

NEW SPECIES, NEW RECORDS, AND REDESCRIPTION OF PHYTOSEIID MITES FROM AUSTRALIA, TAHITI AND THE AFRICAN REGION (ACARI: PHYTOSEIIDAE)

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Abstract. The females of *Amblyseius williamsi*, n. sp., *Typhlodromus applegum*, n. sp., *T. corrugatus*, n. sp., from Australia, *A. juliae*, n. sp., from Tahiti and *A. rykei* from Africa, both sexes of *A. tarensis*, n. sp., *A. messor*, *T. machaon* from Australia, *A. tee*, n. sp., and *T. gouaniae*, n. sp., from Madagascar, and *A. vanderlinde* (in part) from Africa are described and illustrated. The females of *A. peltatus* and *A. harrowi* are recorded for the first time from Australia. *A. salish* from Canada is considered a synonym of *A. harrowi*.

The 13 species of phytoseiid mites mentioned below were found during investigations into plant-feeding mites and their natural enemies in Australia and neighboring countries. Most specimens were obtained from small plant samples under stereomicroscopic magnification, and the relatively low number of specimens collected is a reflection of this survey technique. Observations on the biology and behavior of the species were not made, and it is not known whether or not they are important predators. This study is a contribution to our taxonomic knowledge of the large number of different species of phytoseiid mites already known from Australia and their morphological similarities to species occurring in other countries.

Depositories referred to in the text are abbreviated: BCRI, Biological and Chemical Research Institute, Rydalmere; CNCP, Canadian National Collection of Phytoseiidae, Department of Zoology, University of Toronto, Ontario; PPRI, Plant Protection Research Institute, Pretoria; SAM, South Australian Museum, Adelaide; and USNM, U.S. National Museum of Natural History, Washington.

All measurements are in micrometres; the same structures in different illustrations are to the same scale. The setal nomenclature applied to dorsal shields is denoted on 1 figure each of species with 16, 17, 18 and 19 pairs of dorsal setae. Setal homologies are not considered.

Genus *Amblyseius* Berlese

Amblyseius Berlese, 1914: 143. Type-species by original designation: *Zercon obtusus* Koch, 1839.

Amblyseius williamsi Schicha, new species

Fig. 1-6

♀. *Dorsum.* Dorsal shield 380 long (D1-D6), 209 wide (L4-L4), smooth, with 17 pairs of setae, 6 dorsal, 2 median, 4 prolateral, 5 postlateral: D1 27, D2-D3 6, D4-D5 9, D6 10, M1 6, M2 120, L1 44, L2 5, L3 51, L4 70, L5-L8 10, L9 228. M2 and L9 lightly serrated. L1

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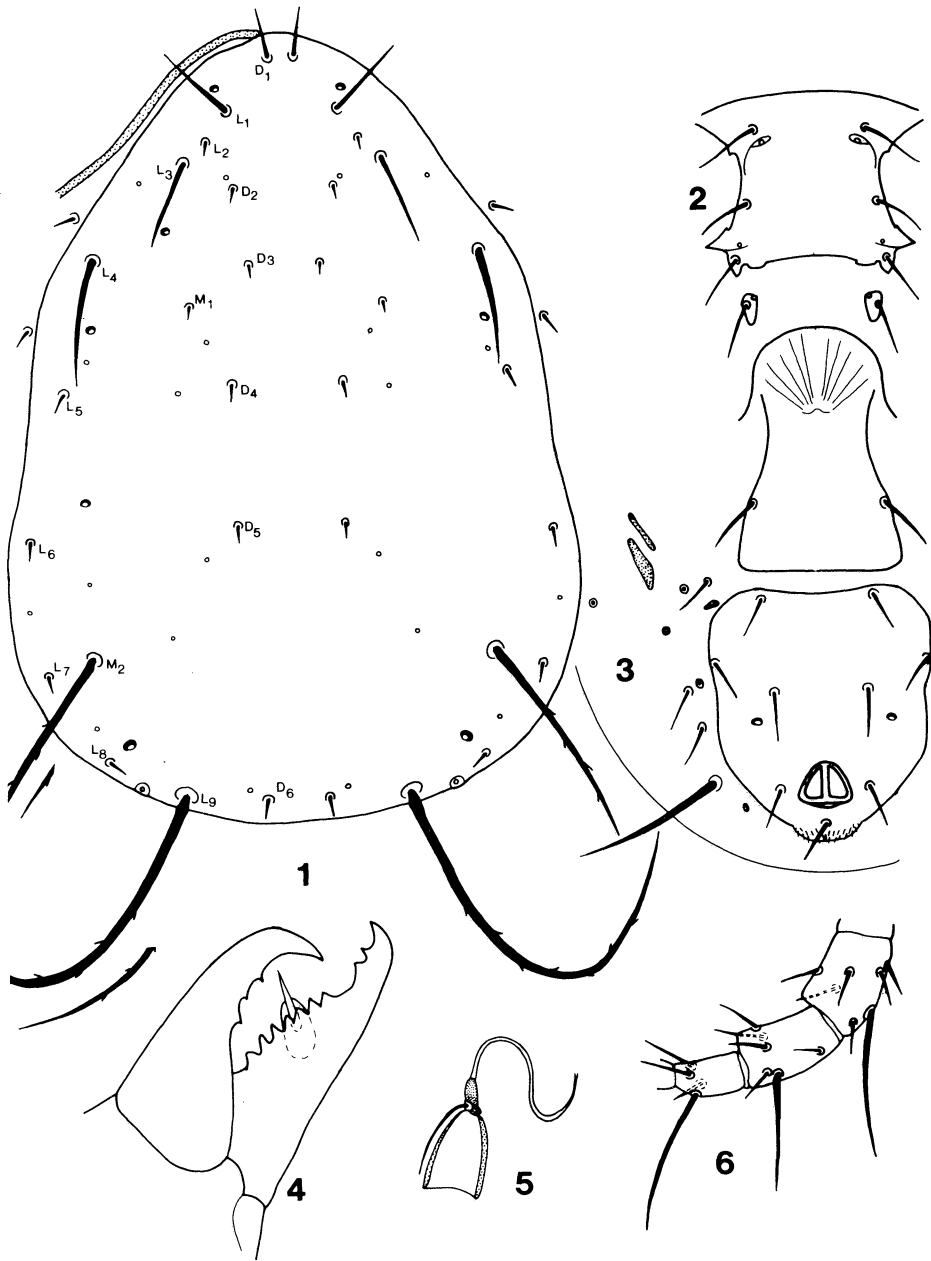


FIG. 1-6. *Amblyseius williamsi*, ♀: 1, dorsum; 2, sternal shield; 3, ventrianal shield; 4, chelicera; 5, spermatheca; 6, leg IV.

longer than, L4 as long as, all other setae shorter than distances between their bases and bases of setae following next in series. Five pairs of large pores and 13 pairs of small pores as figured. S1 10 and S2 8 on interscutal membrane. Peritremes extending forward to bases of D1 (Fig. 1). *Venter*. Sternal shield 70 long, 103 wide, smooth, with 3 pairs of setae, 2 pairs of pores and posterior margin as figured. Fourth pair of setae on oval metasternal shields with a pore each on anterior end (Fig. 2). Pentagonal ventrianal shield 132 long, 111 wide, smooth, with 3 pairs of preanal setae and a pair of small pores 68 apart (and lateral of 3rd pair of preanal setae), surrounded by 5 pairs of pores, a pair of very small shields, primary metapodal shield 29 long, secondary metapodal shield 22 long, 3 pairs of short setae and caudolateral setae 84 (Fig. 3). *Chelicera*. Fixed digit 34 long, with 9 teeth plus pilus dentilis. Movable digit 34 long, with 3 backwardly pointing teeth (Fig. 4). *Spermatheca*. Cup-shaped cervix 10 long, 7 wide, attached to atrium, 2 long and 2 wide, and long, thin macroduct. Microduct relatively thick (Fig. 5). *Legs*. Four setaceous macrosetae: on genu III 32, genu IV 70, tibia IV 47, basitarsus IV 53 (Fig. 6).

Type. Holotype ♀, AUSTRALIA: Tasmania: Ranelagh, 19.VII.1977, in ground cover of apple orchard (M.A. Williams) (BCRI).

Remarks. *Amblyseius williamsi* belongs to a group of species whose D1, M2, L1, L3, L4 and L9 setae are much longer than their other very short dorsal setae. This new species is very similar to *A. nemorivagus* Athias-Henriot, 1961, from the Mediterranean, *A. hispaniensis* Westerboer and Bernhard, 1963, from Spain, and *A. americanus* Garman, 1948, from North America. It differs from *A. nemorivagus* and *A. hispaniensis* in having (1) longer M2, L3, macrosetae of genu III and leg IV; (2) much shorter L2; (3) smooth (rather than imbricated) ventrianal shield; (4) the position of its preanal pores lateral (rather than medial) to the 3rd pair of preanal setae; and (5) 9 (rather than 7 as in *A. nemorivagus*, and 5 as in *A. hispaniensis*) teeth on the fixed digit of the chelicerae. In *A. williamsi* the macrosetae on tibia IV are the shortest of the 3 macrosetae of leg IV, while in *A. americanus* the macrosetae on basitarsus IV are the shortest. In *A. williamsi* the preanal pores are lateral, while in *A. americanus* they are "behind the posterior pre-anal and almost as far lateral" (Garman 1958).

