

Ecology of collembola (springtails) living on seasonal snow in the deciduous forest in Yamagata Prefecture, Japan

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There are diverse organisms living in snow and ice environments. They are adapted to cold temperature, thus they are active and growing on snow and ice. For example, snow algae, heterotrophic bacteria, and insects can be found on snow fields in Japan. Collembola is one of the typical insects living on snow surface. However, their ecology is still not well-known. It is important to understand the ecology of such organisms for quantification of the carbon and nitrogen cycles in the snow and ice ecosystems. In this study, we investigated life history and food resources of the collembola living on the snow surface in the deciduous forest in Yamagata Prefecture in Japan. We described their population density and body size on the snow surface. We also analyzed their carbon and nitrogen stable ratio to identify their main food resources. The study site is located at 750 m a.s.l. in elevation close to Mt. Gassan (altitude). The collembola specimens collected there were mostly *Desoria yukinomi*, which is common species living on snow surface. They were also found in a trunk of trees in the season without snow (October), suggesting that they migrate seasonally between the tree trunk and snow surface. The carbon and nitrogen stable isotopes of the collembola showed generally low nitrogen isotope values. The nitrogen isotope of two species of lichens, grown on a trunk of trees, was lower than that of collembola, suggesting that they are most likely food source of collembola.

Keywords: Snow and ice organisms, soil organisms, carbon stable isotope, nitrogen stable isotope