A NEW PHTHIRACARID MITE FROM ISRAEL

BY

D. MACFARLANE and J. G. SHEALS

(Commonwealth Institute of Entomology, London)
(British Museum (Nat. Hist.), London)

In a survey of the nest fauna of mole rats *(Spalax ehrenbergi)* in Israel, COSTA (1962) collected a number of specimens of a distinctive Phthiracarid mite which he considered to be conspecific with *Hoploderma pavidum* Berlese, a species originally found in moss at Tiarno, Italy, but subsequently collected from moss in various localities in Germany (WILLMANN, 1928). Although the original description (BERLESE, 1913) of this species was perhaps somewhat inadequate, *pavidum* appeared to be characterized by the abnormally large number of anteriorly curved setae on the notogaster, by the elongate-claviform sensilli and by the erect interlamellar setae. All these attributes were noted in the Israeli material. Notes on the type material of *pavidum* were given by VAN DER HAMMEN (1959), and later (1963), he redescribed this species allocating it to the genus *Hoplophthiracarus* Jacot 1933. His redescription was based on material taken from a sample of *Sphagnum* in a fen near Wigster, Netherlands. This publication prompted a re-examination of the Israeli material and it was quite clear that this was not conspecific with the mite described by VAN DER HAMMEN. Further collecting by Dr. COSTA showed the Israeli species to be extremely widespread and not confined to the nests of small mammals. For example, it proved to be dominant Phthiracaroid mite in the litter community of a *Quercus-Styrax* forest, and in view of its abundance and having regard to certain interesting morphological features, the publication of a detailed description of the Israeli mite as a new species was considered desirable. The type material is deposited in the collections of the British Museum (Natural History), London.

Hoplophthiracarus costai sp. n.

Phthiracarus pavidus : COSTA 1962. *Ann. Mag. nat. Hist.* (13) 4 : 498.

Adult : In fifteen specimens the length of the aspis (figs. 1 & 4) ranged from 298-398 μ, the average being 356. At its broadest point (just behind the sensilli)

the width is approximately 0.7 times the length. The rostral setae (ro) are moderately stout and about 1/3 the length of the interlamellar setae (in). The latter are long (about 2/3 the length of the aspis), sub-erect when viewed laterally and slightly curved backwards. The lamellar (la) and exobothridial setae (ex) are about equal in length and approximately half as long as the rostral setae. All the setae on the prodorsum are smooth. The sensilli, approximately equal to the rostral setae in length, are sub-lanceolate in outline and carry a distal hyaline membrane. The bothridia are prominent and two or three associated pseudotracheae can be discerned on each side below the integument. Between the inter-

