

Antennoseius bytinskii sp. nov. , WITH NOTES ON THE GENUS Antennoseius

Berlese (Acari: Mesostigmata) in Israel<sup>1)</sup>

by

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ABSTRACT

The following species of the genus Antejanoseius Berlese are described and figured:

A. bytinskii sp. nov, A. masoviae Sellnick and A. bacatus Athias-Henriot. The first two have been found beneath the elytra of carabid beetles, this being the first record of an association of Antennoseius spp. and insects. The three species are recorded for the first time from Israel.

Introduction

The genus Antennoseius Berlese 1916 includes at present about a dozen species which are generally known from a few specimens only. The genus has been reviewed by Ryke (1962) who recognized eight species (including one species added by him). Ryke transferred the genus from the family Phytoseiidae to the family Rhodacaridae. Athias-Henriot (1963) provides a key for the species of the genus (comprising eight species, including the description of a new species). Additional species were described and named by Schweizer (1961), Bernhard (1963) and Karg (1965). A list of the known species and the known synonymies is provided in the appendix.

Bernhard (*op. cit*) transferred the genus to the family Ascidae Oudemans & Voigts, it has been retained by Lindquist and Evans (1965), although their concept of the family Ascidae differs considerably from that of Bernhard. These authors provide also a modern diagnosis of the genus Antennoseius.

Practically nothing is known about their biology and ecology of the genus, Bernhard assumes that moss cushions are their favorite habitat. Usually only very few specimens were collected in each locality and from each species. Three species are known at present from Israel: one from litter and two from beneath the elytra of carabid beetles, this being the first record of an association of the genus Antennoseius and Insects. The large number of specimens collected of Antennoseius bytinskii sp. nov. from below the elytra of Scarites striatus (Coleoptera: Carabidae) point to an hitherto unknown habitat of the mites. About half the mites found there were dead and shriveled, but the remaining half were alive and active. Nothing is known yet about the nature of this association.

Antennoseius bytinskii sp. nov.

FEMALE: The dorsum is covered by two completely divided shields. Nineteen pairs of setae are inserted on the podonotal shield (280 $\mu$  long and 240 $\mu$  wide), setae r5, r6 and r7 being inserted on the lateral membrane. The vertical seta (i1) are stout and spur like, setae s1, s2, i2 and i3 are stout and peg shaped, each setae having a delicate attenuated tip (fig. 1). The remaining setae being simple. The opisthonotal shield (250 $\mu$  long and 240 $\mu$  wide) bears 16 pairs of simple setae, two unpaired setae being inserted between the setae of the J series. A marked hypertrichy is present in the marginal and submarginal setae which are inserted on the lateral membrane. The posterior dorsal setae and the marginal setae are slightly barbed. Both shields are well ornamented with reticulations that form polygons. Peculiar circular porose areas are outlined on the shields, these differ from the usual markings of muscle attachment and are found in nearly identical arrangement in all the three species occurring in Israel (figs. 1, 7, 8). The distribution and the relative lengths of the setae are shown in fig. 1. The tectum (fig. 5) is three-partite with a denticulate anterior margin. A proximal row of small denticles like projections is present and seems to be characteristic for the genus.

The tritosternum has well developed pilose laciniae. The sternal shield (140 $\mu$  long and 95 $\mu$  wide at St2) bears the usual three pairs of sternal setae, st1 being inserted on a slightly less sclerotized area which is bordered anteriorly by two strongly sclerotized strips which represent apparently preendopodal shields (fig. 3, compare with fig. 9). The metasternal setae are inserted on the membrane. The genital shield is small and drop shaped, the genital setae (distance between them = 45 $\mu$ ) are marginally inserted. About six pairs of simple ventral setae are inserted on the membrane between the genital and anal shields. The anal shield (105 $\mu$  long and 70 $\mu$  wide) is triangular, bearing the regular anal setae only. The peritreme opens opposite coxa IV, anteriorly it extends to setae r1, the peritrematal shield projects strongly posteriorly to coxa IV, anteriorly it is connected broadly to the dorsal shield (fig. 6).

The approximate lengths of the legs (excluding pretarsi) are: I - 505 $\mu$ ; II - 380 $\mu$ ; III - 345 $\mu$ ; IV - 440 $\mu$ ; Tarsus I is lacking a pretarsus, trochanter I bears a stout, strongly developed dorsal setae in addition to the normal simple setae. Coxae I and II are each provided with a peg like setae, similar to the special dorsal setae, each setae is provided with an attenuate "whip" which seems to originate laterally.

