

**NOTES ON PHYTOSEIID MITES (MESOSTIGMATA : PHYTOSEIIDAE)
FROM THE SEA OF GALILEE REGION OF ISRAEL, WITH A
DESCRIPTION OF A NEW SPECIES OF *AMBLYSEIUS****

E. SWIRSKI AND S. AMITAI

Department of Entomology, Agricultural Research Organization,
The Volcani Center, P.O. Box 6, Bet Dagan 50250, Israel

ABSTRACT

A description is given of the phytoseiid mite *Amblyseius rambami* n. sp. The following 16 species of phytoseiid mites are recorded from various plants in the Sea of Galilee (Lake Kinneret, Yam Kinneret) region of Israel: *Phytoseius finitimus* Ribaga, *Iphiseius degenerans* (Berlese), *Amblydromella athenas* (Swirski and Ragusa), *A. drori* (Grinberg and Amitai), *A. hierochuntica* (Amitai and Swirski), *A. recki* (Wainstein), *TypHodromusathiasae* Porath and Swirski, *T. phialatus* Athias-Henriot, *T. leptodactylus* Wainstein, *Bawus talbii* (Athias-Henriot), *Paragigagnathus tamaricis* Amitai and Grinberg, *Amblyseius bicaudus* Wainstein, *A. barkeri* (Hughes), *A. ? zwoelferi* (Dosse), *Amblyseiella setosa* Muma and *Euseius rubini* (Swirski and Amitai).

KEY WORDS: Israel, Sea of Galilee region, predacious mites, Phytoseiidae.

INTRODUCTION

This paper presents the results from a survey of phytoseiid mites (Mesostigmata : Phytoseiidae) carried out since 1961 in the region around the Sea of Galilee (Lake Kinneret, Yam Kinneret). The collection sites are marked on the map (Fig. 7). Asterisks in the text refer to a species new to Israel.

Mites were stored in 70% alcohol, cleared in Nesbitt's solution and mounted in Hoyer's fluid. The setal terminology of Rowell et al. (1978) was followed.

Phytoseius finitimus Ribaga, 1904

MATERIAL EXAMINED. Park of the Jordan River, 28.xii.87, all stages. Bet Zayda Valley, 27.viii.70, 2♀♀, *Polygonum equisetiforme* (Grinberg, 1971). Capernaum, 25.xi.87, 1♀, *Persea americana* (leaf, lower side). Tabgha, 25.xi.87, 3 ♀♀, *Withania somnifera* (leaf, lower side); 2 ♀♀, 1 nymph, *Inula viscosa* (leaf, lower side); all stages, many, *Ficus sycomorus* (leaves, lower side). Migdal, 26.vi. 1986, all stages, many, *Lantana camara* (leaves, lower side); all stages, few, *Rubus sanctus* (leaves, lower side). Tiberias, 26.vi.86, 1♂, *Morus* sp., 24.ii.87, all stages, many, *Ficus carica*; 6♀♀, *Malva silvestris*; 18.iv.87, 1♀, *Adhatoda vasica* (leaf, lower side). Kinneret (Qevuza), 27.X.61, 15.ix.62, 9.vi.63, all stages, many, *Vitis vinifera* (leaves, lower side); 10.ix.63, 8 ♀♀, *Micromeria nervosa* (Swirski and Amitai, 1965); 4.i.64, all stages, *Chrysanthemum* sp., *Pyrus malus*, *Prunus salicina*, *Annona* sp. (leaves, lower side), *Eriobotrya japonica* (litter) (Swirski and Amitai, 1968). Bet Yerah, 13.V.87, 4♀♀, *Inula viscosa*. Zemah, 10.ix.63, 4♀♀,

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Micromeria nervosa (coll. A. Porath); 6.ix.86, 2 ♀♀, *Bryobia syriaca*, 13.v.87, *Rubus sanctus*. haOn, 28.xii.87, all stages.