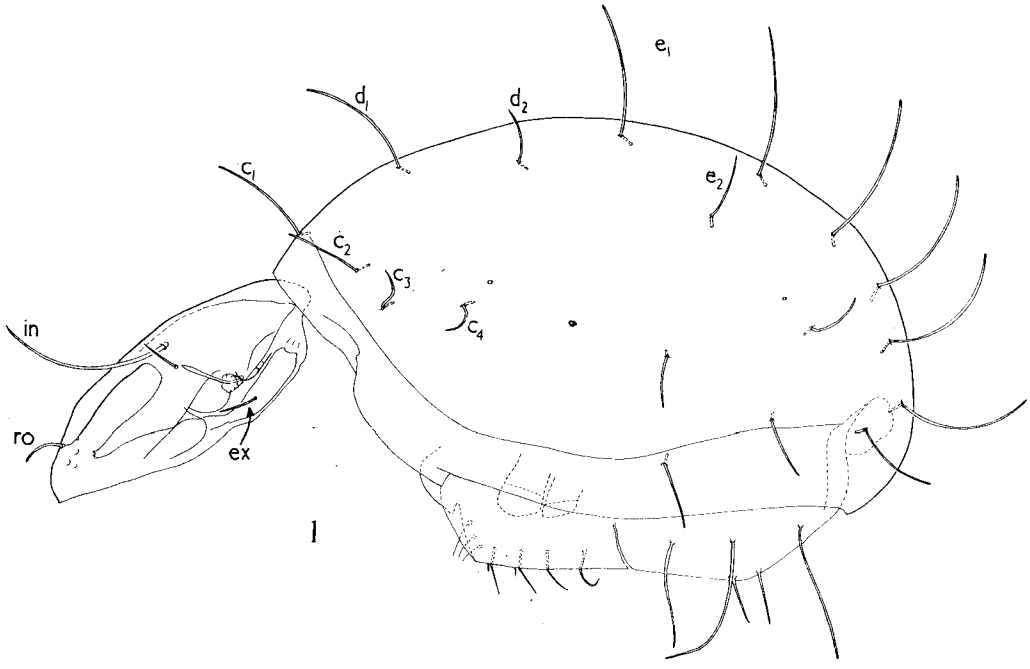
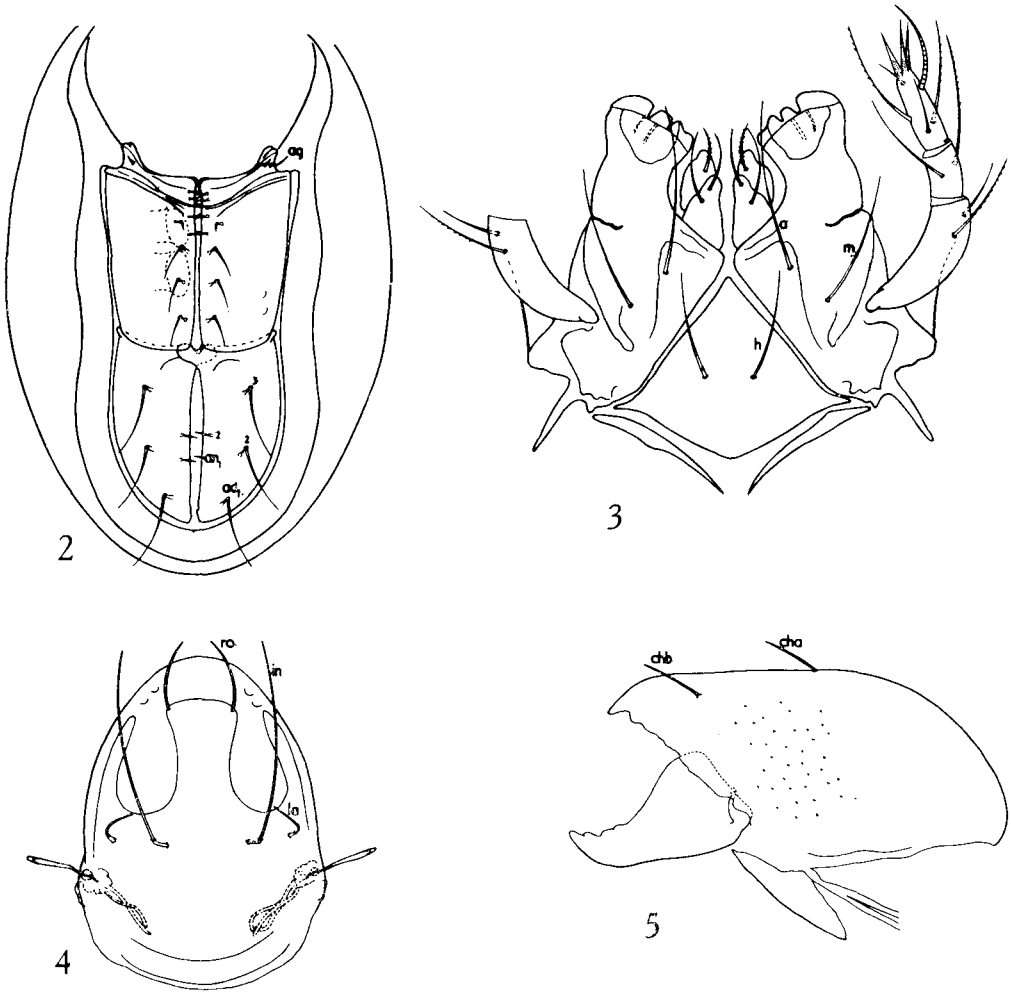


