

ON THE GENUS TOTOBATES HAMMER 1961

(Acarina: Oribatidae)

By John A. Wallwork

DEPT. OF ZOOLOGY, WESTFIELD COLLEGE, UNIVERSITY OF LONDON

Abstract: A description is given of *Totobates elegans* (Hammer) ssp. *antarcticus* n. ssp. from Campbell Island. The genus *Totobates* is defined and its systematic position is discussed. It is concluded that the genus belongs in the family Haplozetidae and is related to the genera *Tuxenia* Ham., *Maculobates* Ham. and *Protoribates* Berlese.

In her surveys of the oribatid fauna of the Andes Mountains, Hammer (1958, 1961, 1962a & 1962b) has given the name *Totobates* to a group of new species. The genus has not been defined satisfactorily and its affinities are uncertain. Balogh (1961) includes it provisionally in the Oribatulidae with the status of a *genus inquirendum*.

The genus is present in the sub-Antarctic region and has been recorded previously from Macquarie Island. It has also been identified from collections taken at Beeman Hill, Campbell Island, where it is represented by a species differing in only a few minor respects from *T. elegans* (Hammer). These differences are perhaps sufficient to warrant the erection of a new subspecies, and the Campbell Island specimens are described below under the name *T. elegans* ssp. *antarcticus* n. ssp. These specimens form the basis for the present study which is designed to clarify the systematic position of the genus. In order to do this it is necessary first to provide a detailed description of *T. elegans* ssp. *antarcticus*. I am indebted to Dr J. L. Gressitt of Bishop Museum, who made the collections, for providing me with the opportunity to examine them. Representatives will be deposited in the Dominion Museum in due course.

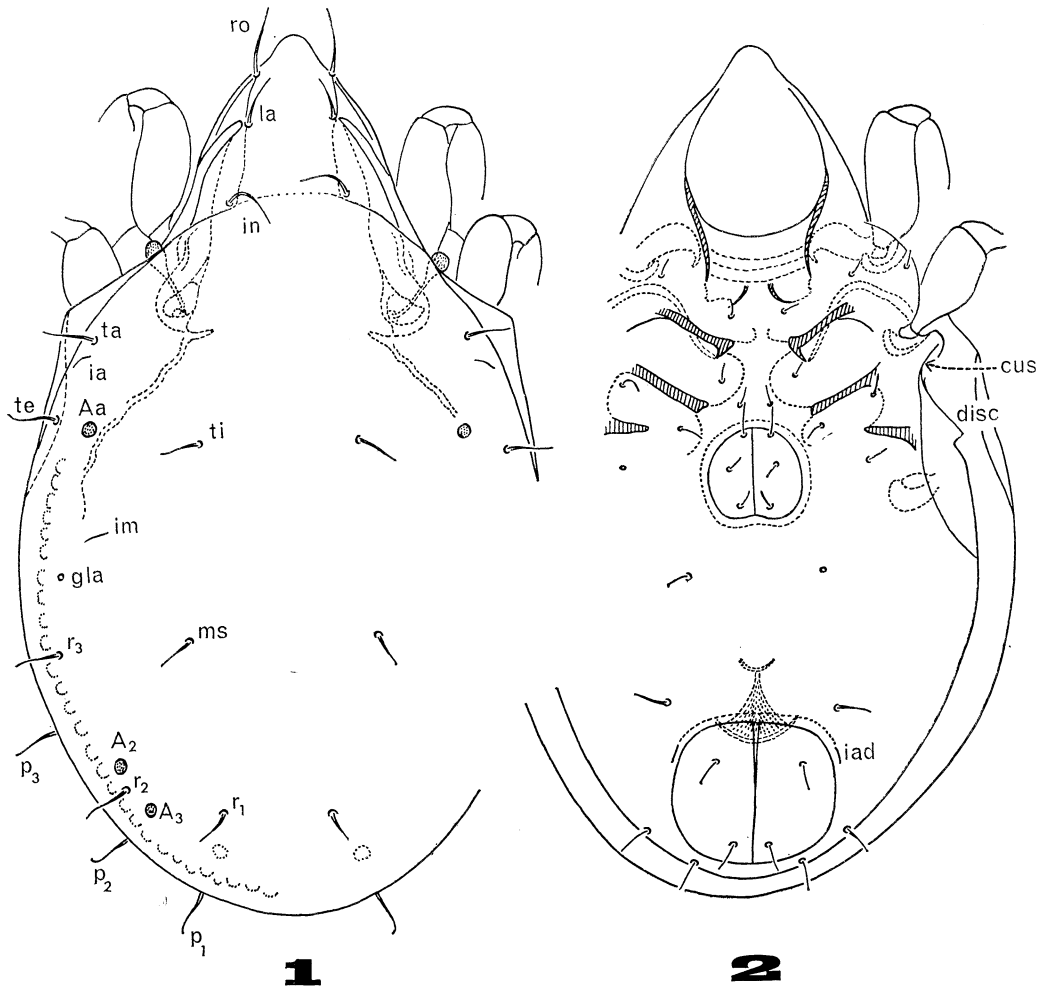
***Totobates elegans* ssp. *antarcticus* n. ssp.** Figs. 1-5.

