

PHYTOSEIID MITES OF MOROCCO, WITH DESCRIPTIONS OF
TWO NEW SPECIES AND NOTES ON THE GENERA
KUZINELLUS, *TYPHLOCTONUS* AND *TYPHLODROMUS*
(ACARI : PHYTOSEIIDAE)

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PHYTOSEIIDAE
MOROCCO
TAXONOMY

SUMMARY : A survey of phytoseiid mites on citrus and various other plants in Morocco yielded 17 species, two of which are new. Descriptions are presented for *Kuzinellus saharae* n. sp. and *Kampimodromus hmiminai* n. sp. and a supplementary description is given for *Amblyseius italicus* (Chant). Notes are included on the authors' concepts of the genera *Kuzinellus*, *Typhloctonus* and *Typhlodromus*.

PHYTOSEIIDAE
MAROC
TAXONOMIE

RÉSUMÉ : Un inventaire des acariens Phytoséïides associés aux Agrumes ainsi qu'à d'autres plantes a été réalisé au Maroc. Il en est ressorti 17 espèces dont deux sont nouvelles. Les descriptions de *Kuzinellus saharae* n. sp. et de *Kampimodromus hmiminai* n. sp. sont présentées. De plus, une description supplémentaire d'*Amblyseius italicus* (Chant) est donnée. Des notes sur la conception par les auteurs, des genres *Kuzinellus*, *Typhloctonus* et *Typhlodromus* sont aussi rapportées.

Collections of Phytoseiidae were made in various parts of Morocco during April and May of 1982 during a survey for natural enemies of phytophagous mites on citrus for possible introduction into California for biological control of pest mites. Some additional collections were made in 1985-86. Of the 17 species reported in this paper, two are described as new and 11 are known from neighbouring Algeria, from long-term studies by C. ATHIAS-HENRIOT.

All measurements are in microns, showing means and ranges. The setal nomenclature follows that of CHANT & HANSELL (1971), ROWELL *et al.* (1978) and CHANT & YOSHIDA SHAUL (1978).

Genus *Kuzinellus* Wainstein

Kuzinellus WAINSTEIN, 1976 : 699.
Paraseiulus (*Kuzinellus*), KARG, 1983 : 322.
Typhlodromus ecclesiasticus group, CHANT and YOSHIDA-SHAUL, 1986 : 447.
Paraseiulus MUMA, 1961 : 299 (part).

We consider the genus *Kuzinellus* to be equivalent to the *ecclesiasticus* species group, characterized by CHANT & YOSHIDA-SHAUL (1986). This genus is distinguished from *Paraseiulus* Muma as defined by WAINSTEIN (1976) by the shape of the ventrianal shield and by the presence of 4, rather than 2, pairs of setae on that shield. We consider *Paraseiulus* to be equivalent to the *soleiger* species group, defined