***Amblyseius juliae* Schicha, new species**

Fig. 7-12

♀. *Dorsum*. Dorsal shield 317 long (D1-D6), 159 wide (L4-L4), reticulated laterally between L1 and L5, with 17 pairs of setae, 6 dorsal, 2 median, 4 prolateral, 5 postlateral: D1 26, D2 to D6 6-8, M1 6, M2 79, L1 48, L2 10, L3 11, L4 76, L5 to L8 6-8, L9 142. M2 and L9 serrated, all other setae smooth. L1 and L4 as long as, all other setae shorter than, distances between their bases and bases of setae following next in series. Seven pairs of large pores and 10 pairs of small pores as figures. S1 15 and S2 7 on interscutal membrane. Peritremes extending forward to bases of D1 (Fig. 7). *Venter*. Sternal shield 63 long, 73 wide, smooth, with 3 pairs of setae, 2 pairs of pores, and almost straight posterior margin. Fourth pair of setae on oval metasternal shields with a pore each on anterior end (Fig. 8). Pentagonal ventrianal shield 119 long, 85 wide, smooth, with 3 pairs of preanal setae and a pair of oval preanal pores 26 apart, between and on a line with the posterior pair of preanal setae, surrounded by 5 pairs of pores, a pair of very small shields, primary metapodal shield 22 long, secondary metapodal shield 13 long, 3 pairs of short setae and caudolateral setae 45 long (Fig. 9). *Chelicera*. Fixed digit 29 long, with 9 teeth plus pilus dentilis. Movable digit 33 long, with 3 backwardly pointing teeth

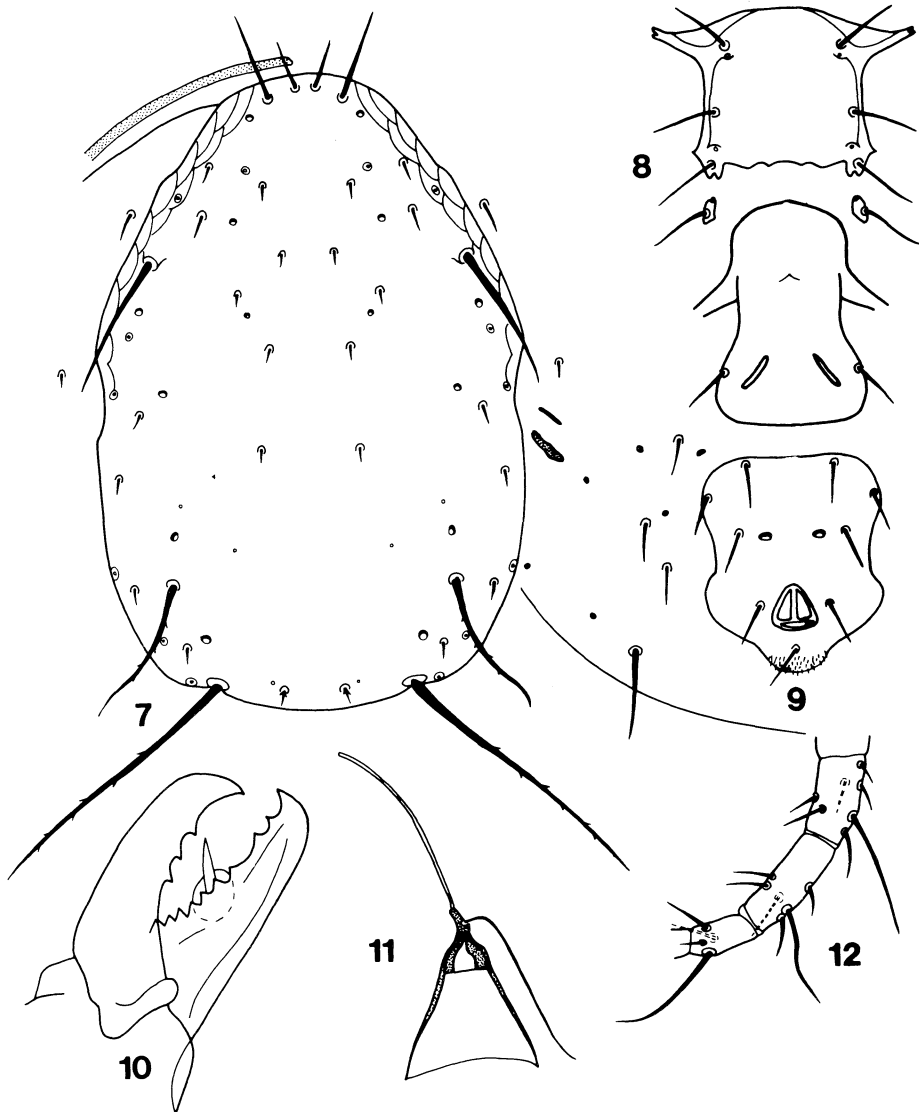


FIG. 7-12. *Amblyseius juliae*, ♀: 7, dorsum; 8, sternal shield; 9, ventrianal shield; 10, chelicera; 11, spermatheca; 12, leg IV.

(Fig. 10). *Spermatheca*. Sacklike cervix 13 long, adjoining narrow atrium 4 long, 2 wide, macroduct narrow (Fig. 11). *Legs*. Six setaceous macrosetae: on genu I 31, genu II 29, genu III 36, genu IV 67, tibia IV 47, basitarsus IV 66 (Fig. 12).

Type. Holotype ♀, SOCIETY IS: TAHITI: Papeete, 14.X.1978, on *Manihot utilissima* (J. Gutierrez) (BCRI).

Remarks. *Amblyseius juliae* belongs to a very large group of similar species. It is

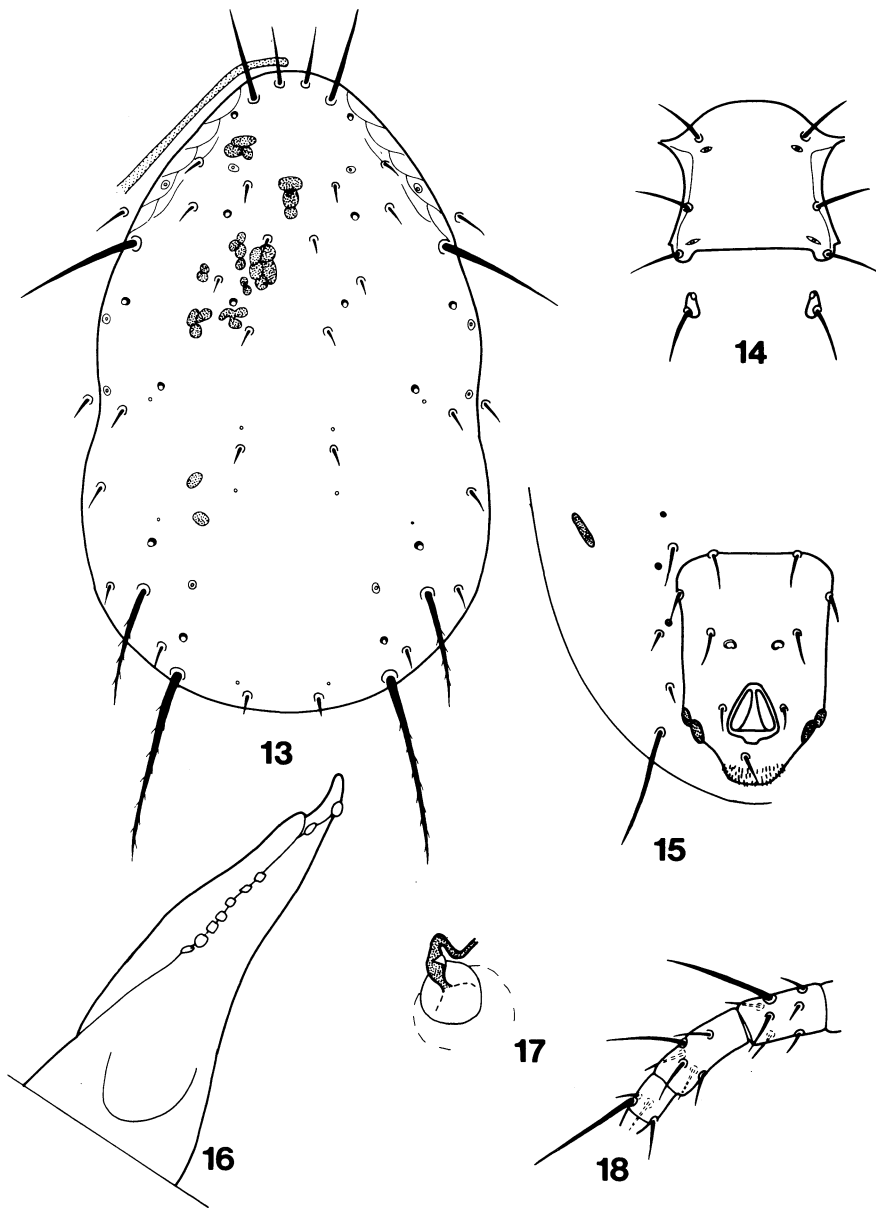


FIG. 13–18. *Amblyseius rykei*, ♀: 13, dorsum; 14, sternal shield; 15, ventrianal shield; 16, chelicera; 17, spermatheca; 18, leg IV.

near *A. fraterculus* (Berlese) in Chant (1959), *A. megaporus* De Leon, 1961, *A. coffeae* De Leon, 1961, *A. divisus* De Leon, 1961, *A. rykei* Pritchard & Baker, 1962 (and redescribed in this investigation), *A. tennesseensis* De Leon, 1962, *A. fernandezi* Chant & Baker, 1965, *A. aricae* Karg, 1976, *A. cinctus* Corpuz & Rimando, 1966 (see also

Ehara & Bhandhufalck (1977), *A. ezoensis* Ehara, 1967, *A. duncansonii* (Specht & Rasmy) in Chant & Hansell (1971), *A. compositus* Muma & Denmark, 1973, *A. neorykei* Gupta, 1976, *A. paraaerialis* Muma in Ehara & Bhandhufalck (1977), and *A. obturellus* Wainstein & Begljarov in Ehara & Yokogawa (1977).

The female of *A. juliae* is most similar to *A. rykei* and *A. neorykei*. It differs from *A. rykei* in its (1) longer M2, L4, macrosetae of leg IV, and considerably longer L9; (2) shorter S2 and caudolateral setae; and (3) different shape of the ventrianal shield and posterior margin of the sternal shield. From the female of *A. neorykei* it differs in (1) the nearly 2× longer D2 to D6, M1, L5 to L8, S2, and more than 2× longer L2 and L3 (L4 are given in Gupta (1976) as “19”, but this seems to be a misprint and should possibly read “79”) and (2) the much longer ventrianal shield.

Amblyseius rykei Pritchard & Baker

Fig. 13–18

Amblyseius (Amblyseius) rykei Pritchard & Baker, 1962: 249.

♀. *Dorsum*. Dorsal shield 323 long (D1–D6), 167 wide (L4–L4), smooth, with 17 pairs of setae, 6 dorsal, 2 median, 4 prolateral, 5 postlateral: D1 32, D2 8, D3 7, D4 8, D5 8, D6 8, M1 7, M2 67, L1 50, L2 10, L3 10, L4 67, L5 10, L6 13, L7 10, L8 10, L9 105. M2 and L9 serrated, all other setae smooth. L1 longer than, all other setae shorter than distances between their bases and bases of setae following next in series. Seven pairs of large pores and 10 pairs of small pores as figured. S1 18 and S2 13 on interscutal membrane. Peritremes extending forward slightly beyond bases of D1 (Fig. 13). *Venter*. Sternal shield 64 long, 78 wide, smooth, with 3 pairs of setae, 2 pairs of pores and straight posterior margin with rounded corners. Fourth pair of setae on oblong metasternal shields with a pore each on anterior end (Fig. 14). Pentagonal ventrianal shield 119 long, 80 wide, with 3 pairs of preanal setae and a pair of large oval pores 25 apart, surrounded by 3 pairs of small pores, primary metapodal shield 20 long, 4 wide (secondary metapodal shield not visible), 3 pairs of short setae and caudolateral setae 64 (Fig. 15). *Chelicera*. Difficult to observe because of its position. Fixed digit with 9 teeth (Fig. 16). *Spermatheca*. Difficult to observe because of its position. Atrium seems to be separated from cervix by a short thin “neck” (Fig. 17). *Legs*. Six setaceous macrosetae: on genu I 26, genu II 32, genu III 36, genu IV 57, tibia IV 44, basitarsus IV 60 (Fig. 18).

