

TWO NEW SPECIES OF THE GENUS *PODAPOLIPUS*
(PODAPOLIPODIDAE, ACARINA),
REDESCRIPTION OF *P. AHARONII* HIRST, 1921
AND SOME NOTES ON THE GENUS *

BY

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Mites of the genus *Podapolipus* Rovelli and Grassi, 1888 exist in three forms only : male, larviform female, and adult female.

The male and the larviform female have three pairs of legs ; they are easily distinguished from one another by the presence of a pair of very long caudal setae in the larviform female. The adult female is sac-like and has one pair of small legs only.

The genus *Podapolipus* was divided by REGENFUSS (1968) into two distinct genera, viz. : *Podapolipus* and *Podapolipoides*.

The genus *Podapolipus* is characterized by : 1) two undivided anterior outgrowths of the adult female body ; and 2) the aedeagus placed on propodosoma ; whereas the genus *Podapolipoides* has 1) Two bilobed anterior outgrowths of the adult female body ; 2) the aedeagus placed on the hysterosoma.

According to REGENFUSS the genus *Podapolipoides* comprises *Podapolipoides grassii* Berlese, 1897, *P. bacillus* Berlese, 1911, and *P. locustanus* Lavoipierre, 1941. All other species of *Podapolipus* (sensu ROVELLI and GRASSI) known in 1968 were left in the genus *Podapolipus* (sensu REGENFUSS).

HUSBAND and SINHA (1970) described a new species of a podapolipodid mite closely related to *Podapolipus* previously referred to as *Locustacarus* sp. Ewing, 1924 (ROTH and WILLIS, 1960) and erected for it a new genus, which they called *Bakerpolipus*.

Studying the various species of these three groups, we came to the conclusion that all should remain in one genus, but should constitute three subgenera for the following reasons :

1) There are more features which unite the species included in these groups than those differentiating them. The chaetotaxy of the legs of the three species described below can serve as an example.

2) In some of the features there is a gradual transition from one group of species to another. So for instance the anterior outgrowths assume a wide range of forms, from the simple mono-lobed shape in *P. reconditus* Rovelli and Grassi, 1888 or *P. tribolii* n. sp. to the bilobed shape of the *Podapolipoides* e. g., *P. grassii*. Between these two extremes, we find species belonging to *Podapolipus* with monolobed

* Supported by NIH grant AI-07711, U.S.P.H.S.

Acarologia, t. XIV, fasc. 4, 1972.

anterior outgrowths, which have, ventrally, an additional pair of very small lobes like *P. aharonii* Hirst, 1921 and *P. libratus* Naudo, 1967 or of larger ones like in the new species *P. coccinellae* to be described below. A fifth dorsal lobe (fig. 21) covering the gnathosoma in *P. coccinellae* may serve as another example. The presence of such a lobe in the adult female was considered as the main differential character of *Bakerpolipus* Husband and Sinha, 1970. The same lobe may, however, be also regarded as nothing but an extreme form of a feature which exists to a variable extent in other species of *Podapolipus sensu* Rovelli and Grassi. Indeed, in the adult females of all species of the three groups the gnathosoma is slightly sunk into the idiosoma like a human head into a turtle-neck collar. In some species the dorsal lobe covers little of the gnathosoma whereas in others such as in *P. tribolii* n. sp. and *P. libratus* it covers about one third of it; in *Bakerpolipus* it covers it completely. A further example of such a gradual transition is presented by the accessory caudal setae of the larviform female. In *Podapolipus* (sensu Regenfuss) they are absent, in *Bakerpolipus* they are present; in *B. serratus* Husband and Sinha, 1970 they are minute (1-2 μ) and were not noticed by the authors who described the species: in *P. coccinellae* they are 5 μ long and in *Podapolipoides grassii*, they are of 18 μ , and easily perceivable.

3) The larviform females are very similar in all three groups.

4) In these groups various characteristics of males follow the same pattern, and only the location of the aedeagus is different. In *P. grassii*, as well as in *Bakerpolipus serratus*, and in *P. coccinellae* n. sp., the aedeagus is found on the hysterosoma whereas in all other known species it is placed on the propodosoma.

5) Some of the main differential characters of any one of the groups are shared with the second group, others with the third. So for instance, the absence of a fully developed dorsal lobe totally covering the gnathosoma of the adult female is common to *Podapolipus* and *Podapolipoides*; *Podapolipoides* resembles *Bakerpolipus* regarding the location of the aedeagus; and in some species of *Podapolipus* and *Bakerpolipus* there are ventral lobes behind the legs of the female. The two last groups are viviparous.

In view of this evaluation of the differences among the groups of species we are inclined to conclude that the three above mentioned groups should constitute subgenera of one genus.

We therefore propose to divide the genus *Podapolipus* into three subgenera, i.e.:

- 1) *Podapolipus* (*Podapolipus*) (new combination)
- 2) *P.* (*Podapolipoides*) Regenfuss (new combination)
- 3) *P.* (*Bakerpolipus*) Husband and Sinha (new combination)

The various species of the genus are attributed to the subgenera as follows:

Subgenus *Podapolipus*.

- 1) *Podapolipus* (*Podapolipus*) *reconditus* Rovelli and Grassi, 1888
- 2) *P.* (*Podapolipus*) *apodus* Trägårdh, 1902
- 3) *P.* (*Podapolipus*) *berlesei* Lahille, 1906
- 4) *P.* (*Podapolipus*) *aharonii* Hirst, 1921
- 5) *P.* (*Podapolipus*) *komáreki* Štorkán, 1927
- 6) *P.* (*Podapolipus*) *solitarius* Lavoipierre, 1941
- 7) *P.* (*Podapolipus*) *locustanus*¹ Lavoipierre, 1941
- 8) *P.* (*Podapolipus*) *lahillei* Naudo, 1967
- 9) *P.* (*Podapolipus*) *elongatus* Naudo, 1967
- 10) *P.* (*Podapolipus*) *libratus* Naudo, 1967
- 11) *P.* (*Podapolipus*) *tribolii* n. sp.
- 12) *P.* (*Podapolipus*) *punjabi* Husband, Personal communication (in press).

1. Regenfuss put this species erroneously in *Podapolipoides*, as the adult female described by Lavoipierre is that of *P. grassii*, and does not belong to the male or larviform female of *P. locustanus*.

Subgenus *Podapolipoides*.

- 13) *P. (Podapolipoides) grassii* Berlese, 1897
 14) *P. (Podapolipoides) bacillus* Berlese, 1911

Subgenus *Bakerpolipus*.

- 15) *P. (Bakerpolipus) serratus* Husband and Sinha, 1970
 16) *P. (Bakerpolipus) coccinellae* n. sp.

The above list contains the two new species to be described in the following, as well as the species *P. (Podapolipus) aharonii* to be redescribed. The redescription is necessary, as HIRST described only the adult female.

It will be noted that the above three species belong to two different subgenera, which, as already mentioned, does not preclude that they resemble each other in certain aspects. It thus facilitates the indication of common characters if they are presented before the separate description of each of the new species. This procedure will be followed with respect to the legs and the palps.

In the genus *Podapolipus* all legs of males and larviform females have 5 free segments. The pulvillus of leg I is directly connected with the tarsus whereas those of legs II and III are connected to the tarsi by long pretarsi. The first pair of legs has two tiny claws at the base of the pulvillus, the second and third pairs have campanulate suckers, but no claws.

The legs chaetotaxy follows a similar pattern in all species of the genus *Podapolipus*, with certain variations among different species. In the three species with which we are dealing in this paper the legs chaetotaxy in males and larviform females is represented in table 1.

TABLE 1. Number of setae on leg segments of males and females
of the three species described.

Trochanter		Femur	Genu	Tibia	Tarsus
Leg I	0	3	1	6	7-9
Leg II	0	1-2	1	4	4-7
Leg III	0	0	1	4-5	4-5

This general scheme of chaetotaxy changes somewhat from one species to the other. Setae may be simple, stout and spur-shaped or flat and fish-tail-shaped. They may be very long or short. In males, e.g., tibia of leg I has always 6 setae, in *P. aharonii* there are 6 simple setae, whereas in *P. tribolii* and *P. coccinellae* 5 are simple setae, and one is a spur.

