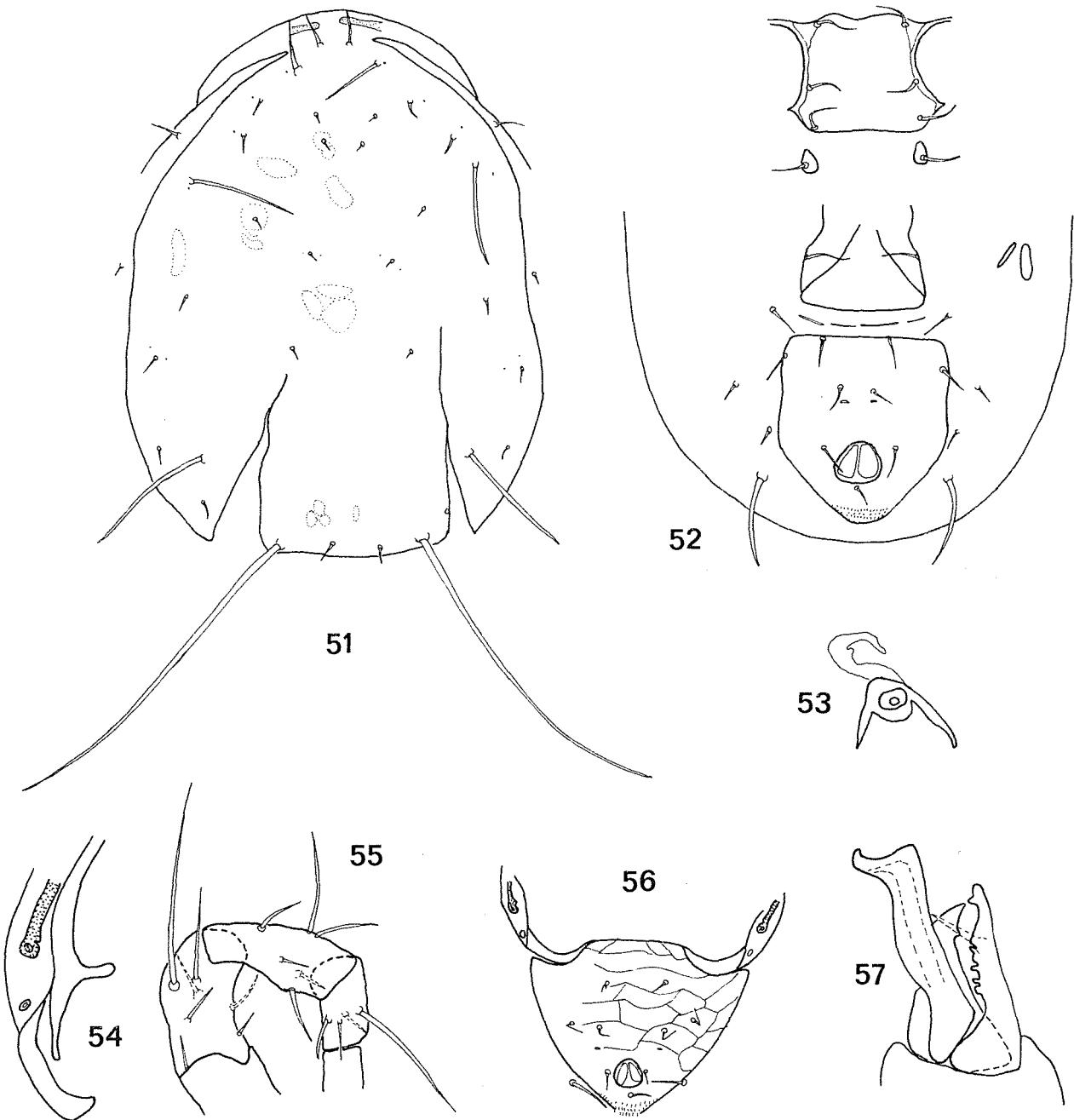
Amblyseius riodocei sp. n.
(Figs 51-57)