FIG. 1. — *Hoplophthiracarus costai* sp. n., lateral.

lamellar and rostral setae the prodorsum is raised to form a low median keel while laterally a small projecting scale is located on each side just behind and above the sensilli. The prodorsal integument is not strongly ornamented but appears to be penetrated by a large number of extremely fine pores.

In fifteen specimens the greatest length of the notogaster (fig. 1) measured diagonally from the antero-dorsal angle ranged from 583-876 μ, the average being 737 μ. There are eighteen pairs of setae in the notogastral series. All the notogastral setae are strong, erect, distinctly curved — mostly anteriorly — and very slightly feathered. Three pairs of fissures, ia, im and ip, can be discerned. In *H. pavidus* VAN DER HAMMEN (*op. cit.*) observed fifteen pairs of notogastral setae, f_1 and f_2 being vestigial and represented only by setal bases. Thus, in comparison

with *H. pavidus*, *H. costai* has three additional pairs of setae behind the e series. It is difficult to homologise the setae in this region but it can be noted that in *H. costai* a well developed seta is present in the position corresponding to VAN DER Hammen's vestigial f_1, while the position corresponding to VAN DER HAMMEN'S vestigial f_2 is occupied by a fissure (? ip.). The notogastral integument is similar to that of the prodorsum.



FIGS. 2-5. — *Hoplophthiracarus costai* sp. n.
Fig. 2, Ano-genital region. Fig. 3, Infracapitulum. Fig. 4, Aspis. Fig. 5, Chelicera.

The ano-genital region is shown in fig. 2. There are two pairs on anal (an) and three pairs of adanal setae (ad). The anal setae are relatively short and inserted marginally while the adanal setae are much longer (approximately equal to setae c_1 in length) and arranged in a somewhat oblique line. Anteriorly the anal valves

carry interlocking tuberosities, the left overlying the right (cf. *H. pavidus* in which the right overlies the left). There are nine pairs of genital and a single pair of aggenital setae. The genital setae are arranged in two overlapping series, an anterior marginal and a posterior lateral. The three posterior setae in the lateral series are comparatively long — approximately equal to the lamellar setae in length — while the remaining genital setae and the aggenital setae are extremely short. The integument of the anal and genital valves is similar to that of the prodorsum. As in *H. pavidus* only two pairs of genital papillae appear to be present although it should be noted that this feature cannot be regarded as a generic attribute, as suggested by VAN DER HAMMEN, for three pairs of genital papillae have been noted in a recently described species of *Hoplophthiracarus* from Nepal (SHEALS in press).

The infracapitulum is shown in fig. 3. The condition here is stenarthric and the rutellum bears an atelebasic expansion (GRANDJEAN 1957). The infracapitular setae, a, m & h are well developed, the genal setae (a & m) being slightly longer than the pair on the mentum (h). There are three pairs of adoral setae. The first pair is very strongly feathered but the pectinations on the other two are barely discernible. The distal portions of the lateral lips appear to be membranous. The supracoxal spines are long, characteristically curved and smooth. The three-segmented palps have the setal formula (2-2-7). The solenidion on the palp tarsus is prominent and at least three of the tarsal setae are eupathidial. The chelicera is shown in fig. 5. Seta cha is dorsal while seta chb is located well down on the lateral margin.