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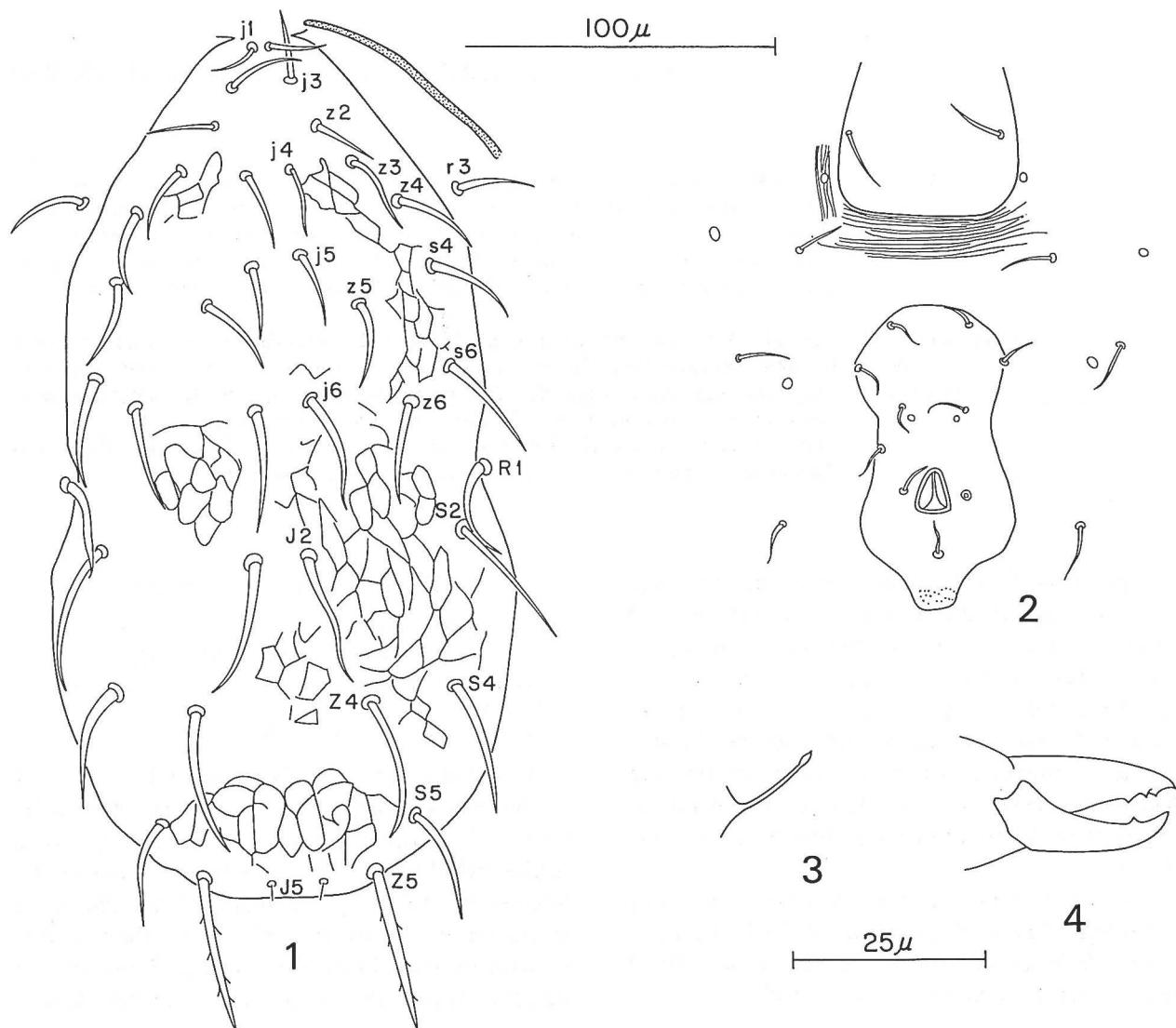
by CHANT & YOSHIDA-SHAUL (1982). Unlike *Paraseiulus*, which seems to be a uniform, natural grouping, *Kuzinellus* probably is not a single natural assemblage of species (e.g. contrast *K. kuzini* (Wainstein) with *K. ecclesiasticus* (DeLeon) or *K. prunusus* (van der Merwe)).

Kuzinellus saharae

MCMURTRY and BOUNFOUR n. sp.

Female : (Figs. 1-4) (7 specimens measured).
Dorsal shield 326 (300-354) long, 152 (144-174)

wide at level of *s4*, reticulated over entire surface, with 18 pairs of setae, the bases of which arise from tubercles. Sensillae and glandular openings difficult to discern. Setae *j1* 20 (18-22), *j3* 32 (30-36), *j4* 29 (26-30), *j5* 31 (30-36), *j6* 47 (44-48), *J2* 54 (48-60), *J5* 7-8, *z2* 27 (24-30), *z3* 31 (27-36), *z4* 32 (30-36), *z5* 36 (36-37), *z6* 40 (31-42), *Z4* 59 (54-60), *Z5* 58 (54-60), *s4* 37 (36-38), *s6* 44 (42-48), *S2* 53 (48-56), *S4* 51 (48-56), *S5* 42 (36-46); *r3* 29 (28-30) and *R1* 37 (36-39), both on membrane adjacent to dorsal shield. Peritreme extending anteriorally almost to level of setae *j1*.



Figs 1-4 : *Kuzinellus saharae* n. sp., female.
1. — Dorsal shield ; 2. — Ventral surface ; 3. — Spermatheca ; 4. — Chelicera.

Sternal and genital shields weakly sclerotized, ill-defined; ventrianal shield width 57 (48-65) at widest anterior level (at $ZV2$), 44 (42-45) at narrowest level (near middle) and 58 (54-60) at level of anus. Four pairs of preanal setae on shield (one pair, $JV3$, missing on one specimen). Ventrolateral setae $ZV1$, $ZV3$, $JV4$ and $JV5$ present; $JV5$ 48 (45-52). Length of primary metapodal plate 35, width 3.

Spermatheca small, indistinct; cervix narrow ($1\ \mu$), parallel-sided but flared at distal end, 9-12 long. Fixed digit of chelicera 31, with 3 teeth; movable digit 30, with 1 tooth. Legs without macrosetae. Chetotaxy of GeII 2, $\frac{2-2}{1}$, 1; GeIII 1, $\frac{2-2}{1}$, 1; TiIII 1, $\frac{1-2}{1}$, 1; TiIII 1, $\frac{1-2}{1}$, 1.

Male : Unknown.

Locality and type material : Holotype female, in U.S. National Museum of Natural History (USNMNH), and 2 paratype females, in University of California, Riverside, Division of Biological Control (UCR) from olive, *Olea europaea*, Zagora, Morocco 11-V-82. Four additional paratype females (in UCR) from *Cupressus*, same location and date.