■ **Female** : Dorsal shield smooth, 308 long and 214 wide. Nine pairs of setae on podonotum : 5j (j1, j3, j4, j5, j6), 3Z (Z1, Z4, Z5), 3S (S2, S4, S5) ; 8 pairs on opisthonotum : 2J (J2, J5), 3Z (Z1, Z4, Z5), 3S (S2, S4, S5) ; 2 pairs on lateral integument : r3, R1. Measurements of dorsal setae : j1 24, j3 35, j4, j5, j6, J2, J5 10, z2, z4 11, z5 10, Z1 7, Z4 75, Z5 214, s4 59, S2 7, S4, S5 10, r3 13, R1 7 (Fig. 51). At least 4 pairs of solenostomes, 7 pairs of poroides present on dorsal shield ; muscle marks as shown in Fig. 51. Sternal shield with 3 pairs of setae. Metasternal setae on oval platelets. Genital shield 76 wide. Ventrianal shield with a pair of elliptical gV3, 3 preanal setae, 108 long and 98 wide. 2 pairs of elongate sigillar sclerites present between genital and ventrianal shields and 4 pairs of setae, and 2 pairs of metapodal platelets surrounding ventrianal shield. JV5 50 long, smooth (Fig. 52). Insemination apparatus with ductus major visible, rounded atrium and thick short cervix (Fig. 53). Peritreme extending anteriorly to level of j1. Peritremal shield as in Fig. 54. Chelicera undiscernible. Macrosetae present on genu I and genu II (31), genu III (35), genu IV (62), tibia IV (32), tarsus IV (38) (Fig. 55). Chaetotactic formula of genu II (1-2/0, 2/1-1) ; genu III (1-2/0, 2/1-1).

■ **Male** Dorsal shield 235 long, 160 wide. Ventrianal shield reticulated, with 3 pairs of preanal setae, a pair of small gV3, 100 long, 128 wide, and fused anteriorly with peritremal shield (Fig. 56). Spermatostylus bilobate (Fig. 57).

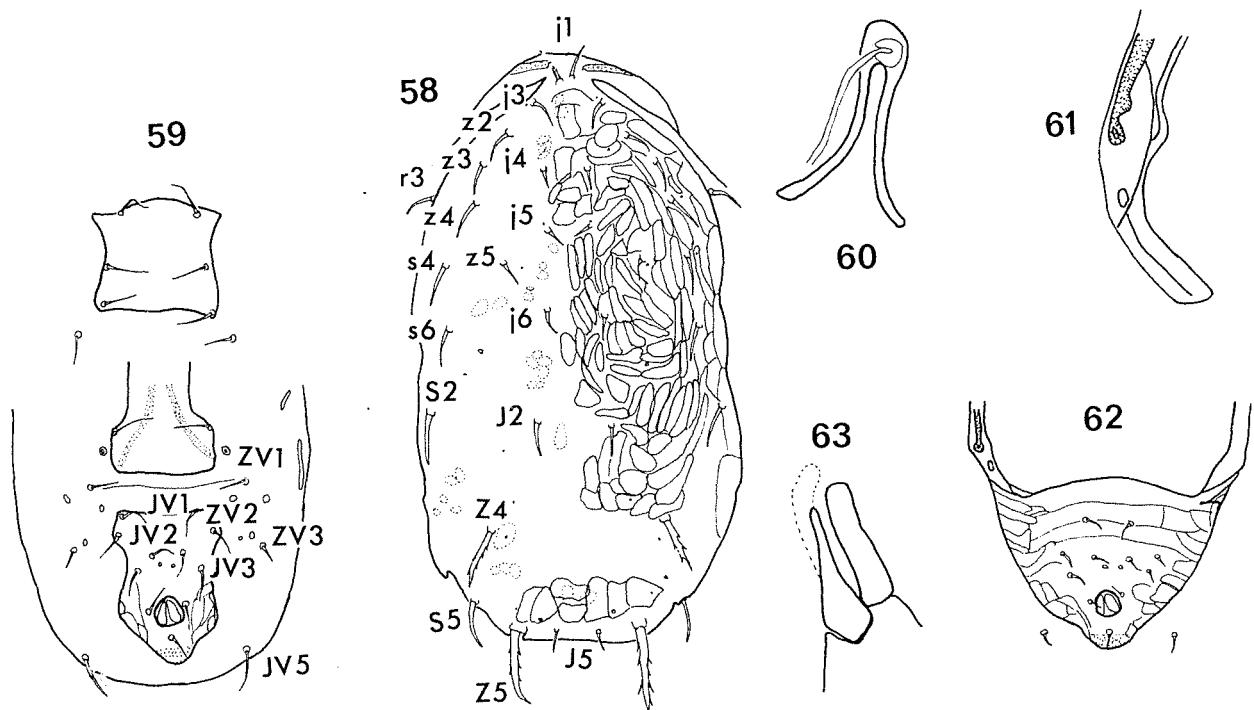
A. riodocei is similar to *A. modestus* (Chant & Baker) (CHANT and BAKER, 1965), especially in the presence of r3 and R1 on sclerotized lateral extension of dorsal shield. The main difference is the shape of ventrianal shield, insemination apparatus and the length of Z5.

