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SOME PHYTOSEIIDAE OF THE CAPE VERE ISLANDS (ACARI: MESOSTIGMATA)

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ABSTRACT

Key words: Acari, Cape Verdean mites, Phytoseiidae

Records of 16 phytoseiid species from the Cape Verde Islands are given. Of these 2 species are new: *Amblyseius insulatus* and *A. neotutsi*. *Amblyseius scutalis* Athias-Henriot and *A. swirskii* Athias-Henriot are redescribed. A key to the Cape Verdean species is given.

Uittreksel

SOMMIGE PHYTOSEIIDAE VAN DIE KAAP VERDIESE EILANDE (ACARI: MESOSTIGMATA)

Sestien spesies van die Kaap Verdiese Eilande word hier aangemeld. Twee spesies word as nuut beskryf nl. Amblyseius insulatus *en* A. neotutsi. Amblyseius scutalis *Athias-Henriot en* A. swirskii *Athias-Henriot word herbeskryf. 'n Sleutel tot die Kaap Verdiese spesies word gegee.*

INTRODUCTION

Members of the Phytoseiidae are predaceous mites which occur on a wide range of plants in association with phytophagous mites and insect pests. The knowledge of the Cape Verdean Phytoseiidae is confined to 13 species reported on by Ueckermann & Loots (1988) and Van Harten *et al.* (1992). Two of these species are excluded here, viz *Amblyseius fallacis* (Garman) and *A. rykei* Pritchard & Baker, because Van Harten *et al.* (1992) doubt the presence of *A. fallais* on the islands and *A. rykei* is most probably synonymous with *A. swirskii* (Athias-Henriot). The latter species and *A. scutalis* (Athias-Henriot) are redescribed here. Van Harten *et al.* (1992) referred to *A. swirskii, A. scutalis* and the two new species described here, as unidentified *Amblyseius* spp. Sixteen phytoseiid species are presently known from the Cape Verde Islands.

Together with the information given by Van Harten *et al.* (1992), the present study may form a basis for the integrated pest control of mite pests in the Cape Verde Islands.

The type material of the 2 new species are deposited in the National Collection of Arachnida, Plant Protection Research Institute, Pretoria. All measurements in this paper are given in micrometres (μm).

KEY TO THE PHYTOSEIID GENERA AND SPECIES OF THE CAPE VERDE ISLANDS

FEMALES

1. Prodoscutum with 6 pairs of lateral setae (j3, z2, z3, z4, s4, s6) 2
– Prodoscutum with 4 pairs of lateral setae (j3, z2, z4, s4) 7
2. Opisthoscutum with 3 to 4 pairs of setae, setae r3 always on dorsal shield; genu III always with 6 setae ..... *Phytoseius* Ribaga 3
– Opisthoscutum with 7 or 8 pairs of setae; setae r3 on interscutal membrane; genu III usually with 7 setae ..... *Typhlodromus* Scheuten 4
3 Leg IV without macrosetae ..... *P. intermedius* Evans & Macfarlane
– Leg IV with 4 macrosetae ..... *P. amba* Pritchard & Baker
4. Ventro-anal shield with 4 pairs of setae; most dorsal body setae smooth 5
– Ventro-anal shield with 3 pairs of setae; all dorsal body setae, except for S5 and J2, serrated and knobbed distally ..... *T. transvaalensis* (Nesbitt)
5. Setae R1 on interscutal membrane .....
– Setae R1 on dorsal shield ..... *T. astibus* Ueckermann & Loots
6. Setae Z5 pointed; genu II with 8 setae ..... *T. praeacutus* Van der Merwe
– Setae Z5 knobbed; genu II with 7 setae ..... *T. persianus* McMurtry
7. Setae r3 and R1 on sclerotized interscutal membrane; ventro-anal shield divided ..... *Iphiseius* (Berlese). ..... *Iphiseius degenerans* (Berlese)
– Interscutal membrane not sclerotized; ventro-anal shield rarely divided ..... *Amblyseius* (Berlese) 6
8. Ventro-anal shield with pre-anal setae almost aligned in one or two transverse rows, setae JV1 almost in line with setae ZV2 9
– Pre-anal setae not arranged as above 11
9. Setae J2 and Z4 longer than distances to setae Z4 and S5 respectively; peritremes extending anteriad of setae j1 or anterolateral to setae j3; leg IV with macrosetae knobbed 10
– Setae J2 much shorter, setae Z4 slightly shorter or as long as distance to setae S5; peritremes extending to level of setae z2; leg IV with macrosetae blunt ..... *A. scutalis* (Athias-Henriot)
10. Setae Z1 62-69 long; cervix of spermatheca tube-like ..... *A. neotutsi* sp. nov.
– Setae Z1 26 long; cervix of spermatheca funnel-shaped ..... *A. insulatus sp. nov.*
11. Dorsal shield almost oval, smooth or slightly reticulated; ventral shields smooth or slightly reticulated 12
– Dorsal shield elongate, strongly reticulated; ventral shields also reticulated ..... *A. lula* Pritchard & Baker
12. Setae Z1 present 13
– Setae Z1 absent .....

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..... *A. sundi* Pritchard & Baker

13. Setae j1, j3, s4, Z4 and Z5 much longer than other dorsal body setae, which are very short 15
- Dorsal body setae not as above 14
14. Posterior margin of sternal shield almost straight; ventro-anal shield sub-triangular; peritremes extending to setae j1 .... *A. barkeri* (Hughes)
- Posterior margin of sternal shield lobed; ventro-anal shield rectangular with lateral margins concave; peritremes extending to a level between setae z2 and z4 .... *A. hima* Pritchard & Baker
15. Ventro-anal shield rectangular; cervix of spermatheca bowl-shaped .... *A. swirskii* Athias-Henriot
- Ventro-anal shield constricted laterome-dially; cervix of spermatheca a long slender tube..... *A. neolargoensis* Van der Merwe

Phytoseius intermedius Evans & Macfarlane

Phytoseius (Dubininellus) intermedius Evans & Mac-farlane, 1961: 587–588; Denmark, 1966: 70.

Phytoseius intermedius Evans & Macfarlane: Moraes De, McMurtry, Van den Berg & Yaninek, 1989: 91.

Phytoseius yira Pritchard & Baker, 1962: 227; Denmark, 1966: 70 (syn.)

This species can be defined as follows: setae R1 and J2 absent, ventro-anal shield with 3 pairs of pre-anal setae and 2 small pores, leg IV without macro-setae, atrium of the spermatheca knob-like and cer-vix bell-shaped.

The Cape Verdean specimens correspond in all respects with the descriptions of Evans & Mcfarlane (1961) and Denmark (1966).

MATERIAL STUDIED. One female from *Ziziphus mauritiana*, Santa Cruz, Santiago, 21 March 1985, A. van Harten; 1 female from *Trichilia emetica.* Sao Jorge dos Orgaos, Santiago, 8 August 1986, A. van Harten.

PREVIOUS RECORDS. This species was described from *Aloe* sp. Mazoe Estates, Zimbabwe. Since then it has also been recorded from India, Japan, Kenya, Madagascar, Pakistan and Zaïre.