Remarks : *K. saharae* resembles *K. kuzini* (Wainstein) but can be distinguished from that species by the longer setae on the dorsal shield (CHANT & YOSHIDA SHAUL, 1986), by having 1 rather than 2 teeth on the movable digit of the chelicera, and by the narrow, tubular rather than saccular cervix of the spermatheca.

This species is also similar to *K. sennarensis* (ELBADRY) but that species has $R1$ inserted on the dorsal shield rather than on the lateral integument (ELBADRY, 1967; CHANT & YOSHIDA SHAUL, 1986). Also, in CHANT & YOSHIDA SHAUL's redescription, which was not based on type material, the cervix of the spermatheca of *K. sennarensis* is considerably longer than in *K. saharae*.

Genus *Typhloctonus* Muma

Typhloctonus MUMA, 1961 : 299; CHAUDHRI, 1974 : 231; DENMARK and RATHER 1984 : 163.

Seiulus (*Typhloctonus*) : KARG, 1983 : 322.

Most species placed in this genus by DENMARK & RATHER (1984) have one or no macrosetae on leg IV, fewer than 6 teeth on the fixed digit of the chelicera, all of which are distal to the *pilus dentilis*, and the spermatheca with a cup-shaped (often shallow) cervix (saccular in *tiliarum*), in addition to the presence of seta Z1. Exceptions are : *T. myopori* Collyer, which has multidentate chelicerae, and 3 long macrosetae on leg IV (we believe this species should be grouped with *T. cottieri* Collyer, which DENMARK & RATHER (1984) place in *Tasminodromus* Wainstein); *T. prunus* Denmark and Rather from India; and *T. vollsella* Chaudhri from Pakistan. The last 2 species have 3 "knobbed, bacillate" macrosetae on leg IV.

Typhloctonus perforatus

(Athias-Henriot) *New Combination*

Typhlodromus perforatus ATHIAS-HENRIOT, 1960a : 72.

Specimen examined : Morocco : El Jadida, 28-IV-82, 1 female, from *Ricinus communis*.

Previous records : Algeria (ATHIAS-HENRIOT, 1960a).

Remarks : The setal measurements of our specimens are close to those given by ATHIAS-HENRIOT (1960a) for specimens from Algeria. This species is included in *Typhloctonus*, based on the generic description of DENMARK & RATHER (1984), although these authors did not list it in their review of the genus.

Typhlodromus Scheutten

Typhlodromus SCHEUTEN, 1857 : 111.

We here include species of typhlodromine mites that have setae $S2$, $S4$ and $R1$ (*Typhlodromus* sensu SCHUSTER & PRITCHARD, 1963; KOLODOCHKA 1978; and KARG, 1983) as well as those species which have setae $S5$ in addition to the above named setae (*Anthoseius* DeLeon sensu KOLODOCHKA, 1978 and KARG, 1983; or *Amblydromella* Muma sensu DENMARK & MUMA, 1973). Because some of these species seem to differ only in the presence or

absence of seta S_5 (e.g. *Typhlodromus athenas* SWIRSKI & RAGUSA, 1976; and *T. atticus* SWIRSKI & RAGUSA, 1976), we consider both of these groups of species to be *Typhlodromus*. Except for the presence of S_5 , some species considered to be *Amblydromella* (or *Anthoseius*) are closer to species lacking S_5 (*Typhlodromus* s.s.) than they are to many of the species with S_5 present. In fact, it is conceivable that this character is subject to intraspecific variation.

Typhlodromus athenas Swirski and Ragusa

Typhlodromus athenas SWIRSKI and RAGUSA, 1976 : 111.

Specimens examined : Morocco : Beni Melal, 4-V-82, 3 females, from *Malva* sp., 2 females, from olive ; Italy : Polizzi Generosa (PA), 7-XII-73, 1 female, from olive ; Greece : Athens (Kiphissia), 14-IV-80, 1 female, from olive.

Previous records : Greece (SWIRSKI & RAGUSA, 1976).

Remarks : Setal measurements of 3 specimens (means and ranges) are as follows : j_1 24 (24-25), j_3 29 (28-30), j_4 18 (17-18), j_5 19 (18-20), j_6 23 (22-24), J_2 25 (24-26), J_5 8-9, z_2 19 (18-20), z_3 25 (24-26), z_4 24, z_5 18, Z_4 48, Z_5 60 (57-61), s_4 29 (28-30), s_6 31 (30-32), S_2 33 (30-36), S_4 34 (30-36), S_5 23 (21-24), r_3 28 (27-30), R_1 27 (24-32), ST IV 47 (44-48) ; dorsal shield 358 (348-366) long 186 (180-192) wide. Lengths of setae and dorsal shield are all somewhat greater for Morocco specimens, compared to those recorded by SWIRSKI & RAGUSA (1976) for specimens from Greece. No other differences were noted between specimens from the two areas.

