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OBSERVATIONS OF THE GENUS PROTOGAMASELLUS KARG
(ACARI : MESOSTIGMATA)
WITH A DESCRIPTION OF A NEW SPECIES

BY G. O. EVANS*

SUMMARY: This paper deals with three species of Protogamasellus (fam. Ascidae) collected at Carnsore Point, Co. Wexford, Ireland and discusses, with re-descriptions, the species of the genus described by ATHIAS-HENRIOT (1961) from Algeria.

Protogamasellus primitivus Karg, 1962, the type of the genus, is considered to be a junior synonym of Protogamasellus mica Athias, 1961.

Protogamasellus hibernicus sp. nov. is described from soil in a grassland/dune area at Carnsore Point, and the following new combinations are presented: Protogamasellus minor for Gamasellodes minor Athias, 1961 and Protogamasellus minor singularis for Leioseius singularis Karg, 1962.

The genus is considered to comprise two distinct groups of species which are characterised. A key is provided for the identification of females occurring in Europe and Africa.

RÉSUMÉ: Cet article concerne trois espèces de Protogamasellus (fam. Ascidae) récoltées à Carnsore Point, Co. Wexford, Irlande et les discussions, avec redescription, des espèces de ce genre décrites d’Algérie par ATHIAS-HENRIOT (1961).


Le genre est considéré comme formé de deux groupes d’espèces dont on donne les caractères. Une clé est fournie pour l’identification des femelles que l’on rencontre en Europe et en Afrique.

The genus Protogamasellus was proposed by KARG (1962) for Protogamasellus primitivus Karg, a small predatory mesostigmatic mite found in soil of arable land (5-10 cm depth) in a number of localities in East Germany. KARG placed the genus in the family Aceosejidae (= Ascidae). LINDQUIST & EVANS (1965) re-defined the genus and drew attention to descriptions of four species of “rhodacarid” mites by ATHIAS-HENRIOT (1961), namely, Rhodacaropsis massula, R. cognatus, R. angustiventris and Rhodacarellus mica, which they considered to be probably congeneric with

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P. primitivus. Subsequently, Genis, Loots & Ryke (1967) have described two new subspecies of P. primitivus and four new species of the genus from the Ethiopian region and Karg (1977) has described a new species, Protogamasellus bicirratus, from Chile.

Recently, three species of Protogamasellus have been extracted from soil samples at Carnsore Point, Co. Wexford, Ireland, one of which appears to be undescribed. All have the characteristic life-form of other euedaphic mesostigmatic mites such as Rhodacarellus and Gamaselloides.

In addition to the description of the species, this work also includes a review of the new species of Rhodacarellus and Rhodacaropsis referred to above, based on a study of the type material.

Syntypes of the new species are deposited in the collections of the National Museum, Dublin and the British Museum (Nat. Hist.), London. The terminology used in this work follows Evans & Till (1979).

DESCRIPTION OF SPECIES

Protogamasellus hibernicus sp. nov.

**Female**: Podonotal shield 119-126 µm in length and 97-100 µm in breadth at level of s3; Opisthonotal shield 134 x 86 µm. Podonotal region with 22 pairs of setae of which 17 pairs comprising j1-j6, z1-z6, s1, s3-s6 are situated on the shield (Fig. 1). Setae s2 and r2-r5 on unsclerotized cuticle; deficient in r1 and r6. Setae j1, j2 and z1 forming more or less a transverse row with j1 about twice the length of j2 and z1. "Pores" located near z1, j4, s2 and j6. Posterior region of podonotal shield with a distinct transverse line passing through setae z6 and marking the posterior boundary between the heavier anterior and the lighter posterior sclerotized regions of the shield.

Opisthonotal region with 22 pairs of setae; j1-j5, z1-z5 and s1-s5 situated on opisthonotal shield and R1-R6 and one pair of UR setae on the lateral unsclerotized cuticle. Setae Z5 (28-32 µm) longer than other opisthonotal setae and about twice the length of J4 (14-15 µm) which is shorter in length than the distance between the bases of J4 (17-20 µm). At least setae J4, Z3-Z5 and S5 minutely barbed. Porotaxy as in Figure 1. Posterior third of podonotal shield ornamented and both dorsal shields minutely punctate.

