

New records of terrestrial arthropods from Dronning Maud Land, Antarctica*

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Data on the occurrence of *Eupodes angardi* Strandmann & Sømme, *Tydeus erebus* Strandmann (Acari, Prostigmata), and *Cryptopygus sverdrupi* Lawrence (Collembola) in Gjelsvikfjella and Mühlig-Hofmannfjella, as well as of *Maudheimia wilsoni* Dalenius (Acari, Cryptostigmata) in H.U. Sverdrupfjella and Gjelsvikfjella are presented. The four species differ in their distribution. While *E. angardi*, *C. sverdrupi* and *M. wilsoni* may be limited to central mountain ranges in Dronning Maud Land, *T. erebus* has been reported from 55°W to 80°E on the Antarctic Continent.

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Until about thirty years ago the fauna of terrestrial arthropods in Dronning Maud Land was completely unknown. The oribatid mite *Maudheimia wilsoni* was the first representative to be discovered from this part of the Antarctic Continent (Dalenius & Wilson 1958). Later several species of prostigmatid mites have been collected in Heimefrontfjella (Bowra et al. 1966), in H. U. Sverdrupfjella (Strandmann & Sømme 1977), and in Vestfjella (Sømme 1980). Ohyama & Matsuda (1977) reported three species of prostigmatid mites from the Syowa Station, East Antarctica. Based on these collections a total of one oribatid and ten prostigmatid mites has so far been observed in Dronning Maud Land. In addition two species of Collembola have been found: *Cryptopygus sverdrupi* in H. U. Sverdrupfjella (Lawrence 1978) and *Cryptopygus antarcticus* in Vestfjella (Sømme 1980). Except for studies on prostigmatid mites from Vestfjella (Sømme 1978), and on *C. sverdrupi* in Mühlig-Hofmannfjella (Sømme 1986), little information is available on the ecology of the terrestrial arthropods of Dronning Maud Land.

The fauna of terrestrial arthropods is still unknown in large parts of Dronning Maud Land. The present study comprises the first observations on Collembola and mites from Gjelsvikfjella and Mühlig-Hofmannfjella. During the Norwegian Antarctic Research Expedition 1984/85, several samples were collected eastwards from

Gjelsvikfjella at about 2°30'E to the middle part of Mühlig-Hofmannfjella at about 5°20'E (Norsk Polarinstittutt, Map of Dronning Maud Land 1:250,000, sheets H5, H6, J5, J6). The most northern nunataks of both mountain ranges rise above the ice cap at approximately 72°S about 200 km from the ice shelf margin. The present study also includes records of the oribatid mite *Maudheimia wilsoni* from H. U. Sverdrupfjella, from where data on prostigmatid mites and Collembola have previously been published (Strandmann & Sømme 1977; Lawrence 1978). Specimens of *M. wilsoni* were collected during the Norwegian Antarctic Expedition 1970/71 (Winsnes 1972). The H. U. Sverdrupfjella mountain range is situated at about 0°30'W to 1°30'E and 72° to 73°S (Norsk Polarinstittutt, Map of Dronning Maud Land 1:250,000, sheets G6, H6).

Description of habitats

Gjelsvikfjella and Mühlig-Hofmannfjella

Loc. 1. – Large numbers of prostigmatid mites and Collembola were present close to the main camp of one of the landing parties of NARE 1984/85 in Mühlig-Hofmannfjella. They were found in two small ice-free patches of gravel, about 2,000 m² each, at 1,600 m a.s.l. at the foot of the NW side of Svarthamaren (Fig. 1). On sunny days one of the patches (the 'Prasiola-field') received ample supplies of meltwater from the surrounding glaciers. The water formed small streams and