Phytoseius amba **Pritchard & Baker**

Phytoseius (Pennaseius) amba Pritchard & Baker, 1962: 224.

Phytoseius (Phytoseius) amba Pritchard & Baker; Denmark, 1966: 46.

Typhlodromus (Phytoseius) amba (Pritchard & Baker), Van der Merwe, 1968: 101.

Phytoseius amba Pritchard & Baker; Swirski & Ragusa, 1978: 408.

According to the literature and a comparison with the identified material in our Mite Collection the differences observed in the Cape Verdean specimens are merely variations. There occur variations in the shape of the macrosetae, which are less expanded distally and the cervix of the spermatheca which is longer. However, specimens were found among the identified material where the macrosetae are similar to those of the Cape Verdean specimens. De Moraes *et al.* (1989) collected specimens with a relatively long cervix. *Phytoseius amba* closely resembles *P. hongkongensis* Swirski & Shecter, but differs by having j3 much shorter (42 in *P. amba* as opposed to 69 in *P. hongkongensis)* and the pre-anal pores present on the ventro-anal shield.

MATERIAL STUDIED. Three females, 1 male and 1 deutonymph from *Sideroxylon marmulana,* Sao Jorge dos Orgaos, Santiago, 9 May 1988, A. van Harten.

PREVIOUS RECORDS. The type specimens were collected from several plants and localities in Zaïre and Rwanda. Other records are from: Kenya, Mada-gascar, Mozambique, Nigeria and South Africa.

Typhlodromus transvaalensis **(Nesbitt)**

Kampimodromus transvaalensis Nesbitt, 1951: 55.

Typhlodromus (Typhlodromus) transvaalensis (Nesbitt), Chant, 1959: 60.

Typhlodromus transvaalensis (Nesbitt), Chant & Baker, 1965: 5; Schicha, 1981b: 36.

Clavidromus transvaalensis (Nesbitt), Muma & Denmark, 1968: 238; Muma & Denmark, 1970: 128.

Typhlodromus jackmickleyi DeLeon, 1958: 75; Muma & Denmark, 1968: 238 (syn.)

Typhlodromus pectinatus Athias-Henriot, 1958: 179; Muma & Denmark, 1968: 238 (syn.)

This species resembles *T. hartlandrowei* (Evans) in that almost all the dorsal body setae, except S5 and J5, are serrated and knobbed distally and the ventro-anal shield bears 3 pairs of setae but with pre-anal pores absent. However, *Typhlodromus transvaalensis* differs from *T. hartlandrowei* in that the dorsal body setae are relatively shorter, the ster-nal shield with 2 pairs of setae and by a differently shaped ventro anal shield.

I have compared the Cape Verdean specimens with identified specimens in our Mite Collection and found them to be conspecific.

MATERIAL STUDIED. Two females from *Cocos vi-ridis*, Sao Jorge dos Orgaos, Santiago, January 1986, A. van Harten.

PREVIOUS RECORDS. Nesbitt (1951) described this species from *Arachis hypogaea,* Nylstroom, Trans-vaal, South Africa. Other records are from Algeria, Brazil, Cameroon, Egypt, Guinea, Hawaii, Israel, Indonesia, Jordan, New Caledonia, Panama, U.S.A. and U.S.S.R.

Typhlodromus astibus **Ueckermann & Loots**

Typhlodromus (Anthoseius) astibus Ueckermann & Loots, 1984: 308.

Ueckermann & Loots (1984) considered the 1st pair of lateral setae on the opisthoscutum of *T. asti-bus* to be S1, but according to ontogenetic evidence presented by Rowell *et al.* (1978) S1 is absent in the Phytoseiidae. The seta in question must be either R1 or Z1. Judging from the location of this seta it must be R1 as it is slightly laterad of the s-S series of setae and not mediolaterad as Z1.

This species can be characterized by the dorsal shield bearing 19 pairs of setae, with setae R1 on the shield and setae Z5 serrated (setae Z4 also are ser-rated in the Cape Verdean specimens); sternal shield with 2 pairs of setae and posterior margin lobed me-dially; ventro-anal shield elongate and constricted mediolaterally; atrium of spermatheca bulbous, cer-vix slender proximally but flares towards vesicle; genu II bears 8 setae (2–2/1,2/0–1); leg IV bears only 1 macroseta on the basitarsus, which is slightly

