

A NEW SUBSPECIES OF *HALOZETES BELGICAE*  
(ACARI, ORIBATIDA, AMERONOTHRIDAE)  
FROM THE MARINE SUPRA-LITTORAL  
OF THE SUB-ANTARCTIC MARION ISLAND

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TAXONOMY  
AMERONOTHRIDAE  
*HALOZETES*  
SUB-ANTARCTIC  
MARION ISLAND

**SUMMARY:** Material from the sub-Antarctic Marion Island contains a new subspecies of *Halozetes belgicae* (Michael, 1903), described here as *Halozetes belgicae mickii* ssp. nov. A comparison of the “*belgicae*-group”, which consists of *H. b. belgicae*, *H. b. brevipilis*, *H. b. longisetae* and *H. b. mickii* ssp. nov., and probably *H. otagoensis* and *H. impeditus* (provisionally included, based on the degree of aggenital neotrichy and the shape of the pregenital ridge in females) is made. Ontogenetic development and leg chaetotaxy of the new subspecies are also given. The defining characters of the new subspecies are: thirteen pairs of notogastral setae; rostral setae long, slender and smooth; lamellar setae short, stout and smooth; interlamellar setae long, barbed and thick; aggenital neotrichy present in males; semi-circular pregenital ridge present in females.

TAXINOMIE  
AMERONOTHRIDAE  
*HALOZETES*  
SUB-ANTARCTIQUE  
ÎLE MARION

**RÉSUMÉ :** Le matériel recueilli à l'île Marion dans la région sub-Antarctique, permet la description d'une nouvelle sous-espèce de *Halozetes belgicae* (Michael, 1903), *Halozetes belgicae mickii* ssp. nov. Une comparaison de l'ensemble “*belgicae*” qui comprend *H. b. belgicae*, *H. b. brevipilis*, *H. b. longisetae* et *H. b. mickii* ssp. nov., ainsi que probablement *H. otagoensis* et *H. impeditus* (provisoirement inclus en raison de la néotrichie aggénitale et la forme du sillon prégénital des femelles), est fournie. Le développement ontogénétique et la chaetotaxie des pattes de la nouvelle sous-espèce sont donnés. Les caractères qui la définissent sont : 13 paires de poils notogastrales ; poils rostraux longs, élancés, lisses ; poils lamellaires courts, gros, lisses ; interlamellaires longs, barbulés, robustes ; néotrichie aggénitale présente chez les mâles ; sillon prégénital semi-circulaire chez les femelles.

#### INTRODUCTION

The genus *Halozetes* belongs to the littoral family Ameronothridae and is restricted in its distribution to southern New Zealand and the sub-Antarctic Region, where it occurs on most of the sub-Antarctic

islands and the Antarctic Peninsula, but not on the continent.

The genus was instituted by BERLESE (1916), who named *Notaspis marina* Lohmann, 1908 as the type and at the same time synonymized *N. antarctica* Michael, 1903 with *N. marina*. He also added *N.*

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*belgicae* Michael, 1903 to the new genus (BERLESE, 1916). *N. antarctica* and *N. marina* are, however, not congeneric and *N. antarctica* was later placed in the genus *Alaskozetes* Hammer, 1955 (see WALLWORK, 1962).

In 1958, DALENIUS & WILSON described two new genera, *Pertorgunia* and *Anarea*, from Maquarie Island, both of which were eventually synonymized with *Halozetes* (see WALLWORK, 1963). Some confusion ensued around these genera, until WALLWORK (1963, 1965) reviewed and redescribed many of the species. Furthermore, the status of the family Podacaridae was changed when WEIGMANN & SCHULTE (1977a, b) reviewed the family Ameronothridae and included the Podacaridae within it.

The oribatid fauna of Marion Island was previously studied by VAN PLETZEN & KOK (1971) and ENGELBRECHT (1974, 1975). A recent collection, made by D. J. MARSHALL, revealed yet another unknown *Halozetes*, described below.

(from I-IV) usually 3-1-2-3 (in some cases 3-1-2-2). Six pairs of genital setae present, setae not aligned on paraxial edge of genital plates; aggenital neotrichy present in males of certain species; genital plates of males smaller than those of females. Tarsi tridactyle.