Holotype, allotype and 2 females were collected from plant leaves, Sooretama, Spirito Santo, Nov. 20, 1976 (E. M. EL-BANHAWY).



FIGS. 51-57 : *Amblyseius riodocei* sp. n.

Female dorsal shield (51), ventral shields (52), insemination apparatus (53), peritremal shield (54), genu, tibia, tarsus IV (55).
Male ventrianal shield (56) and spermatostylus (57).



Figs. 58-63 : *Typhlodromus eiko* sp. n.

Female dorsal shield (58), ventral shields (59), insemination apparatus (60), peritremal shield (61). Male ventrianal shield (62) and spermatostylus (63).

***Typhlodromus eiko* sp. n.**

(Figs 58-63)

■ **Female** : Dorsal shield with heavy elliptical reticulations, 289 long, 150 wide. Eleven pairs of setae on podonotum : 5j (j1, j3, j4, j5, j6), 4z (z2, z3, z4, z5), 2s (s4, s6) ; 6 pairs on opisthonotum 2J (J2, J5), 2Z (Z4, Z5), 2S (S2, S5) ; one pair on lateral integument : r3. Measurements of dorsal setae : j1 17, j3 16, j4, j5 12, j6 14, J2 16, J5 11, z2 17, z3 19, z4 19, z5 14, Z4 32, Z5 44, s4, s6 23-24, S2 24, S5 22, r3 18 (Fig. 58). At least 4 pairs of solenostomes, 7 pairs of poroides present on dorsal shield ; muscle marks as shown in Fig. 58. Sternal shield with 3 pairs of setae. Metasternal setae free on integument. Genital shield 70 wide. Ventrianal shield with slight reticulation, lateral margin constricted near the middle, a pair of small rounded gV3, 4 pairs of

preanal setae (JV1, JV2, JV3, ZV2), 82 long, 54 wide at the constriction. A thin longitudinal sigillar sclerite inserted between genital and ventrianal shields and 3 pairs of setae (ZV1, ZV3, JV5), 2 pairs of metapodal platelets and 4 or 5 small rounded sclerites surrounding ventrianal shield (Fig. 59). Insemination apparatus with major ductus long, small rounded atrium, thick walled cervix concave laterally (Fig. 60). Peritreme extending anteriorly to level of j1 ; peritremal shield with posterior suture as in Fig. 61. Chelicera undiscernible. Chaetotactic formula of genu II (2-2/0, 2/0-1) ; genu III (1-2/1, 2/0-1).

■ **Male** : Dorsal shield measured 260 long, 148 wide. Ventrianal shield reticulated, with 4 pairs of preanal setae, a pair of small rounded gV3, 97 long, 109 wide and fused anteriorly with peritremal shield (Fig. 62). Spermatostylus simple (Fig. 63).

T. eiko belongs to *Pomi* species group :

T. pomi (Parrott, Hodgkiss & Schöene) (PARROTT, et al., 1906); *T. flumenis* Chant and *T. validus* Chant (CHANT, 1957); *T. herbertae* Chant and *T. nelsoni* Chant (CHANT, 1959); *T. juniperi* De Leon (DE LEON, 1959a); *T. juniperoides* (De Leon) (DE LEON, 1962); *T. pomoides* (Schuster & Pritchard) (SCHUSTER and PRITCHARD, 1963); *T. pedoni* Zaher & Shehata (ZAHER and SHEHATA, 1969) (YOSHIDA SHAUL, personal communication). The presence of 7 setae on genu II differentiate it from the rest of the species and the number of preanal setae in addition separate it from *T. validus* and *T. nelsoni*.

Holotype, allotype, female and male were collected from *Tipochena* sp. in the park of University of São Paulo, São Paulo, April 28, 1978 (E. M. EL-BANHAWY).