Material examined. Paratype ♀, ZAIRE (BELGIAN CONGO): Leopoldville, 15.IV.1955, on legume leaf (E.W. Baker) (USNM No. 27).

Remarks. *Amblyseius rykei* has been described by Pritchard & Baker (1962) from 2 females, but their description contains no measurements. The paratype female is described, illustrated, and measured here to facilitate a comparison between it and *A. juliae* (see above). The only other record of *A. rykei* is that of 2 females found by Gupta (1975) in India.

Amblyseius tarensis Schicha, **new species**

Fig. 19–26

♀ (2 specimens measured). *Dorsum*. Dorsal shield 316–334 long (D1–D6), 149–150 wide (L4–L4), slightly reticulated laterally between L1 and L4, with 17 pairs of setae, 6 dorsal, 2 median, 4 prolateral, 5 postlateral: D1 12–13, D2 10, D3 9–10, D4 10–11, D5 11, D6 10, M1 8–9, M2 21–22, L1 12–13, L2 10–12, L3 12, L4 14–15, L5 14, L6 14–15, L7 12, L8 11–14, L9 33. All setae smooth and shorter than distances between their bases and bases of setae

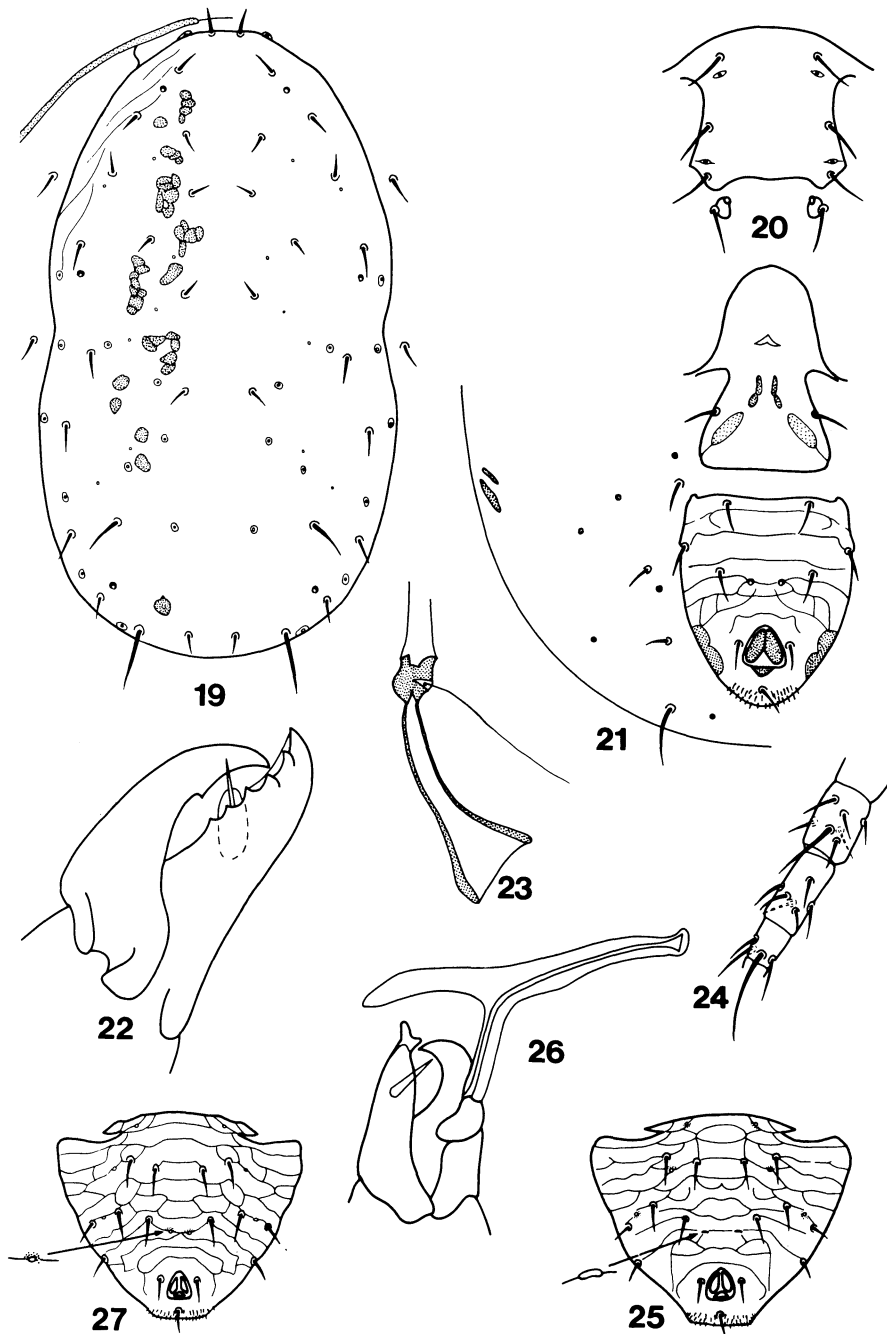


FIG. 19–27. 19–26, *Amblyseius tareensis*. 19–24, ♀: 19, dorsum; 20, sternal shield; 21, ventrianal shield; 22, chelicera; 23, spermatheca; 24, leg IV. 25–26, ♂: 25, ventrianal shield; 26, spermatodactyl. 27, *Amblyseius vanderlindeii*, ♂: ventrianal shield.

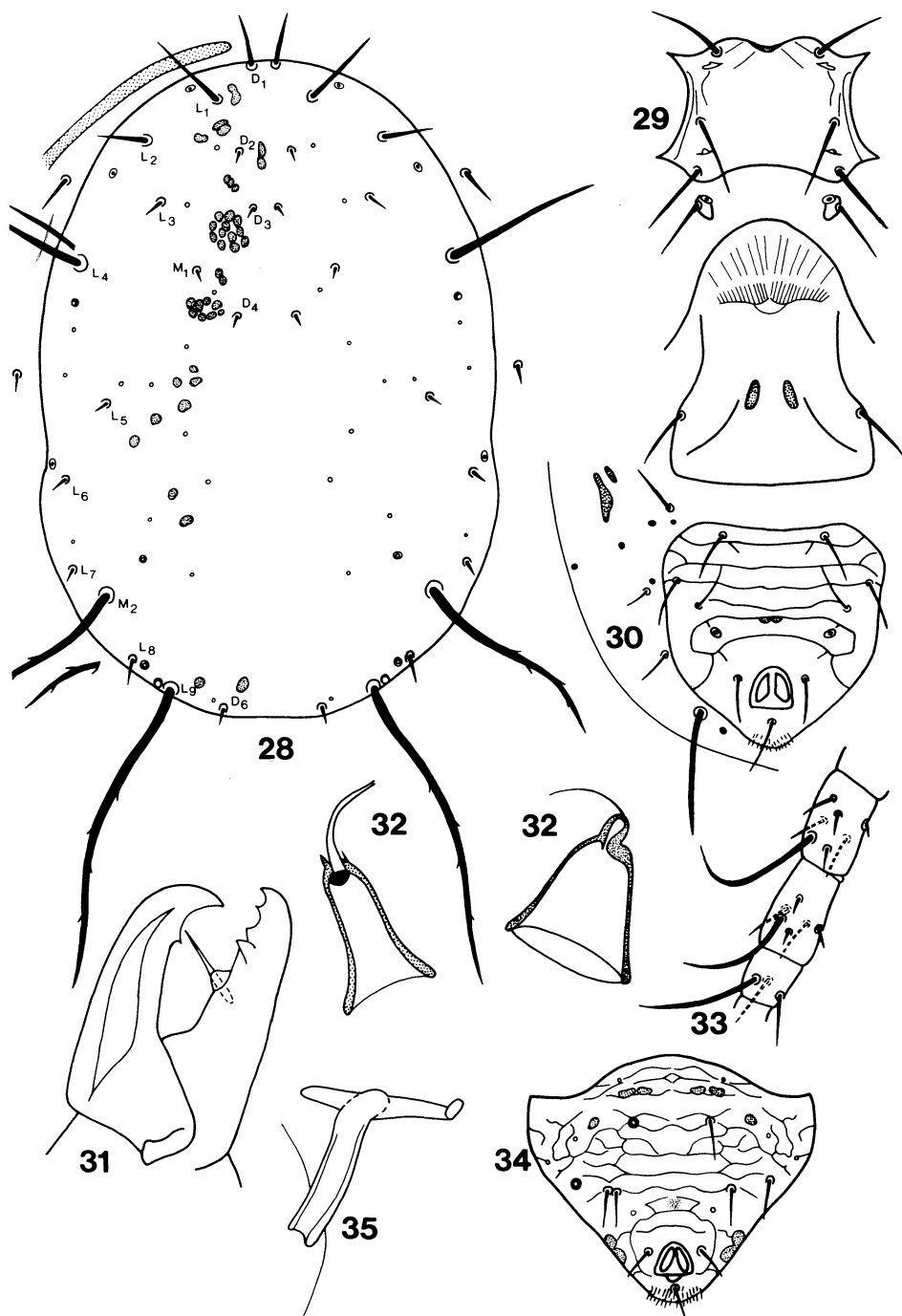


FIG. 28-35. *Amblyseius messor*. 28-33, ♀: 28, dorsum; 29, sternal shield; 30, ventrianal shield; 31, chelicera; 32, spermatheca; 33, leg IV. 34-35, ♂: 34, ventrianal shield; 35, spermatodactyl.

following next in series. Three pairs of large pores and 19 pairs of small pores as figured. S1 12–15 and S2 12 on interscutal membrane. Peritremes extending forward near to bases of D1 (Fig. 19). *Venter*. Sternal shield 63–65 long, 67–70 wide, smooth, with 3 pairs of setae, 2 pairs of pores and posterior margin as figured. Fourth pair of setae on oval metasternal shields with a pore each on anterior end (Fig. 20). Pentagonal ventrianal shield 109–110 long, 95–100 wide, reticulated, with 3 pairs of preanal setae and a pair of round preanal pores 16–17 apart, surrounded by 6 pairs of pores, primary metapodal shield 19–21 long, secondary metapodal shield 11–13 long, 3 pairs of short setae and caudolateral setae 28–30 (Fig. 21). *Chelicera*. Fixed digit 29–33 long, with 5 teeth plus pilus dentilis. Movable digit 29–33 long, with 1 backwardly pointing tooth (Fig. 22). *Spermatheca*. Sacklike cervix 23–24 long, attached to atrium, 5 long and 5 wide, and broad macroduct (Fig. 23). *Legs*. Two setaceous macrosetae: on genu IV 35–37, basitarsus IV 50–51 (Fig. 24).