**Immatures:** Gastronotal integument pleated, porose sclerites present or absent. Number of genital setae from protonymph to tritonymph 1-3-5. Tarsi monodactyle.

The genus presently consists of 19 species and subspecies (including the new subspecies), described from more or less all the sub-Antarctic islands, the Antarctic Peninsula and New Zealand. It is mainly a littoral or supra-littoral genus, occurring on the shores of the islands, but some species occur inland (e.g. *H. fulvus* Engelbrecht, 1975). Immature stages are known for only a few species and knowledge of these are becoming increasingly important for proper classification.

#### GENUS *HALOZETES* (Berlese, 1916)

Type species: *Notaspis marina* Lohmann, 1908.

**DIAGNOSIS:** Adult: Tegument covered with granular cerotegument. True lamellae absent, represented by ridges. Bothridium small, round, situated on an interlamellar-pseudostigmal ridge; sensillar head usually small, oval or globular; stalk short, thin. Anterior notogastral margin projecting anteriorly as a medial peak, medially interrupted or complete. Thirteen to fifteen pairs of notogastral setae present; notogaster pycnonotic. Epimeral setal numbers

#### *Halozetes belgicae* (Michael, 1903)

*Notaspis belgicae* Michael, 1903.

*Halozetes belgicae* (Michael, 1903) Berlese, 1916.

*Pertorgunia belgicae* (Michael, 1903) Dalenius & Wilson, 1958.

The type locality for this species is the Gerlache Strait, Graham Land, Antarctic Peninsula. It was found among mosses and lichens and according to WALLWORK (1965) frequently occurs in association with *Alaskozetes antarcticus* (Michael, 1903).

| Taxon  | Distribution  |
|--|---|
| <i>Halozetes belgicae belgicae</i>           | Antarctic Peninsula (type locality); South Shetland Is; South Orkney Is; South Sandwich Is; South Georgia |
| <i>Halozetes belgicae</i> sensu lato         | Marion Island; Crozet; Heard; Kerguelen; Maquarie Island  |
| <i>Halozetes belgicae</i> subsp. A, B, C     | Kerguelen   |
| <i>Halozetes belgicae longisetae</i>         | South Sandwich Island (type loc.); South Orkney Island  |
| <i>Halozetes belgicae brevipilis</i>         | Maquarie Island.  |
| <i>Halozetes belgicae mickii</i> subsp. nov. | Marion Island.  |
| <i>Halozetes impeditus</i>                   | South Shetland Island   |
| <i>Halozetes otagoensis</i>                  | New Zealand (Otago Peninsula)   |

TABLE 1: Distribution of the "belgicae-group" in the Antarctic Region (see PUGH, 1993; BLOCK & STARÝ, 1996; TRAVÉ, 1987; HAMMER, 1966).

*H. belgicae* is reported in the literature from the Antarctic Peninsula and the following sub-Antarctic Islands: South Shetland, South Orkney, South Sandwich, South Georgia, Marion, Crozet, Heard, Kerguelen and Macquarie (Table 1). Two subspecies *viz.* *H. belgicae brevipilis* Wallwork, 1963, from Maquarie Island, and *H. belgicae longisetae* Wallwork, 1967, from the South Sandwich Islands, have subsequently been described.

Important features of the species are the strong aggenital neotrichy in males, the pregenital ridge in females and the absence of dorsal porose sclerites in immatures. *H. impeditus* Niedbala, 1986 and *H. otagoensis* Hammer, 1966 are provisionally included in the “*belgicae*-group” on account of the strong aggenital neotrichy in males and pregenital ridge in females (immature unknown). The differences between these taxa mainly seem to be the shape and size of dorsal setae and the degree of aggenital neotrichy in males. A weak form of aggenital neotrichy (duplication of *ag*) occurs in males of *H. crozetensis* (Richters, 1908). This species can, however, be distinguished from the “*belgicae*-group” by various other characters, e.g. convergent pregenital ridges in males and females, the peculiar shape of the lamellar setae, and the presence of gastronotal porose sclerites in immatures.

*Halozetes belgicae mickii* ssp. nov.