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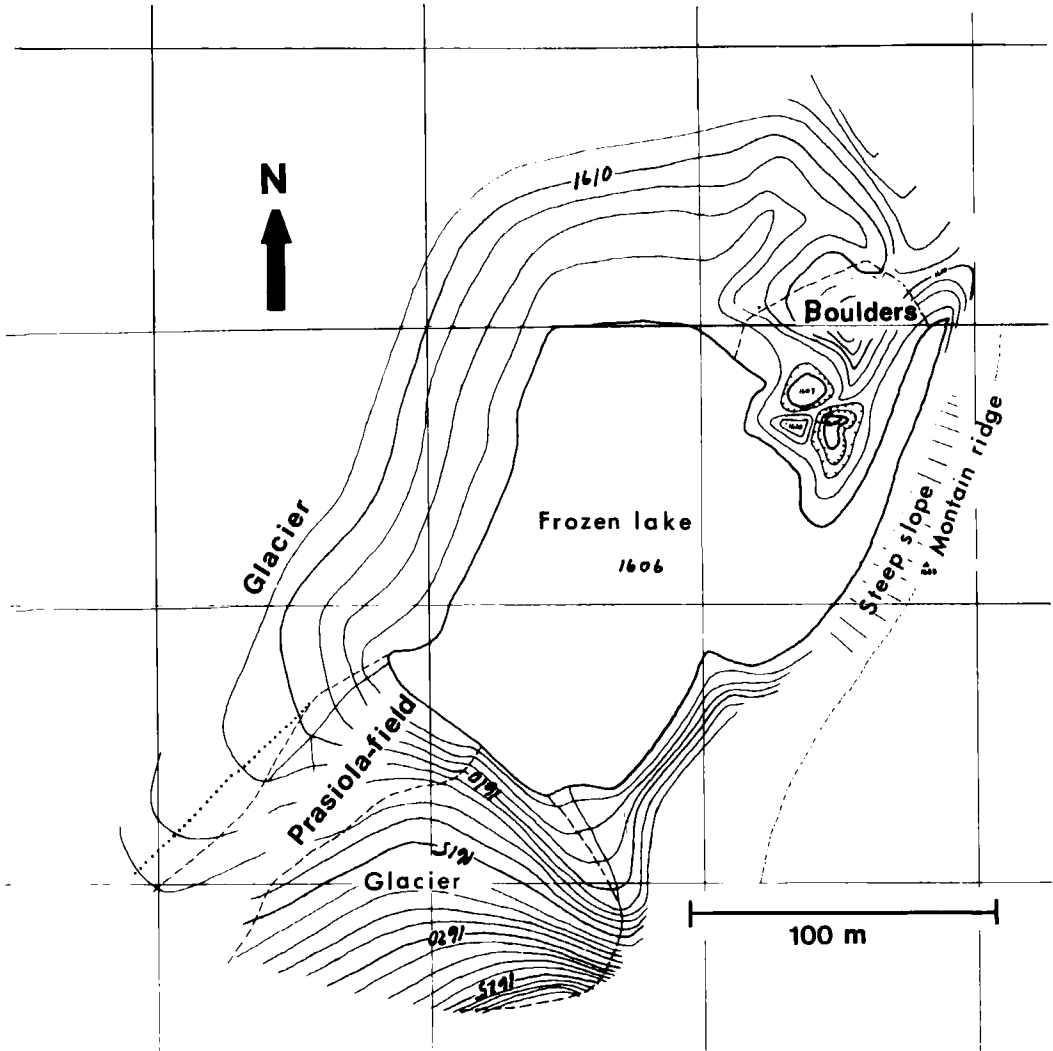


Fig. 1. Map of the 'Prasiola-field' and boulder area at the foot of the NW side of Svarthamaren, Mühlig-Hofmannfjella at about 1,600 m a.s.l. Measurements and drawing by T. Eiken and K. Svendsen, the Norwegian Polar Research Institute.

rivulets that flowed into a frozen lake. The second patch was occasionally covered by drifting snow carried by SE winds during the night. Subsequent melting during daytime provided sufficient moisture to maintain living organisms.

The green alga *Prasiola crispa* was growing in both fields, but was particularly abundant in the 'Prasiola-field' along the streams of meltwater. In other places the *Prasiola* vegetation was more scarce and patchy. In association with the *Prasiola* there were dense clusters of unicellular (*Pleurococcus*) and monofilous (*Ulotrix* sp.) green algae, which also harboured a rich fauna of Protozoa,

Rotifera, Nematoda and Tardigrada. Nutrients for the nitrophilous *Prasiola* algae were supplied by wind-borne guano and debris from a nearby colony of Antarctic petrels (Konovalov 1964) and several specimens of skuas around the frozen lake.

Mites and Collembola appeared to be most numerous in gravel of medium moisture content. They avoid dry places and gravel saturated with water. On sunny days large numbers of mites were crawling on the *Prasiola* mats. They were also found within the gravel and underneath smaller rocks. The Collembola were found mainly

at the base of the *Prasiola* vegetation and under rocks. In January 1985 temperatures above 0°C were recorded at the base of the vegetation every day (Sømme 1986), but sank below freezing point during the night. In early February, when the ground also remained frozen during daytime, Collembola and mites were found in aggregations underneath rocks.