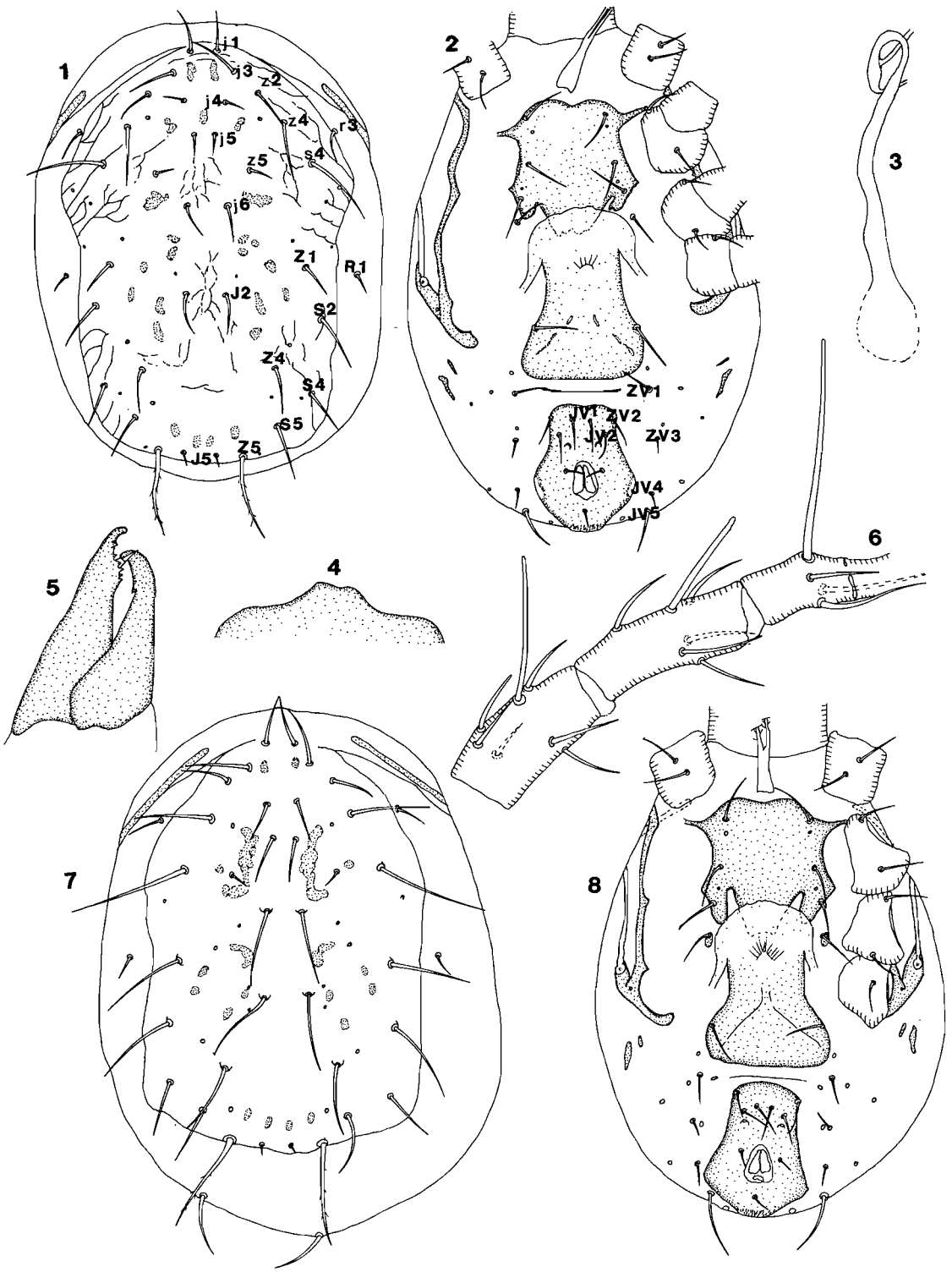


FIG. 1–6 *Amblyseius scutalis* (Athias-Henriot). Female
FIG. 1 Dorsum
FIG. 2 Venter
FIG. 3 Spermatheca
FIG. 4 Anterior margin of tectum
FIG. 5 Chelicera
FIG. 6 Leg IV

FIG. 7–8 *Amblyseius neotutsi* sp. nov.
FIG. 7 Dorsum of female
FIG. 8 Venter of female

knobbed in the holotype, but pointed in the paratype female.

MATERIAL STUDIED. Holo- and paratype females from *Ficus* sp., Gobabeb, Namibia; 11 females from *Ficus gnaphalocarpa,* Sao Jorge dos Orgaos, Santiago, 8 June 1983 to 9 February 1989, A. van Harten.

***Typhlodromus praeacutus* Van der Merwe**

Typhlodromus (Anthoseius) praeacutus Van der Merwe, 1968: 53; Ueckermann & Loots, 1988: 52.

The Cape Verdean specimens differ from the type specimens only in the relative lengths of the dorsal body setae.

Typhlodromus praeacutus can be recognised by the following combination of characters: setae S5 much shorter than S4, setae Z4 serrated and extend to or past Z5, atrium of spermatheca incorporated in cervix, genu II with 8 setae (2–2/1,2/0–1) and leg IV with one macroseta.

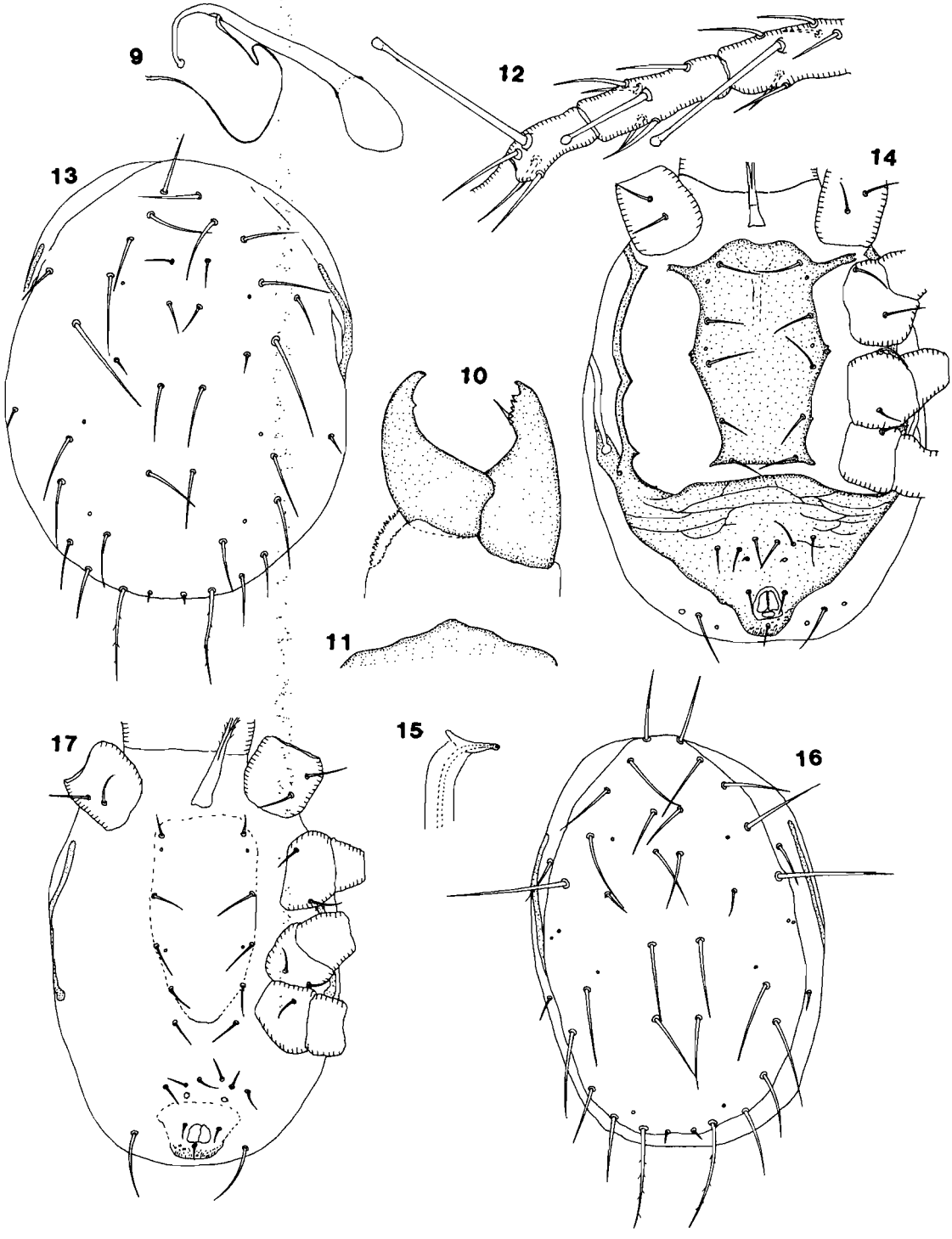


FIG. 9–17 *Amblyseius neotutsi* sp. nov. (continued)
FIG. 9 Spermatheca
FIG. 10 Chelicera of female
FIG. 11 Anterior margin of tectum of female
FIG. 12 Leg IV of female
FIG. 13 Dorsum of male
FIG. 14 Venter of male
FIG. 15 Spermadactyl
FIG. 16 Dorsum of deutonympha
FIG. 17 Venter of deutonympha

MATERIAL STUDIED. Two males from *Ficus gnaphalocarpa*, Sao Jorge dos Orgaos, Santiago, 8 June 1983, A. van Harten; 1 female 2 males and 1 deutonymph from *Lantana camara*, Sao Jorge dos Orgaos, 11 January 1986, A. van Harten.