♂ (2 specimens measured). *Dorsum*. Dorsal shield 253–258 long (D1–D6), 120–124 wide (L4–L4), smooth, with chaetotaxy resembling that of ♀: D1 9–10, D2 and D3 10–11, D4 9–10, D5 10–11, D6 7–10, M1 8–10, M2 16–21, L1 to L3 11–12, L4 12–15, L5 to L8 11–12, L9 20–24. S1 and S2 11–13 on dorsal shield. *Venter*. Ventrianal shield 110–112 long, 125–132 wide, reticulated, with 6 pairs of preanal setae and 4 pairs of pores. Pair of preanal pores nearest to anus small, round and 7–10 apart (Fig. 25). *Spermatodactyl*. T-shaped; shaft 14 long, foot 40 long (Fig. 26). *Legs*. Two setaceous macrosetae: on genu IV 21–22, on basitarsus IV 36–39.

Types. Holotype ♀, AUSTRALIA: NEW SOUTH WALES: Wyong, 29.I.1981, on kikuyu grass (E. Schicha) (BCRI). Paratypes: NEW SOUTH WALES: all on kikuyu grass: 2♀ (*A. tar.* 2 and 3), 1♂ (*A. tar.* 4), Wyong, 29.I.1981 (Schicha); 1♂ (*A. tar.* 5), Wentworthville, 11.II.1978 (Schicha); 1♀ (*A. tar.* 6), Taree, 5.I.1967 (F. Gibson). (All BCRI.)

Remarks. The female of *A. tareensis* keys out to *A. vanderlindei* Merwe, 1965, in Merwe (1968) and the description of the former (see above) agrees with the description of the latter in Merwe (1965), plus the additions below. A comparison of the types of the former and a paratype of the latter showed no significant differences in this investigation. The males of the 2 species are very close. However, the preanal pores nearest to the anus in *A. tareensis* are kidney-shaped and clearly double the distance (19) apart of those in *A. vanderlindei*, which are 7–10 apart, small and round (Fig. 27). The females of *A. tareensis* and *A. vanderlindei* are similar to those of *A. harrowi* as redescribed by Schicha (1980) and above. However, the former 2 species differ from the latter in (1) shorter setae on their dorsal shields, (2) shorter distance between the preanal pores nearest to the anus on their ventrianal shields, and (3) 2 instead of 1 macroseta on their legs IV.

Amblyseius messor (Wainstein)

Fig. 28–35

Typhlodromus messor Wainstein, 1960: 688.

Amblyseius messor (Wainstein), 1977.

♀ (3 specimens measured: 2 from Tasmania, 1 from South Australia; Wainstein's measurements in parentheses). *Dorsum*. Dorsal shield 353–378 long (D1–D6), 215–224 wide (L4–L4), smooth, with 16 pairs of setae, 5 dorsal, 2 median, 4 prolateral, 5 postlateral: D1 28–34 (33), D2 2–3 (4–5), D3 3–4 (4–5), D4 4–8, D5 missing, D6 7–10 (8–9), M1 3–4 (4–5), M2 114–121 (125), L1 42–52 (53), L2 25–31 (28), L3 11–13 (14), L4 83–92 (89), L5 5–6 (8–9),

L6 6–10 (8–9), L7 6–7 (8–9), L8 13–16 (15), L9 164–178 (167). M2 and L9 slightly serrated, all other setae smooth. L1 and L4 as long as, all other setae shorter than distances between their bases and bases of setae following next in series. Four pairs of large pores and 15 pairs of small pores as figured. S1 19–32 and S2 7–8 on interscutal membrane. Peritremes extending forward to bases of D1 (Fig. 28). *Venter*. Sternal shield 66–67 long, 77–85 wide, smooth, with 3 pairs of long and thin setae, 2 pairs of pores, and slightly concave posterior margin. Fourth pair of setae on metasternal shields with a pore each on anterior end (Fig. 29). Pentagonal ventrianal shield 115–121 long, 120 wide, reticulated, with 3 pairs of preanal setae and a pair of concentric preanal pores 57 apart, surrounded by 6 pairs of pores, primary metapodal shield 21–25 long, secondary metapodal shield 9–10 long, 3 pairs of short and thin setae and thick caudolateral setae 74–81 (Fig. 30). *Chelicera*. Fixed digit 31–35 long, with 3 subapical teeth plus pilus dentilis. Movable digit 31–35 long, with 1 backwardly pointing tooth (Fig. 31). *Spermatheca*. Sacklike cervix 14–15 long, 10 wide; atrium incorporated into base of cervix with a black semicircle protruding into cervix lumen (Fig. 32). *Legs*. Five setaceous macrosetae: on genu II 32–35, genu III 38–42, genu IV 69–78, tibia IV 57–71, basitarsus IV 54–74 (Fig. 33).

♂. *Dorsum*. Dorsal shield 304 long, 144 wide, smooth, with chaetotaxy resembling that of ♀: D1 25, D2 to D3 4, D4 5, D5 missing, D6 10, M1 5, M2 106, L1 41, L2 21, L3 16, L4 81, L5 8, L6 7, L7 9, L8 13, L9 141. S1 19 and S2 ? on dorsal shield. *Venter*. Ventrianal shield 135 long, 159 wide, reticulated, with 3 preanal setae on one side (on other side setae as figured), a pair of small round preanal pores 43 apart and in addition 3 pairs of very small pores (Fig. 34). *Spermatodactyl*. T-shaped; shaft and foot both 18 long; lateral process approximately $\frac{1}{2}$ as long as foot; toe egg-shaped (Fig. 35). *Legs*. Five setaceous macrosetae: on genu II 23, genu III 32, genu IV 61, tibia IV 44, basitarsus IV 50.

Material examined. AUSTRALIA: SOUTH AUSTRALIA: 4♀, Mt Barker, 24.VI.1934, in moss (coll. unknown), and 1♀, Gully, 2.II.1957, on *Acacia armata* (coll. unknown), all misidentified by Womersley (1954) as *Amblyseius obtusus* Berlese and identified by Wainstein (1977) as *Amblyseius messor* (all SAM). TASMANIA: 3♀, 1♂, Ranelagh, 5.IV.1978, in ground cover of apple orchard (M.A. Williams). NEW SOUTH WALES: 1♀, Billimari nr Cowra, 26.X.1978, on lucerne stem (W.G. Thwaite); 1♀, Bega, 15.V.1980, on lucerne (P. Walters); 1♀, Bathurst, 3.XI.1970, on grass in apple orchard (E. Schicha). (All BCRI.)

Remarks. All Australian females of *A. messor* examined here agree with the original description of females of that species by Wainstein (1960) from Georgia, Russia. However, they (the former) differ from females from the Crimea, Russia, described by Livshitz & Kuznetsov (1972) in their (1) much shorter setae M2 (114–121 rather than 160–170), L4 (83–92 rather than 125), and macrosetae on genu IV (69–78 rather than 95), tibia IV (57–71 rather than 82) and basitarsus IV (54–74 rather than 80); and (2) in smaller ventrianal shield. From females from Algeria, North Africa, described by Athias-Henriot (1961) they differ in their shorter setae L9 (164–178 rather than 188–210) and macrosetae on genu IV (69–78 rather than 90–108), tibia IV (57–71 rather than 73–79) and basitarsus IV (54–74 rather than 75–85).

Amitai & Wysoki (1974) described (for the first time) what they regard as the male of *A. messor*, from Israel. The authors measured and illustrated 6 males obtained from laboratory cultures. They differ from the male from Australia in their (1) shorter setae D4, L4, L9 and macrosetae on genu IV; (2) longer setae D4, L1 to L3, L5, L6; and (3) considerably longer setae L8 (nearly double the length) and macrosetae on basitarsus IV.

The differences in the lengths of setae as outlined above cannot be explained as

normal variations within the species *A. messor*. Such variations are generally much smaller in species of the genus *Amblyseius*. It is therefore possible that the females from Georgia and Australia on the one hand, and those from the Crimea, Algeria and Israel on the other hand, belong to different taxa. A first step to clarifying this question would be to describe the male of *A. messor* from the original collection site of *A. messor* females in Georgia. It is possible that several species are involved, which can only be distinguished in the male stage.

Additional collections of what authors consider to be *A. messor* were made in Israel by Swirski & Amitai (1965, 1968) and Amitai & Swirski (1978), in Algeria, Spain and South Africa by Athias-Henriot (1966), and in Italy by Ragusa (1977).

Amblyseius tee Schicha, new species

Fig. 36–43

♀. *Dorsum*. Dorsal shield 361 long (D1–D6), 179 wide (L4–L4), reticulated laterally, with 17 pairs of setae, 6 dorsal, 2 median, 4 prolateral, 5 postlateral: D1 29, D2 and D3 15, D4 and D5 18, D6 10, M1 15, M2 46, L1 39, L2 and L3 25, L4 39, L5 25, L6 39, L7 35, L8 19, L9 65. All setae smooth. L1 and L7 as long as, all other setae shorter than distances between their bases and bases of setae following next in series. Five pairs of large pores and 10 pairs of small pores as figured. S1 21 on interscutal membrane, S2 not evident. Peritremes extending forward to bases of D1 (Fig. 36). *Venter*. Sternal shield 75 long, 90 wide, smooth, with 3 pairs of setae, 2 pairs of pores and straight posterior margin as figured. Fourth pair of setae on oval metasternal shields with a pore each on anterior end (Fig. 37). Pentagonal ventrianal shield 120 long, 120 wide, smooth, with 3 pairs of preanal setae and a pair of concentric pores 47 apart, surrounded by primary metapodal shields 18 long, secondary metapodal shields 12 long, and caudolateral setae 46 (other shields, pores or setae not visible because of poor mounting) (Fig. 38). *Chelicera*. Fixed digit 35 long, with 10 teeth plus pilus dentilis. Movable digit 46 long, with 3 backwardly pointing teeth (Fig. 39). *Spermatheca*. Sacklike cervix 12 long, 5 wide, with adjoining small atrium equal in width to macroduct (Fig. 40). *Legs*. Three setaceous macrosetae: on genu IV 42, tibia IV 27, basitarsus IV 46 (Fig. 41).