In the tibia of leg II, there are only 4 simple setae in *P. aharonii*; in *P. tribolii* 3 setae and 1 spur, whereas in *P. coccinellae* the formula of 4 setae has changed to: 1 single seta, 1 fish-tail seta, 1 spur and 1 solenidion.

In the males, we observed a peculiar hitherto undescribed structure on the dorso-internal side of the femur of leg III, which we assume to be a sense organ (fig. 1). This organ is a roughly

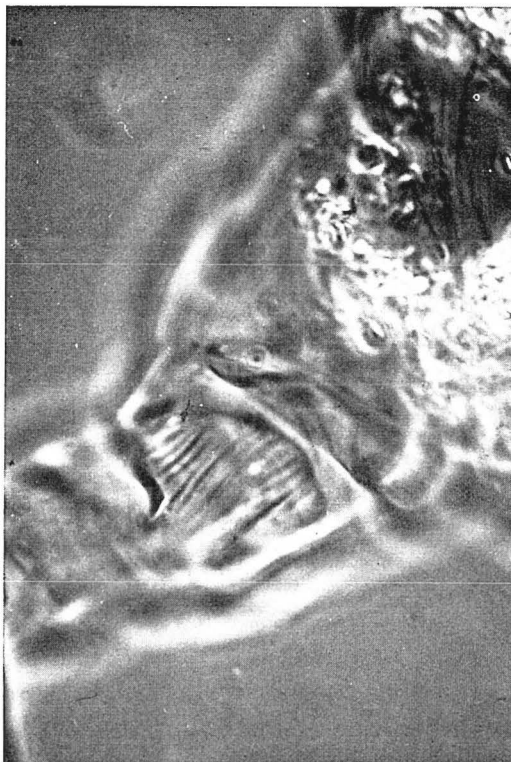


FIG. 1. — *Podapolipus* (*Podapolipoides*) *grassii*, male.
Presumably a sense organ, present on the dorso-internal side of leg III, $\times 1200$.

shaped triangle, pointing posteriorly. Several dark lines, which might be either slits or folds, are running towards the head of the triangle. When observing the leg from the side it appears as if a long and wide slit would reach the organ from the opposite side of the leg. This organ exists in the males of all species of the genus but is most prominent and best seen in *P. grassii*. More details about the structure and function of the presumed sense organ could, no doubt, be learned by studying it with S.E.M.

To avoid repetitions a note concerning special setulae present on the palps, is given below.

The palps of the males and larviform females are small sometimes rudimentary. Even with a good high-power phase microscope, it is sometimes quite difficult to see details, as the minute structures on the palps are too close to the resolution power of the microscope. It could, however, be observed that all podapolipodid mites — described in this paper — bear on the palps some sensillae, whose form and number change from one species to another. These may, perhaps, be compared to the sensory setae on the fourth segment of the palp of the *Ixodidae*. They may be helpful in finding a host or a mate. The sensillae are missing in the adult female.

Podapolipus (*Podapolipus*) *aharonii* Hirst, 1921.

A parasite of *Tropidopola longicornis* (= *Opsomala cylindrica*, *Acrididae*), collected near Ekron, Israel, March 15th, 1921. Only the adult female was described by HIRST. Through kindness of Drs. EVANS, SHEALS and MACFARLANE, from the British Museum, we were able to

examine the whole original batch of mites collected by AHARONI, and sent to HIRST for examination.

In spite of continued search, we were not able to collect more material of this species, thus our study is limited to Aharoni's material only. In addition to Hirst's type of the adult female, we designated one male as an allotype. Holotype, allotype and paratypes in the British Museum (Natural History).

MATERIAL EXAMINED :

HIRST's type of the adult female, three larviform females, and three males, obtained by pressing the type specimen.

HIRST described only the adult female, however, making his observations with a stereoscopic binocular he could hardly see details.

After having examined the adult female type, we have mounted the type in Hoyer, with the kind permission of the British Museum authorities, and observed it under high magnification in Zeiss phase-contrast microscope.

REDESCRIPTION OF HIRST'S TYPE OF *P. aharonii*.

ADULT FEMALE :

Idiosoma long-oval, laterally flattened, full with eggs and embryos (fig. 2). Prior to mounting in Hoyer sizes were : 1700 μ long, 400 μ wide, 500 μ high. According to AHARONI, it was red when alive. Body extends anteriorly with one lobe on each side of the gnathosoma. One pair

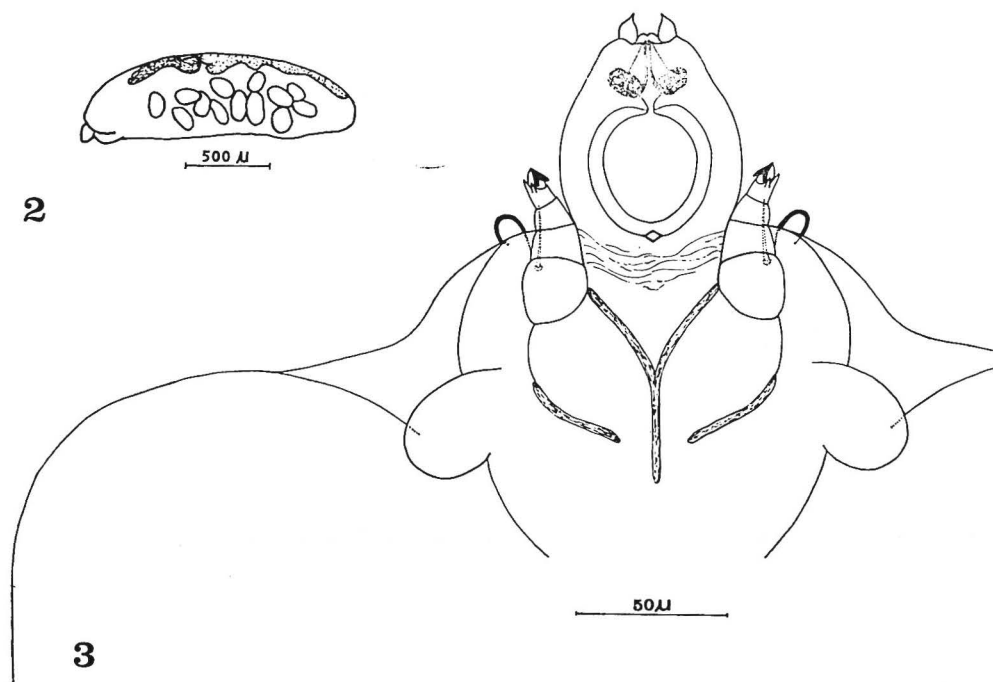


FIG. 2, 3. — *Podapolipus (Podapolipus) aharonii* :
2) Ventro-lateral view of holotype unmounted specimen.
3) Ventral aspect of anterior part of female.

of legs, 5-segmented, ventrally behind the gnathosoma (fig. 3). Leg terminates with an upside down Y-shaped, dark sclerotized hook. One long dorsal seta on the distal part of the femur. Two small lobes protrude ventro-laterally behind the legs. These were considered by Hirst as a reduced unsegmented second pair of legs. The female has a well developed tracheal system. One pair of stigmata protruding dorsally, one on each side of gnathosoma.

Gnathosoma : round-oval, longer than wide ($65 \times 50 \mu$). A pair of short rudimentary palps ; it seems that there is one basal unmovable segment and another one movable. A pair of strong sclerotized chelicerae with a curved basal portion.