MATERIAL EXAMINED: 23 adults.

Measurements: Average length of body; 352.8 μ (range: 347.2 μ -364.0 μ); average width of body: 207.2 μ (range: 201.6 μ -212.8 μ).

Integument: Color brown; pale areas peripherally on notogaster; cerotegument absent from exposed surfaces of body and legs.

Prodorsum: Rostrum moderately constricted to form a narrow lobe in dorsal view (fig 1); in lateral view (fig 3) it curves slightly ventrad. Rostral setae apparently smooth, slender, as long as their mutual distance, extending in front of rostrum for a distance equal to 1/3 their length. Lamellar setae similar in form to rostrals but slightly shorter than these, inserted on surface of prodorsum at apex of lamella. Smooth, slender interlamellar setae slightly longer than rostral and lamellar setae and inserted on posterior re-



Figs. 1-2. *Totobates elegans* (Hammer) ssp. *antarcticus* n. ssp. 1, dorsal; 2, ventral. *ro*=rostral setae; *la*=lamellar setae; *in*=interlamellar setae; *ta*, *te*, *ti*, *ms*, *r*₁, *r*₂, *r*₃, *p*₁, *p*₂, *p*₃=notogastral setae; *Aa*, *A*₂, *A*₃=areae porosae; *ia*, *im*=notogastral fissures; *gla*=aperture of lateral abdominal gland; *cus*=custodium; *disc*=discidium; *iad*=adanal fissure; *ex*=exopseudostigmatic seta.

gion of prodorsum just median to lamellae. Arrangement of prodorsal ridges unusual and difficult to interpret from dorsal aspect; their relative positions are best seen in lateral view (fig 3). Lamella is the most conspicuous of these ridges and extends from pseudostigma to insertion of lamellar seta; it is attached to the surface of prodorsum for the whole of its length and does not project anteriorly as a free lamellar cusp, although it is produced laterally, along most of its length, as a narrow blade which is directed away from surface of prodorsum. Posteriorly, lamella divides into 2 divergent ridges, one of which passes above or inside pseudostigma and the other, which is usually more strongly developed and probably represents a sub-lamella, passing below or outside pseudostigma (figs 3

