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A New Genus and Species of Hyadesid Mite — *Algophagus antarcticus*— from Heard Island

By

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A NEW GENUS AND SPECIES OF HYADESID MITE — *ALGOPHAGUS ANTARCTICUS* — FROM HEARD ISLAND

By A. Margaret Hughes*

The mites discussed in this paper were originally collected by E. H. M. Ealey, A.N.A.R.E. Biologist to Heard Island in 1949 from a freshwater pool (coll. No. 541) in the Atlas Cove area, near Wharf Point at Heard Island on 16/12/49.

Algophagus new genus.

This genus has been founded to include hyadesid mites having the following characters in common—

1. The surface of the body is smooth.
2. No constriction marks the division between propodo- and hysterosoma.
3. All legs in both sexes terminate in a normal size pulvillus bearing a large claw.
4. The legs of the ♂ are markedly longer and thicker than those of the ♀.
5. In the ♀ the apodemes of leg I barely meet in the mid-line, those of leg II end freely. In the ♂ the apodemes of legs I and II all meet in the mid-line.
6. The apodemes of legs III and IV of both sexes are well developed and separate from one another.
7. "Oil" glands are present on the sides of the hysterosoma.
8. No tarsal or anal suckers are present in the ♂.
9. Genital suckers are present in both ♂ and ♀.
10. The solenidia ω_1 and ω_2 arise midway along tarsus I and not near its base.
11. The genus has, up to now, been found only on Algae in fresh water.

Genotype — Algophagus antarcticus sp.n.

The nomenclature of the body setae given below was originally devised by A. C. Oudemans and later used by A. A. Zachvatkin (1940) ; that of the leg setae was compiled by F. Grandjean (1939). Both leg and body setae have been renamed by H. H. Nesbitt (1945) and a table showing the synonymy is given in a previous paper (A. M. Hughes, 1948).

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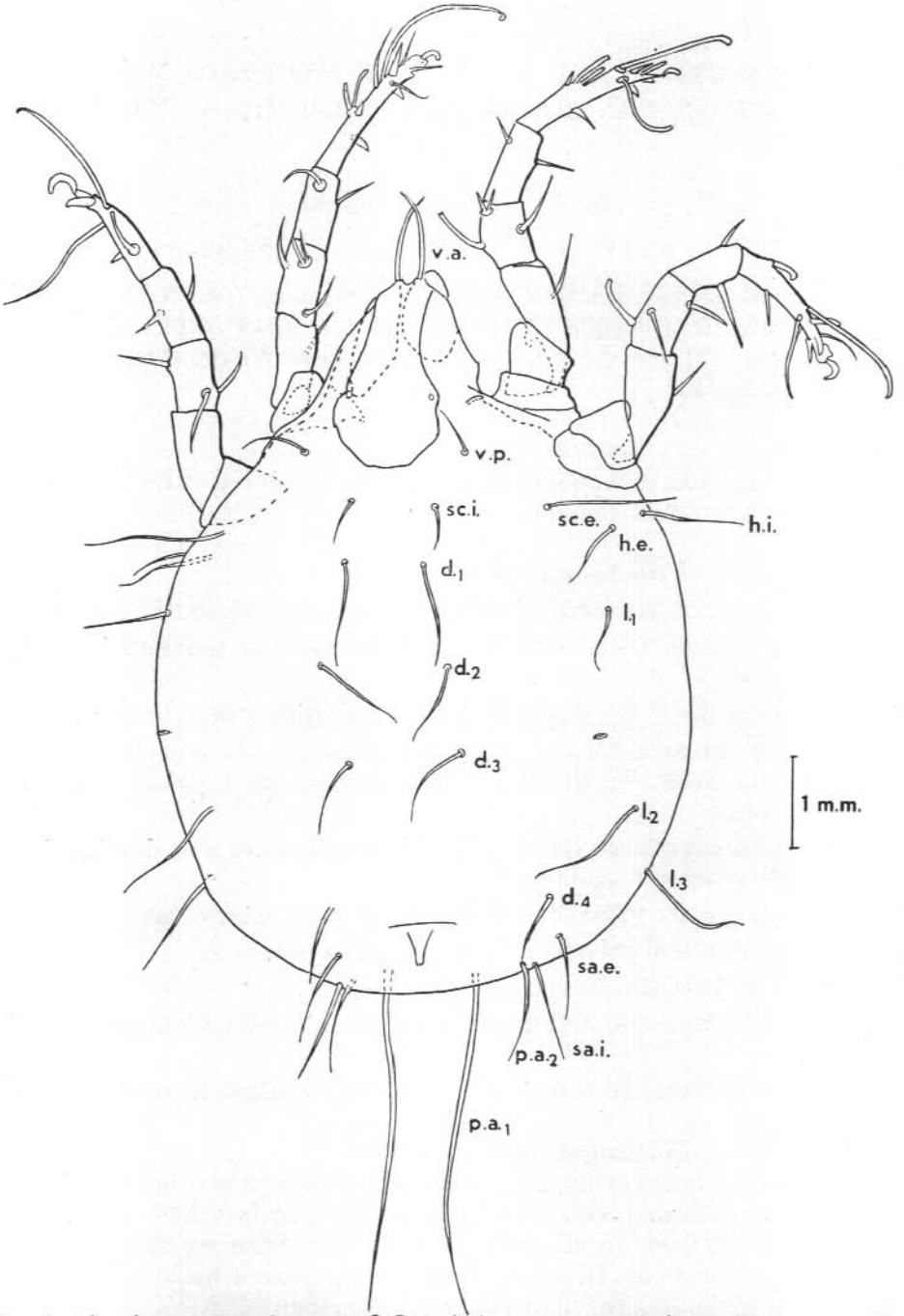


Fig. 1. Algophagus antarcticus sp.n. ♀ Dorsal view. v.a = vertical anterior, v.p = vertical posterior, sc.e = external scapular, sc.i = internal scapular, h.e = external humeral, h.i = internal humeral, d_1-d_4 = dorsals, l_1-l_3 = laterals, sa.e = external sacral, sa.i = internal sacral, $p.a_1$, $p.a_2$ = postanals.