Loc. 2. – Same location as loc. 1. Collembola were collected from *Prasiola* vegetation growing in north-facing crevices of large boulders on one of the gravel fields (Fig. 1) and the adjoining glacier. The crevices received meltwater from drifting snow.

Loc. 3. – A few specimens of prostigmatid mites were collected underneath small rocks in a gravel field at the base of the Båsbolken mountain in Mühlig-Hofmannfjella. The habitat was relatively dry, and crustaceous lichens were the only visible vegetation among the gravel.

Loc. 4. – Prostigmatid mites were found at the base of Svarthamaren, south of the colony of Antarctic petrels. The habitat was relatively dry, and a few specimens only were collected under small rocks.

Loc. 5. – Collembola and prostigmatid mites were collected from two small nunataks in Hamarskaftet, Mühlig-Hofmannfjella at about 1,650 m a.s.l. The specimens were found in patches of vegetation of mosses, lichens and *Prasiola* growing in crevices. According to Engelskjøn (1986), *Grimmia grisea* is the only moss in this location. Lichens comprised species of *Pseudohebe*, *Calloplaca* and *Physcia* (Engelskjøn, pers. comm.) In addition a few specimens of Collembola were collected at nunatak '1745' in Hamarskaftet.

Loc. 6. – Two specimens of prostigmatid mites were found in a sample of *Grimmia* moss (coll. T. Engelskjøn) from the nunatak '1595' in Plogskaftet.

Loc. 7. – Several samples of Collembola and mites were collected by T. Engelskjøn at Jutulsessen, Gjelsvikfjella. The large mountain is formed like an amphitheatre. Some of the lower parts at 1,100 to 1,200 m a.s.l. are relatively flat, ice-free areas with large patches of vegetation. In several places small creeks are formed from

meltwater. Collembola were collected at 1,350 m a.s.l. in the SW valley from sand with the bluegreen cyano-bacterium *Nostoc* and patches of *Xanthoria* lichen, and in the eastern part of the mountainside below Brugda at 1,480 m a.s.l. in gravel with *Xanthoria* spp. They were also extracted in Tullgren funnels from samples of moss (*Sarconeurum glaciale*) from the SE valley at about 1,150 m a.s.l. Extraction of moss from this location also yielded three specimens of oribatid mites. Prostigmatid mites were collected close to this location by hand from gravel with *Nostoc* and rocks with the lichen *Lecania*, on which they appeared to feed.

Loc. 8. – A few specimens of prostigmatid mites were collected at the mountain Stabben in Jutulsessen, Gjelsvikfjella, at 1,450 m a.s.l. The mites were found in dry *Prasiola* vegetation in the vicinity of snow petrel nests.

H. U. Sverdrupfjella

Specimens of *M. wilsoni* were collected in 1970/71 by Jens Angar and Yngvar Gjessing from seven localities in H. U. Sverdrupfjella at elevations from about 1,100 to 1,500 m a.s.l. The mites were found on the underside of rocks. Details about the vegetation and other factors of ecological interest are not available.

Results

Eupodes angardi Strandmann & Sømme, 1977

This prostigmatid mite has previously only been recorded from H. U. Sverdrupfjella (Strandmann & Sømme 1977). The adults are approximately 0.5–0.6 mm long. Live specimens have red legs and a dark, reddish-brown body with a narrow white stripe along the centre of the dorsum. The occurrence of *E. angardi* in the present material is given in Table 1, which represents the number of specimens from the samples that have been examined. The mites were extremely abundant in samples from loc. 1, but were also recorded from other locations in Gjelsvikfjella and Mühlig-Hofmannfjella. All developmental stages were present in the material. The younger stages being less numerous may be due to the fact that they are easily overlooked during sampling in the field.

Table 1. Number of specimens of *Eupodes angardi* examined from samples collected in Gjelsvikfjella and Mühlig-Hofmannfjella, DML. L = larva, I-III = 1st to 3rd nymphal stages.