PREVIOUS RECORDS. The type specimens were collected from a wide range of plant species and several localities in South Africa.

Typhlodromus persianus McMurtry

Typhlodromus persianus McMurtry, 1977: 563.
Typhlodromus (Anthoseius) persianus McMurtry; Ueckermann & Loots, 1988: 54.

Typhlodromus persianus belongs to a group of species having setae S5 much shorter than S4, but can be distinguished by the following combination of characteristics: all dorsal setae smooth, except for setae Z4 and Z5 which are serrated; Z5 also knobbed distally; posterior margin of sternal shield with a median lobe, shield with 2 pairs of setae; major duct and cervix of spermatheca form a tube and the atrium is indistinctly separated; leg IV with a

bluntly-tipped macroseta on basitarsus; fixed and movable cheliceral digits with 4 and 2 teeth, respectively.

Ueckermann & Loots (1988) compared the Cape Verdean specimens with type specimens and found them conspecific.

MATERIAL STUDIED. Twenty-one females, 3 males and 1 larva from *Ficus gnaphalocarpa, Vitis vinifera, Dichrostachys glomerata, Cocos viridis, Asteriscus vogelii, Cocos nucifera and Punica granatum,* Sao Jorge dos Orgaos, Santiago, 24 August 1983 to 1 June 1987, A. van Harten.

PREVIOUS RECORDS. The type specimens were collected from *Citrus* sp., Minab, Iran and reared in quarantine in the Division of Biological Control, University of California, Riverside, U.S.A.

***Iphiseius degenerans* (Berlese)**

Seius degenerans Berlese, 1889: 9.

Iphiseius degenerans (Berlese), Berlese, 1921: 95; Evans, 1954: 517-524; Chant, 1959: 110; Elbadry, 1970: 502.

Iphiseius (Iphiseius) degenerans (Berlese), Pritchard & Baker, 1962: 299 Van der Merwe, 1968: 105.

The Cape Verdean specimens agree in all respects with the available descriptions of this species.

MATERIAL STUDIED. Twelve females and 7 males from *Saccharum officinarum, Trichilia emetica, Vitis vinifera and Dolichos lablab,* Sao Jorge dos Orgaos, Santiago, 20 May 1985 to 16 February 1987, A. van Harten.

PREVIOUS RECORDS: This species is cosmopolitan in distribution.

***Amblyseius scutalis* (Athias-Henriot) (Fig. 1–6)**

Typhlodromus scutalis Athias-Henriot, 1958: 183.

Amblyseius scutalis (Athias-Henriot), Athias-Henriot, 1960: 297.

Typhlodromus (Amblyseius) delhiensis Narayanan & Kaur, 1960: 5; Wysoki & Bolland, 1983: 92 (syn.).

Amblyseius libanesi Dosse, 1967: 30; Wysoki & Bolland, 1983: 92 (syn.).

Amblyseius gossipi Elbadry, 1967: 177; Wysoki & Bolland, 1983: 92 (syn.).

I found the Cape Verdean specimens to be conspecific with a paratype female of *A. scutalis* from Algiers, borrowed from the Museum national d'Histoire Naturelle in Paris. The following redescription is based on the Cape Verdean specimens and the paratype specimen.

FEMALE (measurements in parentheses are those of the paratype). Dorsum (Fig. 1). Dorsal shield 308–354 long and 176–221 wide and faintly reticulated, with 17 pairs of setae, 10 pairs of pores and rugose patches. Lengths of setae: j1 31–39 (33), j3 39–46 (38), j4 15–23 (22), j5 15–23 (19), j6 28–39 (32), J2 31–42 (32), J5 8 (8), z2 31–39 (36), z4 46–51 (47), z5 12–23 (16), Z1 28–39 (28), Z4 34–39 (36), Z5 69 (66), s4 59–65 (66), S2 39–43 (38), S4 31 (32), S5 34–42 (38), r3 23 (20), R1 15–17 (17), JV5 34–42 (38). Setae Z5 serrated. Peritremes extending to level of setae z2. Setae r3 and R1 on the interscutal membrane.

Venter (Fig. 2). Sternal shield 95–104 long and 98–104 wide, with 3 pairs of setae and 2 pairs of pores. Fourth pair of sternal setae on small metasternal shields, accompanied by third pair of sternal pores. According to Athias-Henriot (1958) the posterior margin of the sternal shield is straight. Although the sternal shield was indistinct in the paratype female, a small portion of the posterior margin could be detected and clearly showed that the posterior margin is lobed. This also is the case with the Cape Verdean specimens.

The genital shield is 85–92 wide caudally and bears 1 pair of setae. The ventro-anal shield, 97–110 long and 77–89 wide, narrows anteriorly, flaring caudally towards its broadest part across the anal opening. Three pairs of setae are arranged in 2 rows, with 2 pores posteromediad of setae JV2. The para-anal setae are situated anterior to the middle of the anal opening.

The opisthogasteric cuticle is provided with 4 pairs of setae, 6 pairs of platelets and 2 pairs of metapodal shields.

Spermatheca (Fig. 3). The atrium is slightly bulged with the cervix a long slender tube that slightly widens towards the vesicle.

Gnathosoma. Anterior margin of tectum as shown in Fig. 4. The fixed cheliceral digit bears 6 small teeth and a pilus dentilis subapically and the movable digit only 1 tooth (Fig. 5).

Legs (Fig. 6). Leg IV with 3 bluntly-tipped macrosetae: genu 46–54 (58), tibia 35–42 (44), basitarsus 69 (76). Macrosetae also present on genu III, 28–31 (35); genu II, 23–26 (25); tibia III, 25–28 (32).

MATERIAL STUDIED. A paratype female and male from *Ceratonia siliqua,* Rovigo, Algiers; 1 female from *Jatropha curcas,* Sao Jorge dos Orgaos, Santiago, 28 August 1983, A. van Harten; 4 females from *Ipomoea batatas,* Ribeira de Mangue, Santiago, 9 May 1984, A. van Harten; 2 females from *Ficus gnaphalocarpa,* Ribeira da Barca, Santiago, 16 July 1984, A. van Harten; 1 female from *Dolichos lablab,* Sao Jorge dos Orgaos, Santiago, 16 February 1987, A. van Harten.

***Amblyseius neotutsi* sp. nov. (Fig. 7–19)**

This species is very similar to *A. tutsi* Pritchard & Baker from which it can be distinguished by the shape of the spermatheca and macrosetae on the legs and the number of teeth on the fixed cheliceral digit. The dorsal setal pattern is 10A:9B according to the system proposed by Chant & Yoshida-Shaul (1989).

FEMALE. Measurements in parentheses indicate variations in paratypes. Dorsum (Fig. 7). Dorsal shield 331 (331–347) long and 216 (216–231) wide, rectangular, with 17 pairs of setae, 8 pairs of pores and rugose patches. Lengths of setae are: j1 39 (35–43); j3 46 (46–51); j4 31 (31–39); j5 and z2 34 (34–46); j6, J2 and z4 59 (54–66); J5 6 (5–6); z5 15 (15–17); Z4 51 (51–57); Z5 77 (77–88); s4 85 (77–88); Z1 and S2 62 (62–69); S4 and S5 45 (45–54); r3 26 (26–34); R1 18 (18–20). Setae Z5 serrated. Setae r3 and R1 on the interscutal membrane. Peritremes extending to level of setae j1.