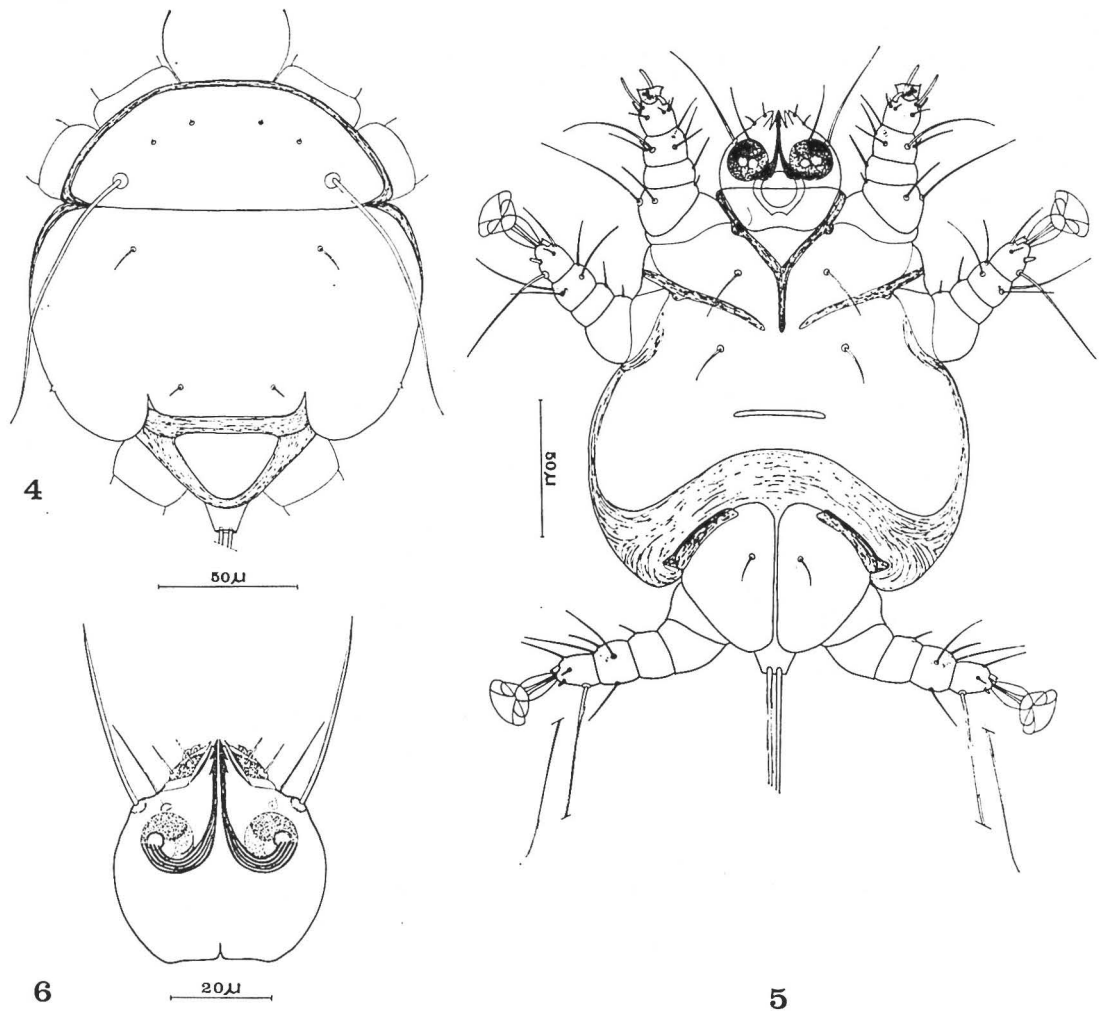


FIG. 4-6. — *Podapolipus (Podapolipus) aharonii*, larviform female :
4) Dorsal aspect ; 5) Ventral aspect ; 6) Gnathosoma, dorsal aspect.

LARVIFORM FEMALE : (First description)

Idiosoma : 160 μ long, 135 μ wide.

Dorsum : Propodosoma slightly overhangs the gnathosoma. Propodosomal plate short and wide ($45 \times 110 \mu$). Vertical internal (v.i.) and vertical external (v.e.) setae minute (shorter

than 2 μ). Scapular external (sc.e.) very long (100 μ). Sejugal furrow between propodosoma and metapodosoma straight. Tergites* I and II of the metapodosoma fused. There is, however, a mark of separation at the postero-lateral border of tergite II. Humeral internal setae (h.i.) short (11 μ), humeral external (h.e.) setae minute. Two dorsal setae (do.) very short (5 μ). Tergite III, well separated, triangular-shaped, bare. Caudal plate (identical with Naudo's opisthosoma) protrudes dorsally, and bears 2 very long caudal setae (275 μ) (fig. 4).

Venter : Apodemes I, II, and sternum thick and distinct. Apodemes I united with sternum, apodemes II free (fig. 5). Two distinct coxal plates are formed between apodemes III. Three pairs of coxal setae, decreasing in size from first to third pair (19, 14 and 10 μ).

Gnathosoma : Spherical (ca. 45 \times 45 μ). Two pairs of long setae, one antero-lateral 40 μ long, and one ventral, 20 μ long. Palps two-segmented, bear two setae, one dorsal and one dorso-lateral (each 7 μ long) and two bulging protuberances, with setulae on the ventral side. Chelicerae well sclerotized, hook-shaped and serrated at their apical end (fig. 6).

Legs : The main variation in chaetotaxy of legs occur in tibiae and tarsi.

Leg I Tibia : 6 setae. Tarsus : 4 setae, 1 spur and 3 solenidia.

Leg II Tibia : 4 setae. Tarsus : 3 setae, 1 fish-tail seta and 1 spur.

Leg III Tibia : 4 setae. Tarsus : 3 setae, 1 fish-tail seta and 1 spur. One of the setae on tarsus of leg III very long (100 μ).

MALE : (First description)

Idiosoma : 160 μ long \times 135 μ wide.

Dorsum : Propodosoma slightly overhangs the gnathosoma (fig. 7). Propodosomal plate longitudinally divided into 2 plates. Genital apparatus between the plates. Setae v.i., v.e. and sc.i. — minute (1-2 μ); sc.e. very long (66 μ). Tergites I and II fused. Setae h.i. and do. short (7 and 9 μ); h.e. minute, very difficult to discern.

Venter : Apodemes and sternum as in larviform female : two coxal plates between the 3rd pair of legs; three pairs of medium sized coxal setae (18, 9 and 8 μ for coxae I, II and III respectively) (fig. 8).

Gnathosoma : Smaller than in the female (30 μ long \times 35 μ wide). Antero-lateral and ventral setae quite long (18 and 15 μ respectively). Palps two-segmented bearing tiny protuberances with setulae on the dorsal and ventral sides. Chelicerae sclerotized, hook-shaped, smaller than in the female and barbed at their apical end (fig. 9).

Legs : The main variation in chaetotaxy as follows :

Leg I Tibia : 6 setae. Tarsus : 3 setae, 1 robust spur and 3 solenidia.

Leg II Tibia : 4 setae. Tarsus : 2 setae, 1 fish-tail seta and 2 spurs.

Leg III Tibia : 4 setae. Tarsus : 3 setae, 1 fish-tail seta and 1 spur.

In contrast to the other males of the genus where some of the tibial setae are replaced by spurs, in *P. aharonii* tibiae bear setae only (fig. 8). The sensory organ on the dorsal side of the 3rd pair of legs is present, but less prominent than in *P. grassii*.

*. We are following here Regenfuss' nomenclature.

