NOTES ON THE FREE-LIVING MITES IN THE ICE-FREE AREAS AROUND SYOWA STATION

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Abstract: Three species of free-living mites were discovered from the chalikosystem in the Syowa Station area. They are *Nanorchestes antarcticus, Tydeus erebus* and *Protereunetes minutus*. *Nanorchestes* was dominant.

It is ascertained that the high density of *Nanorchestes* was supported by the sufficient water supply and that soil in which high density of mite was maintained was a soft deposit of fine sand. The population density of mites was also influenced by the salt content and the amount of organic matters in soil.

The study of land arthropods in Antarctica was commenced with the specimens brought back by "Belgica" Expedition (1897–99) under the leadership of A. DE GERLACHE. These specimens had springtails, wingless midge, mites, and so on, and contained major group of land arthropods found in Antarctica except parasitic insects. These were collected on the islands off the coast of the Antarctic Peninsula. Subsequently, the "Southern Cross" Expedition (1898–1900) brought back the specimens of land arthropods collected in north Victoria Land of the Antarctic Continent. From the beginning to the middle of the present century, European countries sent many expeditions to Antarctica and brought back the specimens of land arthropods more or less. These specimens were collected exclusively from the Antarctic Peninsula or the islands around the Peninsula, and from the ice-free area of the Ross Sea coast such as Victoria Land. It was reported that the free-living land arthropods were not found by the Mawson's Expedition (1911–14) of mainly Adélie Land.

The free-living land arthropod was not reported from the Antarctic region other than the Antarctic Peninsula and Victoria Land before the latter half of this century. An oribatid mite and a prostigmatic mite were reported from Queen Maud Land by the Norweigian-British-Swedish Expedition (1949–52). According to GRESSITT (1967), the number of published species of free-living land arthropods in Antarctica remained unchanged during the period from the early part of this century to the middle of the fifties, and increased extremely from the end of the fifties. This was the result of antarctic research initiated on the opportunity of the International Geophysical Year. But the research was made mainly in West

Antarctica such as the Peninsula area and Victoria Land. In East Antarctica the land arthropods were surveyed little. There were only the survey by American scientists who visited Soviet Mirny and Molodezhnaya Stations, and the survey by Australian scientists in the Vestfold Hills.

In the Syowa Station area the free-living mites were first studied by MATSUDA in December of 1966 (MATSUDA, 1977). He discovered three kinds of prostigmatic mites, *Tydeus* sp. 1, *Tydeus* sp. 2 and *Nanorchestes* sp., and reported that *Tydeus* sp. 1 and *Tydeus* sp. 2 tended to live on the macrophitic vegetation but *Nanorchestes* sp. tended to live on the soil around the vegetation. He also clarified that the population density was high on the wet soil near a small stream of melt water from snow, where the daily fluctuation of temperature was smaller than in the dry sandy soil.

As the first step of ecological studies on mites the present writer carried out, in the summer of 1976, a general survey of the mites in the ice-free areas in the vicinity of Lützow-Holm Bay.

Three species of free-living prostigmatic mites were found from the sandy soil areas in East Ongul Island, east half of West Ongul Island, Langhovde and Skarvsnes. The three kinds of mites were identified as *Nanorchestes antarcticus* Strandtmann, *Tydeus erebus* Strandtmann and *Protereunetes minutus* Strandtmann (OHYAMA and MATSUDA, 1977). *Nanorchestes antarcticus* was most common in the region studied and was distributed widely in the chalikosystem which was defined by JANETSCHEK (1963) as the naked ground of gravel or sand without visible vegetation.

In order to know the general distribution of mites in the chalikosystem, quantitative sampling was carried out using a petri dish of 6 cm in diameter and 1 cm in depth in the ice-free areas mentioned above. The population density of mites was expressed as the individual number in the soil in a petri dish.

Since the details of the results obtained were already reported in OHYAMA (1977), a summary of the distribution of *Nanorchestes* is given here with some comments.

In East Ongul Island, high density of population more than 20 mites was recorded at five sites located in the central and the southern parts of the island. The highest density attained to 57. Out of the five sites three were situated beside ponds and two were beside snow patches. It seemed that there is a close relation between the high density of mites and the moisture of sand. However, few mites were found from very moist sites which were situated close to ponds. MATSUDA (1977) found few mites in the stream. It seemed that mites avoided soil soaked completely with water. Most of the 31 sampling sites in this island were selected close to snow patches, but high density of mites was observed only at two sites. From this fact it is conceivable that snow patches hardly sustain water supply to make sand suitable for living of mites in the surrounding areas.

In West Ongul Island, high density of population more than 20 mites was observed at four sites and the highest density was 75. Two sites out of four were situated beside ponds and the rest were by the side of snow patches. It was also ascertained that the high density of mites was supported by sufficient water supply. However, few mites were discovered from the site at the bottom of a depression where sufficient water could be supplied, because soil was consolidated there.

In Skarvsnes, high density of population more than 20 mites was recorded at 8 sites. The highest population density attained to 82. Five out of 8 sites were beside streams, two were by the side of ponds and one was close to a snow patch. Therefore, it was said that the high density of mites was found in wet sand near the water bodies. There were two sand deposits adjacent to each other along a swift stream. In one deposit 22 mites were found but in the other no mite was discovered. No organic matters were contained in the sand of the latter site. This suggests that density of mites is influenced by the biological factor as well as physical conditions of sand deposit. There are saline lakes in Skarvsnes. One of them, Lake Suribati, contains highly saline water (AKIYAMA, 1974). No mite was discovered from the site situated by the side of this saline lake. Mites seemed to avoid also the salty sand.

To analyze the relationship of the micro-distribution of mites to the moisture in habitat, sampling was made at one meter intervals from waterside along the lines set at right angles to a stream in some selected sites in Langhovde and Skarvsnes. These samples revealed that a very small number or nothing of mite was found at the waterside and that the density of mite population reached a peak at the point a few meters away from the waterside, but going farther away from the waterside the mites decreased again and finally disappeared. The waterside seems to be apparently too damp for mite to inhabit and the sand distant from waterside seems to be too dry for living of mite. This finding supports the results obtained by MATSUDA (1977).

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