♂. *Dorsum*. Dorsal shield 266 long (D1–D6), 144 wide (L4–L4), smooth, with chaetotaxy resembling that of ♀: D1 23, D2 10, D3 14, D4 15, D5 18, D6 10, M1 12, M2 43, L1 25, L2 and L3 19, L4 35, L5 29, L6 36, L7 33, L8 24, L9 53. S1 and S2 19 on dorsal shield. *Venter*. Ventrianal shield 108 long, 142 wide, smooth, with 3 pairs of preanal setae and a pair of preanal pores 26 apart (Fig. 42). *Spermatodactyl*. Not mounted in side view (Fig. 43). *Legs*. Three setaceous macrosetae: on genu IV and tibia IV 27, on basitarsus IV 55.

Types. Holotype ♀, paratype ♂, MADAGASCAR: Tananarive, 16.VII.1964, on tea plant (J. Gutierrez) (BCRI).

Remarks. *A. tee* is not similar to any other known species of *Amblyseius*.

Amblyseius vanderlinde Merwe

Fig. 27

Amblyseius vanderlinde Merwe, 1965: 73.

Additions to original description

♀. *Dorsum*. Dorsal shield with 3 pairs of large pores and 19 pairs of small pores similar to *A. tareensis*. *Venter*. Preanal pores on ventrianal shield 15 apart. Primary metapodal shield 20 long, secondary metapodal shield 15 long.

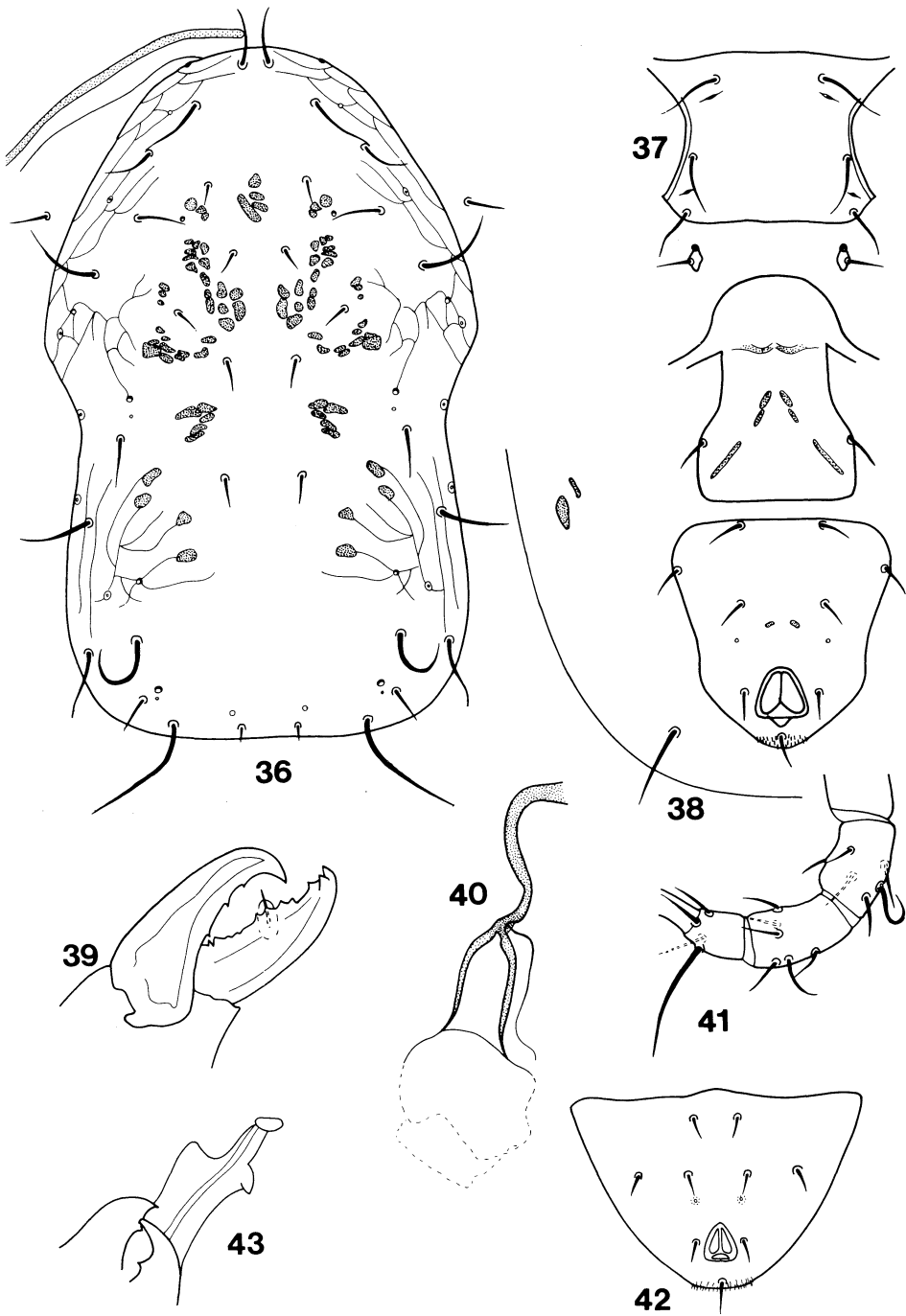


FIG. 36-43. *Amblyseius tee*, 36-41, ♀: 36, dorsum; 37, sternal shield; 38, ventrianal shield; 39, chelicera; 40, spermatheca; 41, leg IV. 42-43, ♂: 42, ventrianal shield; 43, spermatodactyl.

♂ (measurements by Merwe (1965) in parentheses). *Dorsum*. Dorsal shield 266 long (D1–D6), 129 wide (L4–L4), smooth, with chaetotaxy resembling that of ♀: D1 12, D2 to D5 8–9, D6 10, M1 8, M2 8 + rest broken off, L1 to L3 12, L4 10 + rest broken off, L5 10, L6 13, L7 and L8 12, L9 20 (21–24). S1 12 and S2 10 on dorsal shield. *Venter*. Ventrianal shield 97 (110) long, 136 (134–136) wide, reticulated, with 6 pairs of preanal setae and 4 pairs of pores. Pair of preanal pores nearest to anus kidney-shaped and 19 apart. Caudolateral setae 14 (Fig. 27). *Spermatodactyl*. T-shaped; shaft 15 (14) long, foot 38 (34–40) long. *Legs*. Two setaceous macrosetae: on genu IV 21 (22–26), on basitarsus IV 39 (40–43).

Material examined. SOUTH AFRICA: 2 slides labelled “*Amblyseius vanderlinde* Merwe, on Kweekgras, 30.XII.1954, Grabouw, P.A.J. Ryke, paratype ♀ and paratype ♂ (serial no. Ac 64/79).”

Remarks. The description of the female of *A. vanderlinde* in Merwe (1965) is very good. It is supplemented here by the above few additions. The paratype female of *A. vanderlinde* was measured and the measurements by Merwe (1965) are confirmed. The male was not fully described by Merwe and is redescribed here from a paratype male to make comparison with the closely related *A. tareensis* possible. The caudolateral setae of the male of *A. vanderlinde* are 14 long, and not 35 long as Merwe states (possibly a misprint).

***Amblyseius peltatus* Merwe**

Amblyseius (Amblyseius) peltatus Merwe, 1968: 119.

Additions to original description

♀. *Venter*. Preanal pores on ventrianal shield 23 apart. Primary metapodal shield 31 long, 4 wide, secondary metapodal shield 12 long, 4 wide.

Material examined. AUSTRALIA: QUEENSLAND: 2♀, Redland Bay, 10.V.1976, on strawberry leaves, feeding on tetranychid mites (L. Marckwell) (BCRI). NEW SOUTH WALES: 1♀, Alstonville, 18.IV.1978, on pawpaw leaves (M. Elshafie) (BCRI). SOUTH AFRICA: 1 paratype ♀ (serial no. AcY 79/414), Tzaneen, 18.II.1965, from *Verronia ampla* (M.K.P. Meyer); 1 paratype ♀ (serial no. AcY 79/415), Tzaneen, from unidentified plant, 25.II.1964 (G.G. van der Merwe) (both PPRI).

Remarks. The 3 female specimens from Australia agree in their qualitative morphological features (shape, sclerotization) with 2 paratype females of *A. peltatus* Merwe, 1968, from South Africa, and when measurements are considered, the 5 specimens are identical in many features. For instance, the lengths of most setae of the dorsal shields, all setae of the ventral shields (omitted in descriptions), and the size of all ventral shields are equal. But the females from Australia differ slightly from the South African specimens in (1) the shorter and thinner setae M2 and L9, the shorter setae L3, caudolateral setae and macrosetae of leg IV, and the longer setae L5 to L8; (2) the shorter and wider primary metapodal shield; and (3) the slightly shorter and wider cervix of the spermatheca. Despite these differences the Australian specimens are considered here to be conspecific with *A. peltatus*.

Blommers (1976) described *A. peltatus* from 1 female from Madagascar. The Australian specimens differ from it in their longer setae L2 and shorter setae L9. Ehara & Bhanduhufalck (1977) described *A. peltatus* from Thailand. The female specimens

that they found are closer to the Australian than to the South African or Madagascar specimens. Their only difference from the Australian specimens is their very small 6th tooth on the fixed digit of the chelicera.

Setae M2 and L9 of the paratypes of *A. peltatus* from Africa are serrated. Serrations of these setae were not mentioned by previous authors. The distance between the preanal pores and the dimensions of the metapodal shields of the paratypes of *A. peltatus* were determined in this investigation.

***Amblyseius harrowi* Collyer**

Fig. 44–45

Amblyseius harrowi Collyer, 1964: 641.—Schicha, 1980: 26.

Amblyseius salish Chant & Hansell, 1971: 717. **New synonymy.**

Additions to previous descriptions

♀. *Chelicera*. Fixed digit in Australian ♀ has 2 rows of (altogether 5) teeth on 2 different levels: dorsal subapical row has 2 teeth, ventral subapical row has 3 teeth (Fig. 44). *Spermatheca*. Typical sideview in Australian ♀ (Fig. 45).

Material examined. AUSTRALIA: NEW SOUTH WALES: 3♀, Armidale, XI.1970, from litter under apple tree (E. Schicha) (BCRI). CANADA: BRITISH COLUMBIA: 1♀, Lethbridge Laboratories, 3.VI.1955, from colonies of *Aceria tulipae* (J.T. Slykhuis) (lot no. 49); 1♀, Kamloops, 11.VI.1966, from unknown plant (J.R. Hill) (lot no. 48) (both CNCF).