***Iphiseius degenerans* (Berlese, 1889)**

MATERIAL EXAMINED. Kinneret (Moshava), 4.xi.66, *Citrus* sp. (Swirski and Amitai, 1968). Sha'ar haGolan, x.63, 1 ♀, *Citrus* sp. Massada, 12.vii.64, ♀♀ (Porath and Swirski, 1965).

Amblydromella athenas* (Swirski and Ragusa, 1976)

MATERIAL EXAMINED. Tiberias, 6.iv.86, 2 ♀♀, *Pinus halepensis*.

***Amblydromella drori* (Grinberg and Amitai, 1970)**

MATERIAL EXAMINED. Tiberias, 19.ii.82, 13 ♀♀. Kinneret (Qevuza), 2.vi.85, 1 ♀; 6.iv.86, 2 ♀♀; 13.v.87, 3 ♀♀. Hammat Gader, 13.v.87, 3 ♀♀. All collected on *Tamarix* spp.

***Amblydromella hierochuntica* (Amitai and Swirski, 1968)**

MATERIAL EXAMINED. Migdal, 26.vi.86, 3 ♀♀, *Eriobotrya japonica*.

***Amblydromella recki* (Wainstein, 1958)**

MATERIAL EXAMINED. Tiberias, 19.ii.82, 1 ♀, *Zizyphus spina-christi*.

***Typhlodromus athiasae* Porath and Swirski, 1965**

MATERIAL EXAMINED. Bet Zayda Valley, 27.viii.70, 1 ♀, *Vitex agnus castus* (Grinberg, 1971). Capernaum, 20.ii.82, 1 ♀, *Convolvulus* sp.; 25.xi.87, 5 ♀♀, *Citrus* spp., 2 ♀♀, *Persea americana*. Tabgha, 25.xi.87, 1 ♀, Gramineae; 2 ♀♀, 1 nymph, *Prosopis farcata*; 26.vi.86, 1 ♀, *Cupressus sempervirens*. Migdal, 26.vi.86, 1 ♀, *Cupressus sempervirens*; 1 ♀, *Chenopodium murale*. Tiberias, 19.ii.82, 2 ♀♀, *Tamarix* sp.; 6.iv.86, 3 ♀♀, 1 ♂, *Pinus* sp.; 10.v.86, 1 ♀, *Pelargonium* sp.; 1 ♀, *Adhatoda vasica*; 17.vi.86, 12 ♀♀, 1 ♂, *Pinus* sp.; 26.vi.86, 3 ♀♀, *Cupressus sempervirens*; 9.ii.87, 4 ♀♀, *Cupressus sempervirens*; 24.ii.87, 1 nymph, *Grevillea robusta*; 1 ♀, 1 ♂, 1 nymph, *Phaseolus vulgaris*; 1 ♀, 1 ♂, 1 nymph, *Olea europaea*; 1 ♀, *Plumbago capensis*; 1 ♀, 1 nymph, *Cupressus sempervirens*; 7 ♀♀, 4 ♂♂, 2 nymphs, *Rosmarinus officinalis*; 8.iv.87, 1 ♀, *Lantana camara*; 1 ♀, *Acalypha wilkesiana*; 13.v.87, 3 ♀♀, *Pinus halepensis*; 1 ♀, *Amaranthus* sp. Ohalo, 2.vi.85, 1 ♀, *Asparagus* sp.; 1 ♀, *Viburnum tinus*; 1 ♀, *Prunus persica*; 2 ♀♀, *Melia azederah*; 6 ♀♀, *Rosmarinus officinalis*; 6.iv.86, *Atriplex halimus*. Kinneret (Qevuza), 11.ix.63, 5 ♀♀, 3 ♂♂, grapefruit (under leaf calices of the fruit); 21.ii.64, 2 ♀♀, *Solanum* sp. (Swirski and Amitai, 1965); 7.iv.70, ♀♀, Gramineae; 3 ♀♀, 3 nymphs, *Phoenix dactylifera* (Amitai and Swirski, 1978); 13.v.87, 4 ♀♀, 2 ♂♂, *Atriplex halimus*; 1 ♀, 2 ♂♂, *Euphorbia peplis*; 4 ♀♀, *Lonicera caprifolium* and *Bougainvillea* sp.; 3 ♀♀, 1 nymph, undet. Solanaceae; 2 ♀♀, 1 ♂, 1 nymph, Gramineae; 1 ♀, 1 ♂, *Withania somnifera*; 1 ♀, *Amaranthus* sp.; 2 ♀♀, *Cupressus sempervirens*; 3 ♀♀, *Malva nicaensis*. Hammat Gader, 24.iv.75, ♀♀, *Phoenix dactylifera*, *Conyza* sp. (Amitai and Swirski, 1978); 17.vi.86, 1 ♀, *Nerium oleander*. Afiqim, 11.ix.63, 8 ♀♀, 2 ♂♂, grapefruit (under leaf calices of the fruit). Massada, 11.x.63, ♀♀, ♂♂, *Citrus* sp. Deganya "B", 11.x.63, ♀♀, ♂♂ (Porath and Swirski, 1965). haOn, 28.xii.87, 4 ♀♀, *Cupressus sempervirens*.