The chaetotaxy of the legs is as follows:

| Leg No.    | I            | II           | III          | IV           |
|------------|--------------|--------------|--------------|--------------|
| trochanter | 1-1/3-1      | 1-0/3-1      | 1-0/3-1      | 1-0/3-1      |
| femur      | 2-5/3-2      | 2-5/3-1      | 1-3/1-1      | 1-3/1-1      |
| genu       | 2-2/3, 3/1-2 | 2-3/1, 2/1-2 | 2-2/1, 2/1-1 | 2-2/1, 3/0-1 |
| tibia      | 2-3/2, 3/1-2 | 2-2/1, 2/1-2 | 2-1/1, 2/1-1 | 2-1/1, 3/1-2 |

This is in accordance with the standard adult chaetotactic formulae of the Ascinae (Lindquist & Evans, 1965).

The gnathosoma (fig. 4) has seven rows of 2-4 deutosternal denticles which are preceded by an edentate ridge. The first hypostomial setae (hyp. 1) are the longest gnathosomal setae. The chelicera is shown in fig. 2, the pointed ventral projection near the base of the movable digit is characteristic for the genus.

**MATERIAL:** Only females were collected, all from below the elytra of Scarites striatus (Coleoptera: Carabidae), Beer Sheva Dunes. The beetles were collected by Miss H. Kulman and Mr. H. Zinner and their help is acknowledged with thanks. Holotype ♀, on Scarites striatus, Beer Sheva Dunes, 6.4.1968. About 50 paratypes with the same data and also 17.4.1968. A total of six beetles were examined, three of them harboured the mites and three were negative.

**DIFFERENTIAL DIAGNOSIS:** Antennoseius bytinskii sp. nov. is closely related to A. masoviae Sellnick, it can be easily separated from it by having only 4 pairs of peg like setae, z2 being simple and normal in A. bytinskii and peg like in A. masoviae. The third known species having peg like dorsal setae is A. pannonicus Willmann, this differs from the other two by having normal setae on coxae I and II whereas in A. masoviae and A. bytinskii coxae I and II are each provided with a peg like seta.

The species is named in honour of Professor H. Bytinski-Salz, Department of Zoology, Tel-Aviv University, on the occasion of his 65th birthday.

Antennoseius masoviae Sellnick, 1943

This characteristic species has been described by Sellnick (1943) on the base of two females collected from moss cushions in East Prussia. Five females collected from below the elytra of two Carabus hemprichi Dej. (Coleoptera: Carabidae) in Israel, seem to be the first additional record of the species. A. masoviae is very similar to the preceding species and can be separated from it easily by having peg like setae in position z2.

The specimens from Israel differ only in the dimensions from those of East Prussia, otherwise they seem to be identical. The dimensions of the specimens from Israel are: podonotal shield - 300µ long and 270µ wide; opisthonotal shield - 250µ long and 270µ wide; sternal shield - 160µ long and 95µ wide (at the level of St2); anal shield - 105µ long and 80µ wide; distance between genital setae - 50µ. The approximate lengths of the legs (excluding pretarsi) are: I - 535µ; II - 380µ; III - 320µ; IV - 435µ. The dorsal shields, the distribution and relative lengths of the setae are shown in fig. 7.

**MATERIAL:** 4♀, Carabus hemprichi Dej., Tivon, 28.11.1968; 1♀, Carabus hemprichi Dej., Mishmar Haemek, 2.12.1968. Although many dozens of Carabus specimens were examined, only two of them harboured the mites, it seems therefore that this is not the principal host of A. masoviae.