Remarks. *Amblyseius harrowi* was only known from 1 badly mounted female from New Zealand and its incomplete description by Collyer (1964). Until Schicha (1980) redescribed the species from the same remounted female it was nearly impossible to determine if the species occurred in other countries. Chant & Hansell (1971) did not compare their *A. salish* material (and other species of the genus *Amblyseius* in Canada) with the world literature for reasons they gave, as follows: “. . . we made little attempt to determine if our new species had been described previously from other parts of the world More than 800 species have been described in the family and many of the descriptions are so general and cursory that precise identification is virtually impossible.”

Examination of specimens of *A. salish* borrowed from D.A. Chant, and determined as this species by him, and reference to the original description show that *A. salish* is a synonym of *A. harrowi*.

In Merwe (1968) the female of *A. harrowi* keys out to *A. usitatus* Merwe, 1968, from South Africa, but it differs from *A. usitatus* in having (1) shorter dorsal shield; (2) shorter D1, D2, L1 to L3, S2 and considerably shorter L9, caudolateral setae and macrosetae of basitarsus IV; (3) a longer ventrianal shield; (4) the larger number of teeth on the fixed digit of the chelicerae (4 instead of 3); and (5) the longer cervix of the spermatheca. The female of *A. harrowi* is also similar to the other species mentioned below, but it differs from *A. huffakeri* Schuster & Pritchard, 1963, from California in (1) shorter D1, M2 and S2; (2) longer D5; (3) considerably longer ventrianal shield; (4) longer primary metapodal shield; (5) the larger number of teeth

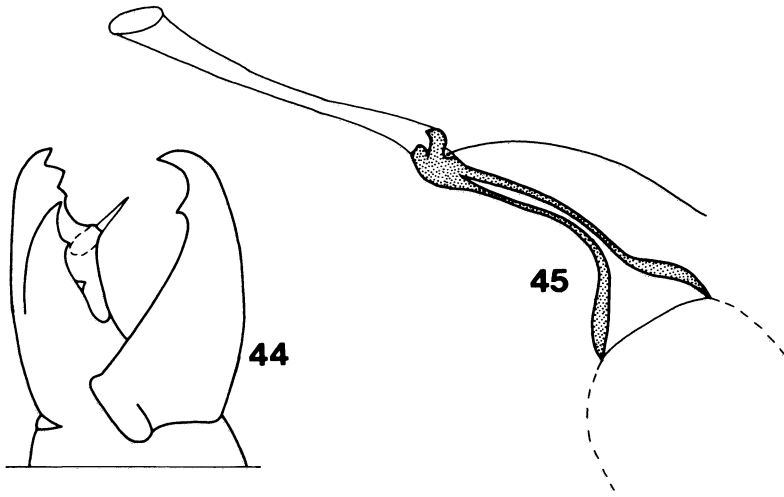


FIG. 44–45. *Amblyseius harrowi*, ♀: 44, chelicera; 45, spermatheca.

(4 instead of 3) on the fixed digit of its chelicerae; and (6) the longer cervix of its spermatheca. From *A. mckenziei* Schuster & Pritchard, 1963, from California, it differs in (1) shorter D1, M1, M2, L1, L3, L5 to L8, and S2 and considerably shorter L9, S2, and macrosetae on basitarsus IV; (2) the larger number of teeth on the fixed digit of its chelicerae (4 instead of 2); and (3) the longer cervix of its spermatheca. From *A. brevispinus* Kennett, 1958, from California [as described by Schuster & Pritchard (1963)], it differs in having (1) a longer dorsal shield; (2) shorter D1, D4, M1, M2, L3 to L8, S1, S2 and macrosetae on basitarsus IV and considerably shorter L9; (3) slightly longer and wider ventrianal shield; and (4) the larger number of teeth (4 instead of 2–3) on the fixed digit of its chelicerae. From *A. benicus* El Badry, 1968, from the Sudan it differs in (1) much longer and wider dorsal shield; (2) shorter D1, L1, L4 to L6 and considerably shorter M2, L9, caudolateral setae and macrosetae of basitarsus IV; (3) much longer ventrianal shield; and (4) the 4 rather than 3 teeth on the fixed digit and the 1 rather than nil tooth on the movable digit of its chelicerae. From *A. gracilis* (Muma, 1962), from Florida it differs in having (1) a longer dorsal shield, and (2) much shorter cervix of the spermatheca; from *A. marinellus* (Muma, 1962), from Florida in the presence of a macroseta on basitarsus IV.

Genus *Typhlodromus* Scheuten

Typhlodromus Scheuten, 1857: 111. Type-species by original designation: *T. pyri* Scheuten.

Typhlodromus applegum Schicha, new species

Fig. 46–50

♀. *Dorsum*. Dorsal shield 370 long (D1–D6), 178 wide (L4–L4), reticulated, with 18 pairs of setae, 6 dorsal, 2 median, 6 prolateral, 4 postlateral: D1 23, D2 14, D3 16, D4 17, D5 22, D6 12, M1 18, M2 34, L1 18, L2 to L4 20, L5 23, L6 26, L7 27, L8 33, L9 34, L10 48. All

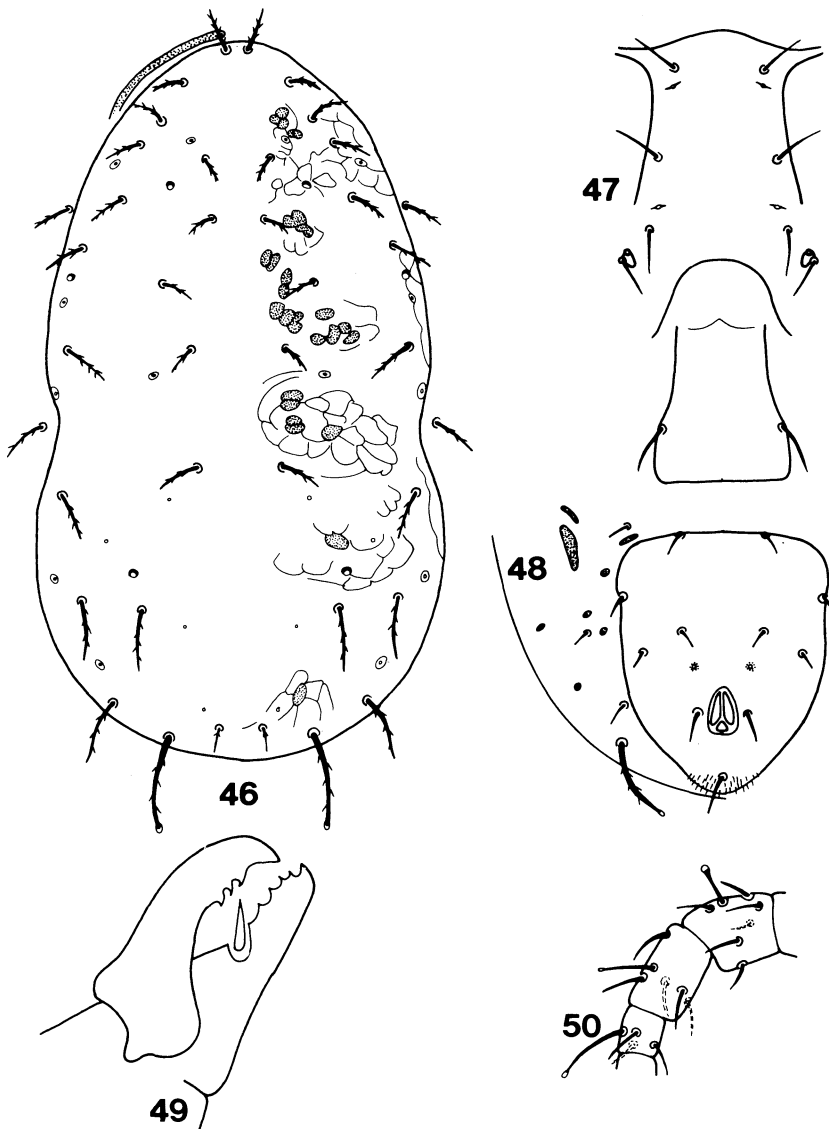


FIG. 46-50. *Typhlodromus applegum*, ♀: 46, dorsum; 47, sternal shield; 48, ventrianal shield; 49, chelicera; 50, leg IV.

setae serrated and L10 in addition knobbed. L1, L2 and L9 as long as, all other setae shorter than distances between their bases and bases of setae following next in series. Three pairs of large pores and 11 pairs of small pores as figured. S1 23 and S2 25, both serrated and on interscutal membrane. Peritremes extending forward to bases of D1 (Fig. 46). *Venter*. Sternal shield 85 long, 71 wide, smooth, with 2 (or 3?) pairs of setae and 2 pairs of pores. Outline of posterior part and positioning of 3rd pair of setae not clearly visible. Fourth pair of setae on