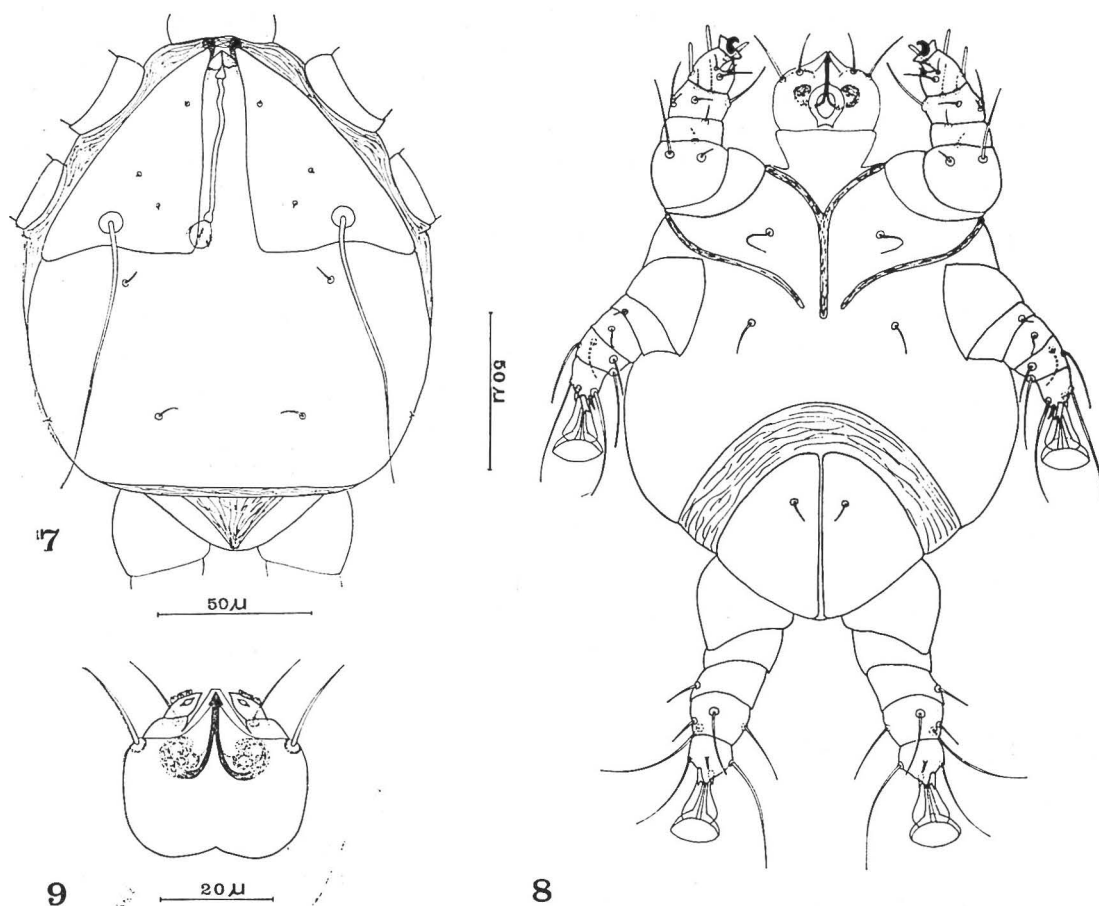


FIG. 7-9. — *Podapolipus (Podapolipus) aharonii*, male :
7) Dorsal aspect ; 8) Ventral aspect ; 9) Gnathosoma, dorsal aspect. (see also Fig. 31)

***Podapolipus (Podapolipus) tribolii* n. sp.**

MATERIAL EXAMINED :

Many females, larviform females and males collected from laboratory-bred *Tribolium confusum*, Jerusalem, Israel. Most of the mites were alive when collected for examination, thus biological observations could be made.

ADULT FEMALE :

Idiosoma : Oval-shaped sac, 310 — 800 μ long \times 240 — 510 μ wide, ventrally flat and dorsally arched (fig. 10). White and transparent when alive, brown when dead. The integument is hairless and in living specimens smooth and shining. At the anterior end of the body the gnathosoma is flanked by a wide lobe on each side (fig. 12). One pair of 5-segmented legs, with one seta dorsally on the femur. From the distal apotele emerges a sclerotized, slightly indented claw.

Spiraculæ and tracheal systems as in *P. aharonii* (Figured only for *P. coccinellae*) (fig. 22).

Gnathosoma : Round oval, somewhat wider than long (55 \times 50 μ). Palps rudimentary, chelicerae well sclerotized, hook-shaped and barbed at their apical end (fig. 11).

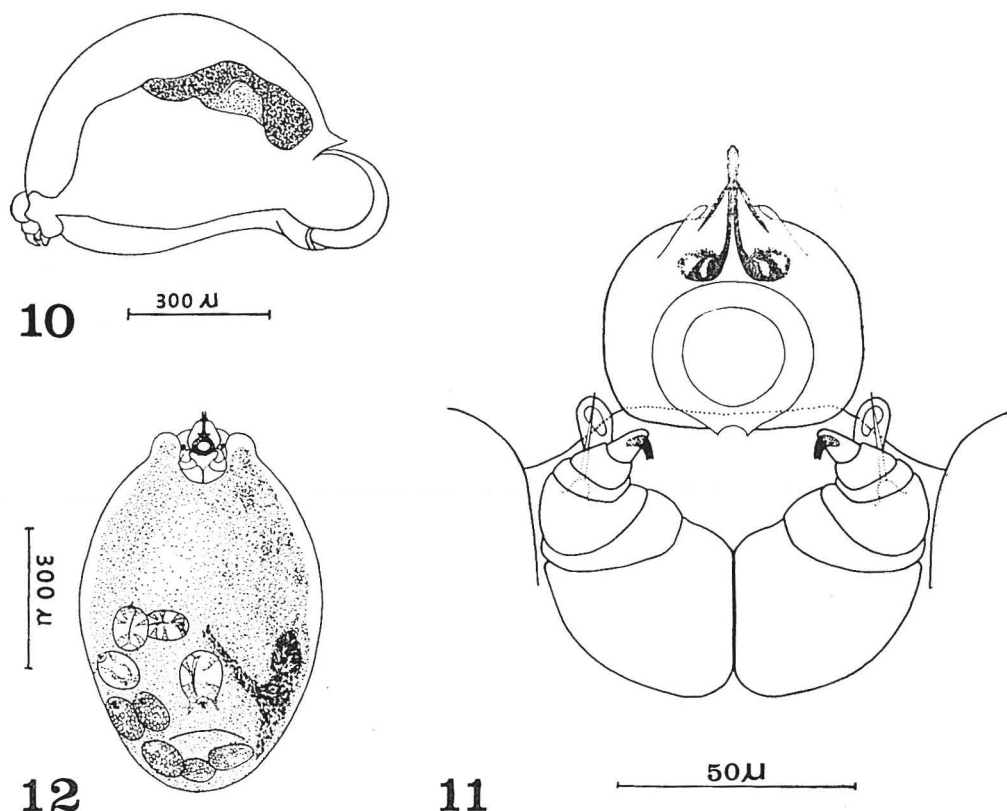


FIG. 10-12. — *Podapolipus (Podapolipus) tribolii*, n. sp., female :
10) Lateral aspect; 11) Ventral aspect of anterior part of holotype; 12) Ventral aspect of gravid female.

LARVIFORM FEMALE :

Idiosoma : Short oval, longer than wide ($120 \times 100 \mu$), dorso-ventrally flat, transparent when alive, brown when dead.

Dorsum : The propodosomal plate short and wide ($37 \times 84 \mu$). Sejugal furrow straight. Tergites I and II completely separated by a semi-circular furrow. Tergite III ca. twice as wide as long. Setae v.i. and v.e. medium sized (16 and 26μ), sc.e. long (65μ), h.i. medium sized (12μ), h.e. short (6μ), do. medium sized (10μ), lumbar setae very short (2μ), one pair of very long caudal setae (ca. 125μ) (fig. 13).

Venter : Apodemes I unite with the sternum. Apodemes II free. Two distinct coxal plates between the third pair of legs. Coxal setae augmenting in size from 1st to 3rd pair (11 - 15μ respectively). (fig. 14).

Gnathosoma : Oval, wider than long ($37 \times 25 \mu$). Antero-lateral and ventral setae long (30 and 15μ respectively). Palps unsegmented with two very short setae (2μ), one dorsal and one ventral. The setae arise from pits, surrounded by sclerotized rings, connected in a form of a spectacle frame. In addition 3 setules rise from a thinly sclerotized triple base, on the ventral side of the palps. Chelicerae relatively short, and serrated for quite a part of their length. (fig. 15).