Antennoseius bacatus Athias-Henriot, 1963

FEMALE: The dorsal shields, the outer part of the peritrematal shields and the ventro-anal shield are ornamented with numerous small sclerotized tubercles. Differences in the density and size of the tubercles form a reticulated pattern. The podonotal shield (300  $\mu$  long and 305 $\mu$  wide) bears 20 pairs of setae, r5 and r7 being inserted on the membrane. The vertical setae (11) are large and flattened, with serrate margins, they expand distally (fig. 8). All the remaining setae are "leaf" shaped with deeply serrated lateral margins. The definition of the setal shape proved to be of considerable difficulty even with the aid of oil immersion and phase contrast, possibly other authors would describe the setae as "pilose". The setae of the specimen from Israel proved to be identical in shape with those of A. bacatus determined by Dr. Athias-Henriot and A. bacatosimilis determined by Dr. Karg. The opisthonotal shield (270 $\mu$  long and 265 $\mu$  wide) bears 16 pairs of setae and three unpaired setae which are inserted between the J series. A marked hypertrichy is present in the marginal and submarginal setae which are inserted on the lateral membrane. The distribution, shape and relative lengths of the setae are shown in fig. 8. The tectum (fig. 10) is basically tripartite, in the figured specimen the three lobes being close to each other (in a different specimen the tectum was more deeply incised, like that of A. bytinski) the anterior border being denticulate.

The tritosternum has well developed laciniae. The sternal shield (120 $\mu$  long and 95 $\mu$  wide at St2) has a deep anterior incision which extends to a line which is continuous with the first sternal pores. This line divides the shield into a weakly sclerotized anterior portion (bearing St1) and a slightly more sclerotized main part. Distinct preendopodal shields are present (fig. 9). The metasternal setae are inserted on the membrane. The genital shield is fairly large, the distance between the genital setae being 70 $\mu$ . Four pairs of simple smooth setae are inserted on the membrane between the genital and ventro-anal shields. The ventro-anal shield (120 $\mu$  long and 120 $\mu$  wide) bears two pairs of simple ventral setae in addition to the regular anal setae. About eleven pairs of ventral and lateroventral setae which are similar to the dorsal setae, are inserted on the membrane. The peritreme opens opposite coxa IV, anteriorly it extends to r1. The peritrematal shield extends posteriorly to coxa IV, its anterior part is fused with the dorsal shield.

The approximate lengths of the legs (excluding pretarsi) are: I - 520 $\mu$ ;  
II - 345 $\mu$ ; III - 320 $\mu$ ; IV - 445 $\mu$ .

The gnathosoma (fig. 12) is provided with seven rows of 4-6 deutosternal denticles which are preceded by an edentate ridge. The first gypostomial setae (hyp. 1) are the longest gnathosomal setae. The chelicera is shown in fig. 11, the pilos dentilis is short and stout.

MATERIAL: 1 $\phi$ , litter, Nahal Keziv. 20. 11. 1966, coll. S. Amitai;  
1 $\phi$ , litter (Polygonum sp.), Eshel HaNassee, 24. 1. 1967, coll. S. Amitai; 2 $\phi$ , litter, Naaman Salt Marsh, 18. 2. 1968.

NOTES; Through the courtesy of Dr. C. Athias-Henriot and Dr. W. Karg respectively, I have been able to examine 2♀ of A. bacatus Athias-Henriot and 1♂, 1♀ of A. bacatosimilis Karg. Except differences in size, A. bacatosimilis being about 20% larger, I could detect no differences between the females of the two species. Karg (1965) points out that there are differences in shape of the spermatophoral process. According to the key provided by Athias-Henriot (1963), both species differ from A. granulatus (Willmann) in showing on the dorsal shields a definite reticulated pattern formed by sclerotized tubercles. The specimens from Israel are intermediate in this respect: the reticulation is obvious only on the anterior and lateral parts of the shield, each polygon formed encloses a large number of smaller tubercles which tend sometimes to obscure the reticulation. The number of tubercles enclosed in each polygon is much smaller in both A. bacatus and A. bacatosimilis. These differences are not, in my opinion, enough to separate the Israeli specimens as a separate species. It is possible that all the three, namely A. granulatus, A. bacatus and A. bacatosimilis are conspecific, but only the study of a large number of specimens, males and females from various localities, could give us definite information about their status. At present I consider them to form a closely related species group.

#### APPENDIX

A list of the known species and synonymies of the genus Antennoseius Berlese.

Antennoseius Berlese, A., 1916, Redia 12:303

Vitzthumia, Thor, S., 1930, Skr. Svalbard Ishavet 27:114

Antennoseius bacatus Athias-Henriot

Antennoseius bacatus, Athias-Henriot, C., 1963, Acarologia 3:461

Antennoseius bacatosimilis Karg

Antennoseius bacatosimilis, Karg, W., 1965, Mitt. zool. Mus. Berlin, 41:291

Antennoseius delicatus, Bernhard, F., 1963, in Stammer, Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina, Bd. II: Mesostigmata: p. 168.