(Figs. 1–10)

**DIAGNOSIS.** *Adult:* Rostral setae slender, smooth with fine point. Lamellar setae smooth, short, stout. Interlamellar setae long, thick, barbed. Thirteen pairs of notogastral setae present. Cerotegument granular, granules of different shapes and sizes. Sexual dimorphism present: aggenital neotrichy well developed in males, absent or very weak in females; semi-circular pregenital ridge present in females, absent in males; genital plates of females appreciably larger than those of males. *Immature:* Five porose sclerites present on aspis. Dorsal gastronotal porose sclerites absent; lateral porose sclerites present (visible in ventral view).

**DIMENSIONS:** Holotype ♂: length 582 µm, width 357 µm. Allotype ♀: length 550 µm, width 314 µm.

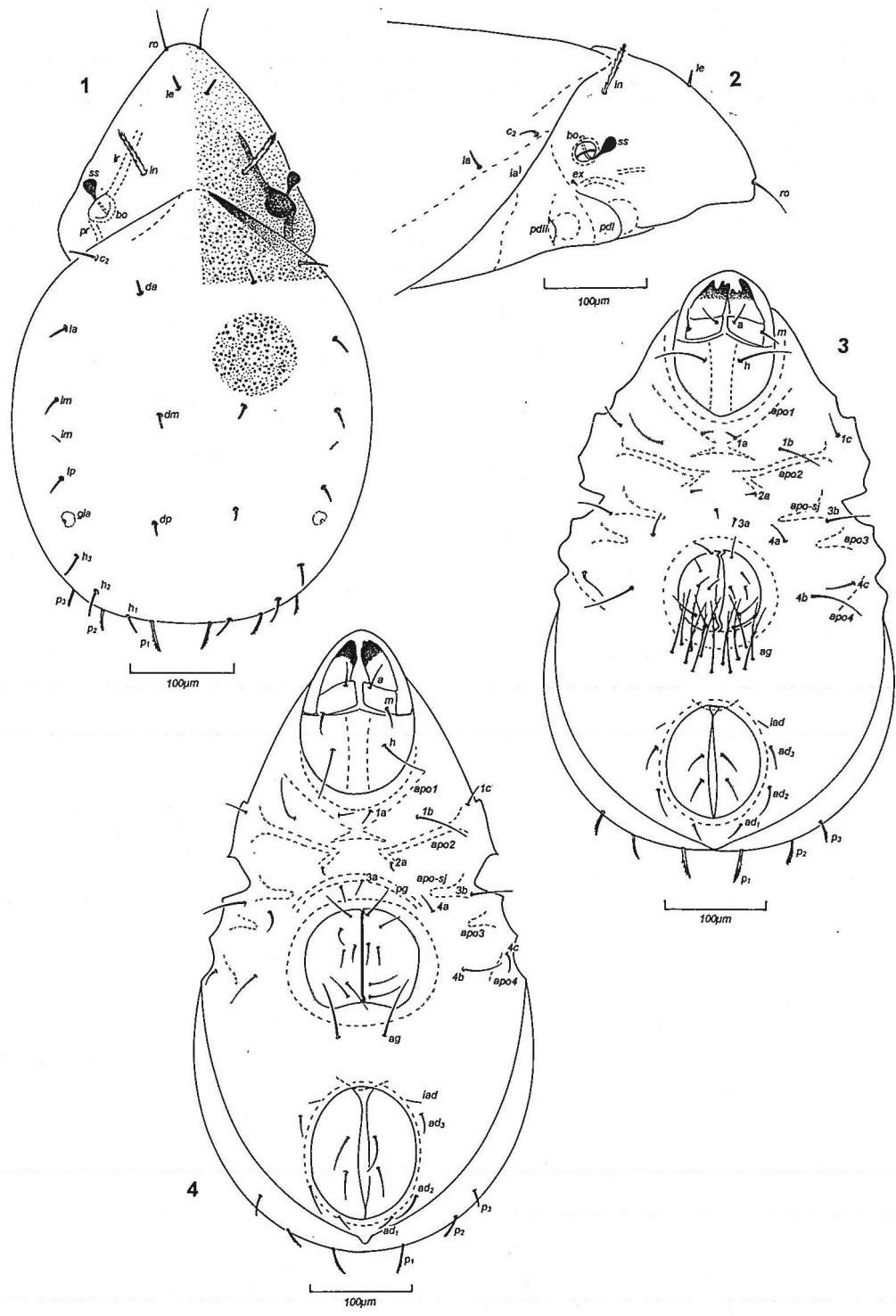
Paratypes ♂ ( $n = 15$ ): mean length 561 µm (range 525–593 µm), mean width 314 µm (range 286–350 µm); paratypes ♀ ( $n = 14$ ): mean length 582 µm (range 500–643 µm), mean width 334 µm (range 293–357 µm).