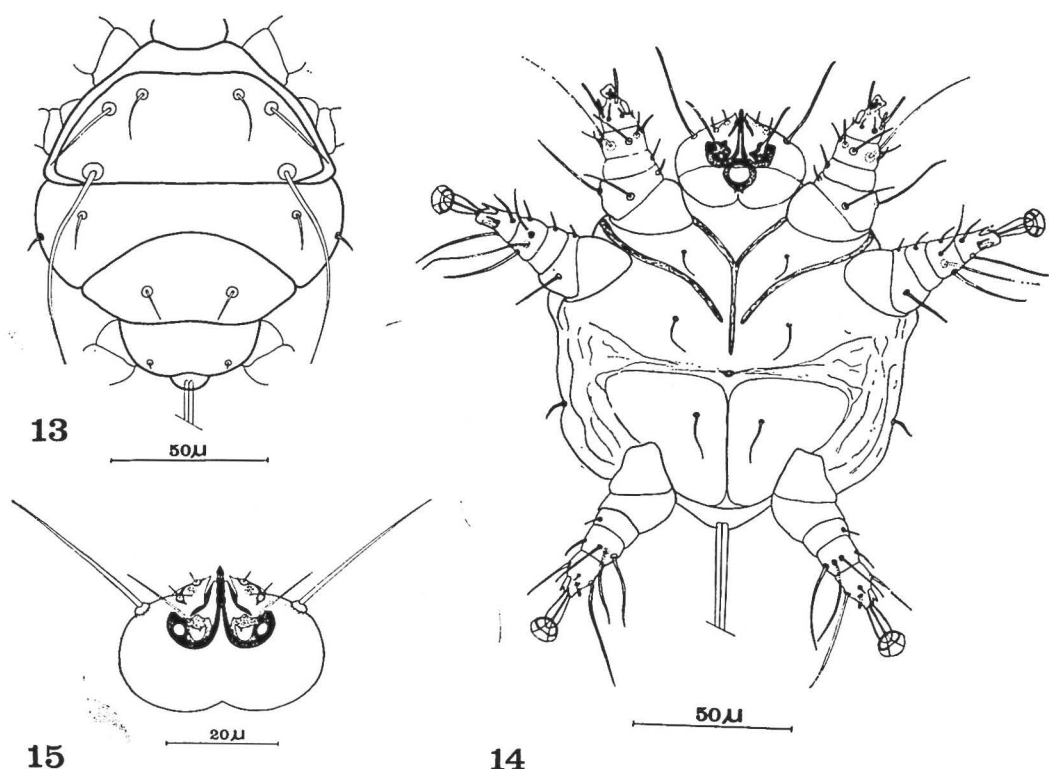


FIG. 13-15. — *Podapolipus (Podapolipus) tribolii*, larviform female :
13) Dorsal aspect; 14) Ventral aspect; 15) Gnathosoma, dorsal aspect (see also fig. 29.)

Legs :

Leg I Tibia : 6 setae. Tarsus : 3 setae, 1 spur and 3 solenidia.

Leg II Tibia : 4 setae. Tarsus : 3 setae, 1 fish-tail seta and 1 spur.

Leg III Tibia : 4 setae. Tarsus : 3 setae, 1 fish-tail seta and 1 spur. No particularly long setae on leg III as in some other species.

MALE :

Idiosoma : Longer than wide (120-150 × 95-130 μ).

Dorsum : Propodosomal plate triangular covers about 1/3 of the idiosoma. The posterior edge of the propodosoma is not a smooth line, its form indicates a rudimentary division of the propodosomal plate (compare with male of *P. aharonii*). (fig. 16).

No semicircular furrow on the metapodosoma. Tergites I and II entirely fused, comprising ca. 1/3 of idiosoma. Tergite III occupying 1/3 of idiosoma.

Propodosomal setae : v.i., v.e. and sc.i. minute arranged in a triangle, sc.e. long (44 μ). Metapodosomal setae medium-short h.i. (9 μ), h.e. (5 μ) and do. (5 μ). Tergite III (Opistosoma) bare. Aedegus dorsal, on anterior margin of the propodosoma.

Venter : Apodemes and sternum as in larviform female. Two coxal plates between third pair of legs. Three pairs of medium size coxal setae (11-13 μ) (fig. 17).

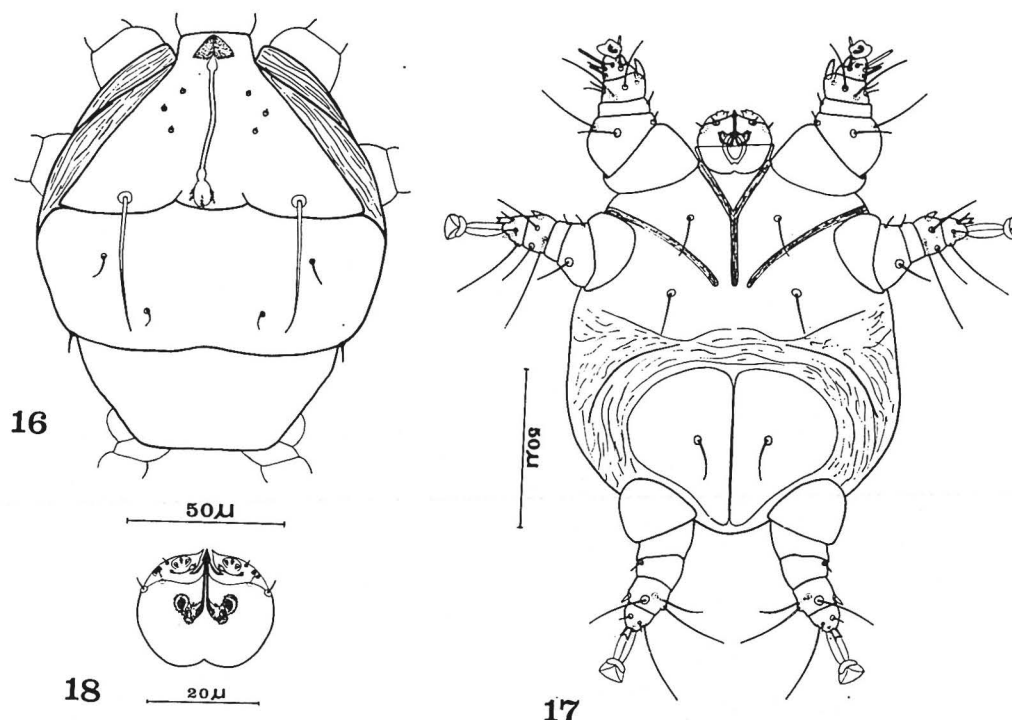


FIG. 16-18. — *Podapolipus (Podapolipus) tribolii*, male :
16) Dorsal aspect; 17) Ventral aspect; 18) Gnathosoma, dorsal aspect (see also fig. 32.).

Gnathosoma : Almost spherical ($24 \times 21 \mu$). Antero-lateral and ventral setae very short (2μ). Palps unsegmented, with three setulae on each, two of them arise from the spectacle-shaped bases. In addition 5 setulae arranged on two small protuberances, 3 can be discerned on one, and 2 on another, all on the antero-dorsal side. Chelicerae with a short base smaller than in the female and barbed at their apical end (fig. 18).

Legs : Setal scheme is normal for the genus. Main variation :

Leg I Tibia : 5 setae, 1 thick, thumb-like, spur. Tarsus : 3 setae, 1 spur and 3 solenidia.

Leg II Tibia : 3 setae and 1 spur. Tarsus : 3 setae, 1 fish-tail seta and 1 spur.

Leg III Tibia : 3 setae and 1 spur. Tarsus : 3 setae, 1 fish-tail seta and 1 spur.

No particularly long setae on the legs.

Holotype female, paratypes, allotype male, larviform females and males deposited in the collection of the Laboratory of Medical Entomology, Hebrew University — Hadassah Medical School. Paratype adult female, larviform female, and male, one in each stage, deposited in British Museum (Natural History).