Antennoseius borossicus Sellnick

Antennoseius borossicus, Sellnick, M., 1945, Blätter für Milbenkunde, 6:42

Antennoseius delicatus Berlese, Schweizer, J., 1949, Res. Rech. Scient. Parc Nat. Suisse N. F. 2, 21:75

Antennoseius epicrioides, Schweizer, J., 1961, Mem. Soc. Helvetique Sci. Nat., 84:135

Vitzthumia magniscutum, Weis-Foch, T., 1947, Natura Jutlandica 1:253

Antennoseius bytinskii Costa sp. nov.

Antennoseius boskopensis Ryke

Antennoseius boskopensis, Ryke, P. A. J., 1962, Ann. Mag. nat. Hist. Ser. 13, 4:660

Antennoseius delicatus Berlese

Antennoseius delicatus, Berlese, A., 1916, Redia 12:304

Antennoseius delicatus, Ryke, P. A. J., 1962, Ann. Mag. nat. Hist. Ser. 13, 4:657

Antennoseius dungeri Karg

Antennoseius dungeri, Karg, W., 1965, Mitt. zool. Mus. Berlin, 41:291

Antennoseius granulatus (Willmann)

Vitzthumia granulata, Willmann, C., 1949, Veröff. Mus. Nat. Bremen 1:112

Antennoseius hispaniensis Bernhard

Antennoseius hispaniensis, Bernhard, F., 1963, in Stammer, Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina Bd. II: Mesostigmata:p. 173

Antennoseius masoviae Sellnick

Antennoseius masoviae, Sellnick, M., 1943, Zool. Anz., 143:201

Antennoseius oudemansi (Thor)

Vitzthumia oudemansi, Thor, S., 1930, Skr. Svalbard Ishavet 27:116

Antennoseius pannonicus Willmann

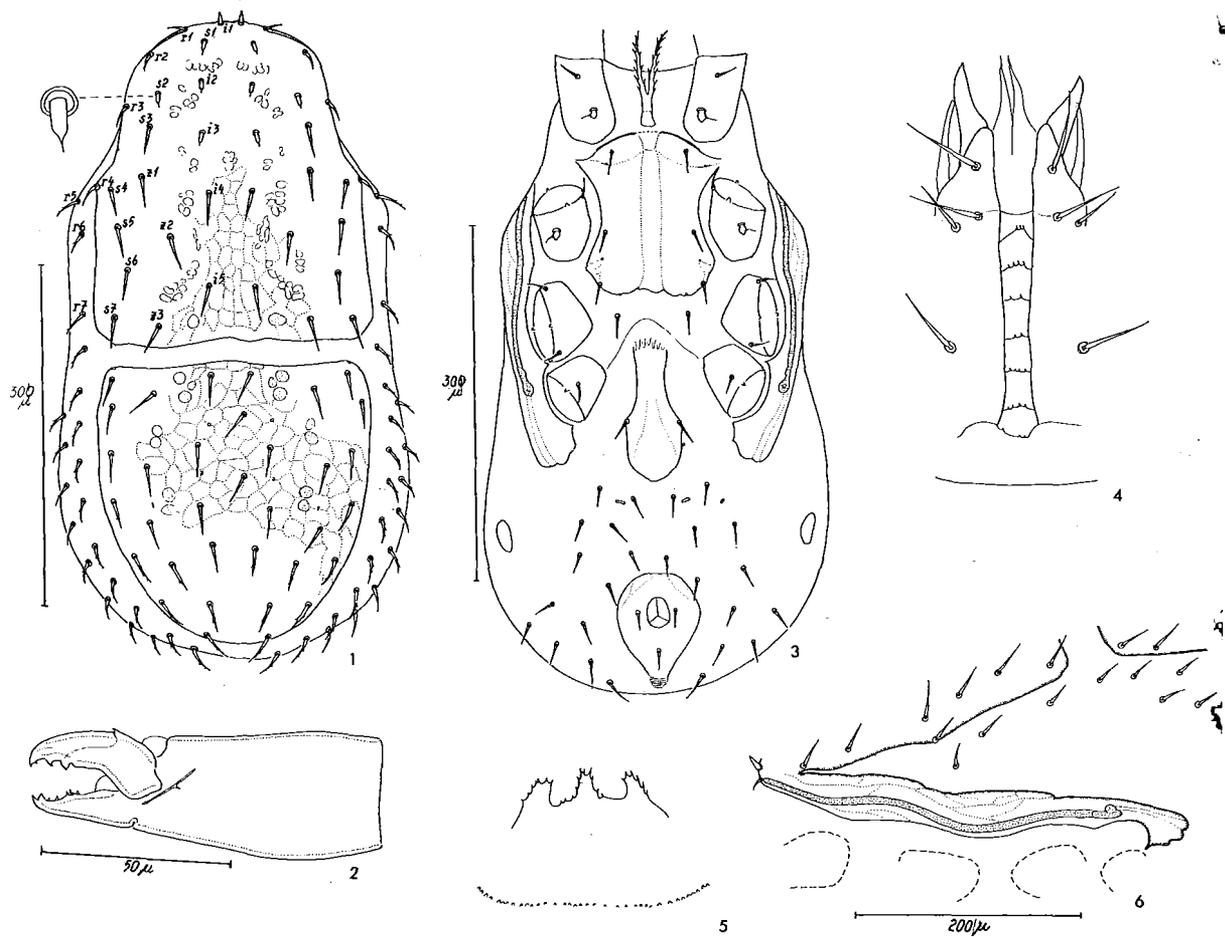
Antennoseius pannonicus, Willmann, C., 1951, Sitzber. Öst. Akad. Wiss. 1, 160:109