Typhlodromus phialatus Athias-Henriot, 1960

MATERIAL EXAMINED. Hammat Gader, 20.ii.72, 1♀, *Tamarix* sp. (Amitai and Swirski, 1978).

Typhlodromus leptodactylus Wainstein, 1961*

MATERIAL EXAMINED. Tiberias, 24.ii.87, 1♀, *Widelia* sp. (Compositae).

NOTE. This species was first recorded in Israel from Ramallah, 7, 21.vii.75, 3♀♀, *Cupressus sempervirens*.

Bawus talbii (Athias-Henriot, 1960)

MATERIAL EXAMINED. Kinneret (Qevuza), 6.iv.86, 1♀, Gramineae.

Paragigagnathus tamaricis Amitai and Grinberg, 1971

MATERIAL EXAMINED. Tiberias, 19.ii.82, 1♀, *Tamarix* sp.

Amblyseius rambami n. sp.*

(Figs. 1–6)

Female. Dorsal shield (Fig. 1) suboval, with slightly constricted lateral margins; it is slightly sclerotized and reticulated, except for the faintly ornamented areas around the bases of Z4 and anterior part of the shield. Dorsal shield carries 17 pairs of setae; setae j3, z2, z3, z4, s4, s6, S2 shorter than the distances between their bases; each group of the above setae subequal in length: j4, j5, z5; J2, z2, z3, s4 and s6, S2, S4; all are smooth, besides setae Z5, which are sometimes very light serrated. The shield bears six pairs of solenostomes, distributed as follows: j3–z2, anterior to z3–j5, posterior to z4, s4–j6, anterior to Z4, mesad to S4.

Sternal shield (Fig. 3) slightly chitinized and striated; anterior margin convex, posterior one waved, lateral margins concave; the shield bears three pairs of setae and poroides pv1 and pv2; setae v4 and poroides pv3 are situated on metasternal plates. Genital shield (Fig. 3) normal, slightly chitinized; V-line prominent. The subtriangular ventrianal shield (Fig. 3) striated and reticulated, with rounded anterolateral corners; solenostomes (ian pores) minute; it carries three pairs of preanal setae; ratio of length/width = 1.22–1.42. Three pairs of setae, besides JV5, surround the ventrianal shield. The oblong primary metapodal plates are much longer (25–33 μm) than the minute secondary ones (8–15 μm) (Fig. 5). Apex of peritreme reaches the bases of setae j1–j3.

Cervix of spermatheca (Fig. 6) cup-shaped; atrium adjacent to the cervix; major duct cylindrical and long; minor duct distinct.