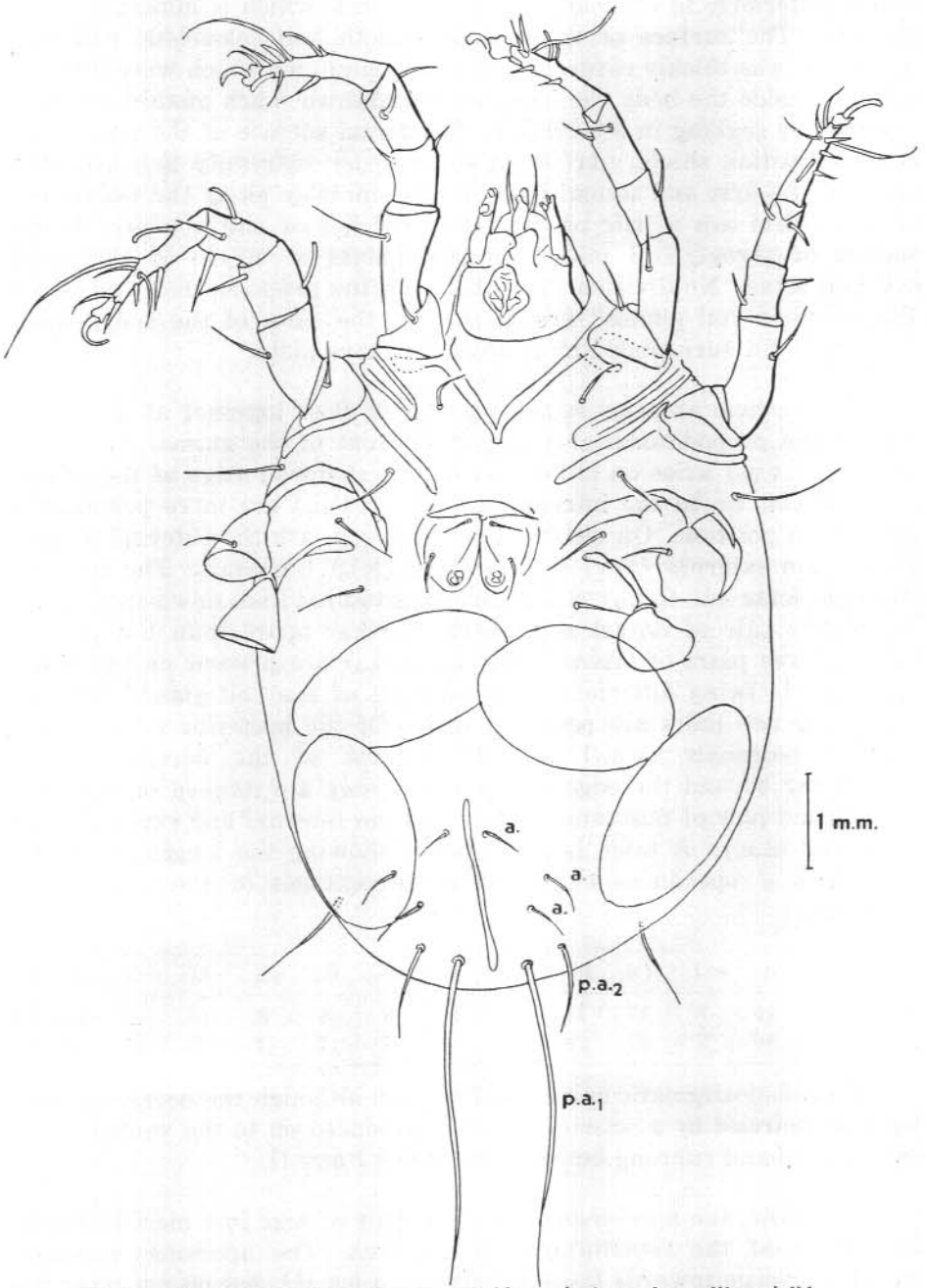


Fig. 2. Algophagus antarcticus sp.n. ♀ Ventral view. Legs III and IV have been removed. a = anal, p.a.1, p.a.2 = postanals.

Female (Figs. 1, 2). Length of idiosoma = 800μ.

The body is almost pearshaped in outline, the propodosoma being prolonged anteriorly to overhang the gnathosoma, which is almost ventral in position. The surface of the skin is smooth and colourless, and in my specimens was thickly covered with small epiphytes which were difficult to detach. Inside the body the haemocoel contained much guanin which was removed by soaking in 5% NaOH. The dorsal surface of the propodosoma bears a median shield, narrow at its anterior extremity and broadening between the first and second pair of legs; midway along the lateral edges of this shield are a pair of colourless patches of chitin which, in other species of tyroglyphid mites, are the points of origin of the vertical external setae. No division exists between the propodo- and hysterosoma. The so-called "oil glands" are present on the sides of the body, opening by a small slit surrounded by a small chitinous plate.

The vertical anterior setae (v.a.) arise close together at the anterior edge of the propodosoma and project in front of the animal; the vertical posterior (v.p.) arise on either side of the posterior edge of the propodosomal shield, whilst the internal scapulars (sc.i.) are more posterior and internal in position. On either side of the sc.i. are the external scapulars (sc.e.) and external (h.e.) and internal (h.i.) humerals. The four pairs of dorsal setae ($d._1$ to $d._2$) run in two longitudinal lines down the idiosoma, the fourth pair of dorsal setae being further apart than the preceding pairs. Three pairs of lateral setae ($l._1$ to $l._2$) are present on the sides of the body, $l._1$ being anterior to the opening of the "oil gland" whilst the remaining two pairs are posterior to it. Of the posterior setae, the first pair of postanals ($p.a._1$) are the longest of the dorsal setae and project far beyond the edge of the body; they are flanked on either side by a second pair of postanals ($p.a._2$) and the internal and external sacrals (sa.i. and sa.e.). A table is given below showing the length of the setae of ♀ and ♂ specimens expressed as percentages of the length of the idiosoma.

	v.a.	v.p.	sc.i.	sc.e.	h.i.	h.e.	$d._1$	$d._2$	$d._3$	$d._4$	$l._1$	$l._2$	$l._3$	$p.a._1$
♀	10	15	8	17	15	7	10	8	8	8	15	13	21	70
♂	11	10	7	20	20	7	8	7	7	7	12	16	15	70

No pseudostigmatic spine could be seen although the dorsal surface of leg I is encircled by a sclerite which is produced on to the ventral surface as a broad band running between apodemes I and II.

Ventrally, the apodemes of the first pair of legs just meet in the midline, those of the remaining ones are free. The apodemes supporting leg IV converge towards those belonging to leg III, but do not meet them. Four pairs of coxal setae are present instead of the normal three pairs.

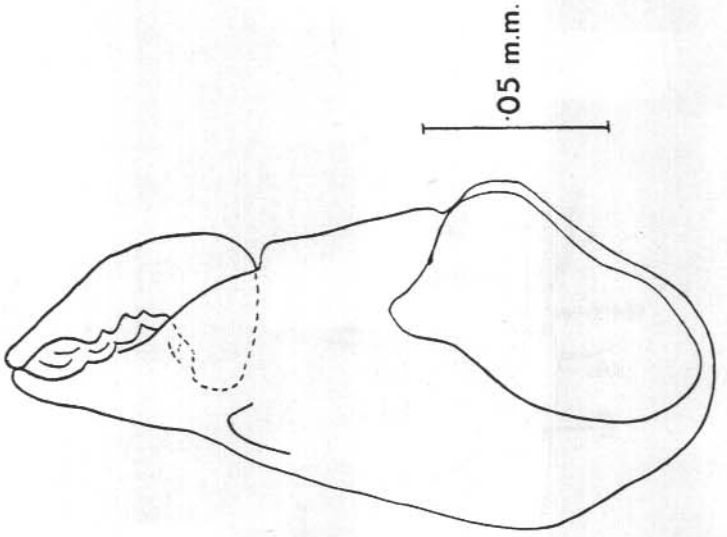


Fig. 4. Algophagus antarcticus sp.n.♀
Internal view of chelicera.