Typhlodromus rhenanoides Athias-Henriot

Typhlodromus rhenanoides ATHIAS-HENRIOT 1960a : 85.
Neoseiulus rhenanoides, SCHUSTER & PRITCHARD 1963 : 205.

Specimens examined : Morocco : Kenitra, 24-IV-62, 2 females, from *Cupressus* ; Italy : Palermo, 19-II-75, 2 females, from *Rosmarinus officinalis* ; USA : California : Monterrey, 6-VI-72, 2 females, from *Pinus radiata* ; San Jose, 5 females, from *Juglans* sp.

Previous records : Algeria (ATHIAS-HENRIOT, 1960a) ; Spain (FERRAGUT et al., 1983) ; Italy (RAGUSA, 1977) ; USA — California (SCHUSTER & PRITCHARD, 1963 ; CHARLET & McMURTRY, 1977) ; USA — Hawaii (PRASAD, 1968).

Remarks : Setal measurements of the 2 Morocco specimens are as follows : j_1 24, j_3 24-30, j_4 18, j_5 18-24, j_6 18-22, J_2 24-26, z_2 12-14, z_3 24, z_4 24-26, z_5 18-22, Z_4 43-48, Z_5 58-60, s_4 26-30, s_6 30, S_2 36, S_4 36-42, S_5 24-28. These measurements are similar to those of specimens from Algeria (ATHIAS-HENRIOT, 1960a), California (SCHUSTER & PRITCHARD, 1963), and 2 specimens from Italy.

Typhlodromus ilicis Athias-Henriot

Typhlodromus ilicis ATHIAS-HENRIOT 1960a : 95.

Specimen examined : Morocco : Azilal, 1 female, 5-V-82, from *Quercus*.

Previous records : Algeria (ATHIAS-HENRIOT, 1960a).

Remarks : Besides the holotype, also from *Quercus*, this is the only other record of this characteristic species, which has a small ventrianal shield bearing only 2 pairs of preanal setae.

Typhlodromus laurentii Ragusa and Swirski

Typhlodromus laurentii RAGUSA & SWIRSKI 1978 : 213.

Specimens examined : Morocco : Marrakech, 6-V-82, 4 females, from olive ; Beni Melal, 4-V-82, 8 females, from olive, 3 females, from *Cupressus* sp. ; Taroudant, 5-V-86, 1 female, from *Cynodon dactylon*. Italy : Palermo, 17-X-79, 1 female, from *Ilex aquifolium*.

Previous records : Italy (RAGUSA & SWIRSKI, 1978).

Remarks : Measurements of setae were made on 13 specimens from 3 locations in Morocco, and the means corresponded very closely to the values given for type material from Italy (RAGUSA & SWIRSKI, 1978).

Typhlodromus phialatus Athias-Henriot

Typhlodromus phialatus ATHIAS-HENRIOT, 1960a : 100.

Specimens examined : Morocco : Sidi Bennour, 29-IV-82, 2 females, from weed in citrus orchard ; Ait Melloul (near Agadir), V-1-86, 1 female, from *Argania spinosa*.

Previous records : Algeria (ATHIAS-HENRIOT, 1960a) ; USSR (WAINSTEIN 1975 ; KOLODOCHKA, 1978, 1980, 1981) ; Israel (SWIRSKI & AMITAI, 1984) ; Jordan Valley (AMITAI & SWIRSKI, 1978) ; Spain (FERRAGUT *et al.*, 1983).

Remarks : SWIRSKI & RAGUSA (1977) and RAGUSA & SWIRSKI (1978) discuss characters separating closely-related species in the *tiliae* or *pyri* group. *T. phialatus* occurs on many different plants in Algeria (ATHIAS-HENRIOT, 1960a).

Genus *Neoseiulus* Hughes

Neoseiulus HUGHES, 1948 : 141 ; DELEON 1965a : 23 ; MUMA & DENMARK 1968 : 235 ; RAGUSA & ATHIAS-HENRIOT 1983.

Neoseiulus stolidus Chaudhri

Amblyseius stolidus CHAUDHRI, 1968 : 558.

Neoseiulus stolidus, RAGUSA & ATHIAS-HENRIOT 1983 : 657.

Specimens examined : Morocco : Beni Melal, 4-V-82, 3 females, from *Hordeum* sp. ; Taroudant, 5-V-86, 1 female, from *Cynodon dactylon* ; Turkey : Balcali, 1-III-81, 3 females, from *Phaseolus* sp.

Previous records : Pakistan (CHAUDHRI, 1968).

Remarks : Our specimens conform closely to CHAUDHRI's description, including the setal measurements, and also to specimens from Turkey, collected by E. SEKEROGLU and loaned by H. A. DENMARK. Attempts to borrow the holotype were unsuccessful and there are no paratypes deposited in the British Museum and USNMNH as indicated in CHAUDHRI's paper.