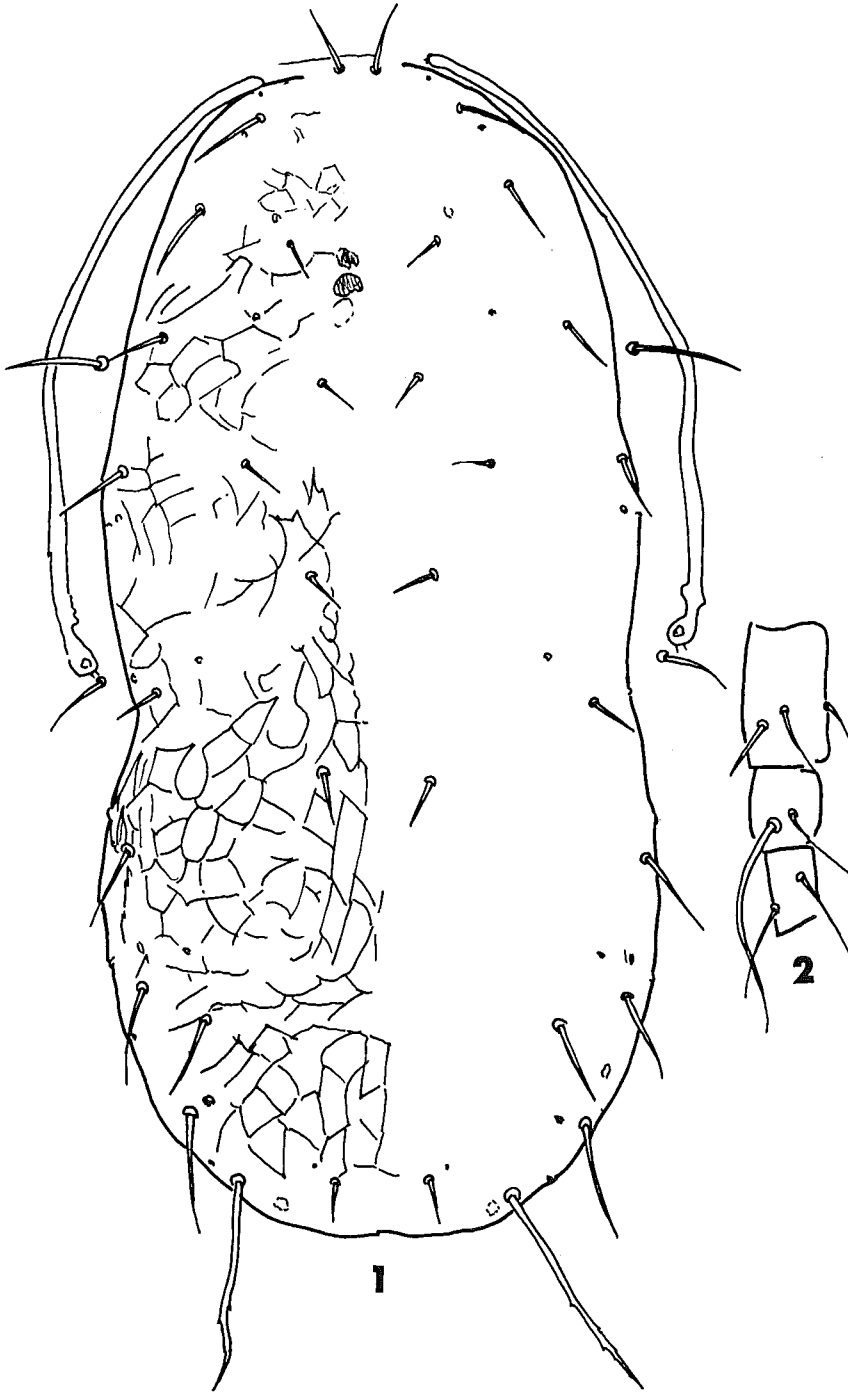
Seven setae on genu II. Hind leg carries one pointed macroseta on basitarsus (Fig. 2).

The movable digit of the chelicerae (Fig. 4) bears two teeth; the fixed one has 5 or 6, seldom 7 teeth, besides the *pilus dentilis*.