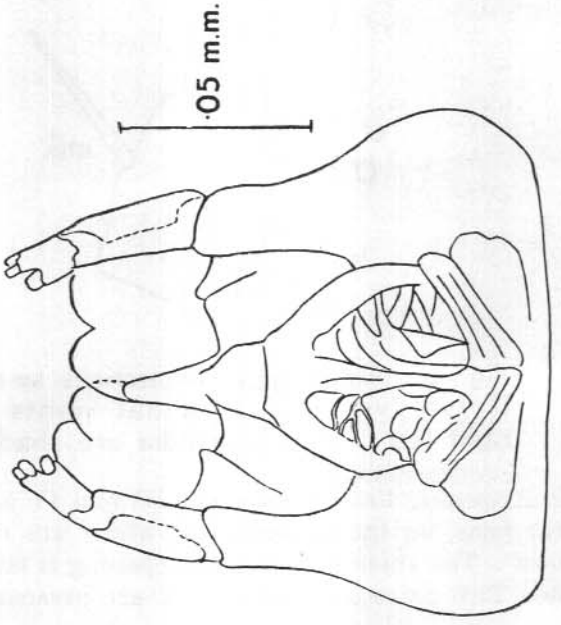


Fig. 3. Algophagus antarcticus sp.n.♀
Ventral view of gnathosoma.

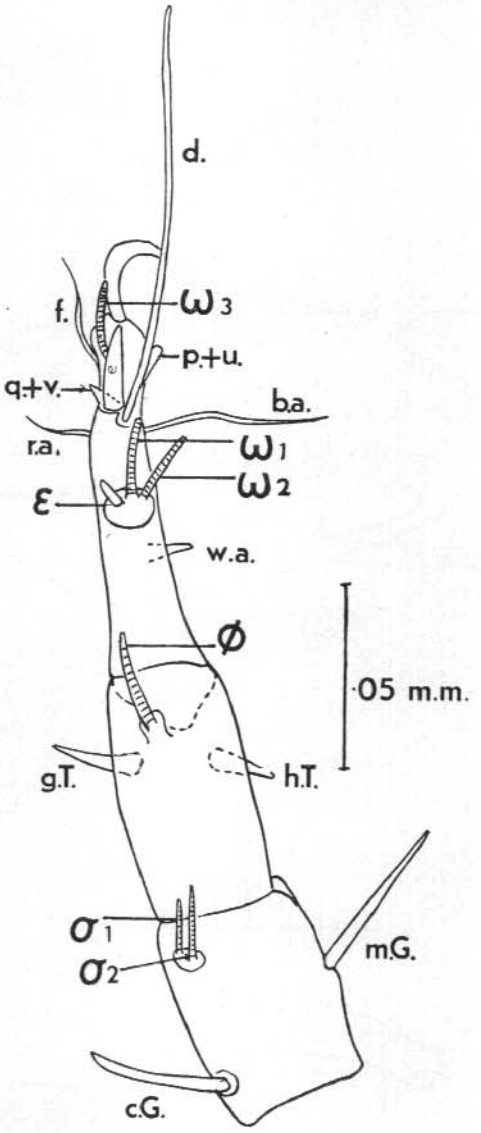


Fig. 5. Algophagus antarcticus sp.n. ♀ Dorsal view of terminal joints of right leg I. The solenidia are shaded.

The genital opening lies between legs III and IV and is covered by a pair of genital folds, on the underside of which are two pairs of small genital "suckers". The anterior end of the opening is marked by a slightly curved sclerite. Two pairs of genital setae are present arising from the genital folds.

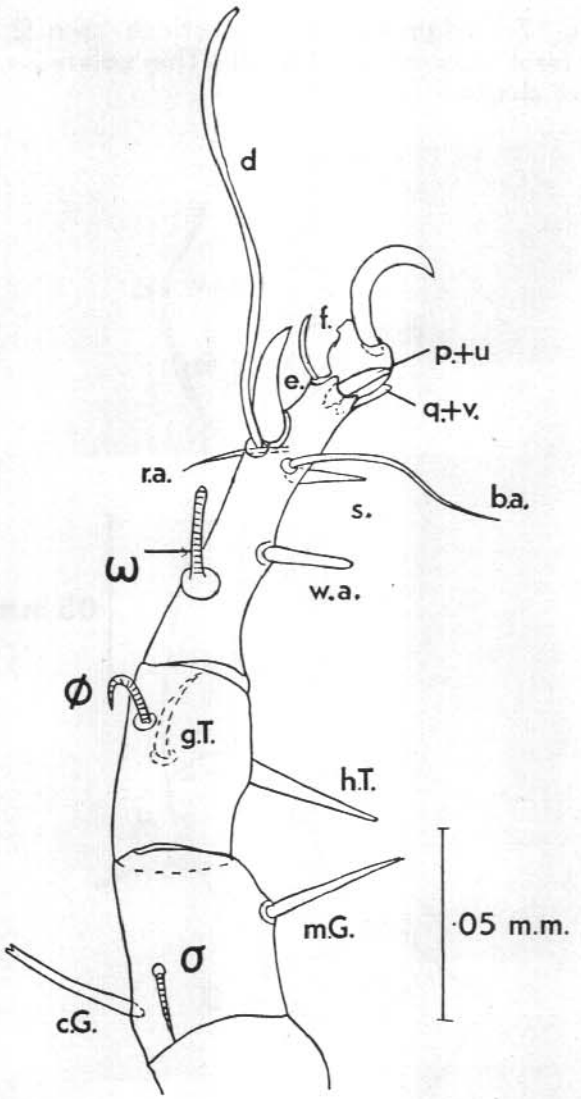
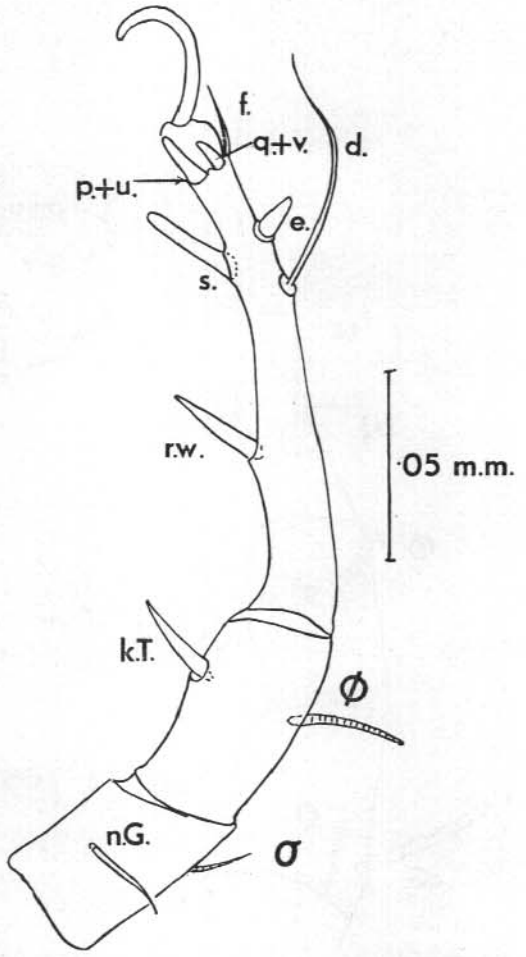


Fig. 6. Algophagus antarcticus sp.n.♀ Dorsal view of terminal joints of right leg II. The solenidia are shaded.