Neoseiulus cucumeris (Oudemans) New Combination

Typhlodromus cucumeris OUDEMANS, 1930 : 69.

Typhlodromus (Amblyseius) cucumeris, CHANT 1959 : 78. *Amblyseius cucumeris*, ATHIAS-HENRIOT, 1957 : 336.

Specimens examined : Morocco : El Jadida, 29-IV-82, 1 female, from strawberry ; Azemour, 30-IV-82, 2 females, from *Ricinus communis* ; USA — California : El Toro (Orange County), 11-V-65, 3 females, from strawberry.

Previous records : Numerous records, including Europe, Middle East, North Africa, Asia, North America, Australia (MORAES, *et al.*, 1986).

Remarks : The Morocco specimens conform closely to the redescriptions of SCHUSTER & PRITCHARD (1963) and SCHICHA (1976) for *N. cucumeris*.

Genus *Kampimodromus* Nesbitt

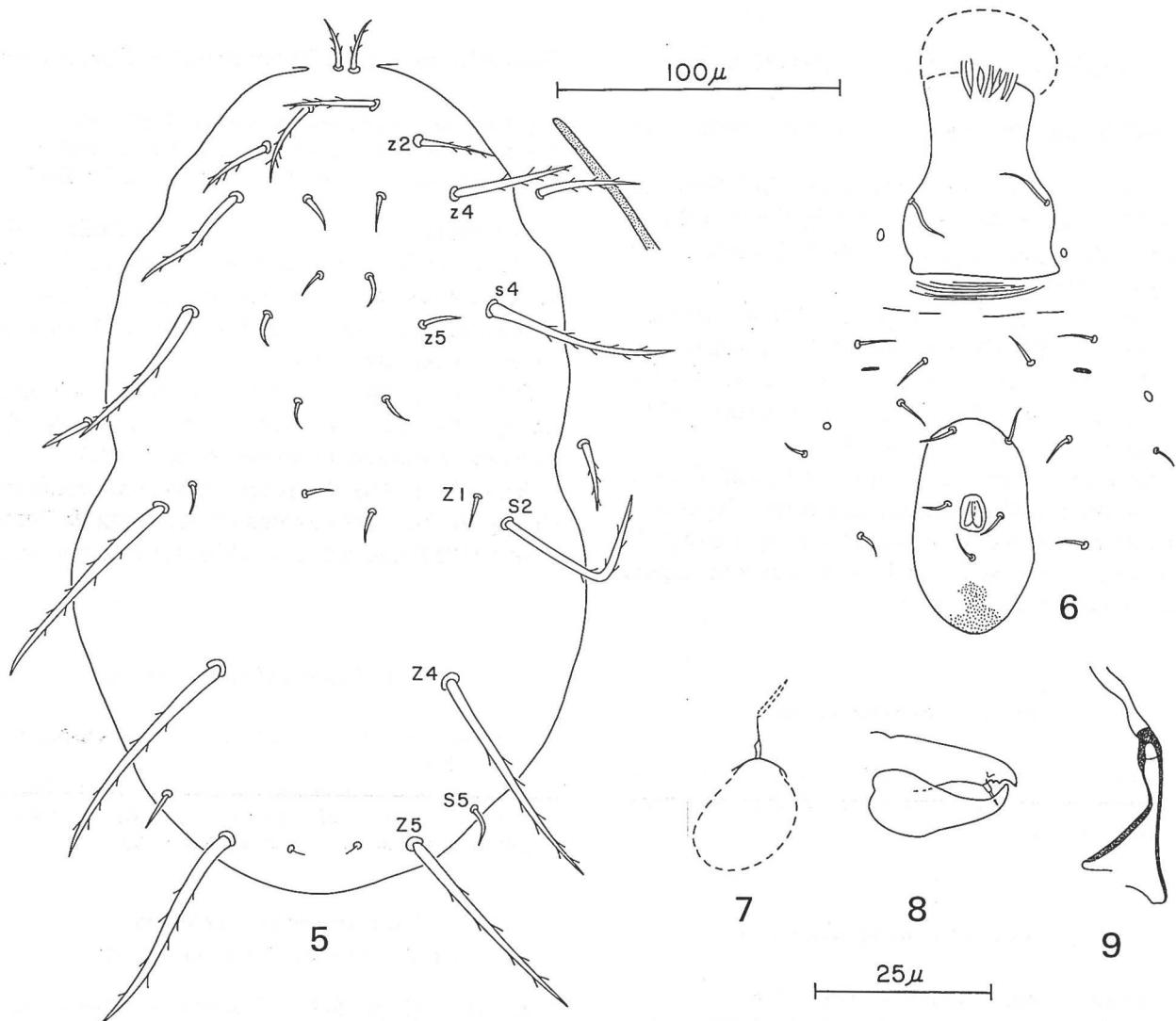
Kampimodromus NESBITT, 1951 : 52 ; MUMA & DENMARK 1968 : 234.