**DORSAL VIEW** (Fig. 1). *Prodorsum:* Rostral setae (*ro*) long, smooth, slender, with fine tips (mean length 38 µm,  $n = 16$ , range 29–46 µm). Lamellar setae (*le*) short, stout, smooth, tips rounded (mean length 14 µm,  $n = 7$ , range 8–24 µm). Interlamellar setae (*in*) long, thick, barbed, (mean length 62 µm,  $n = 7$ , range 47–80 µm). Lamellar (*lr*) and pseudostigmatic (*pr*) ridges present. Bothridium (*bo*) round, situated on pseudostigmatic ridge, opening small, directed ventrally; sensillar head (*ss*) small, globular, smooth; sensillar stalk short.

*Notogaster:* Notogaster more or less oval, anterior border projecting antero-medially, medial part of border complete but very indistinct. Thirteen pairs of notogastral setae present, *c*<sub>1</sub> and *c*<sub>3</sub> absent, setae short, stout, smooth, except *c*<sub>2</sub> longer than rest of setae, *p*<sub>1</sub>, *p*<sub>2</sub>, *p*<sub>3</sub> longer, barbed; medial setae *da*, *dm*, *dp* shortest of notogastral setae; setal lengths: *c*<sub>2</sub> = 21 µm ( $n = 5$ , range 16–24 µm); *d*-series = 12 µm ( $n = 8$ , range 9–18 µm); *la* = 14 µm ( $n = 5$ , range 10–16 µm); *lm* = 16 µm ( $n = 4$ , range 12–18 µm); *lp* = 18 µm ( $n = 3$ , range 14–20 µm); *h*-series = 22 µm ( $n = 16$ , range 18–28 µm); *p*<sub>1</sub> = 22 µm ( $n = 5$ , range 16–25 µm); *p*<sub>2</sub> = 18 µm ( $n = 5$ , range 13–21 µm); *p*<sub>3</sub> = 14 µm ( $n = 4$ , range 13–16 µm). Lyrifissures short. Abdominal gland (*gla*) small, round, opening very small. Cerotegument granular, granules uneven in size and shape.

