GAMASELLODES BICOLOR (BERLESE, 1918) (ACARINA : ASCIDAE) AND ITS RELATIVES

BY

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ATHIAS-HENRIOT (1961) erected the genus *Gamasellodes* to include three species, *G. vulgatior* (type species), *G. minor* and *G. major*. *G. americanus, shealsi* and *seminudus* were transferred from *Digamasellus* to *Gamasellodes* by HURLBUTT (1967). *G. bicolor* (Berlese) and *G. insignis* (Hirschmann) also belong to *Gamasellodes*. Actually HIRSCHMANN (1962) pointed out the relationship of *bicolor* and *insignis* to ATHIAS-HENRIOT's species of *Gamasellodes*, but included them in *Iphidozercon* with species from other genera. Characteristics of *Gamasellodes* and related genera were given by LINDQUIST & EVANS (1965).

G. minor differs from other *Gamasellodes* in that s1 is situated on the anterior dorsal shield and a groove runs from z3 to j4. *G. vulgatior* and *G. insignis* possess punctae on the posterior dorsal shield. According to HIRSCHMANN (1962) the peritreme of *G. insignis* is shortened and J4 = j5, whereas in *G. vulgatior* J4 = 2 × j5 and the peritreme is long. COSTA recently loaned me four specimens collected from litter in Israel which resemble *G. insignis*, although according to BERNHARD (1963), *G. insignis* is only 280 μ long.

BERNHARD made *circuliformis* a synonym of *bicolor*. I believe that *G. major* and *G. shealsi* and perhaps even *G. americanus* are also conspecific with *G. bicolor*. The slide bearing the cotypes of *G. bicolor* is in the BERLESE collection at Florence. Both specimens (table 1) are in excellent condition and agree with the figures of *bicolor* of HIRSCHMANN and BERNHARD except that J3 and j6 appear a little shorter in BERLESE's specimens. According to HIRSCHMANN Z4 = 1 1/2 × and Z5 = 3 × i4 in *bicolor* (i4 = j5 of LINDQUIST and EVANS), whereas Z4 = 2 1/2 × and Z5 = 4 × i4 in *major*. However, HIRSCHMANN did not indicate how many specimens of each species these ratios are based on. I have not seen the type of *G. major*, but base the synonymy on a comparison of BERLESE's types of *G. bicolor* with ATHIAS-HENRIOT's description and figures of *G. major*. I have examined the paratypes of *G. shealsi* (Costa) which were taken from *Spalax* nests in Israel. In these specimens the peritreme extends to coxa I and no punctae can be observed on the posterior dorsal shield. Measurements are similar to those of *G. bicolor* (table 1).

A synonymy of *G. bicolor* (s. str.) follows.

Gamasellodes (*bicolor*) *bicolor* (Berlese, 1918).

Gamasellus (*Digamasellus*) *bicolor* Berlese, 1918, Redia 13 : 135.
Digamasellus circuliformis Leitner, 1949, Zbl. Gesamtgeb. Ent. 3 : 59.
Gamasellodes major Athias-Henriot, 1961, Acarologia 3 : 486, new synonym.
Digamasellus shealsi Costa, 1962, Ann. Mag. nat .Hist. (13) 4 : 486-488, new synonym.
Iphidozercon bicolor Hirschmann, 1962, Acarologie 5 : 46-48.
Leioseius bicolor Bernhard, 1963, Beitr. Syst. Okol. mitteleur. Acarina 2 : 105-113.

Gamasellodes (*bicolor*) *americanus* (Garman), 1948.
(figs. 1-3, 7).

Gamasellus americanus Garman, 1948. Conn. Agr. Expt. Sta. Bull. 520 : 9-10.

G. americanus was described by GARMAN (1948) from the bark of apple trees in Connecticut. In my collection I have several specimens of *Gamasellodes* from Connecticut apple orchards. Some of these are much smaller than *G. americanus* and belong to a new species (described below). The other specimens agree with Dr. GARMAN's description of *G. americanus* especially regarding body length, shape and punctation of the ventrianal plate, and shape of the metapodal plates (parapodals of GARMAN).

G. bicolor and *G. americanus* are closely related, but geographically separated. They are obviously members of the same superspecies, but it is difficult to decide if they are geographic races of a polytypic species or separate species of a superspecies. Similar dilemmas are common in zoology, especially in studies in which forms from Europe and North America are compared (AMADON, 1966 ; HURLBUTT, 1967). AMADON suggested a method for designating components of a superspecies. He advocated that the species comprising a superspecies be termed allospecies, and that brackets enclose the first named species of a superspecies. This procedure doesn't eliminate the necessity of making a rather arbitrary decision concerning whether allopatric forms should be designated as races of species, but it does allow one to show the close relationship of such forms. Doubtful cases regarded as probably subspecies are indicated by parentheses.