Venter (Fig. 8). Sternal shield 92 (85–92) long and 92 (92–100) wide, with 3 pairs of setae and 2 pairs of pores, third pair of sternal pores absent. Posterior margin with 2 lateral lobes and a wedge-shaped median lobe. Fourth pair of sternal setae on small metasternal shields.

Genital shield 88 (88–92) wide posteriorly.

Ventro-anal shield 97 (92–108) long and 77 (69–77) wide. Anteriorly narrower than at level of anal opening and with 3 pairs of pre-anal setae in an almost straight line and a pair of crescent-shaped

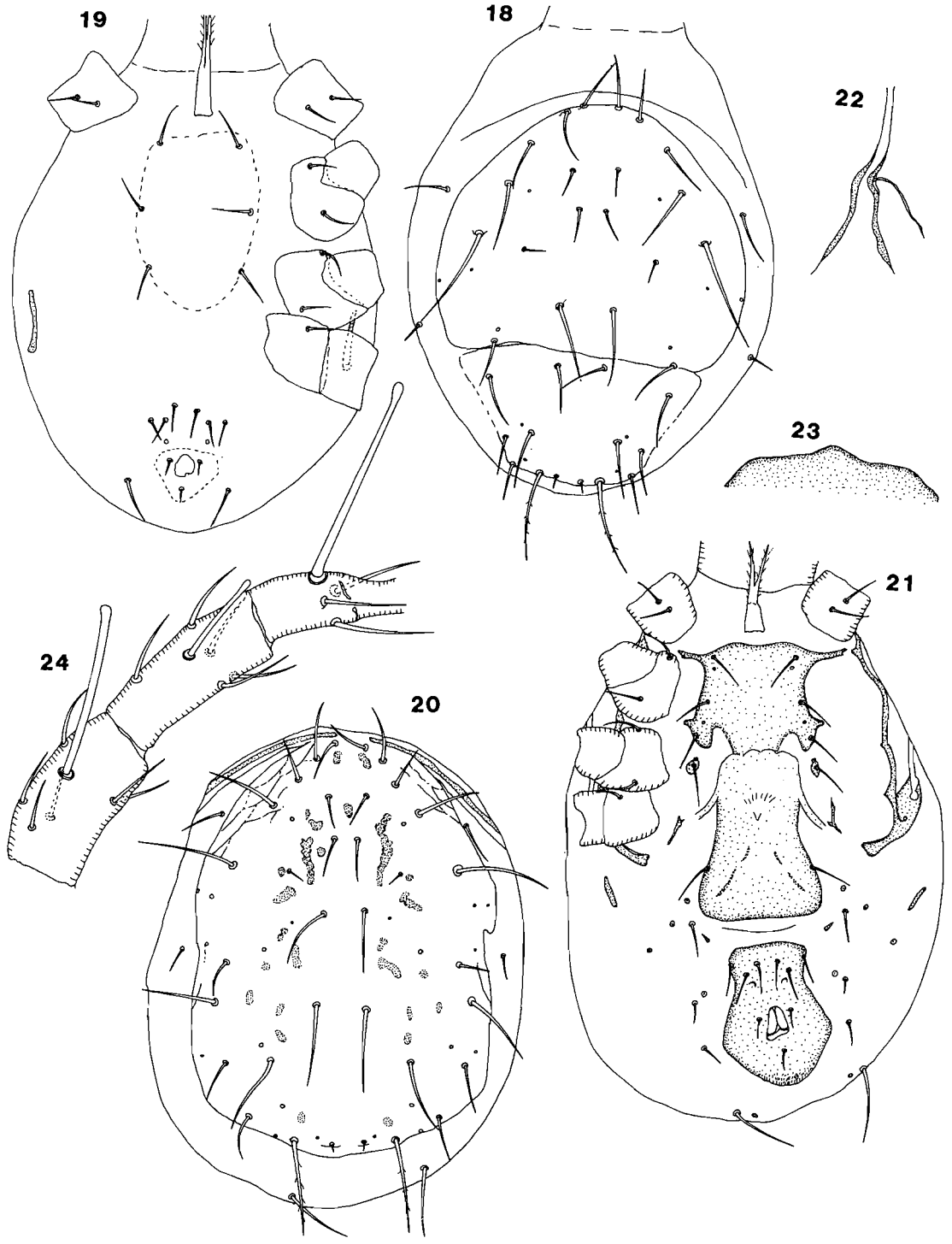


FIG. 18–19 *Amblyseius neotutsi* sp. nov. (continued)
FIG. 18 Dorsum of protonympha
FIG. 19 Venter of protonympha

FIG. 20–24 *Amblyseius insulatus* sp. nov. Female.
FIG. 20 Dorsum
FIG. 21 Venter
FIG. 22 Spermatheca
FIG. 23 Anterior margin of tectum
FIG. 24 Leg IV

pre-anal pores posteriad of setae JV2. Para-anal setae almost in line with anterior margin of anal opening.

Opisthogasteric cuticle with 4 pairs of setae, 2 pairs of metapodal shields and 7 pairs of small platelets. Setae JV5 smooth, 48 (46–51) long.

Spermatheca (Fig. 9). Major duct slender but gradually widens before joining cervix. Cervix tube-like and slightly flared towards vesicle. Atrium indistinctly defined.

Gnathosoma. Fixed cheliceral digit with 6 teeth (3 in *A. tutsi)* and a pilus dentilis. Movable digit with a single tooth (Fig. 10). Anterior margin of tectum as in Fig. 11.

Legs (Fig. 12). Macrosetae measure as follows: genu II 31 (31–34); genu III 42 (42–46); genu IV 69 (54–66); tibia III 31 (31–35); tibia IV 39 (39–46); basitarsus IV 72 (62–77). All macrosetae are knobbed distally.

MALE. Dorsal shield (Fig. 13) 239–262 long and

139–165 wide. Differs from female in that setae r3 and R1 are inserted on shield and peritremes are shorter, reaching to level between setae z2 and z4. Lengths of setae: j1, j3 and j6 39–43; j4 15–23; j5 and r3 23–26; J2 32–34; J5 5–6; z2 35–37; z4 46–54; z5 12–15; Z1 39–40; Z4 and S5 31–39; S2 39–42; S4 28–30; Z5 54–57; R1 9–15. Setae Z5 serrated.

Venter (Fig. 14). Sternogenital shield 131 long and 82 wide, with 5 pairs of setae, 2 pairs of pores and genital opening on anterior margin. Ventro-anal shield, 92 long and 146 wide, slightly reticulated and fused with peritrematal shields. It bears 3 pairs of pre-anal setae, in an almost straight line, and 2 pores. Opisthogasteric cuticle with setae JV5, 31 long, and 2 pairs of small platelets.

Gnathosoma (Fig. 15). Spermadactyl T-shaped distally.