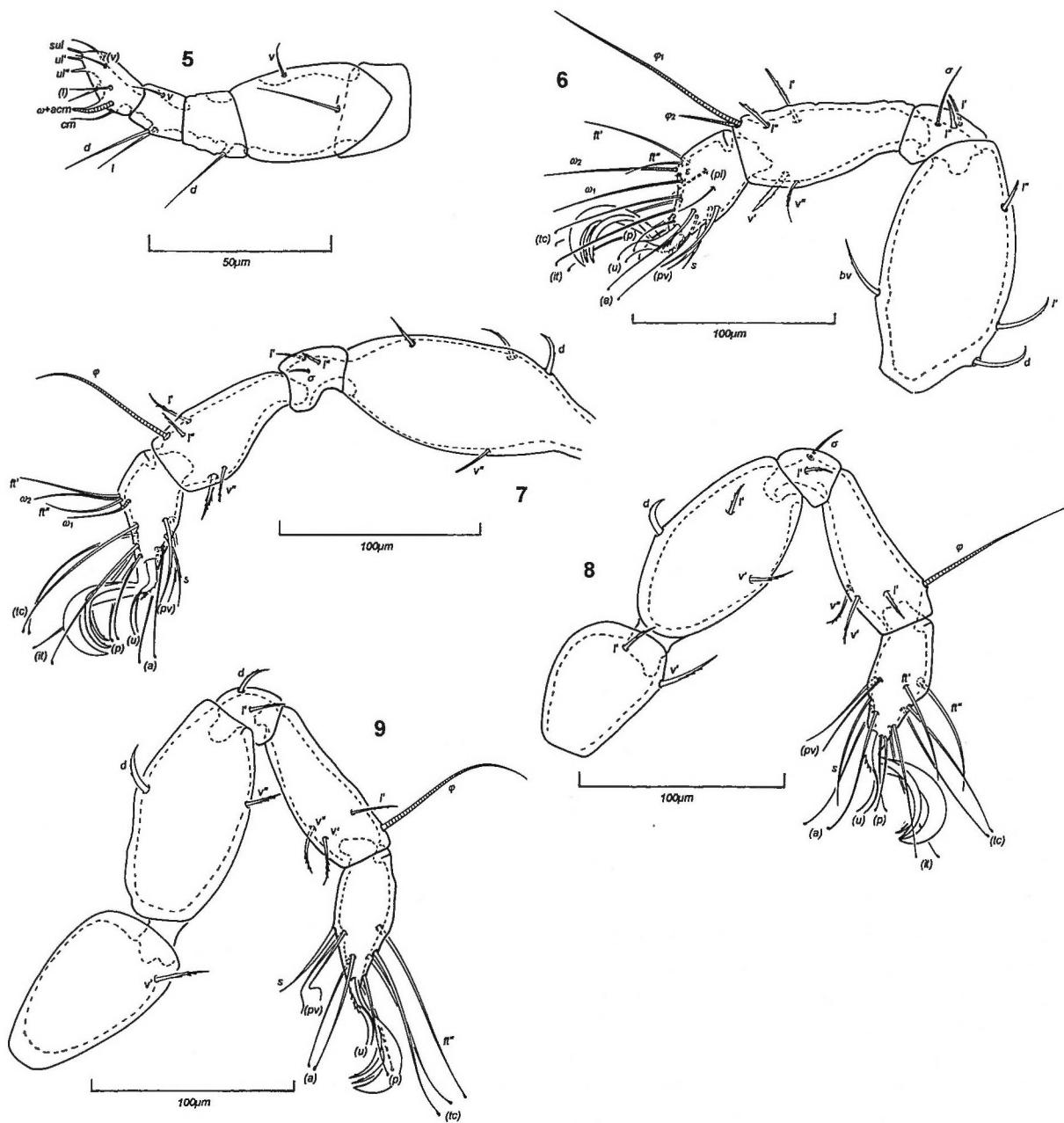
**LATERAL VIEW** (Fig. 2). Exobothridial setae (*ex*) very short, smooth. Pedotectum I (*pdI*) stretching anteriorly from a little below exobothridial seta, covering only posterior half of acetabulum I; pedotectum II (*pdII*) very small.

**VENTRAL VIEW** (Figs. 3, 4). *Epimeral region:* Epimeral setal formula 3-1-2-3 (*3c* absent); medial setae (*1a*, *2a*, *3a*) short; setae *1b*, *3b*, *4b* much longer, slender; setae *1c*, *4a*, *4c* of medium length. Apodemes 1 (*apo1*) medially with postero-laterally directed extensions, medially fused; apodemes 2 (*apo2*) medially with postero-laterally directed extensions; sejugal apo-



FIGS. 1-4: *Halozetes belgicae mickii* subsp. nov.

1. — Dorsal view. 2 — Lateral view. 3. — Ventral view, male. 4 — Ventral view, female.



FIGS. 5-9: *Halozetes belgicae mickii* subsp. nov.

5. — Palp, antiaxial view. 6 — Leg I, antiaxial view. 7. — Leg II, antiaxial view. 8. — Leg III, antiaxial view. 9. — Leg IV, antiaxial view.

demes and apodemes 3 and 4 (*apo-sj*, *apo3*, *apo4*) much reduced. Females with pregenital ridge (*pg*) forming an even semi-circular arch anteriorly of genital plates.

*Ano-genital region (males)* (Fig. 3): Genital plates more or less rounded, length 76 µm ( $n = 15$ , range 68–86 µm), width 80 µm ( $n = 15$ , range 71–89 µm), anteriorly and posteriorly with “interlocking triangles” on median borders (*sensu* WALLWORK, 1963). Six pairs of smooth, slender genital setae; aggenital neotrichy present, 6–7 pairs ( $n = 15$ , range 4–8) of aggenital setae present, setae long, slender, finely barbed. Anal plates more or less oval, length 117 µm ( $n = 15$ , range 111–129 µm), width 92 µm ( $n = 15$ , range 86–100 µm). Two pairs of anal setae; three pairs of adanal setae, setae of medium length, smooth and slender. Adanal lyrifissure (*iad*) oblique, situated anteriorly of *ad<sub>3</sub>*.