Amblyseius (Kampimodromus), PRITCHARD & BAKER 1962 : 294 ; WAINSTEIN 1962 : 14 ; VAN DER MERWE 1968 : 160 ; UECKERMANN & LOOTS 1985 : 195.

Kampimodromus hmiminai

McMURTRY & BOUNFOUR n. sp.

Female : (Figs. 5-8) (10 specimens measured). Dorsal shield 321 (302-336) long, 167 (152-180) wide, lightly sclerotized, with faint reticulations in lateral areas and creases in central areas, with 16 pairs of setae. Setae *j1* 18 (17-19), *j3* 40 (36-48), *j4* 14 (12-16), *j5* 11 (10-12), *j6* 16 (12-18), *J2* 12 (10-14), *J5* 6, *z2* 30 (26-36), *z4* 48 (44-52), *z5* 14 (10-17), *Z1* 12 (10-16), *Z4* 79 (72-86), *Z5* 71 (64-80), *s4* 67 (60-74), *S2* 76 (72-86), *SS* 12 (10-14). Setae *r3* 39 (36-42), inserted on membranous cuticle next to dorsal shield (except for 1 specimen, which has setae inserted on dorsal shield) ; *R1* 28 (24-36), inserted on membrane. Setae *j4* through *j6*, *J2*, *J5*, *z5*, *Z1* and *SS* smooth, all others distinctly serrated. Peritreme 109 (92-118), extending approximately to level of base of setae *z2*.



Figs. 5-8 : *Kampimodromus hmiminai* n. sp., female.
5. — Dorsal shield ; 6. — Ventral surface ; 7. — Spermatheca ; 8. — Chelicera.
Fig. 9 : *Amblyseius italicus* (Chant). Spermatheca.

Sternal shield weakly sclerotized, ill-defined, genital shield width at level of setae 55 (48-60) ; ventrianal shield oval, 84 (78-88) long, 46 (40-48) wide at level of anal opening, bearing only 1 pair of preanal setae (*JV2*) ; *JV1*, *ZV2*, as well as the usual *ZV1*, *ZV3*, *JV4* and *JV5* present on membrane surrounding shield ; *JV5* serrated, 29 long. Primary metapodal plate 29 long, 2-3 wide.

Cervix of spermatheca bowl-shaped (poculiform), atrium distinct. Fixed digit of chelicera 23, with apical

tooth plus 3 small teeth near distal end ; movable digit edentate, 23. Small macroseta only on tarsus IV, 24 (20-30) long. Chetotaxy of GeII 2, $\frac{2-2}{1}$, 1 ; Ge III 1, $\frac{2-2}{1}$, 1 ; Ti II 1, $\frac{1-2}{2}$ —1 ; Ti III 1, $\frac{1-2}{2}$ —1.

Male : Unknown.

Locality and type material : Holotype female (in USNMNH) from fig leaf, Sidi-Bennour, Morocco,

29-IV-82. Six paratypes (in University of California, Riverside, Division of Biological Control), same data. Three additional paratypes from fig, Agdaz (near Zagora), 11-V-82, and one paratype from fig, Taliouine, 12-V-82, all in UCR. Also collected in El Hajeb on fig.

Remarks : The placement of this species in the genus *Kampimodromus* is considered provisional, as the genus needs to be redefined. The new species seems most closely related to *K. aberrans* (Oudemans) in sharing the following characters : (1) similar dorsal shield chetotaxy (*S4* absent); (2) setae *j1*, *j3*, *z2*, *z4*, *Z4*, *Z5*, *s4* and *S2* strongly serrated; (3) bowl-shaped cervix of the spermatheca and small, distinct atrium; (4) small cheliceral digits, with only about 3 teeth on the fixed digit, all distal to the *pilis dentilis*. *Amblyseius (Kampimodromus) maritimus* Ehara and *K. hevae* (Oudemans) are similar in all of the above characters except (1), as they also lack seta *J2*. *Z1* is also serrated on *maritimus*. *K. langei* Wainstein & Arutunjan apparently has all dorsal shield setae serrated. *Amblyseius trichopilus* Blommers differs in character (1) in that *S4* is present. *K. hmiminai* n. sp. differs from all of these similar species in having an oval-shaped ventrianal shield with only one pair of preanal setae rather than a long, narrow shield with 3 pairs of preanal setae.

Genus *Proprioseiopsis* Muma

Proprioseiopsis MUMA, 1961 : 277; MUMA & DENMARK 1968 : 231; MUMA et al. 1970 : 32.

Proprioseiopsis messor (Wainstein) New Combination

Typhlodromus messor WAINSTEIN 1960 : 668.
Amblyseius messor, ATHIAS-HENRIOT 1961 : 426.