Ventrally, sternal shield, indistinct anteriorly, with three pairs of setae (sr1-sr3) and three pairs of pores; s4 lying off shield on striated cuticle (Fig. 2). Tritosternum with slender base and long pilose laciniae. Genital shield wedge-shaped and with genital setae, anterior hyaline extension reaching posterior margin of sternal shield. Endopodal shield in region of coxae IV weak, often fragmented. Ornamented ventral-anal shield, length 83µm, breadth 92µm, with three pairs of ventral setae in addition to the anal plane post-anal setae. Chaetotaxy, porotaxy and sclerotization of remainder of opisthogaster as in Figure 2. Peritreme short, extending almost to the level of r3; peritrematic shield extending posterior to stigma and carrying post-stigmatic pore, shield poorly developed in the region of the peritreme and scarcely extending beyond the peritreme anteriorly. Anterior portion of peritrematic shield separated from posterior portion and weakly attached to podonotal shield in the region of z1.

Gnathosoma compact, hypognathal groove with 7 transverse rows of denticles, 5-7 denticles/row, (Fig. 3). Corniculi strongly grooved externally to accommodate salivary styli; hypostomatic processes simple. Gnathotectum with denticulate anterior margin (Fig. 4). Chaetotaxy of palp-trochanter to palpgenu (2-5-6) with stout seta z1 of palp femur chisel-like distally; apotele two-tined. Chelicera with movable digit bidentate, and fixed digit with 5/6 teeth and short pilus dentilis, resembling in form that of P. m. singularis (Fig. 8).

All legs shorter than idiosoma in length and with ambulacra. Chaetotaxy typical for the genus with the characteristic combination: genu III, 2-2/1-2/0-1, genu IV 2-2/1-3/0-0 and tibia IV 2-1/1-3/1-1. Distal sensilla of tarsi I strongly developed.
Figs. 1-4: Protogamasellus hibernicus sp. nov., female.
1. — Dorsum of idiosoma. 2. — Venter of idiosoma. 3. — Venter of gnathosoma. 4. — Gnathotectum.
**Locality:** Females (syntypes) from soil sample (0-5 cm depth) taken from a sand-dune area at Carnsore Point, Co. Wexford, Ireland.

*Protogamasellus mica* (Athias)

*Rhodacarellus mica* Athias-Henriot (1961) : Acarologia 3 (4) : 488 (Figs.).


**Female:** Podonotal shield 120-126 µm in length and 98-101 µm in width at level of setae s3; opisthonotal shield 120-124 µm in length and 81-83 µm in width at level of s1. Podonotal shield with 17 pairs of setae, j2 (8 µm) situated considerably posterior to j1 (6-7 µm); distinct transverse suture posterior to j4 and connecting lines commencing at s3 and running through z3 and j2 (Fig. 5). Setae s1 located on podonotal shield in all material examined. Pores external to j2, j4 and j5, and between z3 and s2; reticulate area posterior to j5 with a median and two lateral stripes more heavily sclerotized. Transverse line through z6 conspicuous.

Opisthonotal shield with 15 pairs of setae, J4 (14-19 µm) shorter or approximately equal in length to the distance between basis of J4 (18-19 µm). Intraspecific variation in lengths of J2, J4, Z3 and Z5 apparent in specimens from the same sample as well as between specimens from different localities. Six pairs of R setae and two pairs of UR. Distinct line running from margin of the shield to J1 on either side of the body, rarely continuous between J1. Porotaxy as in Fig. 5.

Genital shield wedge-shaped with slightly convex posterior margin, genital setae lying off the shield or, more rarely, one seta lying on margin of the shield (Fig. 6). Ventrional shield (92-95 µm in median length) with five pairs of ventral setae in addition to the three setae associated with the anus. Anterior margin of the shield incised usually to the level of Jv1 but shape and extent of the incision variable, even within the same specimen. Peritreme extending to the level of R4.

Hypognathal groove with 7 transverse rows of denticles, 6-10 denticles/row; corniculi slender, sinuous and hyp. 1 strong, reminiscent of the form in *Proctolaelaps hypudaei* (Oudms.). Hypostomatic processes with externo-lateral spicules. Gnathotectum basically tripartite, multidentate (Fig. 7); supralabral process strongly sclerotized. Palpal chaetotaxy normal, apotele two-tined. Movable digit of chelicera with two strong teeth and a row of smaller closely-set teeth (6-7) in the proximal half of the digit and these oppose similar teeth on the fixed digit; remainder of fixed digit with 5 teeth and a bidentate tip. Pilus dentilis short.

Leg chaetotaxy normal for the genus. Setae pd and pl on femur IV stubby, spine-like.

**Localities:** The type localities are given by Athias-Henriot as: “Djelfa (Titteri) steppe d’alfa, racines d’Euphorbia sp.” and “Alger Ecole Nationale d’Agriculture, Station Botanique, Végétation négligée”. *P. primitivus* was reported from “Ackerboden, Vorwiegend in 5-10 cm. Tiefe, bei Berlin, Halle und Rheinsberg” (Karg, 1962) and from the U.S.S.R. by Ghilarov & Bregetova (1977). Females only have been found in association with *P. hibernicus* in soil samples (0-5 cm depth) taken from a grassland/dune area at Carnsore Point, Co. Wexford, Ireland.