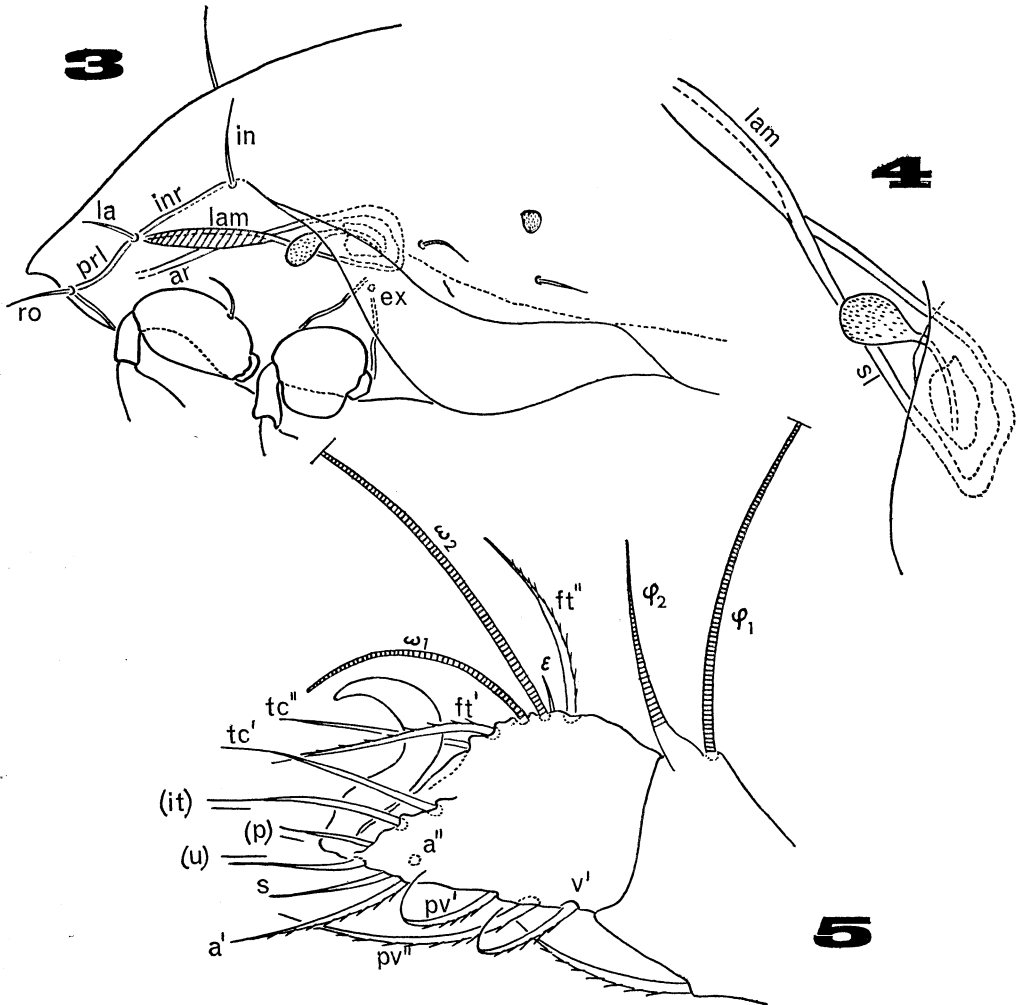
& 4). About half-way along the length of the lamella a ridge emerges from beneath the free lamellar blade and passes ventro-anteriorly in the direction of rostrum; development of this accessory ridge is variable in specimens examined, and it usually becomes indistinct before it attains the rostrum. In addition to these ridges there is another, running from the insertion of interlamellar seta to insertion of lamellar seta; this ridge, which is termed the interlamellar ridge, is an extension of the anterior notogastral margin, and at the point where it joins this margin (at insertion of interlamellar seta) a sharp angle is formed (figs 1 & 3). Interlamellar ridge difficult to see in dorsal view for it is aligned vertically and weakly chitinized; it is quite clearly identifiable in lateral view as it converges with the lamella towards the insertion of lamellar seta. Insertion of lamellar seta is connected with insertion of rostral seta by a curved ridge which is here interpreted as a prolamella; the course of this ridge (*prl*) is shown in fig 3. A lateral ridge is also present running posteroventrally from insertion of rostral seta to join rim of camerostome. Each pseudostigma is a deep cup completely covered by base of pteromorph. Sensillus with a short stem and broadly rounded head covered with short, fine bristles; only the distal part of the head of this structure is exposed.