BIOLOGY :

P. tribolii infests only adult beetles, never larvae or pupae.

All mites were found under the elytra of the beetles (fig. 19) mostly under the anterior part, attached to the intersegmental membranes of the tergites. The gravid females were generally attached between the first 3-4 tergites, whereas the young females were found attached all along the abdomen, sometimes also encountered unattached on the membranous wings. A very high

infestation of a beetle by mites is probably detrimental to the host, for in several cases dead beetles were found with the whole dorsal side of their abdomen covered with mites.

The mites are very sensitive to humidity. If the elytra of the host under which females were attached was removed on one side, the larviform females moved and attached themselves under the other elytra, however, the adult ones were unable to move and dried up, even under conditions of high humidity and darkness. If removed from its host the gravid female died quickly. We never found living mites in the breeding medium of the host. If not attached to a host they appear to die. The newly emerged mites generally attach themselves to the same host as their mother. They probably pass from one host to another when the flour beetles cluster as they generally do.

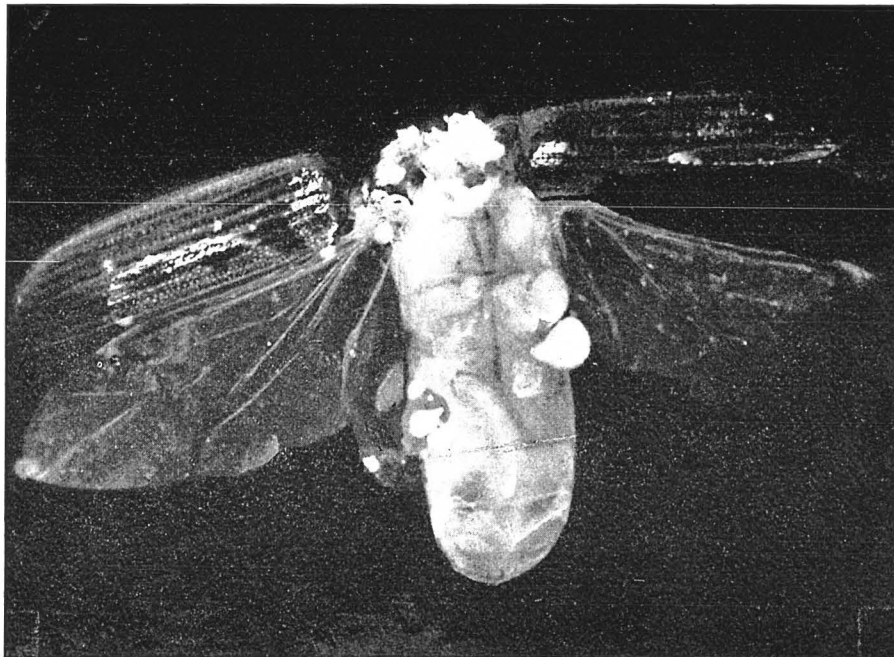


FIG. 19. — *Tribolium confusum*, infested with *Podapolipus (Podapolipus) tribolii*, $\times 20$.

The larviform females are more prevalent than the males. In our breeding of *Tribolium* the ratio of males to larviform females of *Podapolipus* was 1 : 13. The males were never found attached to the flour beetle. We generally obtained our male specimens by pressing slightly on gravid females. The latter contained 0-3 males as compared to 1-17 larviform females. The adult female ecdyses from the larviform female through a slit formed around the edge of the body between venter and dorsum. The slit begins behind the gnathosoma and continues backward on both sides down to the hind legs. Ventral and dorsal integuments remain connected along the posterior part between the hind legs. The gnathosoma and legs remain attached to the ventral skin of the larviform female.

The larviform females were generally found feeding on the beetles. In one case three of them were found attached to the anterior part of the body of an adult female.

The genital opening of the adult female is a ventral transversal slit (fig. 12). The genital system consists of one long coiled tube, containing the ova and embryos in a row of progressive

stages of development. The neotenous larvae are the nearest to the genital opening and are seen moving their free appendages within their mother.

In the very young embryos the chelicerae are the first visible organs. In older embryos the legs can be seen folded under the abdomen, and the long caudal setae of the female are folded ventrally to the anterior. (This is true for all species studied). At the distal end of the uterus the mites are seen to unfold their appendages. The first pair first and the others later. The caudal setae are unfolded only after emerging. The gravid female which generally contains about 8 embryos, could have up to 17 eggs, embryos and neotenous larvae. Males and larviform females are arranged at random within the gravid female.

The morphology of the male genital system is similar in all three subgenera. Two sclerotized plates flank the genital orifice. A pear-shaped bulb, connected to the orifice by a long tube, may function as an ejaculatory apparatus. However, no spermal cells have been found in the bulb.

Podapolipus (Bakerpolipus) coccinellae n. sp.

The material was kindly sent to us by Miss B. Gurney, Glasshouse Crops Research Institute : Rustington, Sussex, England.

The mites infested laboratory breedings of the coccinellid *Cycloneda sanguinea*. The *Cycloneda sanguinea* from which the laboratory breedings were started, was collected from egg plants (*Solanum Melongéna* L.) in Curepe, Trinidad. Together with the mites attached to the underside of the elytra of the beetles, the fungus *Hesperomyces (Laboulbeniales)* was developing and appeared to be in close association with the mites.

MATERIAL EXAMINED :

Many females, larviform females and males, collected from the above mentioned coccinellids, were received here preserved in alcohol.

ADULT FEMALE :

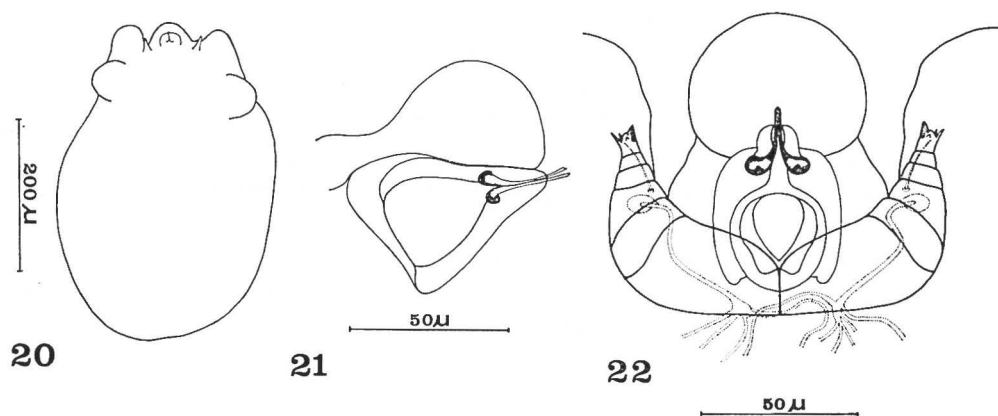
Idiosoma : Oval-shaped sac, 450-630 μ long, 330-400 μ wide. Integument smooth, hairless, and yellowish in alcohol. The anterior end of the body has two lobes like in the subgenus *Podapolipus*, with two additional lobes on the ventral side immediately behind the legs (fig. 20). These lobes are somewhat smaller than the anterior ones, but much bigger than those of *P. (Podapolipus) aharonii*. They can be to a certain extent compared with the bilobed outgrowths of *P. (Podapolipoides) grassii*. In the latter species, however, the bilobed outgrowths arise from a single trunk.

In addition to these four lobes the adult female has another sclerotized fifth lobe, situated on the dorsal side and covering the gnathosoma (fig. 21). This lobe is similar to the one described by Husband and Sinha for *Bakerpolipus*, except that in *Bakerpolipus serratus* it is not sclerotized.