The gnathosoma (Fig. 3) is of the usual sarcoptiform type, the chelicerae (Fig. 4) being chelate and the palpal portion three jointed, irregularly chitinised and terminating in two small knob-like structures which may represent vestigial segments.

The legs are composed of five free joints, the most distal joint—the tarsus—bearing a well-defined pulvillus in the end of which is inserted a strong sickle-shaped claw. Of the distal group of setae encircling the

Fig. 7. Algophagus antarcticus sp.n. ♀ Lateral view of left leg III. The solenidia are shaded.



base of the pulvillus on tarsus I (Fig. 5) d. is a long seta, curved and broadened at its distal extremity and extending well beyond the end of the claw, e. is a blunt spine, f. a short seta extending beyond the base of the claw on the internal side of the leg, r.a. is a slender seta inserted on the ventral internal side and b.a. is a longer seta arising dorsally on the proximal side of d. Ventrally there are three spines, the two distal lateral ones representing a fusion of p. + u. and q. + v., the ventral one being s. The solenidion ω_3 is a straight slender structure lying on the distal side of e. The remaining setae and solenidia are found near the middle of the tarsus, the basal region being bare. ω_1 and ω_2 are slightly curved rods arising from the same chitinous depression as ε. Ventral and proximal to this

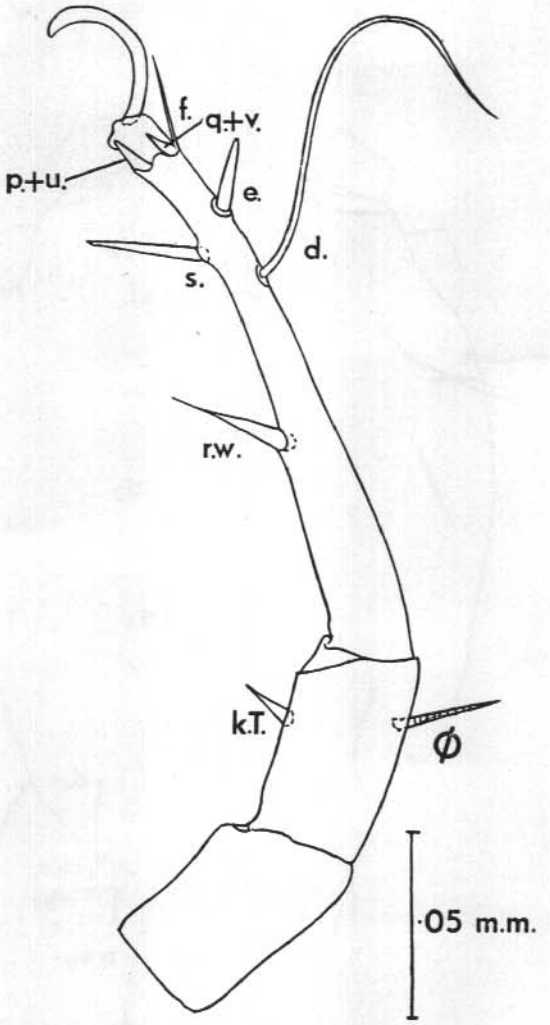


Fig. 8. Algophagus antarcticus sp.n.♀ Dorsal view of left leg IV. The solenidion is shaded.

group is a small spine w.a. The arrangement of spines and setae on tarsus II (Fig. 6) is similar to that of tarsus I and shows the normal simplification of structure; ω_2 and ε are lacking and ω_1 arises nearer the base of the tarsus than on leg I; the spines e., p. + u., q. + v., s. and w.a. are also stouter and longer. On tarsus III (Fig. 7) ω_1, b.a. and r.a. are also absent and d. does not extend to the end of the claw. Tarsus IV (Fig. 8) is similar to III except that d. extends well beyond the end of the claw.

The chaetotaxy of the remaining joints of the legs is similar to that described by F. Grandjean (1939) for *Forcellinia wasmanni*. The