Specimens examined : Morocco : Beni Melal, 5-V-82, 1 female, from *Hordeum* sp.; 1 female, from "ornamental".

Previous records : USSR (WAINSTEIN, 1960; LIVSHITZ & KUZNETZOV, 1972); Algeria (ATHIAS-HENRIOT, 1961); Australia (SCHICHA, 1983); East

Germany (KARG, 1965); Israel (SWIRSKI & AMITAL, 1965, 1968; AMITAL & SWIRSKI, 1978); Italy (*Athias-Henriot*, 1961; *Ragusa*, 1977); South Africa (ATHIAS-HENRIOT, 1966); Spain (ATHIAS-HENRIOT, 1966).

Amblyseius italicus (Chant)

Typhlodromus (Amblyseius) italicus CHANT, 1959 : 70.

Specimens examined : Italy (intercepted at New York, USA), 12-IX-50, 4 female syntypes (holotype not indicated) from beech leaves; Morocco : El Jadida, 29-IV-82, 2 females, from cucumber leaves in greenhouse.

Supplementary description : Based on 4 syntypes. Dorsal shield smooth, 440 (420-450) long, setae *j1* 38 (36-42), *j3* 58 (50-62), *z2* 32 (28-36), *z4* 42 (36-48), *Z4* 100 (96-108), *Z5* 225 (216-228), *s4* 120 (108-126), all other setae on dorsal shield minute (10 µm or less); *r3* 26, *R1* 20.

Genital shield width 84 (1 specimen measured); ventrianal shield length 127, anterior width 66, narrowest width (just in front of level of setae *JV2*) 54, width at level of anus 88; *JV1* and *JV2* only preanal setae on ventrianal shield, setae *ZV2* on membrane along with *ZV1*, *ZV3*, *JV4* and *JV5*. Posterior margin of sternal shield straight, except for small lateral lobes, on which setae *STIII* are inserted.

Six teeth plus *pilis dentilis* on fixed digit of chelicera, 4 teeth on movable digit. Cervix of spermatheca funnel-shaped, tubular at base (Fig. 9), atrium indistinct. Macrosetae on *GeIV* 107 (96-114), *TiIV* 71 (68-72), *TIV* 83 (78-81). Macrosetae also present on *Ge I*, *II*, *III*.

Amblyseius graminis Chant

Amblyseius graminis CHANT, 1956 : 34; ATHIAS-HENRIOT 1961 : 435; LIVSHITZ & KUZNETZOV 1972 : 26.
Typhlodromus (Amblyseius) graminis, CHANT 1959 : 89.

Specimen examined : Morocco : El Jadida, 28-IV-82, 1 female, from *Malva* sp.

Previous records : England (CHANT, 1956); Algeria (ATHIAS-HENRIOT, 1961); USSR (LIVSHITZ &

KUZNETZOV, 1972) ; Poland (WIACKOWSKI & SUSKI, 1963) ; Germany (KARG, 1965) ; Spain (ATHIAS-HENRIOT, 1961). Additional references in MORAES *et al.* (1986).

Remarks : Measurements of various setae on the specimen from Morocco are : j_1 29, j_3 44, z_2 26, z_4 38, (Z_4 broken), Z_5 88, s_4 56, S_2 54, $SgeIV$ 56, $StIIV$ 44, $StIV$ 79. These measurements generally conform closely with those given by ATHIAS-HENRIOT (1961) and LIVSHITZ & KUZNETZOV (1972), but differ from some of those given by WESTERBOER & BERNHARD (1963).

Although this species is retained in *Amblyseius* in this paper, we recognize that it differs from *Amblyseius* s.s., as defined by MUMA *et al.* (1970) and DANMARK & MUMA (1973) in having fewer than 8 teeth on the fixed digit of the chelicera, macrosetae absent on legs I-III, and no erect seta on basitarsus I.

Genus *Phytoseiulus* Evans

Phytoseiulus EVANS 1952 : 397.

Phytoseiulus persimilis Athias-Henriot

Phytoseiulus persimilis ATHIAS-HENRIOT, 1957 : 347.
Phytoseiulus riegeli DOSSE, 1958 : 49.
Amblyseius tardi LOMBARDINI, 1959 : 1963.

Specimens examined : Morocco : Beni-Melal, 5-V-82, 5 females, from ornamental next to house ; El Jadida, 29-IV-82, 1 female, from *Capsicum frutescens* in greenhouse, 1 female, from strawberry, 1 female, from *Malva* ; Sidi Bennour, 29-IV-82, 1 female, from fig tree, 5 females from herbaceous plants in orchard.

