

FIRST SOUTH AFRICAN BIOLOGICAL SURVEY IN DRONNING MAUD LAND, ANTARCTICA

By Peter G. Ryan & Barry P. Watkins, Percy FitzPatrick Institute of African Ornithology, University of Cape Town, Rondebosch 7700, South Africa.

South African biological research inland in continental Antarctica was initiated during the 1987-88 summer season when a two-man team from the Percy FitzPatrick Institute of African Ornithology, University of Cape Town, undertook a preliminary biological survey of Robertskollen, a group of nunataks in the northern Ahlmannryggen, western Dronning Maud Land. Robertskollen had been selected as a potential site for a biological research programme planned to focus on ecosystem structure and functioning on nunataks, with emphasis on the effects of ornithogenic products. Snow Petrels (*Pagodroma nivea*) were known to breed at some of the Robertskollen nunataks.

The expedition visited Robertskollen between 22 December 1987 and 27 January 1988. All nunataks in the group were visited, searched for breeding birds, and their macrofauna and flora sampled quantitatively. Vegetation, soil and water samples were collected for examination for micro-organisms and measurement of nutrient concentrations.

Approximately 600 pairs of Snow Petrels were breeding at three of the five large nunatak complexes. Three other bird species were occasional visitors to the area, although small numbers of Wilson's Storm Petrels (*Oceanites oceanicus*) may breed there. Snow Petrel nest-site choice was investigated, and birds were individually marked in a study colony to investigate aspects of the breeding biology during the incubation and brooding periods. Analyses of soil nutrient concentrations at sites close to and distant from bird colonies indicated that ornithogenic products significantly increase the nutrient status of soils on nunataks with bird colonies.

Preliminary examinations indicate that at least four moss species, 20 lichen taxa, 9 alga taxa, 9 cyanobacteria taxa, and 12 species of fungi occur at Robertskollen. Species composition is essentially similar to that reported from adjacent mountain ranges. The distribution and abundance of macrophytes was determined primarily by nutrient enrichment from bird colonies and by the availability of liquid water.

At least three species of mite were found at Robertskollen, the most abundant being the oribatid *Maudheimia wilsoni* which is endemic to western Dronning Maud Land. Mite abundance was correlated with total macrophyte cover. Surprisingly, no collembolans were found, despite an intensive search. Soil and vegetation samples have been examined for tardigrades (5 taxa), nematodes, rotifers and protozoans (10 ciliate taxa); preliminary findings include a previously undescribed ciliate genus and a new tardigrade species.

This work is being followed up in summer 1989-90, when a five-year inter-disciplinary research programme will commence.

[Most of the results of this preliminary survey are published in: Ryan, P.G., Watkins, B.P., Lewis Smith, R.I., Dastyh, H., Eicker, A., Foissner, W., Heatwole, H., Miller, W.R. and Thompson, G. 1989, and Ryan, P.G. and Watkins, B.P. 1989; see Bibliography].

- PICKUP, J. 1988. Ecophysiological studies of terrestrial free-living nematodes on Signy Island. British Antarctic Survey Bulletin 81:77-81.
- POOLE, A.L. 1987. Southern beeches. Science Information Publishing Centre, Wellington, DSIR, p. 148.
- PRISCU, J., HOWARD-WILLIAMS, C. and VINCENT, W.F. 1989. Inorganic nitrogen uptake and regeneration in perennially ice-covered Lakes Fryxell and Vanda, Antarctica. Journal of Plankton Research 11:335-351.
- QUILHOT, W., GARBARINO, J.A., PIOVANO, M., CHAMY, M.C., GAMBARO, V., OYARZUN, M.L., VINET, C., HORMAECHEA, V. and FIEDLER, P. 1989. Studies on Chilean lichens. XI. Secondary metabolites from Antarctic lichens. Serie Cientifica Instituto Antartico Chileno 39:75-89.
- RAY, M.K., SHIVAJI, S., SHYAMALA RAO, N. and BHARGAVA, P.M. 1989. Yeast strains from the Schirmacher Oasis, Antarctica. Polar Biology 9:305-309.
- ROWE-ROWE, D.T., GREEN, B. and CRAFFORD, J.E. 1989. Estimated impact of feral house mice on subantarctic invertebrates at Marion Island. Polar Biology 9:457-460.
- RUSSELL, S. 1987. Water relations and nutrient status of bryophyte communities at Marion Island (sub-Antarctic). Symposia Biologica Hungarica 35:39-57.
- RYAN, P.G. and WATKINS, B.P. 1988. Accumulation of stranded plastic objects and other artefacts at Inaccessible Island, central South Atlantic Ocean. South African Journal of Antarctic Research 18:11-13.
- RYAN, P.G. and WATKINS, B.P. 1988. Biological Survey of Robertskollen, western Dronning Maud Land, Antarctica. In A Report to the South African Scientific Committee for Antarctic Research, (Rondebosch, ed.), p. 80, Percy FitzPatrick Institute of African Ornithology, Cape Town.
- RYAN, P.G. and WATKINS, B.P. 1989. The influence of physical factors and ornithogenic products on plant and arthropod abundance at an island nunatak group in Antarctica. Polar Biology 10:151-160.
- RYAN, P.G., WATKINS, B.P., SMITH, R.I.L., DASTYCH, H., EICKER, A., FOISSNER, W., HEATWOLE, H., MILLER, W.R. and THOMPSON, G. 1989. Biological survey of Robertskollen, western Dronning Maud Land: area description and preliminary species lists. South African Journal of Antarctic Research 19:10-20.
- SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH 1989. The Role of Antarctica in Global Change. ICSU Press, Cambridge, p. 28.

REPRINTS
AVAILABLE
ON
REQUEST.