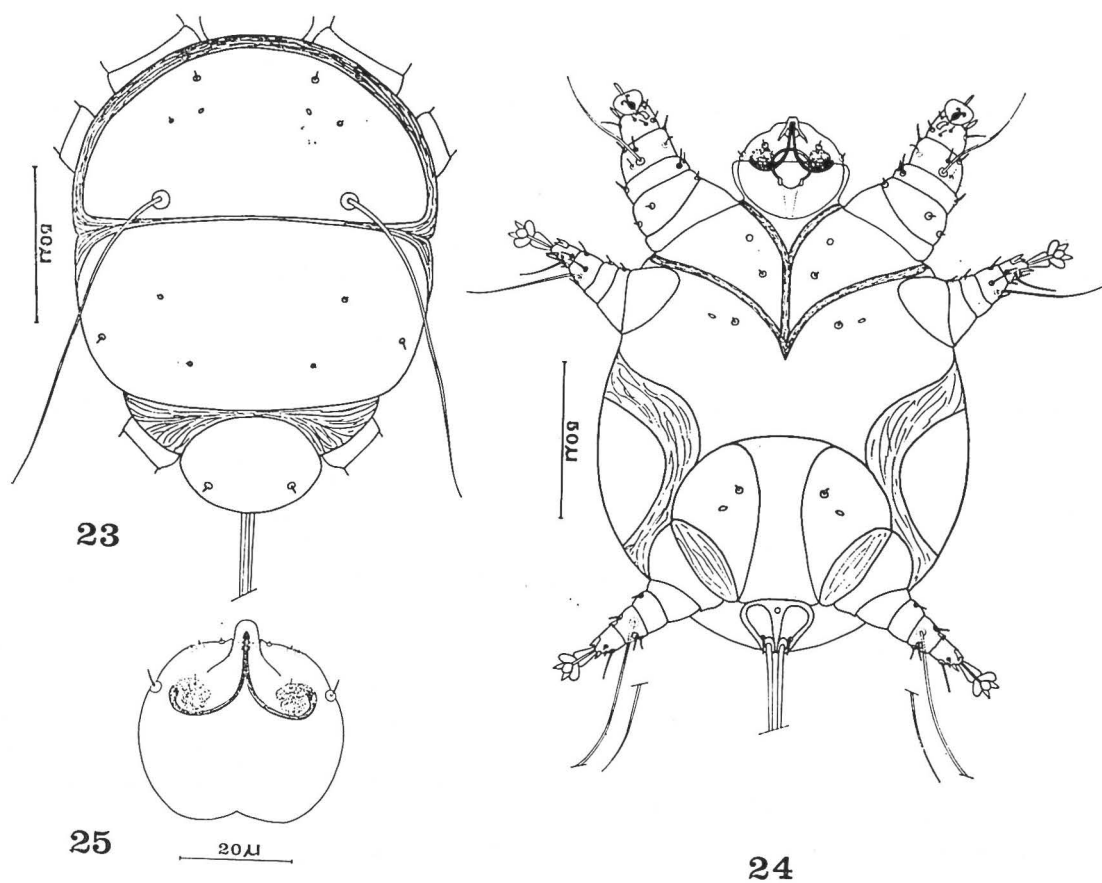
The legs are 5-segmented. The femur bears dorsally a long seta, as in the other species. The distal segment (apotele) is terminated with a dark sclerotized hook-shaped claw, and several processes, one of them finger-like.

The stigmata and tracheal system as in the other species of the genus (fig. 22).

Gnathosoma : Spherical, longer than wide (50 \times 40 μ). The palps well distinguished, apparently undivided, form a conus on the gnathosoma ; chelicerae sclerotized, pointed at their apical end.



FIGS. 20-22. — *Podapolipus (Bakerpolipus) coccinellae* n. sp., female holotype : 20) Ventral aspect, unmounted specimen, showing all five lobes ; 21) Side view of fifth lobe, covering gnathosoma ; 22) Ventral aspect of anterior part.



FIGS. 23-25. — *Podapolipus (Bakerpolipus) coccinellae* n. sp., larviform female ; 23) Dorsal aspect. 24) Ventral aspect ; 25) Gnathosoma, dorsal aspect (see also fig. 30.)

LARVIFORM FEMALE :

Idiosoma : Short oval, 135-150 μ long, 95-115 μ wide. Dorso-ventrally flat.

Dorsum : Propodosomal plate semicircular, wider than long (90 \times 50 μ). Sejugal furrow straight. Setae v.i. (3 μ) v.e. minute, sc.e. long (100 μ). Tergites I and II completely fused, very wide curving in laterally to the ventral side of the female. Setae h.i. (3 μ), h.e. and do. minute. Tergite III transversally oval, with 2 very short lumbar setae (3 μ) (fig. 23).

Venter : Apodemes I and II fused with the sternum. Two distinct plates between third pair of legs far apart from one another. Caudal plates well distinguished; caudal setae very long (140 μ). Two short accessory setae (5 μ) one on each side of caudal setae, seen only from the ventral side; coxal setae minute (fig. 24).

Gnathosoma : Spherical, about as long as wide (40 \times 36 μ). Cheliceral cone protruding. The sclerotized chelicerae thin, hook-shaped with a relatively wide base and short stylets ending apically in 3 pairs of teeth. Antero-lateral and ventral setae very short (3 and 2 μ respectively). Palps apparently not articulated, bearing 3 setulae (fig. 25).

Legs : Chaetotaxy of legs follows the general pattern; the main variation is in the number of solenidia and spurs and the length of the setae. All setae on legs are shorter than in *P. (Podapolipus) aharonii* and *P. (Podapolipus) tribolii*. There is, however, one long seta on the tibia of each leg, with the one on leg III particularly long (80 μ).

Leg I Tibia : 6 setae. Tarsus : 6 setae, 1 strong spur and 2 solenidia.

Leg II Tibia : 4 setae. Tarsus : 5 setae, 1 fish-tail seta and 1 spur.

Leg III Tibia : 4 setae, 1 fish-tail seta. Tarsus : 3 setae, 1 fish-tail seta and 1 spur.

The presence of a fish-tail seta on the tibia of leg III is characteristic only for this species.

MALE :

Idiosoma : 120 μ long, 92 μ wide.

Dorsum : Propodosomal plate narrowed at anterior margin. Its posterior edge has a deep concavity in the middle. Tergites I and II fused, pear shaped, the apex laying in the concavity of the propodosoma. All dorsal setae present but minute. Genital orifice situated in the apex of the metapodosoma (fig. 26).

Venter : Apodemes I and II unite centrally with the sternum. The integument between apodemes I extends anteriorly as a ventral lobe to about 2/3 of the length of the gnathosoma. Between the third pair of legs two distinct plates are present. All 3 pairs of coxal setae minute (fig. 27).

Gnathosoma : Spherical (18 \times 18 μ). The setae, usually antero-lateral, are in this species situated more messially. These and the ventral setae are minute. Palps are well developed and protrude from gnathosomal capsule. They seem to have 3 segments, 2 of which are movable. Three pairs of setulae are present, two of them on the palpi, and one on the anterior part of the gnathosoma. Chelicerae small, as in males of other species, and barbed at their apical end (fig. 28).

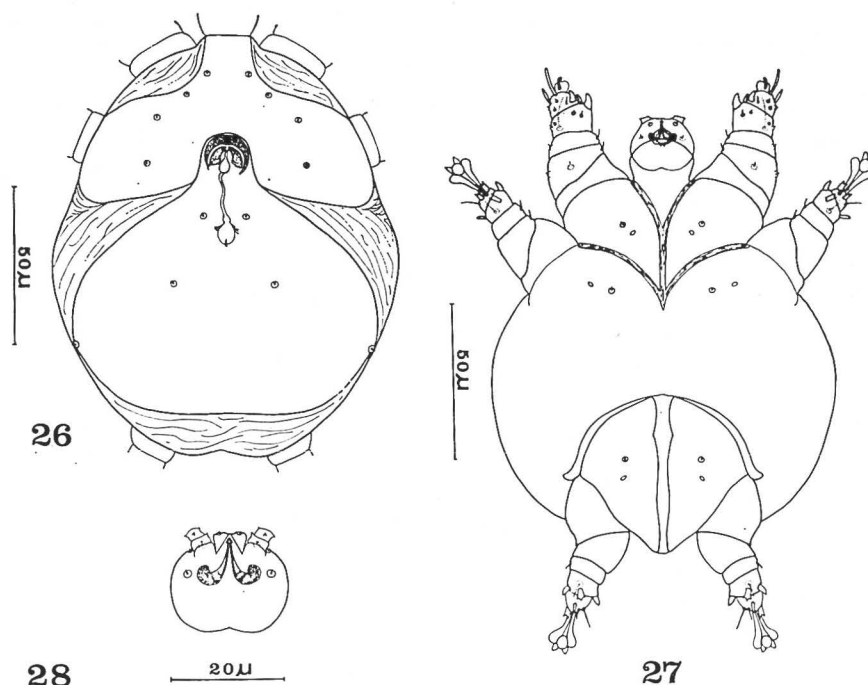
Legs : Setal formula follows the general pattern, but all setae are as a rule reduced in length compared with the female.

