

## SHORT NOTE

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**Occurrence of the flea *Glaciopsyllus antarcticus* and avian lice in central Dronning Maud Land**

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**Abstract** The flea *Glaciopsyllus antarcticus* is endemic to the Antarctic continent, where it is known to parasitise a number of seabird species. This paper reports the occurrence of the flea and two species of lice from snow petrel (*Pagodroma nivea*) colonies in central Dronning Maud Land, Antarctica, and extends considerably the recorded distribution of the flea. Flea adults, pupae and larvae were recovered from 10 of 11 samples of organic material collected from snow petrel nests at Svarthamaren (71°53'S, 05°10'E) in the Mühlig-Hofmannfjella. Specimens of two philopterid lice species, *Saemundssonina antarctica* and *Pseudonirmus charcoti*, were recovered from three of these samples. Specimens of the Antarctic flea and of the louse *S. antarctica* were recovered from carcasses of snow petrel chicks collected both at Svarthamaren and Robertskollen (71°28'S, 03°15'W) in the northern Ahlmannryggen; the louse *Pseudonirmus charcoti* was recovered from Robertskollen only.

parasite of flying seabirds that is endemic to the Antarctic continent, where it is the only known flea species. It has been recorded on snow petrels (*Pagodroma nivea*), Antarctic petrels (*Thalassoica antarctica*), Antarctic fulmars (*Fulmarus glacialisoides*), Cape petrels (*Daption capense*) and Wilson's storm-petrels (*Oceanites oceanicus*) (Dunnet 1964; Bell et al. 1988; Whitehead et al. 1991). There are published reports of the species from localities in eastern Antarctica only, between 62 and 171°E (Smit 1979; Whitehead et al. 1991), although this is probably indicative of a lack of data rather than a limited distribution. The most southerly locality at which specimens have been reported is at Cape Christie (72°18'S, 170°01'E) (Smit 1979).

Although *G. antarcticus* has not previously been reported from Dronning Maud Land, three of its five known avian hosts breed in this area (e.g. Mehlum et al. 1988; Steele and Newton 1995). This paper reports on the occurrence of *G. antarcticus*, and other avian ectoparasites, in central Dronning Maud Land.

**Introduction**

The flea *Glaciopsyllus antarcticus* Smit & Dunnet, 1962, (Siphonaptera: Ceratophyllidae) is a little-studied ecto-

**Materials and methods**

The Robertskollen group of nunataks (71°28'S, 03°15'W) in the northern Ahlmannryggen of Dronning Maud Land supports small scattered colonies of snow petrels totalling ca. 500 pairs (Ryan and Watkins 1989). Three breeding adult snow petrels and three chicks were caught at Robertskollen and searched for ectoparasites during the 1992/1993 field season. The birds were placed up to their necks in plastic bags together with a wad of chloroform-soaked cotton wool, in order to anaesthetise any ectoparasites present. The plumage was then combed and searched for evidence of ectoparasites. A further 200 snow petrel chicks, breeding adults and non-breeding adults were caught and handled at Robertskollen during the 1991/1992–1994/1995 summer field seasons in the course of research into their breeding ecology. All of these birds were briefly examined by eye for evidence of ectoparasites.

Svarthamaren (71°53'S, 05°10'E) in the Mühlig-Hofmannfjella supports the largest known colony of Antarctic petrels, estimated at 250,000 pairs (Mehlum et al. 1988), as well as 10,000 pairs of snow petrels and 120 pairs of south polar skuas (*Catharacta macrormicki*) (N. Røv and H.-C. Pedersen, personal communication). During January 1995, small samples (ca. 50 g) of organic material

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and soil were collected from 11 snow petrel nests at Svarthamaren that were known to have been occupied by birds during the 1994/1995 breeding season. Three of these nest-material samples were sorted in a field hut soon after collection; the remainder were frozen at  $-20^{\circ}\text{C}$  and sorted 4 months later in the laboratory. During sorting all organic material, such as feathers, was carefully sifted and searched under a dissecting microscope for evidence of ectoparasites. One hundred adult snow petrels caught at Svarthamaren during this period were visually checked for ectoparasites.

Finally, three snow petrel carcasses were collected during the 1994/1995 field season (one from Svarthamaren and two from Robertskollen). These carcasses were sealed in plastic bags immediately after collection and later washed with warm water, which was then filtered and the filtrate examined under a dissecting microscope.

All parasites were mounted on slides and then examined and identified using a comparison eyepiece bridge. They have since been deposited in the collection of the Museum of New Zealand.

## Results

No ectoparasites were observed on any of the snow petrels handled at the Robertskollen and Svarthamaren colonies, or on any of the six birds placed in chloroform bags. However, the snow petrels' very dense down plumage made it difficult to search for ectoparasites effectively, and also may have prevented anaesthetised ectoparasites from dropping into the chloroform bag.