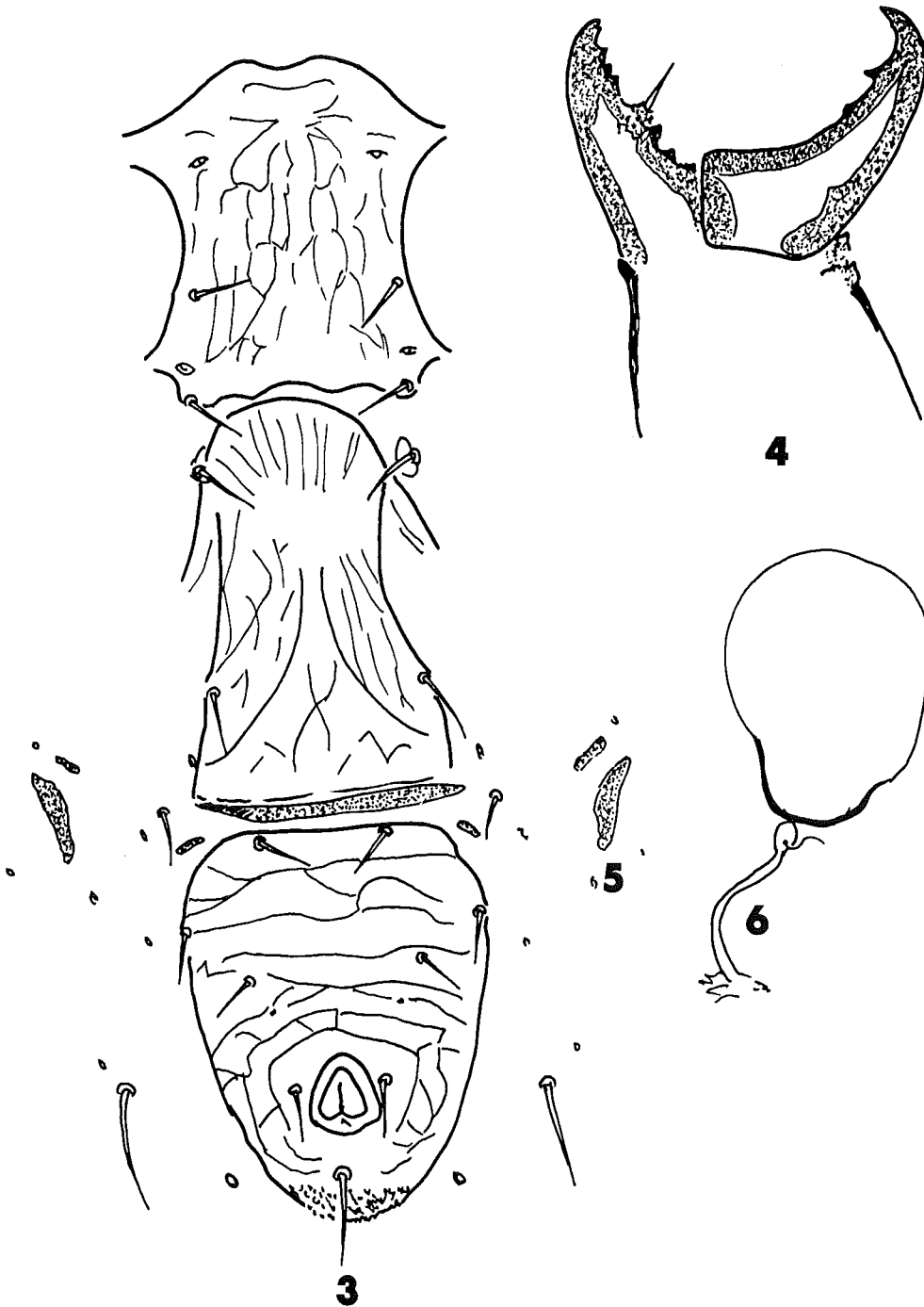
Measurements (in microns): Ds = 362(349–378); Lva = 116(108–129); lva = 90(86–100); j1 = 22(20–25); j4, j5, z5 = 13(12–15); j6 = 14.6 (13–17); J2, z2, z3, s4 = 18(17–20); j3 = 25.5(23–28); z4, r3 = 29(27–32); s6, S2, S4 = 31(27–37); Z5 = 79(75–83); Z4 = 32(30–35); R1 = 26(23–29); JV5 = 43(42–46); st = 68(63–73).

Male. Unknown.