Leg I Tibia : 5 setae and 1 thick, thumb-like, spur. Tarsus : 4 setae, 2 spurs and 2 solenidia.

Leg II Tibia : 1 seta, 1 fish-tail seta, 1 spur and 1 solenidion. Tarsus : 2 setae, 1 fish-tail seta and 1 spur.

Leg III Tibia : 1 seta, 2 spurs, and 1 three-pointed seta. Tarsus : 2 setae, 1 fish-tail seta and 1 spur.

The three-pointed seta on tibia of leg III is present in the male of this species only.



FIGS. 26-28. — *Podapolipus (Bakerpolipus) coccinellae* n. sp., male allotype :
26) Dorsal aspect ; 27) Ventral aspect ; 28) Gnathosoma, dorsal aspect (see also fig. 33.)

Holotype female, allotype male, paratypes and larviform females in collection of the laboratory of Medical Entomology, Hebrew University — Medical School. Paratype female, male and larviform female one in each stage, deposited in the British Museum (Natural History).

DISTINGUISHING FEATURES :

P. (Bakerpolipus) coccinellae is similar to *P. (Bakerpolipus) serratus* in that the adult female possesses a lobe above the gnathosoma. In male : aedeagus placed on the hysterosoma. Larviform female with two minute accessory caudal setae, also present in *P. serratus*. It differs, however, by the smooth integument of the adult female, and the chaetotaxy of the larviform female and of the male.

SUMMARY.

The taxonomy of three genera : *Podapolipus* s. str. Rovelli and Grassi, 1888 (sensu Regenfuss), *Podapolipoides* Regenfuss, 1968, and *Bakerpolipus* Husband and Sinha, 1970 is discussed. It is suggested to change the status of the genera to subgenera. The adult female of *P. aharonii* Hirst, 1921 is redescribed whereas the male and larviform female are described for the first time.

Two new species are erected : *P. (Podapolipus) tribolii* associated with *Tribolium confusum*, and *P. (Bakerpolipus) coccinellae*, associated with *Cycloneda sanguinea*.

All developmental stages were studied.

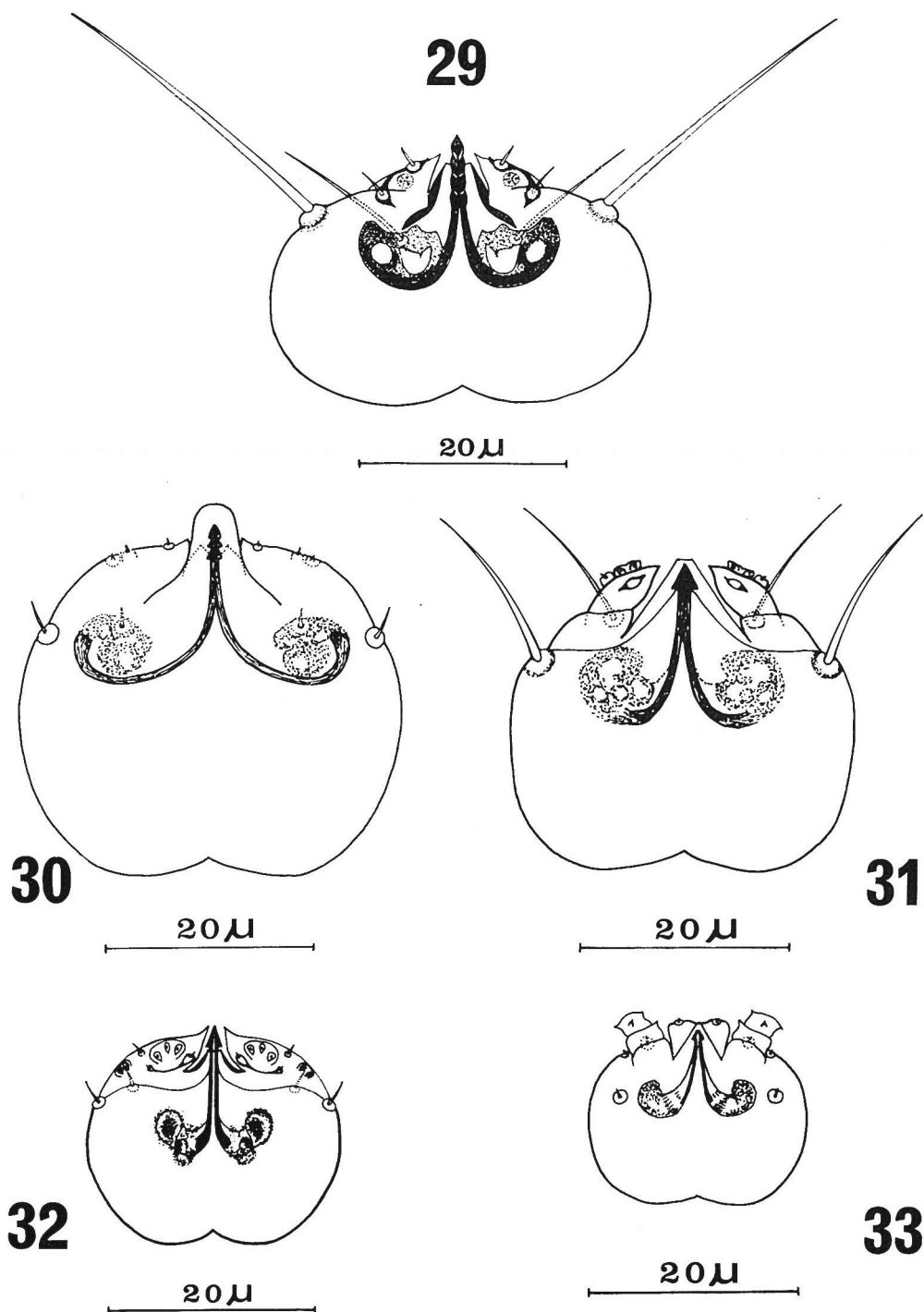


FIG. 29-33 : Gnathosoma, dorsal aspect :

- 29) *Podapolipus* (*Podapolipus*) *tribolii*, larviform female ;
 30) *Podapolipus* (*Bakerpolipus*) *coccinellae*, larviform female ;
 31) *Podapolipus* (*Podapolipus*) *aharonii*, male ; 32) *Podapolipus* (*Podapolipus*) *tribolii*, male ; 33)
Podapolipus (*Bakerpolipus*) *coccinellae*, male allotype.

ACKNOWLEDGEMENTS.

Our sincere thanks are due to the scientists of the British Museum (Natural History), Drs. G. O. EVANS, J. G. SHEALS and D. MACFARLANE, for the loan of Aharoni's original material ; Miss B. GURNEY is to be thanked for having kindly supplied *P. coccinellae*. Likewise the assistance of Dr. P. LAVOPIERRE (University of California), Dr. M. H. NAUDO (Musée National d'Histoire Naturelle Paris, France) and Dr. R. W. HUSBAND (Adrian College, U.S.A.) who generously lent us their material thus enabling us to carry out this study, is greatly appreciated.

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