*Ano-genital region (females)* (Fig. 4): Genital plates much larger in females than in males, length 95 µm ( $n = 14$ , range 79–118 µm), width 113 µm ( $n = 14$ , range 100–121 µm), anterior and posterior “interlocking triangles” present. Six pairs of genital setae, setae smooth, slender; aggenital neotrichy absent or sometimes only weakly developed, usually one pair of aggenital setae present ( $n = 14$ , range 0–3), setae long, slender, mostly smooth, occasionally finely barbed. Anal plates oval, slightly larger than in males, length 124 µm ( $n = 14$ , range 100–143 µm), width 96 µm ( $n = 14$ , range 86–100 µm). Two pairs of anal setae, three pairs of adanal setae, setae of medium length, smooth, fine. Adanal lyrifissure (*iad*) oblique, situated anteriorly of *ad<sub>3</sub>*.

**APPENDAGES. Palp** (Fig. 5): Number of setae on each article from trochanter to tarsus: 0-2-1-3-9; solenidion  $\omega$  and anteroculminal eupathidium (*acm*) fused, all setae fine and slender.

**Legs** (Figs. 6–9): All legs covered with cerotegument. Number of setae on each article from proximal to distal: Leg I: 4-2-4-18; Leg II: 4-2-4-15; Leg III: 2-3-1-3-15; Leg IV: 1-2-2-3-12. Number of solenidia on each article from genu to tarsus: Leg I: 1-2-2; Leg II: 1-1-2; Leg III: 1-1-0; Leg IV: 0-1-0. Ambulacra tridactyle, median claw strongest, lateral claws with a small subapical tooth on ventral surface. Proral (*p*), iterol (*it*), tectal (*tc*) and antelateral (*a*) setae with small flattened disk-shaped ends; unguinal setae (*u*)

with basal half broad, ventrally barbed, distal half smooth, thin, (*u*) of leg I with small flattened disk-shaped ends, (*u*) of legs II–IV with fine, slender ends; primiventral setae (*pv*), primilateral setae (leg I) (*pl*) and subunguinal setae (*s*) slender, smooth; fastigial setae (*ft*) of legs I–III slender, leg IV *ft* with small, flattened, disk-shaped end; setae on tibia, genu and femur shorter than tarsal setae, minutely barbed. Solenidia setiform. Famulus (*e*) minute.

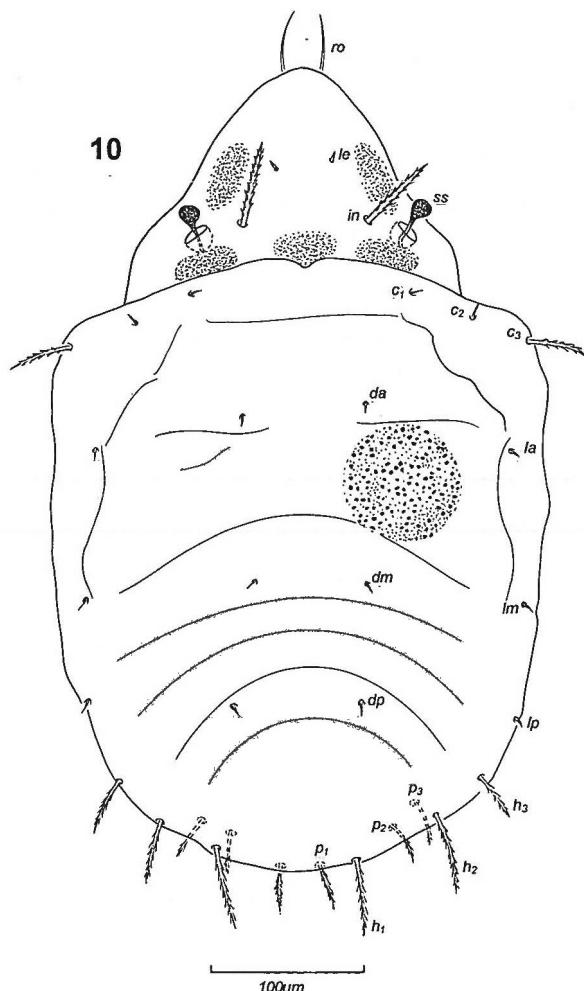


FIG. 10: *Halozetes belgicae mickii* subsp. nov., tritonymph, dorsal view.