Legs. Distribution and shape of macrosetae similar to those of female: genu II 28–31, genu III 34–39, tibia III 26–28, genu and basitarsus IV 48–54 and tibia IV 39–40.

DEUTONYMPHA (MALE). Dorsal shield (Fig. 16) 254 long and 185 wide. Length of setae: j1, j3, j6 and S4 39; j4 15; j5 26; J2 34; J5 5; z2 37; z4 and S5 43; z5 11; Z1 and S2 42; Z4 46; Z5 62; s4 65; r3 27; R1 12. Shield with 5 pairs of pores and setae Z5 serrated. Peritremes extending to level of setae z4, peritrematal shields absent.

Venter (Fig. 17). Ventral shields indistinctly outlined. Sternal area with 5 pairs of setae. Opisthogaster with an anal shield, 3 pairs of pre-anal setae and 2 pre-anal pores. Setae JV5 smooth and 42 long. The absence of setae ZV1, ZV3 and JV4 distinguishes the male deutonymph from the female deutonymph (Chant, 1958).

Legs. Leg chaetotaxy similar to that of female. Length of macrosetae: genu II and tibia III 31, genu III 39, genu IV 54, tibia IV 46 and basitarsus IV 80.

PROTONYMPHA. Dorsal shield (Fig. 18) 231 long and 169 wide. Shield not clearly defined, with suture between podonotal and opisthonotal shields. Setae j1, j3, J2, z2, Z1, Z4 and S2 31; j4 18; j5 23; j6 46; J5 5; z4 39; z5 and R1 15; Z5 54; s4 69; S4 and S5 25; r3 28. Peritrematal shields absent. Setae Z5 serrated.

Venter (Fig. 19). Outline of ventral shields could not be discerned. Sternal region with 3 pairs of setae. Opisthogasteric cuticle with anal opening, 3 pairs of pre-anal setae, 2 pre-anal pores and short peritremes. Setae JV5 smooth and 31 long.

Legs. The chaetotaxy is as follows: coxae similar to that of female; trochanters each with 4 setae; femur I 2–2/2,2/1–1; femur II 1–2/1,2/0–1; femur III 1–1/1,2/0–0; femur IV 1–2/0–1; genu I 1–2/1,2/1–1; genu II–III 1–2/0,2/0–1; genu IV 1–2/0,2/0–0; tibia I 1–2/1,2/1–1; tibiae II–III 1–1/1,2/1–1; tibia IV 1–1/1,2/0–1. Length of macrosetae; genu II 28, genu III 39, tibia III 26, genu IV 62, tibia IV 57 and basitarsus IV 85. Macrosetae also knobbed.

MATERIAL STUDIED. Holotype female and 14 paratype females from *Jatropha curcas*, Sao Jorge dos Orgaos, Santiago, 24 August 1983, A. van Harten; 25 paratype females, 6 paratype males, 6 paratype deutonymphae and 1 paratype protonympha from *Vitis vinifera, Trichilia emetica, Musa sapientum, Cocos nucifera, Morus alba, Carica papaya, Dolichos lablab, Hibiscus rosasinensis* and *Coffea arabica*, Sao Jorge dos Orgaos, Santiago, 2 June 1983 to 9 February 1989, A. van Harten.

***Amblyseius insulatus* sp. nov. (Fig. 20–24)**

This species resembles *A. tutsi* Pritchard & Baker, *A. orientalis* (Elbadry), *A. neotutsi* sp. nov. and *A. scutalis* (Athias-Henriot). However, it differs from these species by the shape of the spermatheca. *A. insulatus* further differs from *A. neotutsi, A. tutsi* and *A. scutalis* in that its peritremes reach anteriad of setae j1. The dorsal setal pattern is 10A:9B (Chant & Yoshida-Shaul, 1989).

FEMALE. Dorsum (Fig. 20). The broad ovate dorsal shield is 315 long and 232 wide, with 17 pairs of setae, 10 pairs of pores and rugose patches. Length of setae: j1 and z2 32; j3 42; j4 25; j5 and S5 35 j6 47; J2 61; J5 4; z4 55; z5 13; Z1 26; Z4 60; Z5 69; s4 72; S2 59; S4 38; r3 30; R1 16. All setae, except z5 and J5, relatively long, and smooth, except setae Z5, which are serrated. Setae r3 and R1 on interscutal membrane, r3 twice as long as R1. Peritremes extending anteriad of setae j1.

Venter (Fig. 21). Sternal shield, 88 long and 106 wide, with 3 pairs of setae and 2 pairs of pores. Posterior margin lobed. Third pair of sternal pores and fourth pair of setae on small metasternal shields.

Genital shield 91 broad caudally, with 1 pair of setae.

Ventro-anal shield, 104 long and 74 wide, with 3 pairs of pre-anal setae, almost aligned, and 2 pores. Para-anal setae almost in line with anterior margin of anal opening.

Opisthogasteric cuticle with 6 pairs of small platelets, 1 pair of metapodal shields and 4 pairs of setae, setae JV5 50 long.

Spermatheca (Fig. 22). Atrium incorporated in funnel-shaped cervix.

Gnathosoma. The position of the chelicerae renders an illustration impossible, but the movable and fixed digits bear at least 1 and 3 teeth, respectively. Anterior margin of tectum dome-shaped, but slightly triangular medially (Fig. 23).

Legs (Fig. 24). Macrosetae knobbed and measure as follows: genu I and II 26, genu III 23, genu IV 54, tibia IV 28 and basitarsus IV 63.

MATERIAL STUDIED. Holotype female from an unidentified plant, Sao Jorge dos Orgaos, Santiago, 30 August 1983, A. van Harten.

***Amblyseius lula* Pritchard & Baker**

Amblyseius (Amblyseius) lula Pritchard & Baker, 1962: 239; Ueckermann & Loots, 1988: 212.

Amblyseius lula Pritchard & Baker; Schicha, 1981a: 212.

Amblyseius insignitus Van der Merwe, 1968: 138; Ueckermann & Loots, 1988: 140 (syn.).

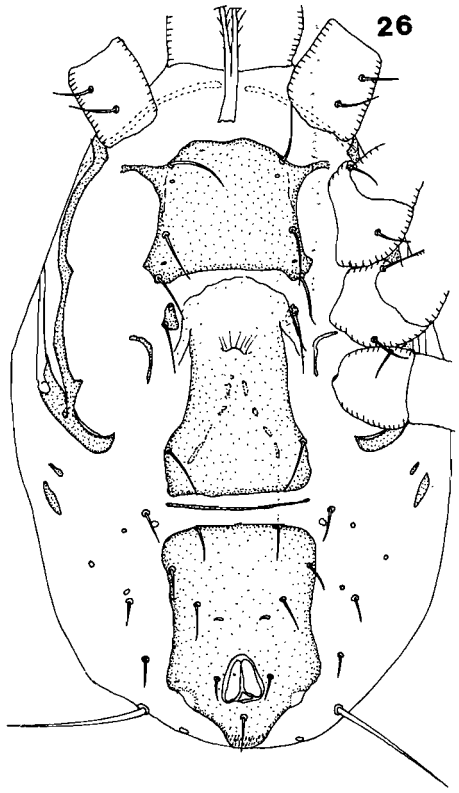
Amblyseius lula can be recognised by the slender, reticulated dorsal shield bearing short setae, except for setae Z5 which is relatively long, the reticulated ventral shields, the shallowly domed cervix of the spermatheca and leg IV which bears 1 macroseta. In all the specimens studied so far only setae Z4 and Z5 are serrated but in the Cape Verdean specimen setae S4 and S5 also are serrated.