Loc. no.	Date (1985)	Locality	Altitude m a.s.l.	Number of specimens					
				L	I	II	III	♂	♀
1	20-30 Jan.	Svarthamaren NW	1,600	2	21	17	28	85	127
4	18 Jan.	Svarthamaren S	1,600			1	3	7	14
5	3 Feb.	Hamarskaftet	1,650	1					
7	23 Jan.	Jutulsessen	1,100		1	3	1	2	3
8	20 Jan.	Stabben	1,450			1	2	1	2

Tydeus erebus Strandtmann, 1967

This small prostigmatid mite, about 0.25 to 0.30 mm long, was originally described from Mule Island at the Vestfold Hills (Strandtmann 1967). It has later been collected in other locations in the East Antarctic between 55° and 80°E by Rounsevell (1977). Ohshima & Matsuda (1977) reported the species from the Syowa Station at about 40°E. Specimens from the Pensacola Ranges at 55°W, originally described as *Tydeus wilkesi* by Strandtmann (1967), are considered to be small individuals of *T. erebus* (Rounsevell 1977). *T. erebus* has also been reported from Heimefrontfjella at 12°E (Bowra et al. 1966) and from Vestfjella at 15°E (Sømme 1980).

The occurrence of *T. erebus* in the present material is listed in Table 2. The species was found both in Gjelsvikfjella and in Mühlig-Hofmannfjella and was particularly numerous at loc. 1. Smaller stages than deutonymphs may have been overlooked during sampling in the field.

Maudheimia wilsoni Dalenius, 1958

This is a cryptostigmatid mite, which was described from specimens collected at the two nunataks Passat (71°S, 4°W) and Ekberget (72°S,

0°20'W) in Dronning Maud Land (Dalenius & Wilson 1958). No other records have been published. In the present study it was found at the following localities:

H. U. Sverdrupfjella: NW Vendeholten, 6 Jan. 1971, 1,600 m a.s.l., 1♀, 1♂; Rømlingane 6 Jan. 1971, 1,540 m a.s.l., 2♂♂; unnamed nunatak west of Tua, 1,435 m a.s.l., 2♂♂, 2 nymphs; Jutulrøra 19 Jan. 1971, 1♀, 1♂; Brekkerista 26-29 Jan. 1971, approximately 1,200 m a.s.l., 7♀♀, 6♂♂; Tvara 25-26 Dec. 1970, 1,300-1,500 m a.s.l., 1♀ (coll. J. Angar and Y. Gjessing).

Gjelsvikfjella: Loc. 7: Jutulsessen, 23 Jan. 1985, SE valley approximately 1,150 m a.s.l., in moss (coll. T. Engelskjøn).

Cryptopygus sverdrupi Lawrence, 1978

This collembolan was described by Lawrence (1978) from specimens collected in the H. U. Sverdrupfjella, which was the only known location. In the present study *C. sverdrupi* was collected from several localities in Gjelsvikfjella and Mühlig-Hofmannfjella, as listed below. They were especially numerous at loc. 1, where studies on the distribution of size classes suggested that the population is composed of several overlapping generations (Sømme 1986).

Table 2. Number of specimens of *Tydeus erebus* examined from samples collected in Gjelsvikfjella and Mühlig-Hofmannfjella, DML. I-III = 2nd to 3rd nymphal stages.

Loc. no.	Date (1985)	Locality	Altitude m a.s.l.	Number of specimens			
				II	III	♂	♀
1	20-30 Jan.	Svarthamaren NW	1,600	4	7	38	54
3	15 Jan.	Båsbolken	1,600		1	1	7
5	3 Feb.	Hamarskaftet	1,650	1	4	3	7
6	8 Feb.	Plogskaftet	1,595			2	
7	23 Jan.	Jutulsessen	1,100		2	3	5

Loc. 1: Svarthamaren SW, 16 Jan.–2 Feb. 1985, at the base of *Prasiola* vegetation, in gravel and under rocks. Numerous specimens. Loc. 2: Svarthamaren SW, 16–27 Jan. 1985, from *Prasiola* in crevices of boulders. Numerous specimens. Loc. 5: Hamarskaftet, from two nunataks at 1,650 m a.s.l., 2 Feb 1985, and at nunatak '1745' in connection with lichens 13 Feb. 1985. Several specimens. Loc. 7: Jutulsessen, 16–23 Jan. 1985, 10–20 specimens in each of three samples (see 'Description of habitats') (coll. T. Engelskjøn).

Discussion

From our present knowledge it appears that the four species found in the present study differ in their pattern of distribution. The oribatid mite *M. wilsoni* has previously been found only at the two nunataks Passat and Ekberget in Dronning Maud Land (Dalenius & Wilson 1958). Presently it is reported from H. U. Sverdrupfjella and Gjelsvikfjella, but was not found in samples from Mühlig-Hofmannfjella. Due to more extreme climatic conditions its distribution may be limited at higher, inland elevations. The species is not known from other locations in the Antarctic, but the related form *Maudheimia petrova* is reported from North Victoria Land (Wallwork 1967).