A total of 65 adult fleas and 2 larvae were collected from 10 of the 11 snow petrel nest-material samples collected at Svarthamaren during the 1994/1995 field season. Intact adults were identified unequivocally as *G. antarcticus* by reference to the original description and by comparison with specimens determined by F.G.A.M. Smit; larvae were identified by comparisons with numerous larvae obtained during the studies of Bell et al. (1988). Two live adult fleas were found in different samples of nest-material; one was sorted in the field shortly after collection, and the other was recovered from nest-material that had been kept frozen.

Four lice (Phthiraptera: Philopteridae) were found amongst material collected from three of the snow petrel nests at Svarthamaren; one ♀ *Pseudonirmus charcoti* Neumann, 1907, and three ♀ *Saemundssonina antarctica* Wood, 1937.

Two snow petrel chick carcasses, of unknown post-mortem age, were shown to harbour 11 fleas and lice amongst their plumage. These included one ♂ and one ♀ *G. antarcticus*, one ♂ and one ♀ *S. antarctica*, and one ♀ *Pseudonirmus charcoti* on a carcass collected at Robertskollen; and two instar I and one probable instar III larval *G. antarcticus*, together with one ♂ and two ♀ *S. antarctica* from Svarthamaren.

## Discussion

*G. antarcticus* has a broad host range and has been reported from five species of flying seabirds in Antarctica, and possibly occurs in many, if not most, of their col-

onies. However, little is known of the distribution of this flea, and there are published records of *G. antarcticus* from only the Australian and New Zealand sectors of continental Antarctica (Smit 1979; Whitehead et al. 1991). The records presented here extend its known range within the breeding distribution of the snow petrel.

Adult *G. antarcticus* are thought to over-winter on the host (Bell et al. 1988), but the revival of an adult from nest-material frozen at  $-20^{\circ}\text{C}$  for 4 months indicates that this species has unexpected physiological capabilities, and further research into its over-wintering strategies might be useful.

Both of the louse species collected are regular parasites of snow petrels that have been recorded from several Antarctic localities (Clay and Moreby 1967), although not previously from Dronning Maud Land. *Pseudonirmus charcoti* is host-specific to the snow petrel (Timmermann 1961) whereas *S. antarctica* has been regularly recorded on the Antarctic petrel also (Pilgrim and Palma 1994). Because lice spend their complete life-cycle on the host and are totally dependent upon host heat, humidity and secretions, it is unusual to find them in nest material. Mester (1971) recorded two species of Menoponidae crawling on warm lapwing egg clutches during the host incubation period but Menoponidae can run on smooth surfaces whereas Philopteridae do so efficiently only on feathers, and therefore leave their host only to transfer to another. Consequently, most philopterid lice found in nests are those that have died and have been either passively dislodged from the plumage or actively removed by the host's preening.

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## References

- Bell PJ, Burton HR, Franeker JA van (1988) Aspects of the biology of *Glaciopsyllus antarcticus* (Siphonaptera: Ceratophyllidae) during the breeding season of a host (*Fulmarus glacialisoides*). *Polar Biol* 8:403–410
- Clay T, Moreby C (1967) Mallophaga (biting lice) and Anoplura (sucking lice). Part 2: Keys and locality lists of Mallophaga and Anoplura. In: Gressitt JL (ed.) *Entomology of Antarctica*. Antarctic Research Series 10. American Geophysical Union, Washington, DC, pp 157–196
- Dunnet GM (1964) Distribution and host relationships of fleas in the Antarctic and Subantarctic. In: Carrick R, Holdgate MW, Prevost J (eds) *Biologie Antarctique*. Hermann, Paris, pp 223–238
- Mehlum F, Gjessing Y, Hafthorn S, Bech C (1988) Census of breeding Antarctic Petrels *Thalassoica antarctica* and physical features of the breeding colony at Svarthamaren, Dronning Maud Land, with notes on breeding Snow Petrels *Pagodroma nivea* and South Polar Skuas *Catharacta maccormicki*. *Polar Res* 6:1–9

- Mester H (1971) Federlinge auf Limikolen-Gelegen. *J Ornithol* 112:109–130
- Pilgrim RLC, Palma RL (1994) New synonymy between *Philopterus antarcticus* and *Saemundssonina nivea* (Phthiraptera: Philopteridae). *NZ J Zool* 21:239–244
- Ryan PG, Watkins BP (1989) Snow petrel breeding biology at an inland site in continental Antarctica. *Colon Waterbirds* 12:176–184
- Smit EGAM (1979) The fleas of New Zealand (*Siphonaptera*). *J R Soc NZ* 9:143–232
- Steele WK, Newton IP (1995) New distributional and breeding records of birds in the Ahlmannryggen, western Dronning Maud Land. *Mar Ornithol* 23:47–52
- Timmermann G (1961) Gruppen-Revisionen bei Mallophagen. IV. Genera *Pseudonirmus* Mjöberg, 1910, *Bedfordiella* Thompson, 1937, und *Episbates* Harrison, 1935. *Z Parasitenk* 21:30–45
- Whitehead MD, Burton HR, Bell PJ, Arnould JPY, Rounsevell DE (1991) A further contribution on the biology of the Antarctic flea, *Glaciopsyllus antarcticus* (Siphonaptera: Ceratophyllidae). *Polar Biol* 11:379–383