MATERIAL EXAMINED. Holotype ♀ (No. 3327A3) and 21 paratype ♀♀, Tiberias, 9.ii.87, on *Ficus religiosa*, inside the nearly globular receptacles (fruits).



Figs. 1 and 2. *Ambylseius rambami* n. sp., female. 1. Dorsal shield. 2. Tibia and tarsus of the hind leg.



Figs. 3-6. *Amblyseius rambami* n. sp., female. 3. Sternal, genital and ventrianal shields. 4. Chelicera. 5. Metapodal plates. 6. Spermatheca.

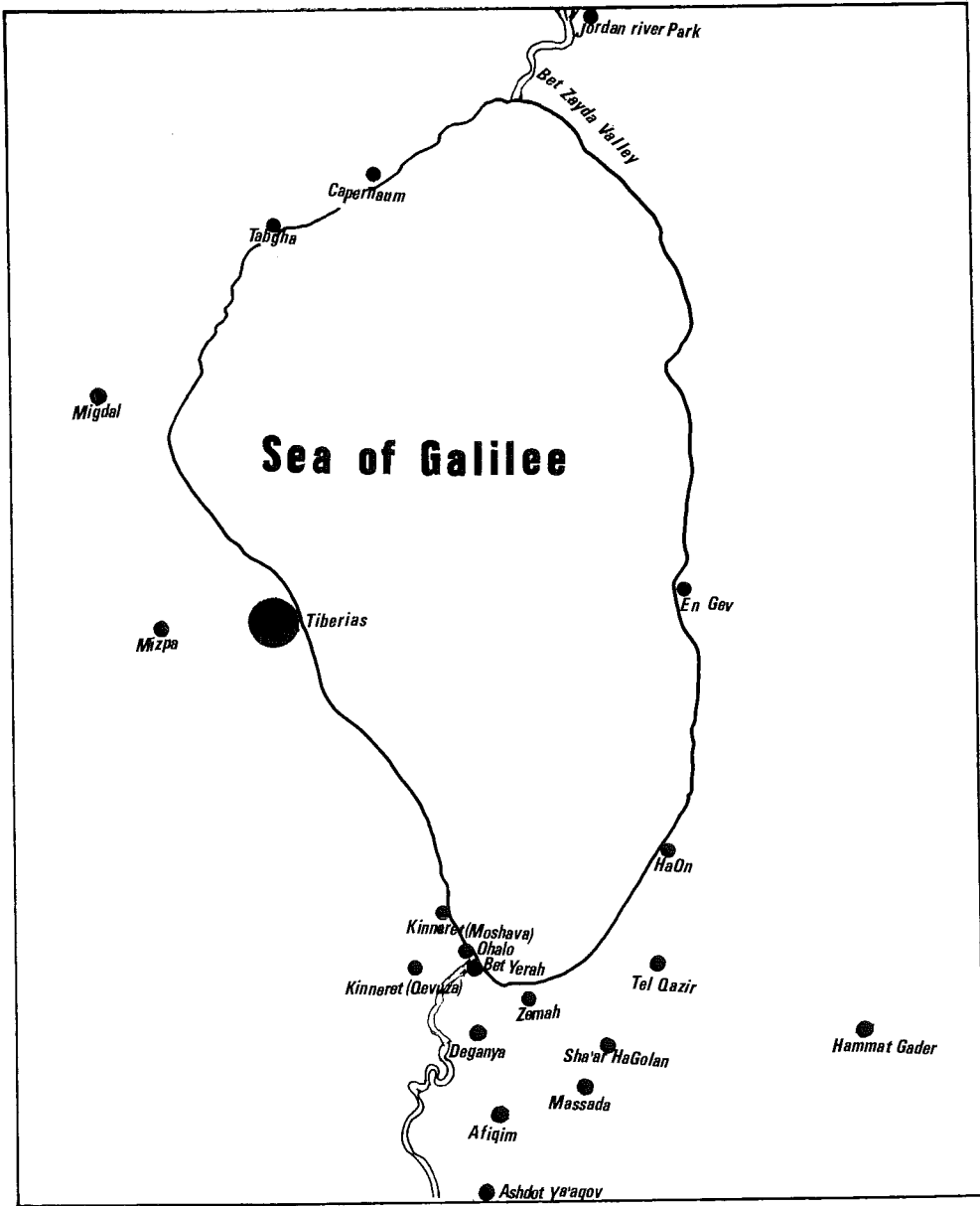


Fig. 7. Collection sites of phytoseiid mites at the Sea of Galilee region.