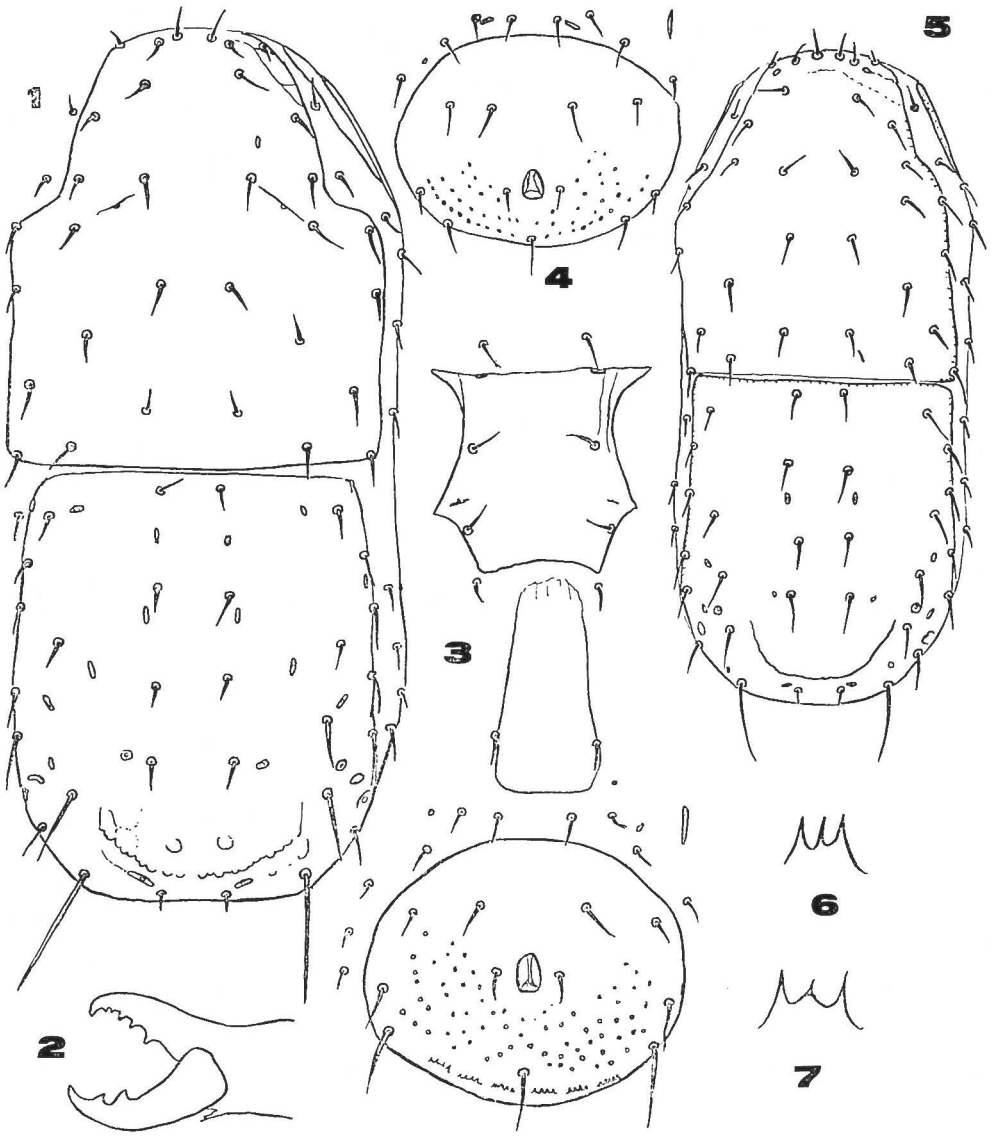
Material examined. One ♀ So. Windsor, Conn. ; 4 ♀♀ Middlefield, Conn. ; 8 ♀♀, 1 ♂ Storrs, Conn. (all from orchard sod) ; 3 ♀♀ ex forest litter, Middletown, Conn., 1 ♀ ex galleries *Dendroctonus frontalis*, Accomac, Va. Two of the specimens from Storrs are considerably larger than the others.

Gamasellodes [*bicolor*] *seminudus* (Ryke).

C. (*Digamasellus*) *seminudus* Ryke, 1962. Jour. Ent. Soc. S. Africa 25 : 98-99.

Three females of *seminudus* from South Africa, one a paratype, were loaned to me by RYKE and LOOTS. I have also examined material from Tanzania and Somalia. *G. seminudus* is similar to *G. bicolor*, but is smaller (table 1).