Typhlodromus regularis (De Leon)
(Figs 64-73)

Typhlodromus regularis : DE LEON, 1965a, p. 122, fig. 2.

Diadromus regularis (De Leon) : DE LEON, 1966, p. 100-101, fig. 121.

Diadromus regularis (De Leon) : DENMARK & MUMA, 1972, p. 27.

Chanteius regularis (De Leon) : DE LEON, 1967, p. 16, fig. 18.

Diadromus regularis (De Leon) : DENMARK & MUMA, 1973, p. 269.

Diadromus regularis (De Leon) : DENMARK & MUMA, 1975, p. 297-298.

■ *Female* : Dorsal shield smooth, with deep constriction posterior to s6, 360 long and 226 wide. Eleven pairs of setae on podonotum : 5j (j1, j3, j4, j5, j6), 4z (z2, z3, z4, z5), 2s (s4, s6); 5 pairs on opisthonotum : 2J (J2, J5), 2Z (Z4, Z5), S5; 2 pairs on lateral integument : r3, R1. j1, j3, s4, Z4, Z5 long or very long; remaining setae very short or minute. Measurements of dorsal setae : j1 27, j3 38, s4 77, Z4 92, Z5 261 (Fig. 64). At least 7 pairs of solenostomes, 10 pairs of poroides present on dorsal shield; muscle marks as shown in Fig. 64. Sternal shield with 3 pairs of setae and one or 2 pairs of rounded solenostomes. Metasternal setae on small rounded platelets.

Genital shield 74 wide. Ventrianal shield with lateral margin concave, a pair of distinct gV3, 4 pairs of preanal setae, 108 long and 62 wide at paraanal level. A thin sigillar sclerites present between genital and ventrianal shields and 3 pairs of setae, 2 pairs of metapodal platelets and 2 pairs of small sclerites surrounding ventrianal shield. JV5 55 long (Fig. 65). Insemination apparatus simple as in Fig. 66. Peritreme extending anteriorly to level of j1; peritremal shield short as in Fig. 67. Chelicera undiscernible. Macrosetae present on genu I (52), tibia I (57), tarsus I (52) (Fig. 68); genu II (40), tibia II (31) (Fig. 69); genu III (48), tibia III (37) (Fig. 70); genu IV (111), tibia IV (65), tarsus IV (55) (Fig. 71). Chaetotactic formula of genu II (1-2/1, 2/0-1; genu III (1-2/1, 2/0-1).

■ *Male* : Dorsal shield measured 264 long and 162 wide. Ventrianal shield with anterior striae, 4 pairs of preanal setae, a pair of rounded gV3, 112 long, 125 wide and fused anteriorly with peritremal shield (Fig. 72). Spermatostylus bilobate (Fig. 73).