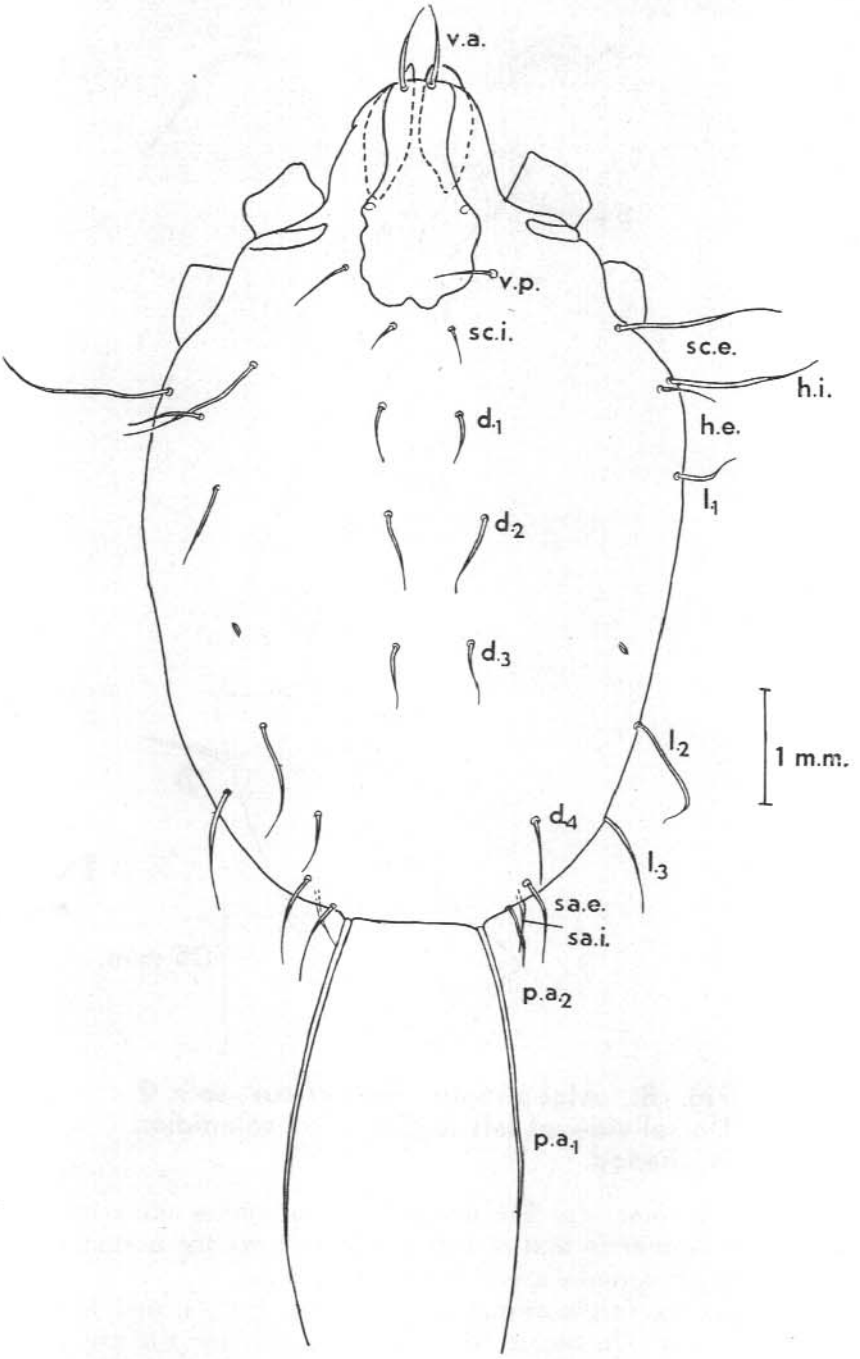


Fig. 9. Algophagus antarcticus sp.n.♂ Dorsal view. The legs have been omitted. v.a.=vertical anterior, v.p.=vertical posterior, sc.e.=external scapular, sc.i.=internal scapular, h.e.=external humeral, h.i.=internal humeral, d_1-d_4 = dorsals, l_1-l_3 = laterals, sa.e. = external sacrals, sa.i. = internal sacrals, $p.a._1$, $p.a._2$ = postanals.

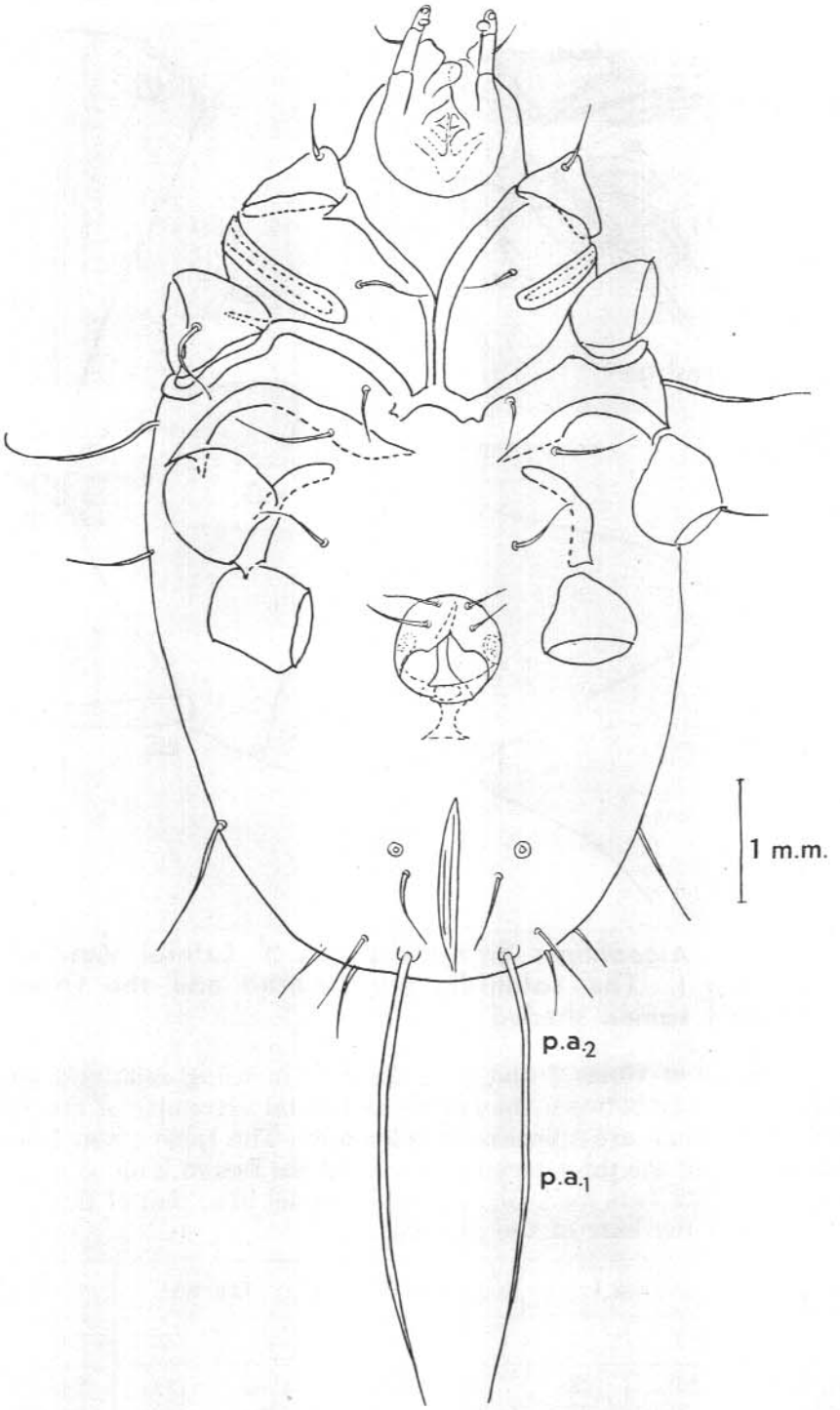


Fig. 10. Algophagus antarcticus sp.n. ♂ Ventral view. The legs have been omitted. p.a.1, p.a.2 = postanals.