ETYMOLOGY. Named after the Rambam (an acronym for Rabbi Moses ben Maimon — Maimonides [1135–1204 A.C.]), the famous rabbi, philosopher and physician, near whose tomb the mites were collected.

TAXONOMIC NOTES. *Amblyseius rambami* n. sp. resembles *Amblyseius bicaudus* Wainstein (1962), from which it differs in having two teeth instead of one on the movable digit of the chelicera, in the absence or presence of a minute neck in the spermatheca (small and prominent in *A. bicaudus*), and in shorter JV5 setae.

Amblyseius bicaudus Wainstein, 1962

MATERIAL EXAMINED. Bet Zayda Valley, 27.viii.70, 1♀, 1♂ (Grinberg, 1971, under *Amblyseius* sp. Abl.).

Amblyseius barkeri (Hughes, 1948)

MATERIAL EXAMINED. Bet Zayda Valley, 27.viii.70, 2♀♀, *Polygonum equisetiforme* (Grinberg, 1971).

Amblyseius ? zwoelferi (Dosse, 1957)*

MATERIAL EXAMINED. Tabgha, 25.xi.87, 1♀, Gramineae.

Amblyseiella setosa Muma, 1955*

MATERIAL EXAMINED. Kinneret (Moshava), 17.iv.70, 1♀, Gramineae.

Euseius rubini (Swirski and Amitai, 1961)

MATERIAL EXAMINED. Park of the Jordan River, 28.xii.87, ♀♀, ♂♂, nymphs, *Zizyphus spina-christi*. Tabgha, 25.xi.87, 3♀♀, Gramineae; 2♀♀, *Zizyphus lotus*. Migdal, 11.ix.63, 2♀♀, 1♂, *Citrus* sp. (Porath and Swirski, 1965); 26.vi.86, 1♀, grapefruit; Mizpa, 24.ii.87, 1♀, *Ceratonia siliqua*. Tiberias, 19.ii.82, 4♀♀, *Zizyphus spina-christi*; 1♀, *Ricinus communis*; 1♀, 1 nymph, *Phragmites communis*; 6.iv.86, 3♀♀, 1♂, *Morus* sp.; 10.v.86, 3♀♀, 1♂, *Plumbago capensis*; 2♀♀, *Adhatoda vasica*; 1♀, *Acalypha wilkesiana*; 1♀, *Lantana camara*; 9.ii.87, 1♀, 1 nymph, *Bryonia syriaca*; 24.ii.87, nymphs, *Acalypha wilkesiana*; 1♀, *Pelargonium* sp.; 1♀, *Echium* sp.; 1♀, *Hibiscus* sp., 1♀, *Lantana camara*; 8.iv.87, ♀♀, *Ceratonia siliqua*, *Bougainvillea* sp., *Lippia nodiflora*, *Wedelia* sp., 22♀♀, 3♂♂, *Withania somnifera*; 3♀♀, *Acalypha wilkesiana*. Ohalo, 2.vi.85, 5♀♀, *Hibiscus* sp.; 4♀♀, 2 nymphs, *Viburnum tinus*; 6.iv.86, all stages, many, *Ceratonia siliqua*, *Urtica pilulifera*. Kinneret (Qevuza), 4.i.66, 4♀♀, 1♂, *Inula viscosa* (Swirski and Amitai, 1968); 21.vi.85, 5♀♀, 1♂, *Tamarix* sp.; 6.iv.86, 3♀♀, 1♂, *Withania somnifera*; 13.v.87, 4♀♀, 2♂♂ *Lonicera caprifolium* and *Bougainvillea* sp. Sha'ar haGolan, 13.iii.83, 4♀♀, *Persea americana*. Hammat Gader, 17.vi.87, 2♀♀, *Zizyphus* sp., *Punica granatum*. Ashdot Ya'aqov, 13.iii.83, 1♀, *Persea americana*.