Similarly the collembolan *C. sverdrupi* has a limited distribution. Presently it is known from H. U. Sverdrupfjella (Lawrence 1977), Gjelsvikfjella and Mühlig-Hofmannfjella. It may be present further to the east in Dronning Maud Land, where large areas have not been investigated. The only report of Collembola in the western part of this sector is a record of *Cryptopygus antarcticus* in Vestfjella (Sømme 1980).

Of the two prostigmatid mites, *E. angardi* has been reported from H. U. Sverdrupfjella (Strandtmann & Sømme 1978), Gjelsvikfjella and Mühlig-Hofmannfjella. This species may also be found further to the east. It has not been reported from the western parts of Dronning Maud Land, where the related species *Eupodes tottanfjella* has been recorded from Heimefrontfjella (Bowra et al. 1966) and Vestfjella (Sømme 1980).

In contrast, the other prostigmatid mite, *T. erebus*, is widely distributed. From previous records and the present study it appears to have an almost continuous distribution from 55°W to 80°E.

In conclusion it appears that *M. maudheimia*,

C. sverdrupi and *E. angardi* are endemic to restricted mountain ranges in the central parts of Dronning Maud Land, while *T. erebus* is one of the most widespread mites of the Antarctic Continent.

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References

- Bowra, G. T., Holdgate, W. M. & Tilbrook, P. J. 1966: Biological investigations in Tottanfjella and Central Heimefrontfjella. *Br. Antarct. Surv. Bull.* 9, 63–70.
- Dalenius, P. & Wilson, O. 1958: On the soil fauna of the Antarctic and of the Sub-Antarctic Islands. The Oribatidae (Acari). *Ark. Zool.* 11, 393–425.
- Engelskjøn, T. 1986: Botany of two Antarctic mountain ranges: Gjelsvikfjella and Mühlig-Hofmannfjella, Dronning Maud Land. I. General ecology and the development of the Antarctic cold desert cryptogam formation. *Polar Research 4 n.s.* (in press).
- Kononov, G. V. 1964: Observations of birds in Queen Maud Land. *Sov. Antarctic Exped. Inform. Bull.* 4, 156–158.
- Lawrence, P. N. 1978: *Cryptopygus sverdrupi* n.sp. A new species of Collembola (Isotomidae) from Sverdrupfjella, Antarctica, with notes on the related species in five genera. *Norw. J. Ent.* 25, 15–20.
- Ohyama, Y. & Matsuda, T. 1977: Free-living prostigmatid mites found around Syowa Station, East Antarctica. *Antarctic Record* 59, 172–176.
- Rounsevell, D. E. 1977: Geographic variation in the size of an Antarctic mite *Tydeus erebus* Strandtmann (Acarina, Prostigmata). *Acarologia* 19, 209–219.
- Sømme, L. 1978: Notes on the cold-hardiness of prostigmatid mites from Vestfjella, Dronning Maud Land. *Norw. J. Ent.* 25, 51–55.
- Sømme, L. 1980: Terrestrial arthropods from Vestfjella, Dronning Maud Land (Acari, Collembola), with notes on their taxonomy. *Ent. Scand.* 11, 61–64.
- Sømme, L. 1986: Ecology of *Cryptopygus sverdrupi* from Dronning Maud Land, Antarctica. *Polar Biology* 6, 179–184.
- Strandtmann, R. W. 1967: Terrestrial Prostigmata (Trombidiform mites). Pp. 51–80 in Gressitt, J. L. (ed.): *Entomology of Antarctica, Antarctic Res. Ser. 10*. American Geophysical Union, Washington D.C.
- Strandtmann, R. W. & Sømme, L. 1977: Prostigmatid mites (Acari, Prostigmata) from Sverdrupfjella, Dronning Maud Land, with description of four new species. *Norw. J. Ent.* 24, 137–146.
- Wallwork, J. A. 1967: Cryptostigmata (Oribatid mites). Pp. 105–122 in Gressitt, J. L. (ed.): *Entomology of Antarctica, Antarctic Res. Ser. 10*. American Geophysical Union, Washington D.C.
- Winsnes, T. S. 1972: The Norwegian Antarctic Expedition 1970–71. *Nor. Polarinst. Årbok* 1970, 224–226.