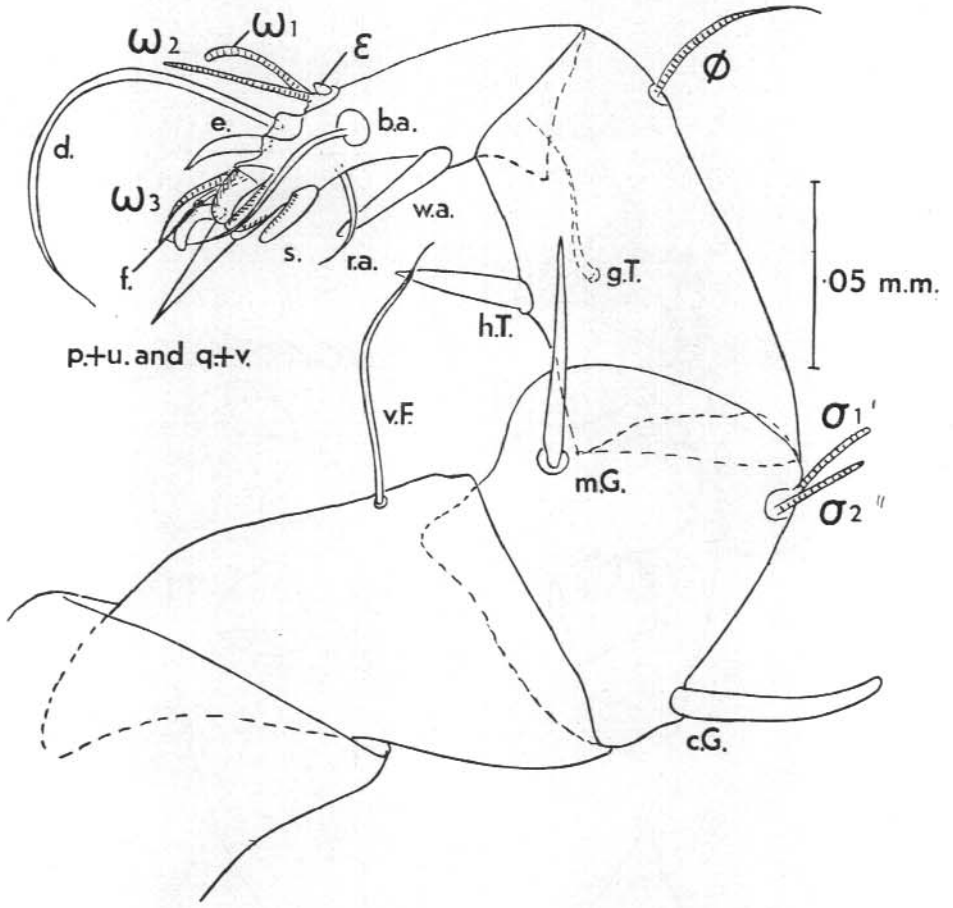


Fig. 11. Algophagus antarcticus sp.n.♂ Lateral view of left leg I. The solenidia are striated and the three terminal spines shaded.

solenidion ø of tibiae I and II is unusual in being relatively short and arising midway between the middle and distal extremity of the joint; the remaining setae are spinelike in structure. The table given below gives the lengths of the three terminal joints of the legs of both ♂ and ♀. The measurements were made along the mid-dorsal line; that of the tarsus was taken from the base of the pulvillus.

	Leg I		Leg II		Leg III		Leg IV	
	♂	♀	♂	♀	♂	♀	♂	♀
Tarsus	101μ	88μ	149μ	93μ	179μ	132μ	189μ	151μ
Tibia	125μ	61μ	92μ	54μ	88μ	56μ	108μ	56μ
Genu	87μ	61μ	88μ	54μ	81μ	54μ	93μ	56μ

In the case of the ♀, it will be noticed that the tarsus increases in size from leg I to leg IV, it is always longer than either tibia or genu and the tibia and genu are of about equal length.

Male (Figs. 9, 10). Length of iodiosoma = 750 μ.

The structure of the ♂ is essentially similar to that of the ♀. The idiosoma is more pear-shaped in outline, being broadest behind the second pair of legs and tapering towards the posterior end of the body. As in the ♀ it was thickly covered with small epiphytes. The dorsal propodosomal shield is narrow and elongated, its greatest width being above the first and second pairs of legs; its outline is more irregular than in the ♀ in the only specimen which I have been able to examine in any detail.

The arrangement of dorsal setae is the same as in the ♀, although the setae tend to be shorter (see table). Only one pair of anal setae is present, lying on either side of and midway along the anal opening; anterior to these are two chitinous rings which may represent vestigial anal suckers.

Ventrally the apodemes of leg I are joined to a well-defined sternum which is prolonged posteriorly and bifurcates to unite with the apodemes associated with leg II. The apodemes of legs III and IV are stouter than those of the ♀, because these legs are longer and thicker. The legs of the ♂ (Figs. 11-14) are remarkable in that the joints are considerably longer and thicker than the corresponding ones in the ♀. Their chaetotaxy is similar, but the spines and setae are relatively longer and stouter in structure. On tarsus I, ω_1, ω_2 and ε are more distal in position and ε is smaller. The ventral terminal spines—p. + u., q. + v. and s. are stouter. Legs II and III resemble those of the ♀, except the ventral terminal spines or w.a. of the tarsus are better developed, as well as h.T. on the tibia. Tarsus IV differs from the ♀ in that the single ventral spine r.w. is, in the ♂, represented by two stouter spines—r. and w. No tarsal suckers are present. As can be seen from the table on p. 12, the lengths of the terminal three joints are in every case much greater than those of the ♀. It must be remembered that these measurements, as well as those of the setae, were taken from only two individuals and considerable variation might be found if it were possible to examine a large number of individuals from different colonies.

The penis is a slightly curved tube lying between the bases of legs IV and concealed by a pair of genital folds. Each of these bears a pair of genital setae on its outer surface and a pair of genital suckers on the inner.

The types of both sexes are in the author's possession, paratypes have been sent to Dr. Evan of the Arachnida Department of the British Museum

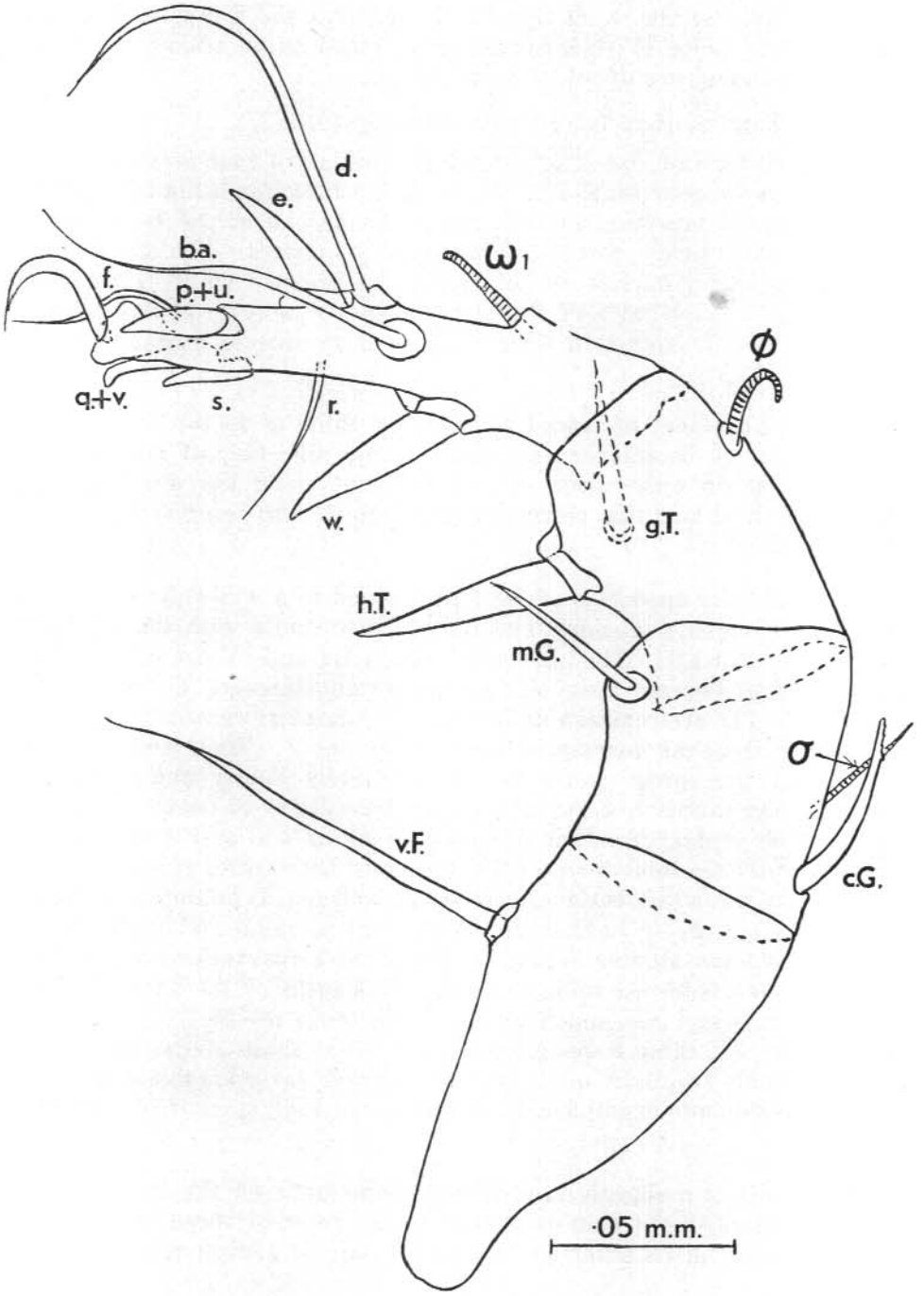


Fig. 12. Algophagus antarcticus sp.n.♂ Lateral view of left leg II. The solenidia are striated.