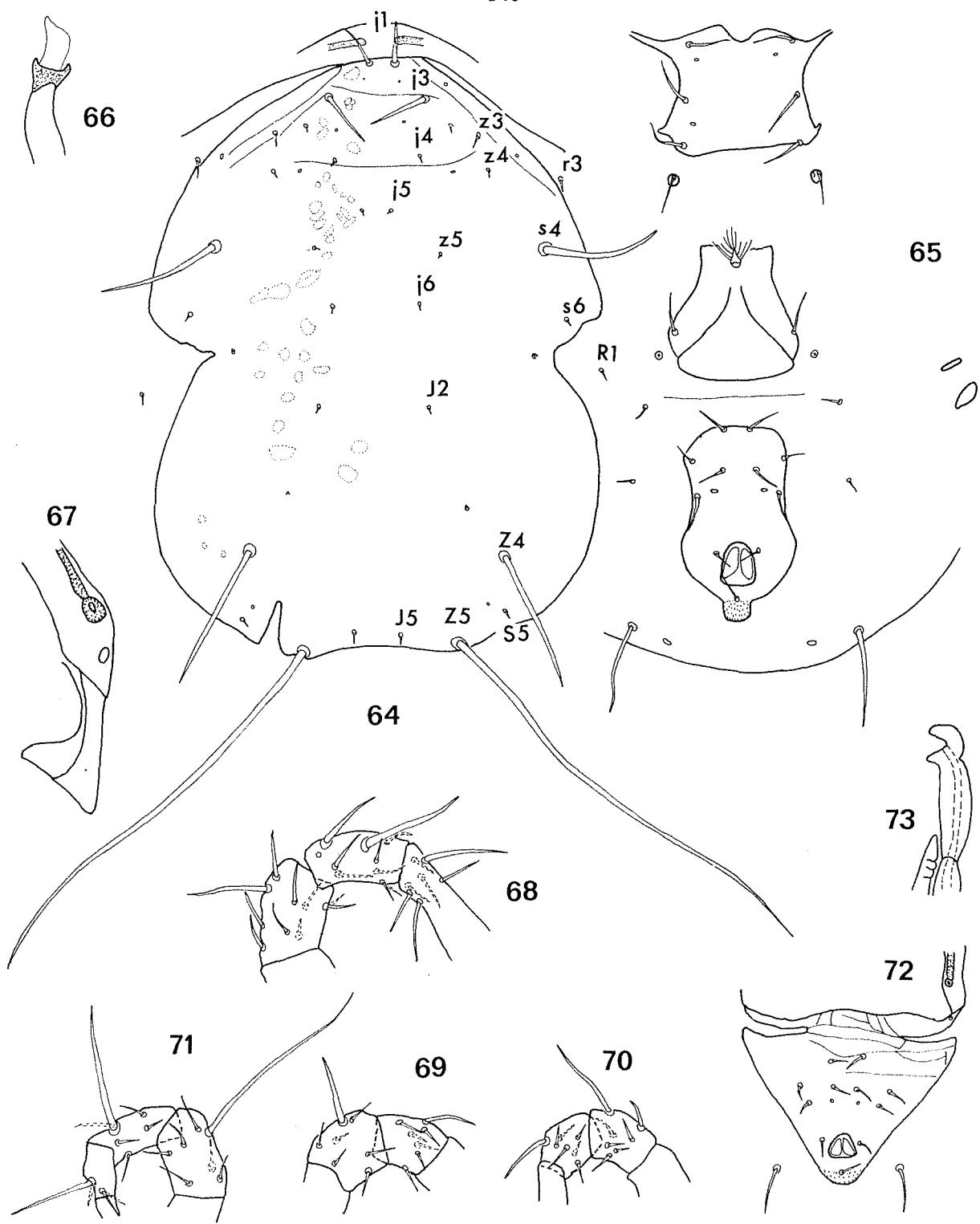
Specimen collected from Brazil represents some morphological differences, especially, lengths of the long setae and legs (Table I). The present description, also, shows other details which were overlooked in the original.

TABLE I

Comparison between the lengths of the setae on dorsal shield and legs in the holotype and plesiotype of *T. regularis*.

	Holotype	Plesiotype
s4	100	77
Z4	106	92
Z5	295	261
Leg I	429	395
Leg II	332	324
Leg III	339	314
Leg IV	438	440

Female holotype was collected from Cavey mountain, Puerto Rico, Aug. 28, 1963 (D. DE LEON). Allotype was collected from natural reserve, British Guyana, unknown date (D. DE LEON). Holotype and allotype in the Museum of Comparative Zoology, Harvard Univ., Cambridge, Massachusetts. It was also reported from



FIGS. 64-73 : *Typhlodromus regularis* (Deleon).

Female dorsal shield (64), ventral shields (65), insemination apparatus (66), peritremal shield (67), genu, tibia, tarsus I (68), genu, tibia, tarsus II (69), genu, tibia, tarsus III (70), genu, tibia, tarsus IV (71). Male ventrianal shield (72) and spermatostylus (73).

Trinidad, Colombia and Brazil. Additional 8 females and male were collected from plant leaves, Sooretama, Spirito Santo, Nov. 20, 1976 (E. M. EL-BANHAWY).

Phytoseius marumbus sp. n.

(Figs 74-79)

