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POPULATIONS OF INTRODUCED ARTHROPODS AT AUSTRALIAN ANTARCTIC STATIONS

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Abstract: Populations of a beetle *(Lathridius nodifer),* a mite *(Haemogamasus pontiger)* and a dipteran, presumably introduced from Australia, were found in heated buildings at Australian Antarctic stations where they lived for at least 11 months. Direct evidence of breeding was obtained only for the mite population. A brief discussion is presented on the history of introductions which have occurred and the potential consequences of future introductions of arthropods to the Antarctic by man.

Spiders, weevils, flies, mosquitoes and other arthropods have been found among stores and packing material on Antarctic stations. Cameron (1972) observed that these organisms invariably succumbed to the cold. There are no reports of such introduced animals becoming established on the Antarctic continent.

Nevertheless, as this paper reports, accidentally introduced beetles, flies and mites can survive in heated buildings and have lived among stored food on Australian Antarctic stations for at least 1 year. Each station is normally resupplied with stores by ship annually, in January or February, and is not revisited until the following austral summer. Therefore, arthropods in stores can be introduced to the stations only once a year.

RESULTS

The following arthropods have been observed at Australian Antarctic stations. Others are known to have occurred but their identity and status are uncertain.

COLEOPTERA

In 1973 at Davis station (68°35′S, 77°58′E) I found *Lathridius nodifer* Westwood (Lathridiidae: Coleoptera) in a building maintained at temperatures between 0° and 10°C. Only adult beetles were observed in litter on a wooden floor beneath wooden crates containing food; direct evidence of breeding was not obtained. Approximately 20 adults were collected for identification on 15.XII.1973, 11 months after the building was stocked with food.

The species has a cosmopolitan distribution and was described by Hinton (1945) under the name *Coninomus nodifer.* At 15-20°C its life-cycle occupies 27-32 days; its food is fungi.

ACARI

Also at Davis Station in 1973 I found *Haemogamasus pontiger* Berlese (Laelapidae: Acari) in the same habitat as *Lathridius nodifer.* The mite was common in detritus on the

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floor, and on 15.XII.1973 approximately 100 specimens of eggs, larvae, nymphs and adults were collected for identification.

Keegan (1951) described this cosmopolitan species under the name *Euhaemogamasus oudemansi*. It occurs in large numbers in the detritus of warehouse floors and in the nests and fur of small mammals (Hughes 1961). However, it has not been demonstrated to be even a facultative parasite on rodents, and probably feeds on detritus and other mites. Individuals fed only on wheat germ can proceed to complete development (Hughes 1961).

DIPTERA

D. J. Lugg (pers. commun.) at Davis in 1963 and A. S. Cameron (unpubl. log book) at Mawson station (67°36′S, 62°53′E) in 1965 observed adult flies (presumed to be *Drosophila* sp.) living among stored vegetables in buildings maintained almost continuously at temperatures above 0°C. The temperature of the building at Davis in 1963 ranged from 0°C to 10°C with a mean of 7°C (DJL). This was the same building in which the mite and the beetle were found in 1973.

Although not directly observed, breeding may have occurred, because at both stations adult flies were also found in containers of kitchen waste in buildings separate from those in which the vegetables were stored. At Mawson adult flies were observed near kitchen waste until at least 24.XII.1965 (ASC), almost a year after previous resupply of the station.

DISCUSSION

Introduced arthropods are commonly observed on Antarctic stations singly or in small numbers among stores or packing material and are occasionally reported in the literature (for example, Cameron 1972). Some survive to senescence in heated buildings, but locally-bred populations have not previously been reported in detail and presumably most of the introduced arthropods fail to reproduce. In a comprehensive review of Antarctic entomology, Gressitt (1967) has discussed the native arthropod fauna and given evidence to illustrate the processes of natural dispersal which could operate to introduce other fauna to the region.

The species discussed here and possibly others which are commonly synanthropic would have little difficulty surviving at Antarctic stations. Each summer a year's stores are shipped to Australian Antarctic stations on voyages lasting up to 2 months. At the stations perishable food is quickly stored in buildings maintained above 0° for use during the ensuing year. Often detritus accumulates in these buildings and spilling and spoiling of food occurs, encouraging the growth of fungi which may be used as food by some arthropods.

Arthropods accidentally introduced from Australia can readily reproduce and infest the food and the buildings. The new populations may then be spread over the stations as food is moved to other heated buildings when it's used and the packages and waste are discarded. These populations represent an early stage in the colonization of Antarctica by introduced species. They may harbor microorganisms which could be transmitted to local populations of endemic arthropods in soil close to stations.

In the Subantarctic *Lathridius nodifer* was introduced to Campbell Island (52°30′S, 169°10′E) before 1942 (Brookes 1951). Two other species of lathridiid beetles, *Lathridius minutus* L. and *Cartodere apicalis* (Blackburn), have recently been extracted from moss close to stations which they appear to inhabit on Signy Island (60°43′S, 45°38′W) in the South Orkney Islands, and King George Island (62°00′S, 58°15′W) in the South Shetland Islands (Balfour-Browne & Tilbrook 1966). Schlatter et al. (1968) also found small numbers of lathridiid larvae in moss on Robert Island (62°24′S, 59°30′W) in the South Shetland Islands. These beetles appear to be colonizing the Subantarctic and maritime Antarctic, and Saiz et al. (1970) suggested that in these places the species may be adapting to the environment.

T. H. Johnston of the 1911-1914 Australasian Antarctic Expedition found *Haemogamasus pontiger,* described by Womersley (1937) as *Eulaelaps mawsoni,* at Macquarie Island (54°30′S, 158°57′E). Watson (1967) stated that the species was not well established on the island and occurred only on the isthmus, which is near the station presently occupied by Australian National Antarctic Research Expeditions (ANARE). It may have been accidentally introduced by the 19th century oil-gangs at Macquarie Island who also lived on the isthmus. Thus, the mite has been associated with human activity for more than 50 years and has not spread over the island to colonize the more natural environment. Conceivably, it may be dependent on human activity.

Araneida, Psocoptera (Covarrubias 1966, Saiz et al. 1970) and Thysanoptera (Saiz et al. 1970) have also been found in moss on the South Shetland Islands, where they are presumably members of small but viable populations able to survive in the natural environment. In the absence of more information on their present distribution, it is not possible to infer whether these populations are the result of natural dispersal or the introduction of animals by man.

Introduced arthropods are unlikely to become established in the environs of all Antarctic stations because of the severe climatic restrictions (Llano 1962), but such species capable of colonizing maritime Antarctic islands are potentially able to colonize the Antarctic Peninsula or areas in the vicinity of stations such as Casey (66°17′S, 110°32′E) that approach the Peninsula in environmental characteristics (Llano 1970). Introduced arthropods that are able to establish themselves will most certainly benefit from the diversification of the Antarctic environment caused by man's activities, as has occurred already in the case of microorganisms (Cameron 1972).

Nevertheless, the introduction of arthropod-borne microorganisms is probably a greater potential hazard to the natural ecosystems of terrestrial Antarctica than the hosts themselves. Pathways for introduction of these organisms are provided by arthropods that live as pests of stored food on Antarctic stations.

It is to be hoped that the faunal and functional simplicity of the natural ecosystem of terrestrial Antarctica is not destroyed by man in his efforts to study it.

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