Notogaster: Prodorsal/notogastral suture lacking or indicated only by a very fine line, so that the 2 parts of the body are apparently confluent in the interpseudostigmatic region. Pteromorphs moderately well developed, steeply curved ventrad, apparently hinged. Anterior margin of each pteromorph rather irregular in contour, continuous with anterior margin of notogaster and with the latter describes a steep slope away from the insertion of interlamellar seta; anterior notogastral margin sharply angled at insertion of interlamellar seta and continues forwards over prodorsum as the interlamellar ridge. There are usually 10 pairs of smooth, moderately long (about 25μ) notogastral setae; occasionally an additional seta is present in humeral region. Three pairs of areae porosae were identified with certainty; these are rounded in shape and all approximately equal in size; one specimen shows an asymmetrical development of a second, small area porosa in the vicinity of *Aa*.

Genito-anal region: Two pairs of anal setae and 3 pairs of adanals similar in appearance and length to notogastral setae; the most anterior adanal seta located antero-lateral to anal aperture. Adanal fissure located close to and parallel with rim of anal aperture. Anal aperture almost square in outline, only slightly broader posteriorly than anteriorly. The form of the preanal organ, particularly characteristic of the genus, is shown in fig 2. Aggenital setae (1 pair) smooth, briefly flagelliform, shorter than anal setae. Genital aperture broadly rounded, slightly wider anteriorly than posteriorly. Each genital plate bears 3 fine, smooth setae of which the most anterior is the longest.

Ventral region of podosoma: Apodemes I continuous with posterior border of camerostome; apodemes II extend an appreciable distance towards mid-ventral line but not confluent in sternal region; the same is true for the sejugal apodemes which are directed postero-medially towards the antero-lateral angles of genital field. Coxisternal ridges associated with these apodemes extend to mid-ventral line where they fuse to form a sternal ridge; this ridge extends back to include the anterior margin of the genital field. Apodemes III very short, extending only for 1/3 the distance from lateral margin to genital field. Coxisternal setae smooth and slender; setae *3c* and *4c* were not observed.

Lateral region of podosoma: The development of prodorsal ridges has already been de-



Figs. 3-5. *Totobates elegans* (Hammer) ssp. *antarcticus* n. ssp. 3, lateral region of podosoma; 4, pseudostigma, lateral view; 5, tarsus and distal part of tibia of leg I, paraxial. *inr*=interlamellar ridge; *lam*=lamellar ridge; *prl*=prolamella; *ar*=accessory ridge; *sl*=sublamella. Notations for leg setae follow Grandjean's scheme. Other notations as in figs. 1-2.

scribed. No idiosomal porose areas were observed. The insertion of the exopseudostigmatic seta was noted (*ex*: fig 3). Rim of camerostome entire; there is no genal process or incision. Pedotecta I and II moderately well developed; pedotectum II truncate apically when viewed from ventral aspect (fig 2). A short heavy discidium present. A circum-pedal ridge developed, the anterior extension of which joins the discidial process to form a custodial ridge; this ridge curves sharply laterally over the posterior face of pedotectum II.

Gnathosoma: Labio-genal articulation diarthral. Rutellum relatively small and pantelebasic. Infracapitular setae *a*, *m* and *h* simple. Chaetotaxy of palp normal; a corne double present on palpal tarsus.

Legs: Ventral keels developed on all femora and on trochanters III and IV. All tarsi monodactyle; single claw well developed and does not carry a subsidiary tooth (fig. 5). Tarsal element of each leg bilaterally flattened, this condition being more evident on legs I and II than on III and IV. As a result of this flattening the tarsal setae are arranged in a dorso-ventral ring, and are difficult to interpret. Each tarsal segment short and deep, bearing distally a pair of chitinized ridges, carrying insertions of setae (*tc*), (*it*) and (*p*), which converge towards base of claw; between these ridges is a concavity into which the claw can be reflexed; this development more pronounced on tarsi I and II than on III and IV. All tarsi except tarsus III carry a posterior accessory seta, *v'*; seta *ft'* lacking on tarsus III as well as tarsus IV; solenidion ω_2 considerably longer than ω_1 on tarsus I; these solenidia are approximately equal in size on tarsus II. The complete tarsal setal formula shows some regression and may be summarized as follows: -