■ **Female** : Dorsal shield with anterior lateral striations, 282 long and 154 wide. Twelve pairs of setae on podonotum. 5j (j1, j3, j4, j5, j6), 4z (z2, z3, z4, z5), 2s (s4, s6), r3 ; 4 pairs on opisthonotum : 2J (J2, J5), 2Z (Z4, Z5) and one pair on lateral integument : R1. j3, z3, z4, z5, s4, s6, r3 long and strongly serrated, remaining setae short and smooth. Measurement of dorsal setae : j1 21, j3 25, j4, j5, j6, j2, z2 8-9, z3 45, z4 10, z5 9, Z4 55, Z5 72, s4 60, s6 72, r3 39, R1 14 (Fig. 74). At least 8 pairs of solenostomes, 7 pairs of poroides present on dorsal shield, muscle marks as shown in Fig. 74. Sternal shield with 3 pairs of setae. Metasternal setae free on integument. Genital shield 64 wide. Ventrianal shield with lateral margin deeply concave, a pair of tiny gV3 near the margin, 3 pairs of preanal setae (JV1, JV2, ZV2), 86 long and 51 wide. A thin sigillar sclerites present between genital and ventrianal shields and 3 pairs of setae, a pair of metapodal platelets surrounding ventrianal shield. JV5 serrated and 50 long (Fig. 75). Peritreme extending anteriorly to level of j1 ; peritremal shield as in Fig. 77. Chelicera with 3 teeth on fixed digit and 2 on movable (Fig. 78). Macrosetae present on genu IV (26), tibia IV (32), tarsus IV (26), with enlarged tip (Fig. 79). Chaetotactic formula of genu III (1-2/0, 2/0-1) ; genu IV (2-2/0, 2/1-1) ; tibia IV (1-2/0, 2/0-1).

■ **Male** : Unknown.

P. murumbus is characterized by having j1 smooth, a pair of solenostomes associated with z5, 8 setae on genu IV and 6 on tibia IV. These criteria, therefore, separate it from the closely related species. *P. nahuatlensis* De Leon (DE LEON, 1959b), *P. mexicanus* De Leon (DE LEON, 1960), *P. plaudis* De Leon, *P. purseglovei* De

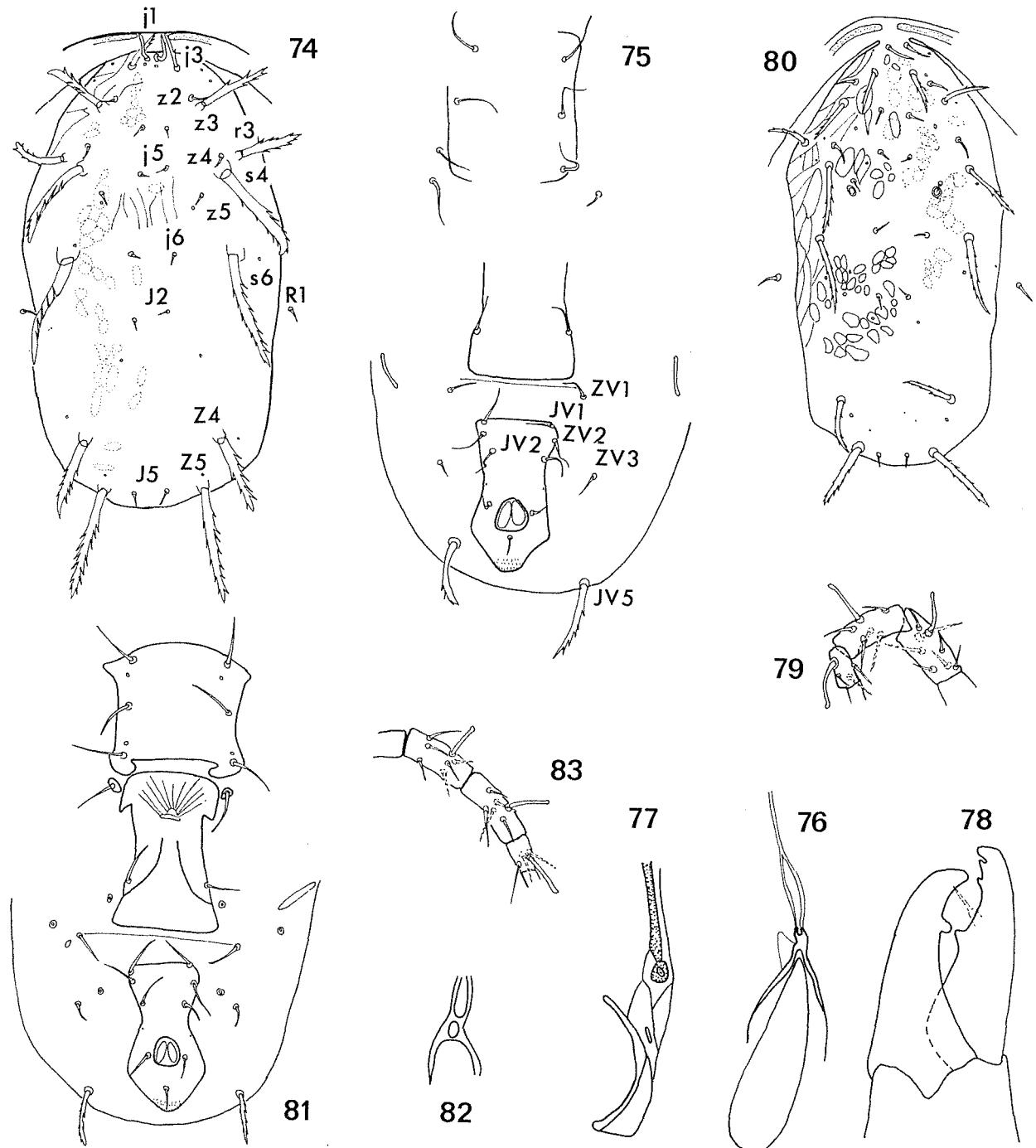
Leon and *P. manteganus* De Leon (DE LEON, 1965b). *P. hydrophyllis* Poe (POE, 1970) is similar to the present species by having 8 setae on genu IV, although the chaetotactic formula of tibia IV, absence of R1 and number of preanal setae distinctly separate it from *P. marumbus*.