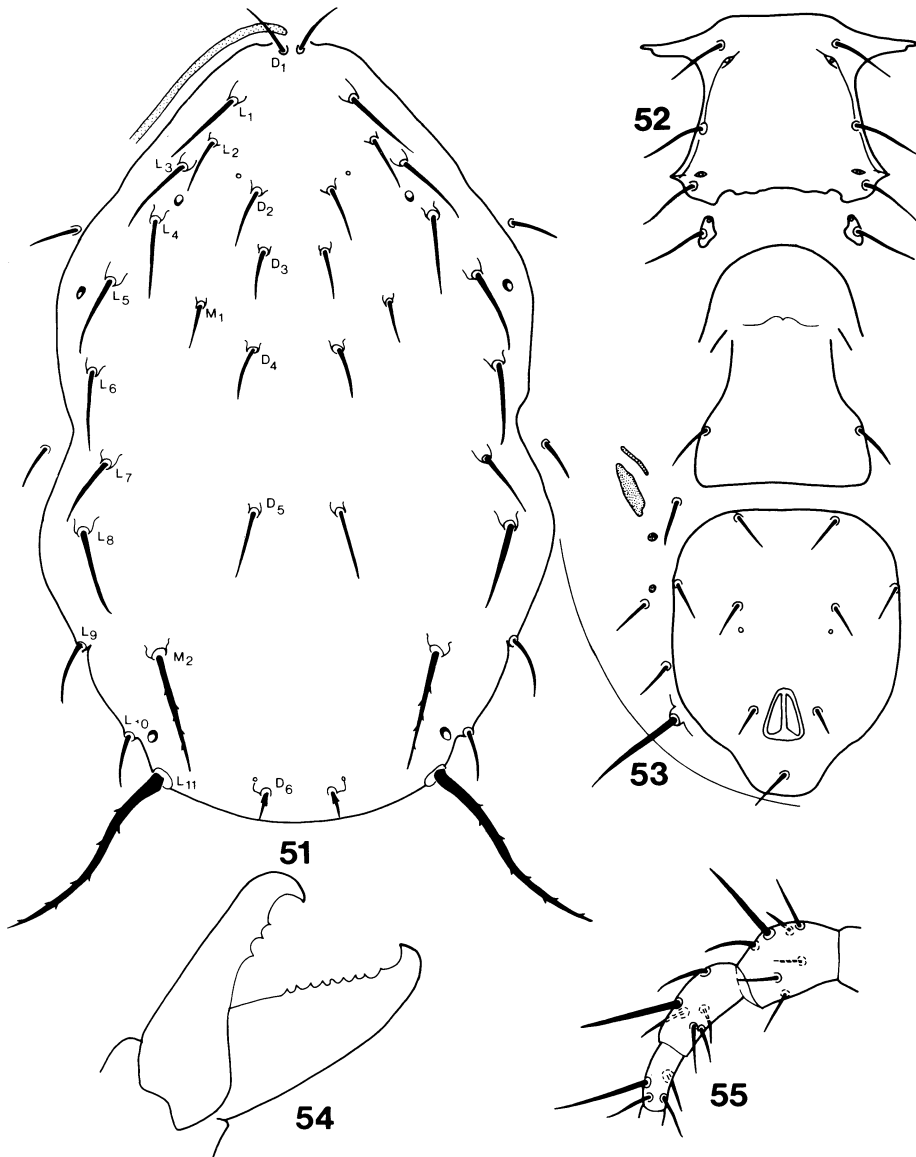


FIG. 51–55. *Typhlodromus corrugatus*, ♀: 51, dorsum; 52, sternal shield; 53, ventrianal shield; 54, chelicera; 55, leg IV.

oval metasternal shields with a pore each on anterior end (Fig. 47). Pentagonal ventrianal shield 136 long, 114 wide, smooth, with 4 pairs of preanal setae and a pair of small preanal pores 29 apart, surrounded by 5 pairs of pores, a pair of very small shields, primary metapodal shield 26 long, secondary metapodal shield 10 long, 3 pairs of short setae and serrated and knobbed caudolateral setae 42 (Fig. 48). *Chelicera*. Fixed digit 31 long, with 4 teeth plus pilus

dentilis. Movable digit 31 long, with 3 backwardly pointing teeth (Fig. 49). *Spermatheca*. Not visible. *Legs*. Three knobbed macrosetae: on genu IV 17, tibia IV 26, basitarsus IV 39 (Fig. 50).

Type. Holotype ♀, AUSTRALIA: NEW SOUTH WALES: Bayview, 14.IX.1977, on leaves of *Angophora* sp. (G. Brown) (BCRI).

Remarks. *Typhlodromus applegum* differs from *T. neobakeri* Prasad, 1968, from Hawaii in having (1) longer setae of dorsal shield and interscutal membrane (M2 and L8 by $\frac{1}{3}$ longer) and considerably longer caudolateral setae and macrosetae of basitarsus IV; (2) all dorsal setae serrated (D2 to D6, M1 and some L setae are smooth in *T. neobakeri*); and (3) the presence of knobbed macrosetae on genu IV and tibia IV (*T. neobakeri* has such macrosetae only on basitarsus IV).

***Typhlodromus corrugatus* Schicha, new species**

Fig. 51-55

♀. *Dorsum*. Dorsal shield 391 long (D1-D6), 216 wide (L4-L4), smooth, with 19 pairs of setae, 6 dorsal, 2 median, 6 prolateral, 5 postlateral: D1 29, D2 27, D3 24, D4 29, D5 34, D6 13, M1 15, M2 67, L1 40, L2 26, L3 38, L4 36, L5 42, L6 and L7 38, L8 48, L9 32, L10 29, L11 112. All setae on tubercles, M2 and L9 serrated, all other setae smooth. L1 to L3 longer than, L4 as long as, all other setae shorter than distances between their bases and bases of setae following next in series. Three pairs of large pores and 2 pairs of small pores as figured. S1 24 and S2 21 on interscutal membrane. Peritremes extending forward to bases of D1 (Fig. 51). *Venter*. Sternal shield 74-77 long, 85-88 wide, smooth, with 3 pairs of setae, 2 pairs of pores and nearly straight posterior margin. Fourth pair of setae on oval metasternal shields with a pore each on anterior end (Fig. 52). Pentagonal ventrianal shield 149 long, 121 wide, smooth, with 3 short pairs of preanal setae and a pair of small preanal pores 46 apart, surrounded by 2 pairs of pores, primary metapodal shield 25 long, secondary metapodal shield 13 long, 3 pairs of short setae and thick caudolateral setae 49 (Fig. 53). *Chelicera*. Both digits 33 long. Fixed digit with 9 teeth (pilus dentilis not visible), movable digit with 3 teeth (Fig. 54). *Spermatheca*. Difficult to see. Macroduct very long. *Legs*. Four setaceous macrosetae: on genu III 33, genu IV 46, tibia IV 51, basitarsus IV 48 (Fig. 55).

Type. Holotype ♀, AUSTRALIA: TASMANIA: Ranelagh, 27.IX.1978, under cardboard shelters on trunks of apple trees (R.H. Prebble) (BCRI).

Remarks. No species was found in the world literature which could be regarded as similar to *T. corrugatus*. However, this new species shows some similarity to Australian and New Zealand species, such as *T. nesbitti* Womersley, 1954, *T. manukae* Collyer, 1964, *T. cottieri* Collyer, 1964, *T. dachanti* Collyer, 1964, *T. armidalensis* Schicha, 1980, and *T. glenfieldensis* Schicha, 1980. They all have 11 lateral setae on a smooth dorsal shield, smooth pentagonal ventrianal shields with small round pores, 3 backwardly pointing teeth on the movable digit of the chelicerae, and a multidentate fixed digit (compare redescrptions in Schicha 1978, 1980a, 1980b). Its striking difference from these species is relatively short dorsal setae set on tubercles. Such setae occur, for example, in *T. (Seiulus) acanthus* Merwe, 1968, in South Africa.

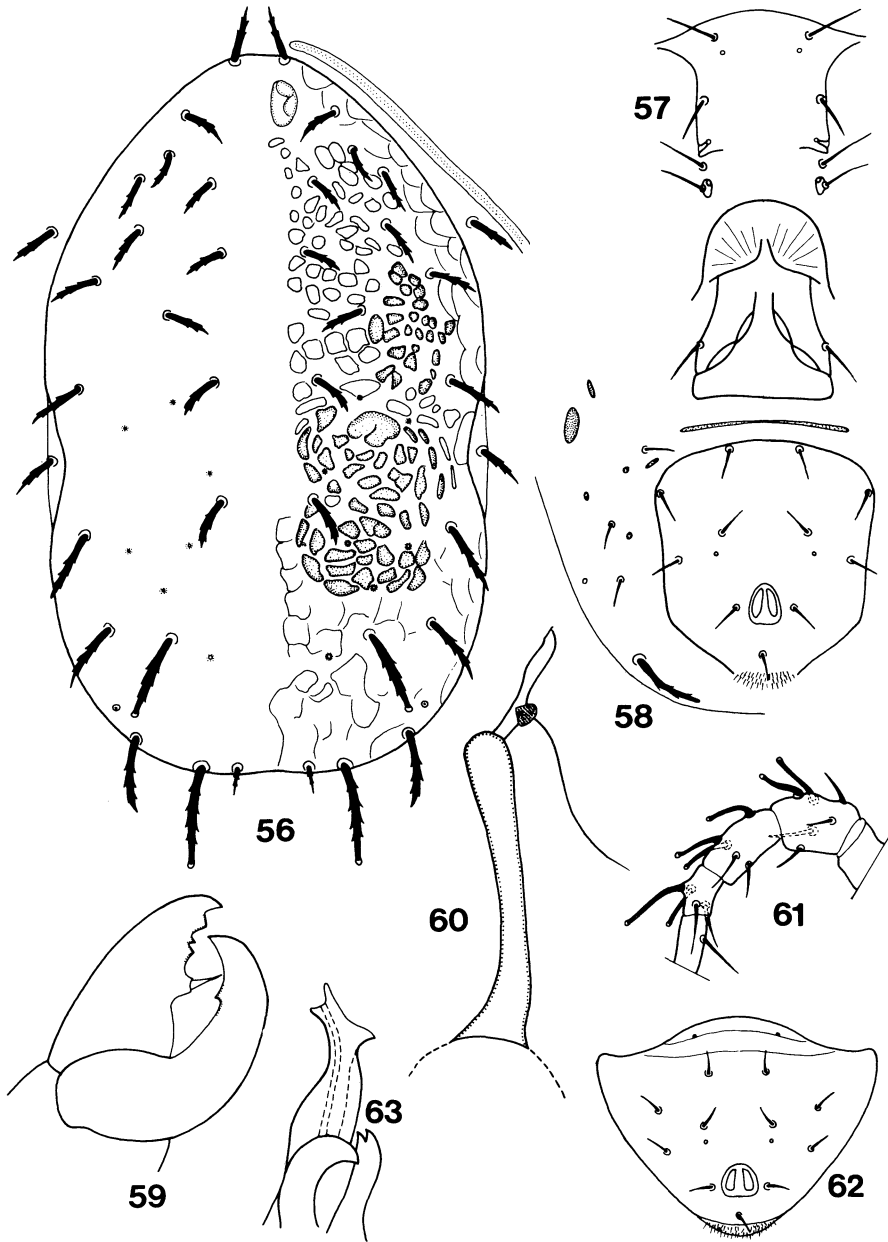


FIG. 56-63. *Typhlodromus machaon*. 56-61, ♀: 56, dorsum; 57, sternal shield; 58, ventrianal shield; 59, chelicera; 60, spermatheca; 61, leg IV. 62-63, ♂: 62, ventrianal shield; 63, spermatodactyl.