I	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), <i>s</i> , (<i>a</i>), (<i>pv</i>), <i>v'</i> , <i>e</i>	= 17
II	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), (<i>pv</i>), <i>v'</i>	= 15
III	<i>ft''</i> , (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), (<i>pv</i>)	= 13
IV	<i>ft''</i> , (<i>tc</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), (<i>pv</i>), <i>v'</i>	= 12

DISTRIBUTION: Beeman Hill, Campbell I., ex moss, XII. 1961, J. L. Gressitt.

DISCUSSION

A comparison between Hammer's description of *T. elegans* and that given above indicates that the Campbell I. specimens differ from the South American form in having shorter lamellar setae and more completely covered pseudostigmata. The description of Hammer (1958) does not indicate the complete relationship between the various prodorsal ridges; the interlamellar ridge is not described but, as noted above, this ridge is difficult to distinguish from the dorsal aspect. There appear to be no other obvious differences between the 2 forms.

The genus *Totobates* Hammer: The following list of characters may serve to define the genus:

1. Prodorsal/notogastral suture lacking in inter-pseudostigmatic region.
2. Notogaster poronotic.
3. Notogaster with true, ventrally-curving pteromorphs.
4. Pteromorphs apparently hinged.
5. Lamellae, prolamellae and sub-lamellae present on prodorsum. No tutorium.
6. No translamella; no free lamellar cusp.
7. No genal incision.
8. Pseudostigma more or less covered by base of pteromorph.
9. 10 pairs of notogastral setae.
10. Discidium present; circum-pedal and custodial ridges present.
11. Sternal ridge present on ventral region of podosoma.
12. 3 genital setae on each plate.
13. Preanal organ broad posteriorly, narrowing sharply to its insertion on anterior sclerite.

14. All tarsi monodactyle; claw without subsidiary tooth.
15. Tarsal chaetotaxy shows slight deficiency.
16. Tarsal segments foreshortened, bilaterally flattened, bearing a concavity into which the claw may be reflexed.

The affinities of the genus must be sought in the superfamily Oribatuloidea for it is with members of this group that the greatest similarities lie. The possession of triangular, ventrally-curving, hinged pteromorphs clearly indicates that *Totobates* belongs in the family Haplozetidae. There is a strong resemblance between *Totobates* and the haplozetid genus *Protoribates*, particularly in the form of the prodorsal ridges, the possession of 10 pairs of notogastral setae, the development of discidium and custodium and the monodactylous tarsi. In certain respects, however, *Totobates* differs from other haplozetids; the presence of only 3 genital setae on each plate is unusual, the number normally being 5 or, more occasionally, 4; most haplozetids have a well defined prodorsal/notogastral suture and exposed, or partly exposed, pseudostigmata. Two other genera from South America, *Tuxenia* and *Maculobates* (see Hammer 1958, 1962a), share with *Totobates* the characteristics of genital chaetotaxy and absence of prodorsal/notogastral suture. It seems reasonable to suggest that these 3 genera are closely related and have affinities with *Protoribates*.

REFERENCES

- Balogh, J. 1961 Identification keys of world oribatid (Acari) families and genera. *Acta Zool. Hung.* 7 (3-4): 243-344.
- Hammer, M. 1958 Investigations on the oribatid fauna of the Andes Mountains. I. The Argentine and Bolivia. *Biol. Skr. Dan. Vid. Selsk.* 10 (1): 129 pp.
- 1961 Investigations on the oribatid fauna of the Andes Mountains. II. Peru. *Ibid.* 13 (1): 157 pp.
- 1962a Investigations on the oribatid fauna of the Andes Mountains. III. Chile. *Ibid.* 13 (2): 96 pp.
- 1962b Investigations on the oribatid fauna of the Andes Mountains. IV. Patagonia. *Ibid.* 13 (3): 37 pp.