The legs are shown in antiaxial view in figs. 6-9. All are approximately equal in length although leg I is more robust than the other three. Trochanters I and II are short, trochanters III and IV being much longer. The setal formulae are as follows : I (1-4-2-5-16-1) ; II (1-3-2-3-12-1) ; III (2-2-1-2-10-1) and IV (2-1-1-2-10-1) while the formulae for the solenidia are I (2-1-3) ; II (1-1-2) ; III (1-1-0) and IV (0-1-0). The setal count for tarsus I does not include the curious spine which arises immediately distal to the solenidion ω_2. This structure which was present in all the specimens examined, does not appear to be a true seta and is reminiscent of the spine on tarsus II of *Perlohmannia dissimilis* (Hewitt) as described and figured by GRANDJEAN (1958). The setal formulae are not in complete agreement with VAN DER HAMMEN's findings for *H. pavidus*. Tarsus I of *costai* bears 16 setae in comparison with 15 for *pavidus* ; tarsus II bears 12, *pavidus* 14 ; tibia III of *costai* bears 2 setae while that of *pavidus* has 3. Although VAN DER HAMMEN in his formulae records 4 setae for tibia I of *pavidus* his figures shows 5. The proximal solenidion of genu I and all the tibial solenidia are coupled with short setae. In *pavidus* VAN DER HAMMEN shows the tibial solenidion of leg IV to be free but legs II and III are not figured.

Material : HOLOTYPE (B.M.N.H. no. 1964.10.8.1), ISRAEL : Tivon, in litter of *Quercus-Styrax* forest, 10.X.62 ; 21 PARATYPES from the above locality ; 2 PARA-

FIGS. 6-9. — *Hoplophthiracarus costai* sp. n. Legs.
Fig. 6, Leg I. Fig. 7, Leg II. Fig. 8, Leg III. Fig. 9, Leg IV.

TYPES, ISRAEL : Akko Junction, in nest of *Spalax ehrenbergi*, 22.ii.56. All the material was collected by Dr Michael COSTA.

The systematic position of H. costai.

The genus *Hoplophthiracarus* was proposed by JACOT (1933), with *Hoploderma histricinum* Berlese 1908 as the type, for Phthiracarini similar to the genus *Phthiracarus* but with erect 'vertical' [interlamellar] setae. In the same paper he described two further species, *H. robustior* and *H. grossmani*, and yet another, *H. paludis*, in 1938. Until 1959, *Hoplophthiracarus* species were known only from North America but in that year Aoki described *H. kugohi* from Japan. As a result of an examination of Berlese's type material VAN DER HAMMEN (1959) added *Hoplophora variosa* Berlese 1888, a South American species to the genus, and later (1963) he redescribed *Hoploderma pavidum* Berlese 1913, a European species, allocating it to *Hoplophthiracarus*. Finally, SHEALS (in press) described a new representative from a Rhododendron forest in the Nepal Himalaya.

JACOT's original diagnosis was somewhat elaborated by VAN DER HAMMEN (1963) who considered the genus to have the following attributes : interlamellar hairs nearly erect ; notogaster at least partly punctate or granulate, anal hairs inserted on the border, adanal hairs in a distinct oblique row ; two pairs of genital papillae. It has already been noted that the presence of two pairs of genital papillae cannot be considered as a generic attribute. Moreover, the nature of the integument varies considerably throughout the Phthiracaridae and appears to be uncorrelated with other morphological features, while an anal chaetotactic pattern closely approaching the condition associated with *Hoplophthiracarus* is found in species classified in *Phthiracarus*. Thus, although a further study of the group may well reveal further generic attributes, at present the only real basis for separating *Hoplophthiracarus* from *Phthiracarus* is the nature of the interlamellar setae.

Apart from *H. pavidus* and the Nepalese species the descriptions of *Hoplophthiracarus* species have been somewhat superficial. It would appear, however, that *H. costai* differs from all the other members of the genus by having 18 pairs of notogastral setae. The spine-like structure on leg I (immediately distal to the solenidion ω_2) may also serve to characterize *H. costai*. This structure is not present in *pavidus* or in the Nepalese species but unfortunately the morphology of the legs in other species is not known.

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