Typhlodromus machaon (Wainstein)

Fig. 56-63

♀ (2♀ measured; Wainstein's measurements in parentheses). *Dorsum*. Dorsal shield 334-407 (370) long (D1-D6), 212-229 (190) wide (L4-L4), rugose, with 18 pairs of setae, 6 dorsal, 2 median, 6 prolateral, 4 postlateral: D1 19-26 (25), D2-D4 16-20 (16-22), D5 19-24 (25), D6 11-12 (13), M1 18-20 (21), M2 33-39 (38), L1 20-25 (23), L2 15-18 (17), L3 16-22 (19), L4 and L5 19-23 (21-22), L6 21-28 (27), L7 26-31 (29), L8 30-35 (33), L9 28-33 (31), L10 43-50 (48). All setae thick and serrated, M2 and L10 slightly knobbed. L1, L2 and L9 as long as, all other setae shorter than distances between their bases and bases of setae following next in series. Seven pairs of pores as figured. S1 and S2 18-22 on interscutal membrane. Peritremes extending forward to bases of D1 (Fig. 56). *Venter*. Sternal shield 67-71 long, 63-65 wide, smooth, with 2 pairs of setae and 2 pairs of pores as figured. Third pair of setae on interscutal membrane; 4th pair of setae on metasternal shields with a pore each on anterior end (Fig. 57). Pentagonal ventrianal shield 114-131 long, 105-119 wide, smooth, with 4 pairs of preanal setae and a pair of preanal pores 39-46 apart, surrounded by 3 pairs of setae, 4 pairs of pores, 1 pair of small shields, primary metapodal shield 19-24 long, secondary metapodal shield 10-13 long, and serrated, blunt caudolateral setae 36-39 (39) (Fig. 58). *Chelicera*. Both digits 28-33 long. Fixed digit with 3 teeth plus pilus dentilis; movable digit with 1 backwardly pointing tooth (Fig. 59). *Spermatheca*. Funnel-like cervix 30-37 long, 4-5 wide, atrium a short distance removed from where macroduct fuses with cervix (Fig. 60). *Legs*. Seven knobbed macrosetae on leg IV: on genu 14-19 and 14-20, tibia 21-22, 21-22 and 25-26, basitarsus 17-20 and 30-34 (Fig. 61).

♂. *Dorsum*. Dorsal shield 288 long, 164 wide at L4, rugose, with chaetotaxy resembling that of ♀: D1 to D4 11-14, D5 17, D6 10, M1 14, M2 29, L1 17, L2 to L5 11-14, L6 to L9 19-20, L10 38, S1 and S2 16. *Venter*. Smooth ventrianal shield 116 long, 142 wide, with 4 pairs of preanal setae and a pair of preanal pores 31 apart (Fig. 62). *Spermatodactyl*. Shaft and foot short, heel pointed, toe ending in a suctional disc (Fig. 63). *Legs*. Seven knobbed macrosetae on leg IV: 2 on genu 14, 3 on tibia 14, 14 and 17, 2 on basitarsus 15 and 18.

Material examined. AUSTRALIA: NEW SOUTH WALES: holotype ♀ labelled *Anthoseius (Aphanoseius) machaon* Wainstein, from "Galled pear twig," Roseville, 16.VII.1934, N.S.W. Dep. Agric. (1st label) and *Typhlodromus bakeri* (Garman), det. H. Womersley, same collection data (2nd label) (SAM); 2♀, 1♂, Bathurst, II.1971, on leaves of apple tree (E. Schicha); 2♀, Coffs Harbour, 2.II.1978, on leaves of *Eucalyptus* sp. (Schicha); 2♀, Narara, 2.II.1978, on bark of *Eucalyptus* sp. (Schicha). (All BCRI.)

Remarks. This Australian species was wrongly identified by Womersley (1954) as *Typhlodromus bakeri* (Garman) on the basis of 3 females (on 2 slides) held in the SAM: 2 specimens from twigs of pear, N.S.W. Bathurst: 12.VI.1934, and 1 specimen that Wainstein (1977) described later as the holotype of his new species *Anthoseius (Aphanoseius) machaon* (see above). Wainstein (1977) did not compare it to *T. bakeri*. In the meantime more specimens have been found so that it is now possible to redescribe the female of *T. machaon* from this new material, and to describe the male for the first time.

T. machaon is quite distinct from *T. bakeri* sensu Chant (1956, 1958) in *T. machaon* having (1) all dorsal setae serrated, rather than only M2 and the posterior lateral setae; (2) 1, rather than 2-3 teeth on the movable digit and 3 rather than 5 teeth on the fixed digit of the female chelicerae; (3) 7 knobbed, rather than only 1 setaceous, macrosetae on leg IV; and (4) 4, rather than 5, pairs of preanal setae on the male ventrianal shield.

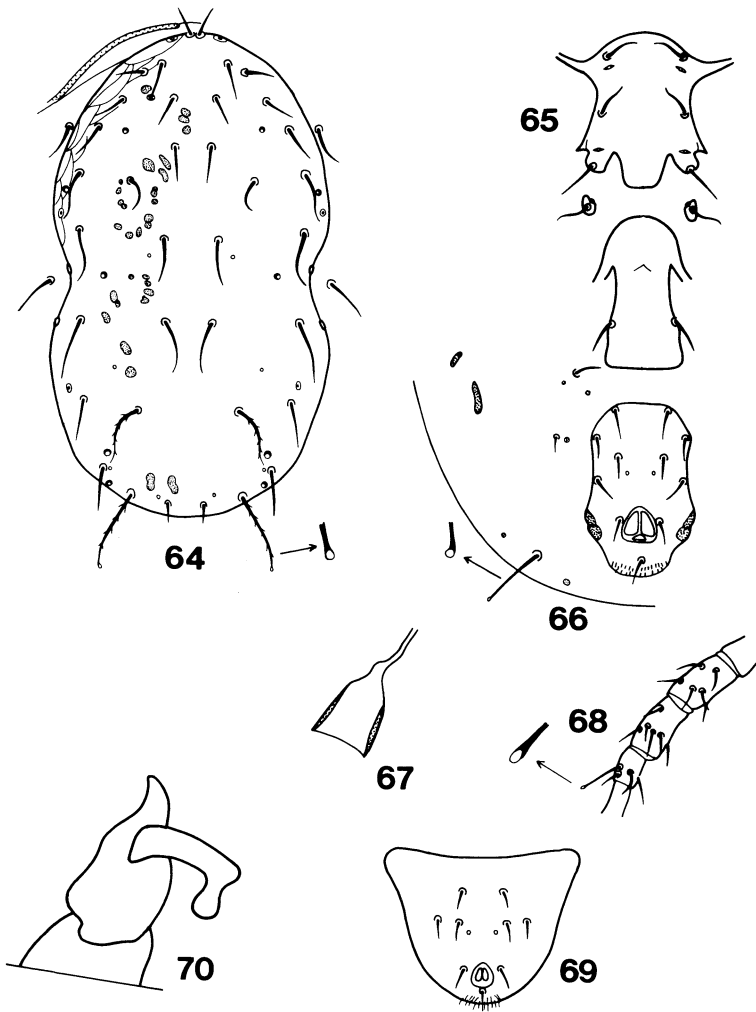


FIG. 64–70. *Typhlodromus gouaniae*. 64–68, ♀: 64, dorsum; 65, sternal shield; 66, ventrianal shield; 67, spermatheca; 68, leg IV. 69–70, ♂: 69, ventrianal shield; 70, spermatodactyl.

Typhlodromus gouaniae Schicha, new species

Fig. 64–70

♀. *Dorsum*. Dorsal shield 249 long (D1–D6), 114 wide (L6–L6), clearly imbricated only between L1 and L6, with 18 pairs of setae, 6 dorsal, 2 median, 6 prolateral, 4 postlateral: D1 15, D2 17, D3 19, D4 23, D5 27, D6 10, M1 17, M2 32, L1 21, L2 15, L3 19, L4 20, L5 26, L6 29, L7 33, L8 24, L9 24, L10 42. M2 serrated, L10 serrated and knobbed, all other setae smooth. L1 and L9 longer than, L3 as long as, all other setae shorter than distances between their bases and bases of setae following next in series. Five pairs of large pores and 9 pairs of small pores as figured. S1 19 and S2 23 on interscutal membrane. Peritremes extending forward nearly to bases of D1 (Fig. 64). *Venter*. Sternal shield 60 long, 50 wide, smooth, with 3 pairs of setae, 2 pairs of pores, and lobed posterior margin. Fourth pair of setae on oval metasternal shields with a pore each on anterior end (Fig. 65). Oblong ventrianal shield 91 long, 58 wide,

smooth, with 4 pairs of preanal setae and a pair of small preanal pores 14 apart. On surrounding interscutal membrane visible are 5 pairs of pores, primary metapodal shield 17 long, secondary metapodal shield 10 long, 2 pairs of short setae and a pair of knobbed caudolateral setae 33 (Fig. 66). *Chelicera*. Both digits 21 long, details not visible. *Spermatheca*. Sacklike cervix 8 long, 6 wide, atrium and microduct not visible (Fig. 67). *Legs*. One knobbed macroseta on basitarsus IV 23 (Fig. 68).

♂. *Dorsum*. Dorsal shield 190 long, 106 wide, smooth with chaetotaxy resembling that of ♀: D1 16, D2 14, D3 14, D4 13, D5 16, D6 5, M1 10, M2 23, L1 17, L2 10, L3 15, L4 15, L5 19, L6 14, L7 22, L8 14, L9 19, L10 32. S1 19 and S2 21 on dorsal shield. *Venter*. Smooth ventrianal shield 62 long, 124 wide, with 3 pairs of preanal setae and a pair of preanal pores 14 apart (Fig. 69). *Spermatodactyl*. Shaft ?long, heel pronounced and rounded, foot terminating in a knob (Fig. 70). *Legs*. Knobbed macroseta on basitarsus IV 26.

Types. Holotype ♀, 2 paratype ♂ (*T. gou.* 2 and 3), MADAGASCAR: nr Joffre-Ville, 21.IX.1969, on *Gouania mauritiana* (J. Gutierrez) (BCRI).

Remarks. *T. gouaniae* is similar to *T. microbullatus* Merwe, 1968, from South Africa. It differs in the female from *T. microbullatus* in (1) shorter D2, D3, M1, L1, L5, L6, L10 and S2; (2) considerably shorter D1, L2 to L4, L8, L9 and S1; (3) the position of its 3rd pair of sternal setae on the sternal shield rather than on separate small shields; and (4) knobbed rather than setaceous caudolateral setae.

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NOTICE

NOTICE FROM THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

The following Opinions have been published by the International Commission on Zoological Nomenclature in the *Bull. Zool. Nom.* **39**(4), 7 December 1982.

Opinion no. 1227 (p. 233) *Tinea bjerkandrella* Thunberg, 1784 and *Phalaena (Noctua) cardui* Hubner, 1790 (Insecta, Lepidoptera): conserved.

Opinion no. 1231 (p. 243) *Blatta germanica* Linnaeus, 1767 (Insecta, Dictuoptera): conserved and designated as type species of *Blattella* Caudell, 1903.

Opinion no. 1238 (p. 262) *Mycteromyia* Philippi, 1865 (Insecta, Diptera): designation of type species.

(The Commission regrets that it cannot supply separates of Opinions.)