Previous records : Algeria (ATHIAS-HENRIOT, 1957), France, Tunisia (RAMBIER, 1972) ; Libia (HESSEIN, 1976) ; Lebanon (DOSSE, 1967) ; Greece (SWIRSKI & RAGUSA, 1977) ; Italy (LOMBARDINI, 1959 ; McMURTRY, 1977 ; RAGUSA, 1977) ; Israel (AMITAI & SWIRSKI, 1978) ; Chile (DOSSE, 1958) ; GONZALEZ, 1961) ; Australia (GOODWIN & SCHICHA, 1979) ; USA — California (McMURTRY *et al.*, 1978) ; South Africa (MEYER, 1981) ; Peru

(ELBENHAWY, 1979) ; Spain (FERRAGUT *et al.*, 1983).

Remarks : Collection records suggest that *P. persimilis* is native to the Mediterranean region, possibly to North Africa. Its occurrence in other parts of the world probably is the result of introductions. *P. persimilis* is generally found only in coastal, subtropical environments. The collection from Beni-Melal, Morocco, a hot, dry area, was from plants next to a house in a shaded situation. Another unusual record is from an oasis in Tunisia, which also is probably a humid microenvironment (RAMBIER, 1972). In Morocco, *P. persimilis* was found naturally occurring in plastic greenhouses, apparently surviving pesticide treatments on cucumbers and sweet peppers.

Genus *Euseius*

Amblyseius (*Amblyseius*), section *Euseius* WAINSTEIN 1962 : 15.

Amblyseius (*Euseius*), DELEON 1965b : 125.
Euseius, DELEON 1966 : 86 ; MUMA *et al.* 1970 ; McMURTRY 1983.

Euseius scutalis (Athias-Henriot) New Combination

Typhlodromus scutalis ATHIAS-HENRIOT, 1958 : 183.
Amblyseius scutalis, ATHIAS-HENRIOT, 1960b : 297.
Typhlodromus (*Amblyseius*) *finlandicus*, subsp. *rubini* SWIRSKI & AMITAI 1961 : 196.
Amblyseius rubini, SWIRSKI & AMITAI 1965 : 132.
Amblyseius delhiensis NARAYANAN & KAUR, 1960 : 5.
Amblyseius libanesi DOSSE 1967 : 30.
Amblyseius gossypi ELBADRY 1967 : 177.

Specimens examined : Morocco : More than 100 females from 29-IV-82 to 11-V-82 from the following plants and locations : Citrus from Beni Melal, Marrakech, Agadir ; fig, apple, *Datura stramonium*, near Zagora ; apricot, Zagora. Israel : Ein Gedi, 11-III-63, 1 female, from *Calotropis* sp. ; Bet Dagan, 25-VIII-64, 2 females, from *Persea americana* ; 2 females, from *Ricinus communis*. Jordan : Jordan Valley, 9-IV-84, 7 females, from *Lantana*.

Previous records : Based on synonomies given above and by WYSOKI & BOLLAND (1983), *E.*

scutalis has a distribution extending from Spain, through North Africa and the Middle East, to India (see BOUNFOUR & McMURTRY, 1987, FOR ADDITIONAL REFERENCES).

Remarks : *E. scutalis* was the main phytoseiid mite collected on citrus in the interior valleys (e.g. Marrakech, Beni Melal) and the relatively dry southern coast (Agadir). It was not collected in the more humid coastal areas, such as Kenitra and Rabat, where *E. stipulatus* was the dominant species. Its distribution extends to desert areas such as Zagora in Morocco, where it was collected on fruit trees, and the Dead Sea region of Israel, where it occurs on numerous species of plants (SWIRSKI & AMITAI, 1985).

Euseius stipulatus (Athias-Henriot)

Amblyseius stipulatus ATHIAS-HENRIOT, 1960b : 294.

Specimens examined : Morocco : Rabat, VI-82, 12 females, from *Persea americana*; 14 females, from *Citrus* spp.; 3 females, from *Datura* sp.; Kenitra, 24-IV-82, 14 females, from *Citrus*; Azemmour, 30-IV-82, 9 females, from *Citrus*; El Jadida, 28-IV-82, 11 females, from *Ricinus communis*; 1 female, from *Malva*.

Previous records : Algeria (ATHIAS-HENRIOT, 1960b), Spain, Italy, Greece, Turkey (RAGUSA & SWIRSKI, 1976; SWIRSKI & RAGUSA, 1976; McMURTRY, 1977; RAGUSA, 1977); USA — California (Introduced) (McMURTRY, 1977).

Genus *Iphiseius* Berlese

Iphiseius BERLESE, 1916 : 33, *nomen nudum*; BERLESE 1921 : 95.

Iphiseius degenerans (Berlese)

Seius degenerans BERLESE, 1889 : 9.

Iphiseius degenerans, BERLESE, 1921 : 95; EVANS, 1954 : 518.

Specimens examined : Morocco : Rabat, 8-V-82, 3 females, from *Citrus*.

Previous records : Numerous records from Africa, Middle East and southern Europe (MORAES *et al.*, 1986).

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