**IMMATURE STAGES** (Fig. 10): Porose sclerites present on aspis, three sclerites along posterior border, two sclerites (one on each side) laterally. Prodorsal setae in all stages recognizable as in adult. Gastronotal integument pleated; dorsal porose sclerites absent; lateral porose sclerites present (visible in ventral view). For development of ventral setae, see

Table 2. For development of leg setae see Table 3. Tritonymph unidifident; gastronotal setae  $c_1$ ,  $c_2$ ,  $d$ -series and  $l$ -series short, fine and smooth; gastronotal setae  $c_3$ ,  $h$ -series and  $p$ -series long, stout and barbed.

**TYPE MATERIAL:** Collected by D. J. MARSHALL on Marion Island ( $46^{\circ} 54'S$ ,  $37^{\circ} 45'E$ ), Sub-Antarctic Region, during April/May 1996 and 1997. Sampling site and substrate: Macaroni Bay, on *Mastodia*, a supra-littoral lichen. The holotype (male) (NMB

3885.1), allotype (female) (NMB 3885.2) and 10 paratypes (5 males, 5 females) (NMB 3885.3) are deposited in the Acarology Collection of the National Museum, Bloemfontein, South Africa.

Other oribatids found at the same site are *Alaskozetes antarcticus* (Michael, 1903) and *Podacarus auberti* Grandjean, 1955.

**ETYMOLOGY:** The new subspecies is named after Dr D. J. ('Mick') MARSHALL who donated the material for this study to me.

|             | Larva | Protonymph | Deutonymph | Tritonymph   | Adult        |
|-------------|-------|------------|------------|--------------|--------------|
| Coxisternal | 2-1-2 | 3-1-2-1    | 3-1-2-2    | 3-1-2-3      | 3-1-2-3      |
| Genital     | 0     | 1          | 3          | 5            | 6            |
| Aggenital   | 0     | 0          | 1          | 1(♀) 3/4 (♂) | 1(♀) 6/7 (♂) |
| Anal        | 0     | 0          | 0          | 2            | 2            |
| Adanal      | 0     | 0          | 3          | 3            | 3            |

TABLE 2: Development of ventral setae in immatures and adult of *Halozetes belgicae mickii*.

|                | Troch. | Femur   | Genu   | Tibia                   | Tarsus   |
|----------------|--------|---------|--------|-------------------------|--|
| <i>Leg I</i>   |        |         |        |                         |  |
| Larva          | -      | d, bv'' | δ, (l) | φ <sub>1</sub> , (l) v' | ω <sub>1</sub> (p) (tc) (ft) ε (pl) (u) (a) s (pv) |
| Protonymph     | -      | -       | -      | -                       | ω <sub>2</sub>                                     |
| Deutonymph     | -      | -       | -      | φ <sub>2</sub>          |  |
| Tritonymph     | -      | l''     | -      | -                       | (it)   |
| Adult          | -      | v''     | -      | v''                     |  |
| <i>Leg II</i>  |        |         |        |                         |  |
| Larva          | -      | d, bv'' | δ, (l) | φ <sub>1</sub> , l', v' | ω <sub>1</sub> (p) (tc) (ft) (u) (a) s (pv)        |
| Protonymph     | -      | -       | -      | -                       | -  |
| Deutonymph     | -      | l'      | -      | -                       | ω <sub>2</sub>                                     |
| Tritonymph     | -      | -       | -      | l''                     | (it)   |
| Adult          | -      | l''     | -      | - v''                   |  |
| <i>Leg III</i> |        |         |        |                         |  |
| Larva          | -      | d, ev'  | δ, l'  | φ <sub>1</sub> , v'     | (p) (tc) (ft) (u) (a) s (pv)                       |
| Protonymph     | l'     | -       | -      | -                       | -  |
| Deutonymph     | v'     | -       | -      | -                       | -  |
| Tritonymph     | -      | l'      | -      | l'                      | (it)   |
| Adult          | -      | -       | -      | v''                     | -  |
| <i>Leg IV</i>  |        |         |        |                         |  |
| Protonymph     | -      | -       | -      | -                       | (p) ft'' (u) (pv)                                  |
| Deutonymph     | v'     | d, ev'  | d      | φ <sub>1</sub> , v'     | (tc) (a) s   |
| Tritonymph     | -      | -       | l'     | l'                      | -  |
| Adult          | -      | -       | -      | v''                     | -  |