Holotype and 10 females were collected from *Solanum* SP Itatiaia, Rio de Janeiro, Sept. 14, 1976 (E. M. EL-BANHAWY).

Phytoseius latinus sp. n.

(Figs 80-83)

■ **Female** : Dorsal shield reticulated laterally with circle or elliptical reticulation near the middle, 246 long, 123 wide. Twelve pairs of setae on podonotum ; 5j (j1, j3, j4, j5, j6), 4z (z2, z3, z4, z5) 2s (s4, s6), r3 (aberrated) ; 4 pairs on opisthonotum : 2J (J2, J5), 2Z (Z4, Z5) ; one pair on lateral integument, R1. j3, z3, Z4, Z5, s4, s6, r3 long and serrated ; remaining setae short and smooth. Measurements of dorsal setae : j1 17, j3 24, j4 10, j5 7, j6 10, J2 12, J5 17, z2 9, z3 30, z4 15, Z3 36, Z5 42, s4 41, s6 52, r3 29, R1 15 (Fig. 80). At least 6 pairs of solenostomes, 8 pairs of poroides present on dorsal shield ; muscle marks as shown in Fig. 80. Sternal shield with 3 pairs of setae and 2 pairs of rounded solenostomes. Metasternal setae on oval platelets. Genital shield 62 wide. Ventrianal shield with lateral margin strictly concave, a pair of tiny gV3 near the margin, 3 pairs of preanal setae, 87 long, 44 wide. A thin sigillar sclerites present between genital and ventrianal shields and 3 pairs of setae, a pair of metapodal platelets, and 3 or 4 pairs of small rounded sclerites surrounding ventrianal shield. JV5 serrated, 38 long (Fig. 81). Insemination apparatus with short ductus major, small atrium and short cup shaped cervix (Fig. 82). Peritreme extending anteriorly to level of j1 ; peritremal shield and chelicera undiscernible. Macrosetae present on genu IV (24), tibia IV (24), tarsus IV (24), slightly bulbous near terminal (Fig. 83). Chaetotactic formula of genu II (1-2/1, 2/0-1) ; genu III (1-2/0, 2/0-1).



Figs. 74-79 : *Phytoseius marumbus* sp. n., female.

74. — Dorsal shield ; 75. — Ventral shields ; 76. — Insemination apparatus ; 77. — Peritremal shield ; 78. — Chelicera ;
79. — Genu, tibia, tarsus IV.

Figs. 80-83 : *Phytoseius latinus* sp. n., female.

80. — Dorsal shield ; 81. — Ventral shields ; 82. — Insemination apparatus ; 83. — Genu, tibia, tarsus IV.

■ Male : Unknown.

Serration of dorsal setae, insemination apparatus, chaetotactic formula of genu IV and presence of metapodal platelets distinguished *P. latinus* from *P. marumbus*.

Female holotype was collected from *Tipochena* sp., Sooretama, Spirito Santo, Nov. 20, 1976 (E. M. EL-BANHAWY).

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