NOTE. Suspected junior synonym of *Euseius scutalis* (Athias-Henriot, 1958) (de Moraes, McMurtry and Denmark, 1986).

DISCUSSION

The Sea of Galilee lies in the Great Rift Valley, 212 m below the level of the Mediterranean Sea. The weather in the region is hot in summer and mild in winter (Table 2).

TABLE 1
Distribution of phytoseiid mites in the Sea of Galilee region and in the various geographical areas of Israel

Species	Sea of Galilee		Galilee				Coastal Plain					Negev					
	Galilee	Dead Sea	Arava	Upper	Lower	Carmel	N	C	S	S	Yizre'el Valley	Shomron Mts.	Foothills of Judea	Judean Hills	Desert	N	C
<i>Phytoseius fniitimus</i>	+	+		+	+	+	+	+	+	+	+		+	+			
<i>Iphiseius degenerans</i>	+																
<i>Amblydromella athenas*</i>	+																
<i>A. drori</i>	+														+		
<i>A. hierochuntica</i>	+			+	+	+	+	+	+	+	+		+	+			+
<i>A. recki</i>	+			+	+	+	+	+	+	+	+		+	+			+
<i>Typhlodromus athiasae</i>	+			+	+	+	+	+	+	+	+		+	+			+
<i>T. phialatus</i>	+																
<i>T. leptodactylus*</i>	+																
<i>Bawus talpii</i>	+																
<i>Paragigagnathus tamaricis</i>	+		+														
<i>Amblyseius rambami</i> n.sp.*	+																
<i>A. bicaudus</i>	+																
<i>A. barkeri</i>	+			+	+	+	+	+	+	+	+		+	+			+
<i>A. ? zwoelferi*</i>	+																
<i>Amblyseiwella setosa*</i>	+			+	+	+	+	+	+	+	+		+	+			+
<i>Euseius rubini</i>	+			+	+	+	+	+	+	+	+		+	+			+

N = northern; C = central; S = southern.

TABLE 2
Monthly relative humidity and temperature at Deganya [long-term averages]
(after Meteorological Service, State of Israel)

Month	Relative humidity %	Temperature (°C)		
		Average	Minimum	Maximum
January	72	12.9	8.4	17.6
February	72	14.2	6.8	19.6
March	70	16.5	10.4	22.5
April	63	19.9	13.0	26.8
May	57	24.0	16.3	31.7
June	56	27.3	19.8	34.9
July	58	29.0	22.0	36.0
August	61	29.2	22.3	36.1
September	62	27.6	20.6	34.6
October	63	23.9	17.5	30.5
November	64	19.3	13.7	25.0
December	72	14.4	9.9	19.1

The distribution of phytoseiid mites recorded in the present paper in the various geographical regions of Israel is given in Table 1. *Amblydromella athenas* (Swirski and Ragusa), *Amblyseius rambami* n. sp., *A. ? zwoelferi* (Dosse), and *Amblyseiella setosa* Muma were found only in the Sea of Galilee region. *Amblydromella drori* (Grinberg and Amitai) and *A. hierochuntica* (Amitai and Swirski) were recorded also from other sites in the Great Rift Valley (Dead Sea and Arava) of Israel, *A. hierochuntica* penetrating also into the Judean Desert. The following species are distributed in the various regions of Israel: *Phytoseius finitimus* Ribaga, *Iphiseius degenerans* (Berlese), *Amblydromella recki* (Wainstein), *Typhlodromus athiasae* Porath and Swirski, *T. phialatus* Athias-Henriot, *T. leptodactylus* Wainstein, *Bawus talbii* (Athias-Henriot), *Paragigagnathus tamaricis* Amitai and Grinberg, *Amblyseius bicaudus* Wainstein, *A. barkeri* (Hughes), and *Euseius rubini* (Swirski and Amitai).

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