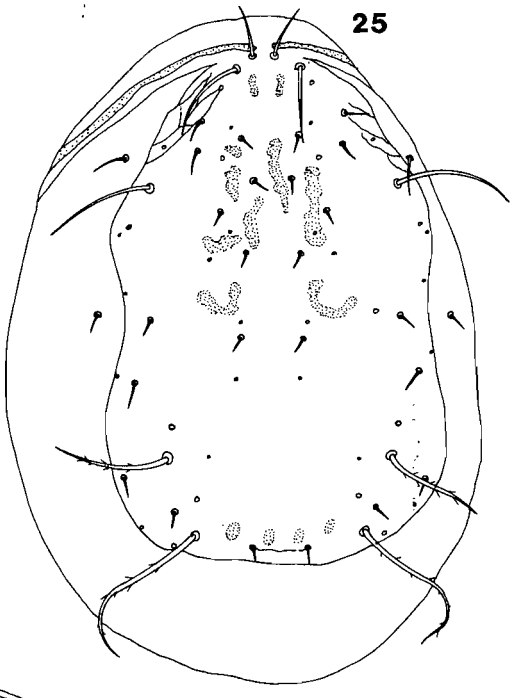
MATERIAL STUDIED. One female from a suction trap, Sao Jorge dos Orgaos, Santiago, November 1987.

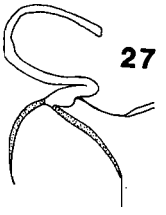
PREVIOUS RECORDS. This species also is known from South Africa and Zaïre.

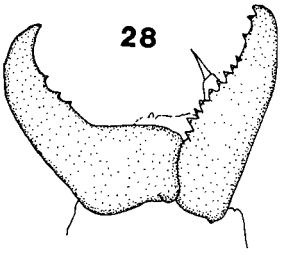
***Amblyseius sundi* Pritchard & Baker**

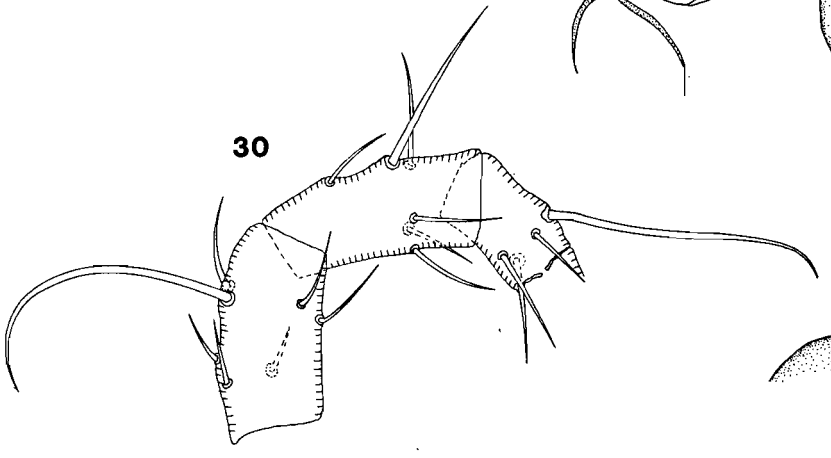
Amblyseius (Amblyseius) sundi Pritchard & Baker











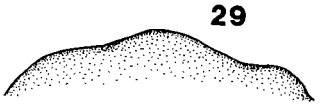


FIG. 25–30 *Amblyseius swirskii* Athias-Henriot. Female

FIG. 25 Dorsum
FIG. 26 Venter
FIG. 27 Spermatheca
FIG. 28 Chelicera
FIG. 29 Anterior margin of tectum
FIG. 30 Leg IV

1962: 244.

Amblyseius (Proprioseiopsis) sundi Pritchard & Baker; Blommers, 1976: 99

Amblyseius sundi Pritchard & Baker; Matthysse & Denmark, 1981: 344; Denmark & Muma, 1989: 19; Moraes De, McMurtry & Yaninek, 1989: 97.

According to Pritchard & Baker (1962) *A. sundi* lacks seta Z1. This was confirmed by the redescriptions of this species by Blommers (1976) and Moraes De, McMurtry & Yaninek (1989). I examined specimens of this species from Nigeria and also found that seta Z1 is absent. In contradiction to these findings Matthysse & Denmark (1981) and Denmark & Muma (1989) redescribed *A. sundi* as having seta Z1. The latter authors seem to have examined another species.

Amblyseius sundi can be recognised by the absence of seta Z1, the very long setae s4, Z4 and Z5, with the latter longer than the dorsal shield, and the long tube-like cervix of the spermatheca.

MATERIAL STUDIED. I did not study any material of *A. sundi,* but according to Van Harten (1988) Dr C. Klein Koch collected this mite from *Coffea arabica* on the island of S. Antao, in 1980.

PREVIOUS RECORDS. Madagascar, Mozambique, Nigeria and Zaïre.

***Amblyseius barkeri* (Hughes)**

Neoseiulus barkeri Hughes, 1948: 142; Ragusa & Athias-Henriot, 1983: 668.

Typhlodromus (Neoseiulus) barkeri (Hughes), Nesbitt, 1951: 35.

Typhlodromus (Typhlodromus) barkeri (Hughes), Chant, 1959: 61.

Amblyseius barkeri (Hughes), Athias-Henriot, 1961: 440; Swirski, Ragusa, Van Emden & Wysoki,

1973: 70; Wainstein & Shcherbak, 1972: 43.

Amblyseius (Amblyseius) barkeri (Hughes), Ehara, 1972: 147; Ueckermann & Loots, 1988: 147.

Amblyseius usitatus Van der Merwe, 1968: 71; Ueckermann & Loots, 1988: 148 (syn.).

Amblyseius pieteri Schults, 1972: 17; Ueckermann & Loots, 1988: 148 (syn.).

Amblyseius masiaka Blommers & Chazeau, 1974: 308; Ueckermann & Loots, 1988: 148 (syn.).

Amblyseius mckenziei Schuster & Pritchard, 1963: 268; Ragusa & Athias-Henriot, 1983: 668 (syn.).

Amblyseius oahuensis Prasad, 1968: 1518; Ragusa & Athias-Henriot, 1983: 668 (syn.).

Amblyseius mycophilus Karg, 1970: 290; Ragusa & Athias-Henriot, 1983: 668 (syn.).

Amblyseius picketti Specht, 1968: 681; Ragusa & Athias-Henriot, 1983: 668 (syn.).