**Notes:** Within the limited material of *P. mica* which I have examined including type material of both *P. mica* and *P. primitivus*, it is difficult to assess the status of the subspecies described by Genis et al. (1967). The distinctive characters given by these authors refer, in the main, to the relative lengths of the dorsal setae and the nature of the incisions of the anterior margin of the ventral anal shield in the female. It will be noted that both of these features show considerable intraspecific variability in the Carnsore material. *Protogamasellus dispar* Genis, Loots & Ryke is obviously closely related to *P. mica* and would appear to differ less from the typical form.
FIGS. 5-7: Protogamasellus mica (Athias), female.
5. — Dorsum of idiosoma. 6. — Genital and ventral-shield. 7. — Gnathotectum.
than *P. primitivus machadoi* Genis et al. The statement that setae s1 are located on the lateral cuticle *P. dispar* is not in agreement with their illustration of the dorsum of the female in which these setae are located on the podonotal shield (cf. Fig. 17 in Genis et al., 1967).

**Protagamasellus minor singularis** (Karg) 
*comb. nov.*


■ **Female** : Podonotal shield 120-124 μm in length and 103-108 μm in breadth at the level of s3 (Fig. 8). Setae complement and distribution on the dorsum of the idiosoma as in *P. hibernicus*. Setae j1, j2 and z1 forming a transverse row with j2 (14-16 μm) about two-thirds the length of j1 (22-24 μm). Line connecting z3 and j4 on eitherside of the podonotum. “Pores” present in the region of z1, j4 and z3-s3.

Opisthontal shield (130-135 × 97-99 μm) with setae j4 (22-24 μm) considerably longer than the distance between their bases (14-16 μm) ; Z4 and Z5 are 29 μm and 36 μm, respectively. Porotaxy as in Fig. 8 ; surface of shield minutely punctate with depression posterior to j4 and a crenulate ridge in the region of Z4. Setae J4-J5, Z3-Z5 and S5 barbed.

Chaetotaxy and sclerotization of the venter as in Fig. 9. Ventri-anal shield (78-82 × 99-102 μm) with four pairs of ventral setae in addition to the analan and postanal setae ; ventral setae Jv2 and Zv2 forming more-or-less a tranverse row. Anal opening normal in size. Peritreme short extending almost to the level of r3, peritrematic shield extending posterior to the stigma but poorly developed in the region of the peritreme. Anterior portion of peritrematic shield isolated and attachment to podonotal shield weak or lacking.

Gnathosoma with hypognathal groove provided with 7 transverse rows of denticles ; hypostomatic processes simple ; corniculi and hypostomatic setae as in *P. hibernicus*. Gnathotectum tridentate with median and lateral processes divided distally (Fig. 10). Movable digit of chelicera with 6 teeth and a bidentate lip, pilus dentilis short ; fixed digit bidentate (Fig. 11). Seta al of palp-femur stout, chisel-like distally.

Chaetotaxy of legs normal for the genus. Setae ad2, pd and p1 of femur IV subspinose.

Tubuli of Michael's organ (spermatheca) narrow and simple and extending from acetabula III to a median sacculus.

■ **Localities** : *Karg* (1962) collected *P. m. singularis* (females, males and nymphs) from arable and meadow soil (?) Kleinmachnow, E. Germany. I have examined females from soil samples under gorse at Carnsore Point, Co. Wexford, Ireland and from pasture soil (ex-barley) on chalk at Berwick St. James, Wiltshire, England (Coll. W. Wilkinson, 1969).

■ **Notes** : The subspecific status attributed to *P. m. singularis* must be considered provisional pending the examination of a range of material from N. Africa and Europe. In the original description of *Protagamasellus minor minor* (Athias) *comb. nov.* no mention was made of the transverse lines at the level of z6 and J1 although the characteristic lines connecting z3 and J4 were illustrated. The main difference between the typical form and *P. m. singularis* lies in the relative lengths of some of the opisthontal setae, particularly, J4, and the nature of the ornamentation of the depressed area posterior to the latter setae (Fig. 12). In *P. minor minor* setae J4 are shorter (18 μm) than the distance between their bases (23 μm). Further, the lateral tines of gnathotectum are relatively shorter and are each divided into four processes.