Material examined. Two ♀♀ in BERLESE collection, " Somalia italiana Foce del Giuba-Legni marci " ; 2 ♀♀ ex forest litter, Lake Manyara Natl. Park, Tanzania ; 1 ♂, 3 ♀♀ under banana log, 5 ♀♀ ex litter under trees, Morogoro, Tanzania ; paratype ♀, Potchestroom, South Africa, loaned by P. A. J. RYKE ; 2 ♀♀, South Africa, from G. LOOTS.



FIGS. 1-3, 7 : *G.* (*bicolor*) *americanus* (Garman), ♀ from Middlefield, Conn. 1. — Dorsum ; 2. — Chelicera ; 3. — Ventral ; 7. — Tectum.
FIGS. 4-6 : *G. garmani* n. sp., holotype ♀. 4. — Ventral ; 5. — Dorsum ; 6. — Tectum.

Gamasellodes garmani n. sp.

(figs. 4-6).

Holotype female. Anterior dorsal shield 130 μ long, with sixteen pairs of simple setae of nearly uniform length. Setae s1, s2 and r2 to r5 on membrane. Seta j2 nearly lateral to j1, j1 and j5 11 μ, r3, 13 μ. PDS 125 μ long, 100 μ wide at anterior border, without punctae but with U-shaped groove posteriorly. Z3, J4 14, Z4 15, Z5 29 μ long.

The peritreme extends anteriorly past s1 to the posterior margin of coxa I. The anterior

portion of the sternal area is so weakly sclerotized that it is not possible to determine if the jugularia are joined to the sternal shield. Posterior edge of sternum slightly concave. Metapodals convex medially. Ventrianal shield bearing nine setae, 75 μ long at midline, maximum width 100 μ. A few punctae are visible posterior to the anus.

Epistom three-tined, moveable chela 25 μ long. Tarsus I 50 μ long.

TABLE 1 : Holarctic and Ethiopian *Gamasellodes*. Measurements are given in microns.

Species	Locality	ADS	PDS	Ventrianal length	Ventrianal width	Z5	Punctae on PDS
G. garmani, n. sp.	So. Windsor, Conn.	125-131	117-128	69-74	92-102	24-29	—
G. (bicolor) americanus	Storrs, Conn.	165-185	160-203	97-128	117-153	46-63	—
	Middlefield, Conn.	170-180	175-185	97-105	128-133	52-55	—
	So. Windsor, Conn.	165	170	102	130	49	—
	Accomac, Va.	170	170	102	120	47	—
G. [bicolor] bicolor	Firenze (cotype)	200	195	120	150	46	—
	Firenze (cotype)	190	190	110	140	44	—
	Firenze	185	185	110	155	—	—
	Iberia [1]	180-190	190-198	110-118	137-158	—	—
	Israel [2]	180	185	100	130	49	—
	Israel [2]	183	180	100	140	50	—
	Israel, Tivon	175	170	102	138	44	—
G. [bicolor] seminudus	Somalia	155	155	95	125	—	—
	Somalia	155	150	95	125	—	—
	Tanzania	150-160	145-160	87-92	110-130	37-42	—
	So. Africa [3]	140	140	77	107	47	—
	So. Africa	150	138	80	112	47	—
	So. Africa	157	153	90	125	45	—
G. vulgatior	Algeria [4]	163	163	97	127	—	+
G. insignis ?	Israel, Ein Gedi	170-175	180-190	100	120-130	25-28	+

1. *G. major* of ATHIAS-HENRIOT (1961).
2. Paratypes of *D. shealsi* (COSTA, 1961) from Spalax nests.
3. Paratype.
4. From ATHIAS-HENRIOT (1961).

Material examined. 15 ♀♀ collected from sod from Pero's apple orchard, South Windsor, Connecticut. Holotype and one paratype in U.S. National Museum.

G. garmani is clearly separated from *G. bicolor* by its smaller size. The idiosomal length of 15 ♀♀ of *G. garmani* ranged from 242 to 275 μ, whereas in 14 ♀♀ of *G. bicolor* from Connecticut it ranged from 327 to 388 μ. Also, in *G. garmani* tarsus I is over 1 1/2 × Z5.

SUMMARY.

Taxa heretofore referred to as *americanus, bicolor, major, seminudus* and *shealsi* are all placed in a single superspecies, *Gamasellodes bicolor* Berlese. The superspecies includes two allospecies, *G. [bicolor] bicolor* (Holarctic) and *G. [bicolor] seminudus* (Africa). *G. americanus* from North America is treated as a probable subspecies of *G. bicolor*, whereas *major* and *shealsi* are regarded as synonyms of *G. (bicolor) bicolor*. *Gamasellodes garmani* n. sp. is described from a Connecticut apple orchard.

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