Amblyseius barkeri can be recognized by the following combination of characters: dorsal body setae relatively short, except for setae Z4 and Z5, which may be slightly serrated; sternal shield with posterior margin straight, with 3 pairs of setae; ventro-anal shield slightly reticulated, subtriangular, with 3 pairs of pre-anal setae and 2 pores (male ventro-anal shield with 4 pairs of pre-anal setae); major duct of spermatheca broad, atrium bifid and cervix almost tube-like but broadening slightly towards vesicle, sometimes with the cervix slightly bulging before joining atrium. The Cape Verdean specimens are similar to identified material in our Mite Collection.

MATERIAL STUDIED. Seven females, from *Phaseolus vulgaris* and *Fragaria vesca*, Boa Entrada, Santiago, 26 July 1983 to 26 August 1983, A. van Harten.

PREVIOUS RECORDS. Algeria, Brazil, China, East Germany, Egypt, Ghana, Greece, Guinea, Hawaii, Israel, Italy, Japan, London Docks England, Mozambique, Madagascar, South Africa, Spain, The Netherlands, Turkey, U.S.A., U.S.S.R., Zimbabwe.

***Amblyseius hima* Pritchard & Baker**

Amblyseius (Amblyseius) hima Pritchard & Baker, 1962: 257; Blommers, 1976: 89.

Euiseius hima (Pritchard & Baker), Moraes De, McMurtry, Van den Berg & Yaninek, 1989: 84.

Moraes *et al.* (1989) suggested a critical comparison between *A. hima* and *A. natalensis* Van der Merwe because the latter appears to be a junior synonym of *A. hima*. Therefore I compared the type specimens of *A. natalensis* with the literature on *A. hima* as well as specimens of *A. hima* from the Cape Verde Islands. I found that these 2 species can be separated by 2 distinctive characters: firstly the cervix of the spermatheca is inflated proximally and constricted distally in *A. hima*, as opposed to a broad tube in *A. natalensis*; secondly, leg IV of the holotype female and Cape Verde specimens of *A. hima* has 1 macroseta [Moraes *et al.* (1989) counted 3 in their Kenyan specimens], whereas leg IV of *A. natalensis* bears 2 macrosetae.

MATERIAL STUDIED. Eight females from *Ficus gnaphalocarpus*, Sao Jorge dos Orgaos, 8 June 1984, A. van Harten.

PREVIOUS RECORDS. India, Kenya, Madagascar and Rwanda.

***Amblyseius swirskii* Athias-Henriot** (Fig. 25–30)

Amblyseius swirskii Athias-Henriot, 1962: 1–7; Porath & Swirski, 1965: 95; Swirski, Ragusa, Van Emden & Wysoki, 1973: 80.

Amblyseius swirskii is closely related to *A. andersoni* (Chant). A comparison between Israeli specimens of *A. swirskii* and specimens of *A. andersoni* (=*potentillae*, Chant & Yoshida-Shaul, 1990) from cultures of the University of Amsterdam, The Netherlands, showed that *A. swirskii* differs in that setae Z5 are much shorter (100–126 as opposed to 145–158 in *A. andersoni*) and in the shape of the minor duct of the spermatheca; the minor duct originates from the atrium as a very slender duct but suddenly broadens and gradually narrows distally, whereas it is slender throughout its length in *A. andersoni*.

Amblyseius enab Elbadry is another species which may be conspecific with *A. swirskii*. Judging from the description of Elbadry (1967) it is only the shape of the ventro-anal shield that separates these 2 species.

The following redescription of *A. swirskii* is based on the Cape Verdean specimens:

FEMALE. Dorsum (Fig. 25). Dorsal shield 347–408 long and 211–246 wide, slightly reticulated anterolaterally, with 17 pairs of setae, 18 pairs of pores and rugose patches. Length of setae are: j1 31–39; j3 57–69; j4, j5 and z5 8–9; j6, J2, J5, Z1, S4 and S5 9–11; z2, z4 and R1 12–15; Z4 69–77; Z5 100–126; s4 74–85; S2 15–20; r3 23. Both setae Z4 and Z5 serrated. Setae r3 and R1 are inserted on interscutal membrane. Peritremes extending anteriad of setae j1.

Venter (Fig. 26). Sternal shield 69–82 long and 95–100 wide with 3 pairs of setae and 2 pairs of pores. Third pair of sternal pores and fourth pair of setae on small metasternal shields. Genital shield 85–88 wide posteriorly. Ventro-anal shield 123–134 long and 89–92 wide, rectangular with lateral margins slightly concave, bearing 3 pairs of pre-anal setae and 2 pores, caudamedial to setae JV2. Paraanal setae in line with middle of anal opening. Opisthogasteric cuticle with 2 pairs of metapodal shields, a long slender platelet between genital and ventro-anal shields, 5 pairs of small platelets and 4 pairs of setae with JV5 62–77 long and smooth.

Spermatheca (Fig. 27). Major duct long and slender, with atrium kidney-shaped and cervix bowl-shaped.

Gnathosoma. The Cape Verdean specimens differs from the Israeli specimens in that the fixed cheliceral digit bears 11 teeth instead of 9 (Fig. 28). Movable digit with 3 teeth. Anterior margin of tectum as in Fig. 29.

Legs (Fig. 30). Macrosetae distributed as follows: genu I 26–31; genu II and III 31–39; genu IV and basitarsus IV 57–69; tibia III 26–28 and tibia IV 46–54.

MALE. Similar to the male described by Porath & Swirski (1965).

PROTONYMPHA AND DEUTONYMPHA. As described by Swirski *et al.* (1973).

MATERIAL STUDIED. Seven females and 3 males from *Citrus* sp., Bet Dagan, Israel, 20 September 1976, S. Kamburov; 1 male from *Coffea arabica*, Paul, Santo Antao, 19 July 1984, A. van Harten; 13 females, 1 male, 1 deutonympha and 1 protonympha from *Codiaeum variegatum*, *Dolichos lablab*, unidentified Convolvulaceae and a suctiontrap, Sao Jorge dos Orgaos, Santiago, 4 March 1984–November 1987, A. van Harten; 3 females from *Ziziphus*

mauritiana, Santa Cruz, Santiago, 21 March 1985, A. van Harten.

PREVIOUS RECORD. Israel.

***Amblyseius neolargoensis* Van der Merwe**

Amblyseius (Amblyseius) neolargoensis Van der Merwe, 1965: 59.

This species can be separated from the closely related *A. largoensis* (Muma) by the markedly longer setae s4, Z4 and Z5, relatively narrower cervic of the spermatheca and the pre-anal pores on the ventro-anal shield, which is located almost between setae JV2. Setae Z4 and Z5 are shorter in the Cape Verdean specimens, viz. 148–154 and 277–312, as opposed to 158–167 and 355–362 in the type specimens.

MATERIAL STUDIED. Two females from *Plantago* sp., Vale Cachopa, Santiago, 9 August 1984, A. van Harten; 1 female from *Ipomoea batatas,* Ribeira de Mangue, Santiago, 16 July 1984. A. van Harten; 4 females and 1 male from *Ageratum conyzoides,* 19 August 1986, A. van Harten.

PREVIOUS RECORDS. Hawaii, Mozambique, Madagascar and South Africa.

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