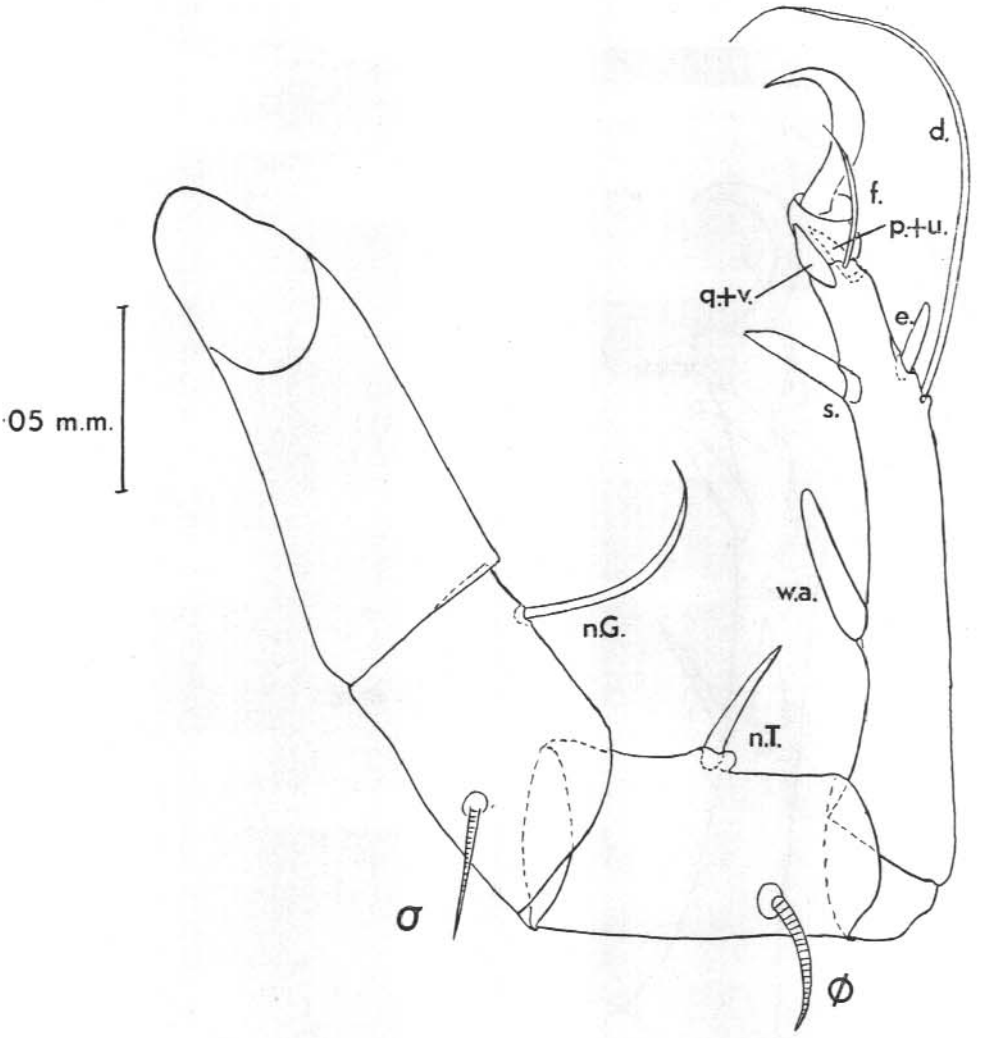


Fig. 13. Algophagus antarcticus sp.n.♂ Lateral view of right leg III.

(Natural History), to Dr. Andre of the Musée d'Histoire Naturelle, Paris, whom I must thank for lending me material. The remaining specimens are being returned to the Director of the Australian National Antarctic Expedition.

Immature stages.

Only deutonymphs and adults were present amongst the material received and these resemble the ♀ sufficiently for the same description to apply.