**Protagamasellus massula** (Athias)

Rhodacaropsis massula *Athias-Henriot* (1961) : *Acarologia* 3 (4) : 495 (Figs.).

■ **Female** : Dorsal idiosomatic chaetotaxy typical for the genus and with one pair of UR setae. Podonotal shield (length 140 μm) with setae j1
Figs. 8-11: *Protogamasellus minor singularis* (Karg), female.  
Fig. 12: Posterior region of opisthonal shield of *Protogamasellus minor minor* (Athias), female.
and J2 approximate and forming a transverse row with z1; setae J2 about two-thirds the length of J1. No ornamentation in the region of J5-J6. Opisthonotal shield (length about 140 μm) with 15 pairs of setae. J4 (27-29 μm) considerably longer than the distance between the bases of J4 (18-19 μm); at least setae J4, Z4, Z5 and S5 with one or two barbs (Figs. 13).

Genital shield with pair of setae; ventri-anal shield with three pairs of ventral setae in addition to the three setae associated with the anus (Fig. 14), setae Jv1 considerably posterior to Zv1.

Hypognathal groove with 7 transverse rows of denticles; proximal three rows multidentate but remaining rows apparently with single median dentine. Gnathotectum subtriangular with denticulate margin. Movable digit of chelicera bidentate, teeth widely separated, dentition of fixed digit and form of pilus dentilis as in Figure 15.

Leg chaetotaxy normal for the genus; setae ad2, p1 and a1 of femur IV short, spinose.

**Locality**: The type locality is “La Réghaia, route de Ménerville, forêt de Quercus suber”, Algeria. I have also examined material from litter and soil under pines (Pinus halepensis), Kadons (Hydra), Algeria (ATHIAS collection).

The specimens at my disposal were unfortuna-
tely distorted and it is not possible to give a comprehensive re-description of the species. The chaetotaxy and ornamentation of the opisthonotal shield and the shape and chaetotaxy of the ventral shield are diagnostic.

**Protogamasellus angustiventris** (Athias)


The holotype and only known specimen of this species is badly distorted and it is not possible to make a detailed description of the species.

The dorsal chaetotaxy is typical for the genus with one pair of setae. Setae J1 (30 µm) is approximately twice the length of J2. A feature of the species is the extremely narrow opisthonotal shield (155 x 59 µm) which has a U-shaped depression posterior to J4. Setae Z4 and Z5 are, respectively, 15 and 42 µm in length while setae J4 are 14 µm and the distance between their base 11 µm. Three pairs of ventral setae occur on the ventral shield.

The hypognathal groove has 7 transverse rows of denticles and the gnathotectum is subtriangular in shape with its margins multidenticulate. Chelicerae with bipartite movable digit; fixed digit with 3 large proximal teeth and 5 smaller teeth between them and the bifid tip. The leg chaetotaxy is normal for the genus.

**Locality** : A single female from soil under *Laurus nobilis*, “ Vallée de l'Oued Bouzaréah, Alger”.

**Protogamasellus cognatus** (Athias)

*Rhodacaropsis cognatus* ATHIAS-HENRIOT (1961) : *Acarologia* 3 (4) : 495 Figs.

This species is also only represented by the holotype. The dorsal complement of setae is typical for the genus but J1 are situated on striated cuticle flanking the podonotal shield. Setae J6 are 14 µm in length. The opisthonotal shield has a U-shaped depression posterior to J4 which are 20 µm in length and 18 µm between their bases; Z5 are 45 µm long.

The ventral shield is distinctly attenuated in its anterior two-thirds and bears only two pairs of ventral setae (cf. Fig. 299 in ATHIAS 1961).

The leg chaetotaxy is typical for the genus.

**Locality** : Known only from the type locality : “ Jardin d’agrément, compost végétal ”, Maison Carrée, Algeria.

**DISCUSSION**

The morphological features of the species examined in the course of the present study agree with those given in the definition of the genus by Lindquist & Evans (1965). The females of *Protogamasellus* appear to fall into two distinct groups which may be distinguished by the following contrasting characters :

<table>
<thead>
<tr>
<th>mica-gr</th>
<th>hibernicus-gr</th>
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<tbody>
<tr>
<td>1. Setae J1 and z1 subequal in length.</td>
<td>Setae J1 outstandingly longer than z1.</td>
</tr>
<tr>
<td>2. Transverse line in anterior region of opisthonotal shield interrupted between the bases of setae J1.</td>
<td>Transverse line continuous between setae J1.</td>
</tr>
<tr>
<td>3. Opisthonotal shield without a depressed, ornamented area posterior to setae J1.</td>
<td>Opisthonotal shield usually with a depressed, ornamented area posterior to setae J4.</td>
</tr>
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The mica-gr contains *P. mica* s. lat. (including *P. dispar* and *Protogamasellus bifurcallis* Genis, Loots & Ryke while the remainder of the described species belong to the hibernicus-gr. I do not consider it necessary in the present state of our
knowledge of the genus to propose subgeneric taxa for these groups.