Antennoseius spinosus (Willmann)

Vitzthumia spinosa, Willman, C., 1949, Veröff. Mus. Nat. Bremen 1:114

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LEGENDS TO THE FIGURES

Figs. 1-2 Antennoseius bytinskii sp. nov., female. 1. Dorsum. 2. Chelicera.

Figs. 3-6 Antennoseius bytinskii sp. nov., female. 3. Venter. 4. Gnathosoma, ventral view. 5. Tectum. 6. Peritreme, lateral view.

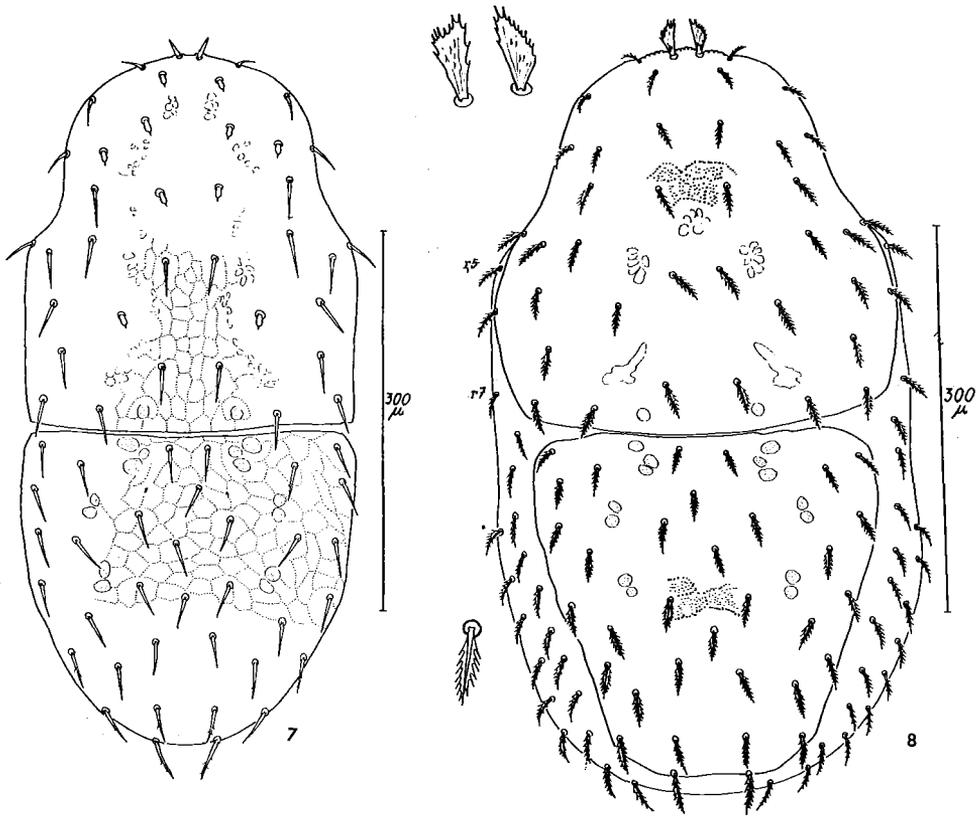
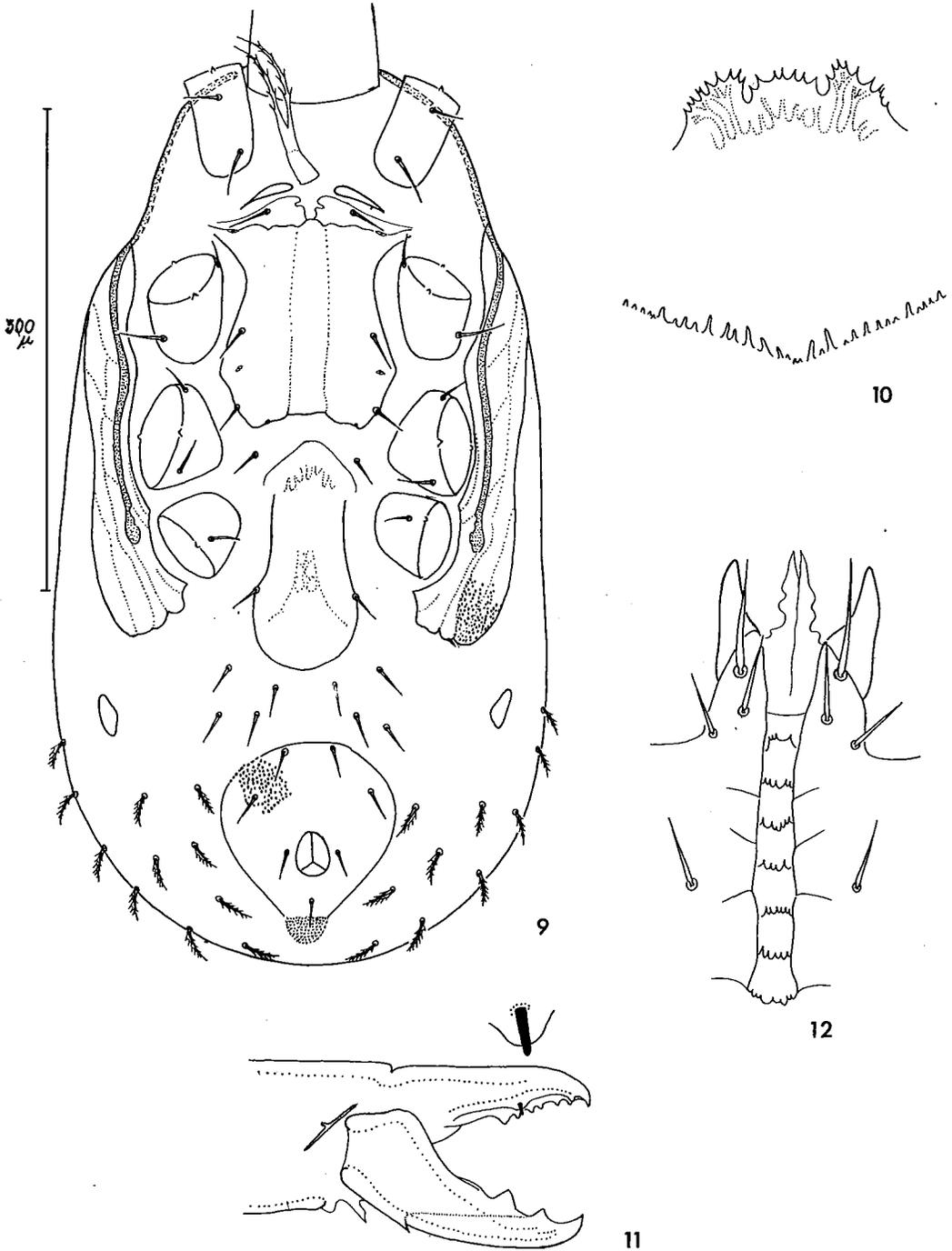


Fig. 7 Antennoseius masoviae Sellnick, female. Dorsal Shields.

Fig. 8 Antennoseius bacatus Athias-Henriot, female, Dorsum.



Figs. 9-12 *Antemoseius bacatus* Athias-Henriot, female. 9. Venter. 10. Tectum. 11. Chelicera. 12. Gnathosoma, ventral view.