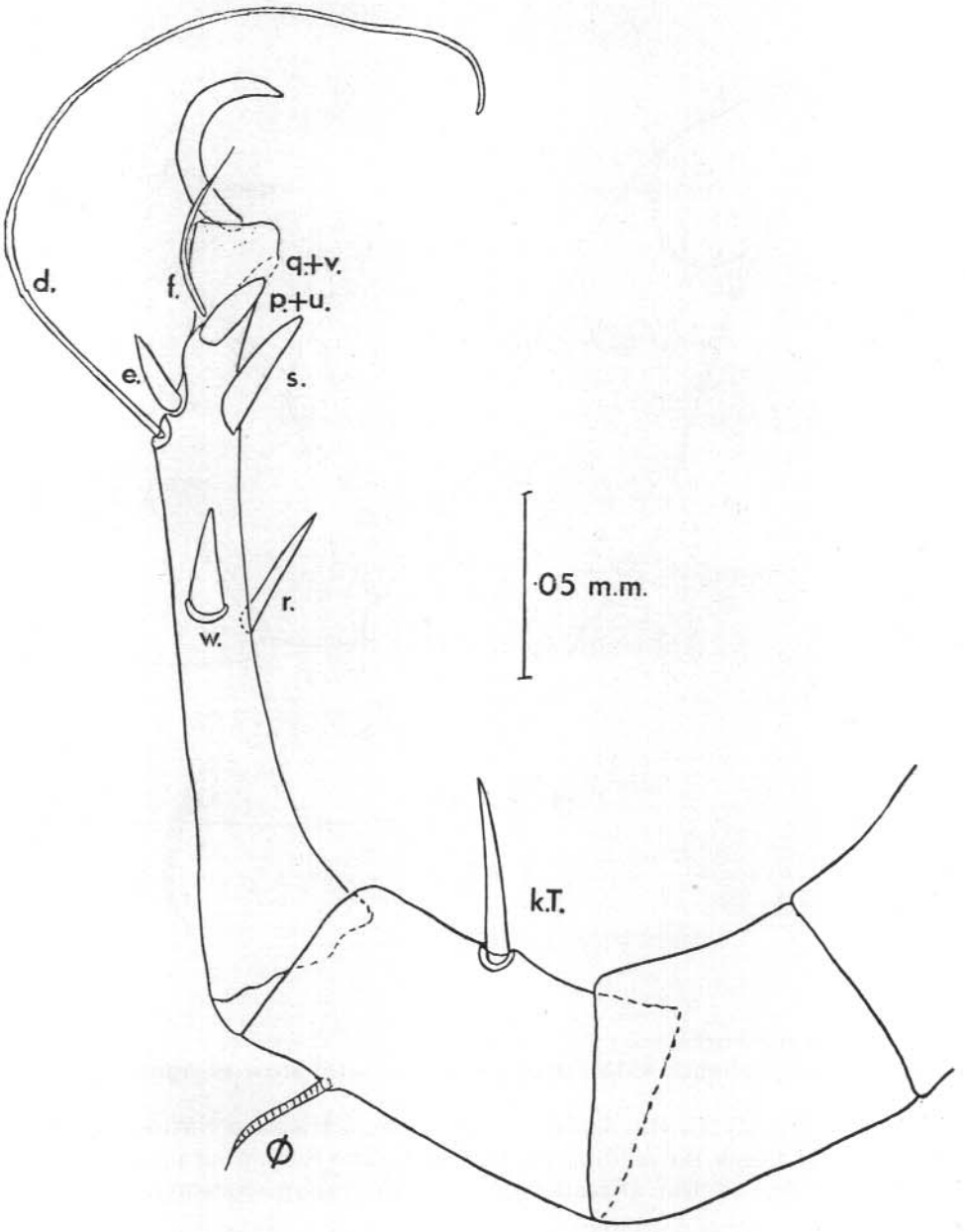


Fig. 14. Algophagus antarcticus sp.n. ♂ Lateral view of terminal joints of left leg IV.

Systematic position.

Algophagus antarcticus has been placed in a new genus of the family *Hyadesidae* Halbert 1915 (= Lentungulidae Berlese 1897)—a family of wide distribution whose individual species are found feeding on Algae in sea *or* brackish water in widely scattered parts of the world. General accounts of the family are given by M. André (1931) and A. A. Zachvatkin (1940) and a key to all described species by K. Viets (1931).

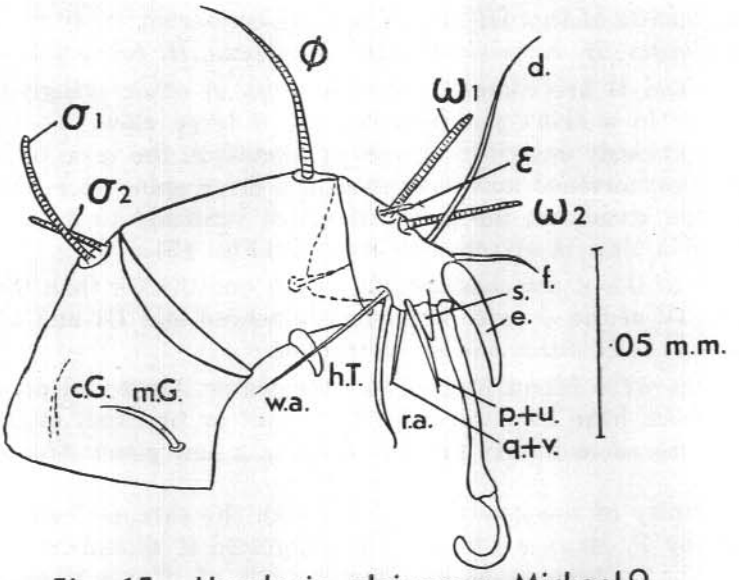


Fig. 15. Hyadesia algivorans Michael ♀ External view of right leg I. The solenidia are indicated by striations.

It is allied to the genus *Hyadesia* in the following characters—

1. The gnathosoma is fairly massive with chelicerae of the normal chelate structure; it is overhung by the anterior edge of the propodosoma (also in *Hyadesia fusca* Lohmann, *H. sellai* Viets and *H. kerguelensis* Lohmann but not in *H. algivorans* Michael).
2. A dorsal plate is present on the propodosoma (also present in *H. fusca* and *H. sellai* but not in *H. algivorans*).
3. The arrangement of the dorsal setae agrees with that of *H. kerguelensis*; *H. fusca*, *H. sellai* and *H. algivorans* lack one pair of dorsal setae.
4. No anal suckers are present in the ♂.
5. The apodemes of leg II end freely in the ♀, in the ♂ they are united to a backward extension of the sternum in all species in which descriptions are given of the ♂.
6. The claw is well-developed and attached to the end of the tarsus by means of a pulvillus and not by paired sclerites.

7. The distal position of the solenidia ω_1 and ω_2 is the same in *A. antarctica* and in *H. algivorans* (Fig. 15).
8. The similarity of habitat, all species being aquatic.

A. antarctica differs from other species in that—

1. No suture is present between the propodo- and hystero-soma — a character only shared by *H. uncinifer* Mégnin.
2. "Fatty" glands are present on the sides of the hysterosoma which are absent in other species.
3. The apodemes of legs III and IV are not connected (they are united in *H. uncinifer, H. kerguelensis, H. algevorans, H. fusca* and *H. sellai*).
4. Tarsi I and II are comparatively long, as in other tyroglyphids, and terminate in a short pulvillus bearing a large claw.
   In all previously described species of *Hyadesia,* the tarsi of legs I and II are foreshortened and terminate in a large spine (e.) which forms a clawlike structure, the pulvillus arises ventrally to e., is unusually long and a claw is attached to its end (Fig. 15).
5. The legs of the ♂ are considerably longer and thicker than those of the ♀ ; legs IV of the ♂ arise immediately behind legs III and not median to them as in *H. fusca* and *H. algivorans.*
6. The mites were found feeding on freshwater Algae; all other species of *Hyadesia* have been recorded from salt or brackish water.

Such differences justify the formation of a new genus *Algophagus.*

The affinity of the genus *Hyadesia* with the sarcoptiform mites was recognised by P. Mégnin (1889) who suggested it should be placed in a separate tribe on account of its aquatic mode of life; a separate family was created by A. Berlese in 1897—the Lentunguli—whose name was later changed to Hyadesidae by J. N. Halbert (1915) after the synonymy of *Hyadesia* with *Lentungula* Michael had been recognised. In 1940 A. A. Zachvatkin (1940) reclassified the genus and placed it in a subfamily Carpoglyphinae of the family Glycyphagidae together with the genera *Carpoglyphus* Robin and *Hericia* Canestrini. E. W. Baker and H. W. Wharton (1952) reclassified it once more as the only genus of a separate family—Hyadesidae Halbert 1915.

The placing of the genus in a subfamily of the Glycyphagidae (Zachvatkin, 1940) is justified since the fundamental structure of the ambulacrum, the arrangement of setae on the dorsal surface and absence of tarsal and anal suckers in the ♂ indicate an affinity with the family Glycyphagidae. The smooth nature of the setae, posterior position of the genital opening and fusion of apodemes of legs II with the sternum in the case of the ♂ are also characters which link the genus with *Carpoglyphus* and *Hericia.*

ACKNOWLEDGMENTS

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