The transverse lines in the posterior region of the podonotal shield and in the anterior region of the opisthonotal shield define an area of weakly sclerotized cuticle bordering the prosomatic/opisthosomatic juncture. This area, together with the transverse suture in the anterior region of the podonotal shield of the deeper layers of the soil as in the case of certain species of *Rhodacarus*. The occurrence of a suture posterior to *J*4 in some euedaphic Gamasina would indicate flexibility in the region of legs II and III, and this condition compares with the flexibility of the prosomatic region at the sejugal furrow in euedaphic Lower Cryptostigmata.

Females of the European and African species of *Protogamasellus* are distinguished in the following key. No attempt is made to separate the subspecies of *P. mica*. I do not consider *P. bicirratus* to be congeneric with *Protogamasellus* sensu Lindquist & Evans (1965) on the basis of spurred legs II in the male, the absence of a line at the level of setae *z6* and the presence of an anal shield in the female.

**KEY TO FEMALES OF *Protogamasellus* KARG**

1. Setae *J*1 and *z1* subequal in length; anal opening conspicuously enlarged; transverse line in anterior region of opisthonotal shield typically interrupted between setae *J*1 (*mica-gr*) .................. 2
   — Setae *J*1 considerably longer than *z1*; anal opening normal in size; transverse line anterior region of opisthonotal shield continuous between *J*1 (*hibernicus-gr*) ........................................ 3

2. Podonotal shield with transverse suture posterior to *J*4 (Fig. 5); ventri-anal shield with 5 pairs of ventral setae (excluding adanal) and anterior margin with a pair of incisions to about the level of *Jv2* (Fig. 6). Corniculi entire distally. Europe & Africa *P. mica* Athias s. lat. (including *P. dispar* Genis et al).
   — Podonotal shield without such transverse suture; ventri-anal shield with 6 pairs of ventral setae and lacking anterior incisions; corniculi forked distally. S. Africa ....... *P. bifurcalis* Genis, Loots & Ryke.
   3. Opisthonotal shield considerably narrower than the width of the podonotal shield at its posterior margins and at least 2.0 × as long as wide........ 4
   — Opisthonotal shield about as wide as the posterior margin of the podonotal shield less than 1.5 × as long as broad .................. 5

4. Setae *J*4 on opisthonotal shield scarcely longer than the distance between their bases (14 : 11 μm); movable digit with two teeth and bidentate tip; pair of circular platelets between setae *Jv2*. Algeria........ *P. angustiventris* (Athias)
   — Setae *J*4 at least 1.8 × as long as the distance between their bases; movable digit of chelicera with four teeth and bidentate tip; without platelets between *Jv2*. S. Africa............ *P. scuticallis* Genis, Loots & Ryke.

5. Gnathotectum basically three-pronged, lateral prongs denticulate (Fig. 10).................. 6
   — Gnathotectum rounded or subtriangular and multi-denticulate (Fig. 4) .................. 7

6. Podonotal shield with distinct line connecting *z3* and *J*4 (Fig. 8); ventri-anal shield with 4 pairs of ventral setae (excluding adanal). Europe, N. Africa........... *P. minor* (Athias) s. lat.
   — Podonotal shield without such line; ventri-anal shield with 3 pairs of ventral setae (excluding adanal). S. Africa............ *P. brevicornis* Genis, Loots & Ryke.

7. Ventri-anal shield strongly attenuated in its anterior two-thirds and with 2 pairs of ventral setae (excluding adanal); setae *z1* lying on unsclerotized cuticle. N. Africa........... *P. cognatus* (Athias).
   — Ventri-anal shield not or weakly attenuated in anterior two-thirds and with 3 pairs of ventral setae (excluding adanal); setae *z1* on margin of podonotal shield .................. 8

8. Opisthonotal setae *J*4 considerably longer than the distance between their bases; teeth of movable digit of chelicera widely spaced, distance between them greater than the width of the digit at the level of the distal tooth. (Fig. 15). N. Africa........... *P. massula* (Athias).
   — Opisthonotal setae *J*4 shorter than distance between their bases (Fig. 1); teeth of movable digit more closely set, distance between them not exceeding width of digit at level of distal tooth, Europe (Britain and Ireland) .......... *P. hibernicus* sp. nov.

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Paru en décembre 1982.