TABLE 3: Development of leg setae and solenidia in immatures and adults of *Halozetes belgicae mickii*. Setae and solenidia are indicated in the stage in which they first appear. Notations in brackets indicate a pair of setae.

|                         | Size   | Degree of aggenital neutrichy | No. anogenital setae | d-series            | l-series                 | h-series                   | c-series                 | p-series                   | Rostal setae         | Lamellar setae       | Intermellar setae     | Length ratio of ro, le, in | Pre-genital ridge in ♀ | Translamellar ridge | Interlamellar ridge |
|-------------------------|--------|-------------------------------|----------------------|---------------------|--------------------------|----------------------------|--------------------------|----------------------------|----------------------|----------------------|-----------------------|----------------------------|------------------------|---------------------|---------------------|
| <i>H. b. belgicae</i>   | 560 µm | 5–9 setae each side           | 13/14 pairs          | short barbed spines | short barbed spines      | ?                          | long barbed              | long barbed                | barbed short thick   | barbed medium length | barbed 2 × md         | ro<le<in                   | ?                      | -                   | +                   |
| <i>H. b. brevipilis</i> | 539 µm | 2–6 setae each side           | 14/15 pairs          | short smooth spines | short spines occ. barbed | short spines occ. barbed   | short spines occ. barbed | slightly barbed longer     | fine slender smooth  | short thick barbed   | thick barbed <md      | le<ro<in                   | +                      | -                   | +/-                 |
| <i>H. b. longisetae</i> | ?      | ?5–9 setae each side          | ?14 pairs            | short smooth stout  | long thick barbed        | long thick barbed          | long thick barbed        | long thick barbed          | fine slender short   | short barbed         | thick barbed 2 × md   | le<ro<in                   | ?                      | -                   | +                   |
| <i>H. b. mickii</i>     | 582 µm | 6–7 setae each side           | 13 pairs             | short smooth stout  | short smooth stout       | short smooth stout         | smooth longer            | barbed longer              | fine slender smooth  | stout smooth short   | thick barbed <md      | le<ro<in                   | +                      | -                   | +/-                 |
| <i>H. impeditus</i>     | 641 µm | 6–8 setae each side           | 14 pairs             | very short smooth   | very short smooth        | very short smooth          | longer thicker barbed    | longer thicker barbed      | barbed short         | barbed medium length | barbed 1,7 × md       | ro<le<in                   | +                      | +                   | +                   |
| <i>H. otagoensis</i>    | 545 µm | 5 setae each side             | 14 pairs             | tiny rough spines   | tiny rough spines        | tiny rough spines ? longer | tiny rough spines        | tiny rough spines ? longer | fine slightly barbed | ♀ short stiff smooth | thick barbed <md ♂ >♀ | ♀: le<ro<in ♂: ro<le<in    | +                      | +                   | +                   |

TABLE 4: Comparison of the taxa of the “belgicae-group” (md = mutual distance between alveoli of setae; 2 × md = setae twice as long as distance between alveoli; <md = setae shorter than distance between alveoli. occ. = occasionally).

## DISCUSSION

Table 4 gives a comparison of certain characters in the species of the "belgicae-group". The presence of the translamellar ridge seems to be the only consistent character that separates *H. impeditus* and *H. otagoensis* from the subspecies of *H. belgicae*. There may also be differences in leg chaetotaxy (*cf.* 1 seta on genu IV of *H. impeditus* and 2 setae on genu IV of *H. b. mickii*) and immatures (presence or absence of dorsal sclerites), but due to the lack of this information at present, no such comparisons can be made. The new subspecies, however, can be distinguished from the nominate form and other two subspecies by the absence of notogastral setae *c<sub>1</sub>* and *c<sub>3</sub>* and the combination of shape and size of prodorsal and notogastral setae.

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