

The apterous winter stonefly fauna and its feeding on seasonal snowfields in Japan
- Analysis of the food web using C and N Stable Isotope -

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In snow and ice environments, there are diverse living organisms that can be active and grow in cold temperature. For example, snow algae, heterotrophic bacteria, and insects can be found on snow fields in Japan. An apterous winter stonefly is one of the typical insects that appear on snow surface in mountainous regions during winter or spring in Japan. However, their food web, particularly food resources of the stoneflies on snowfields, is still not well-known. It is important to clarify the food web of the organisms living on snowfields to understand carbon and nitrogen cycles quantitatively in the snow and ice environments. The stable isotope ratios of carbon and nitrogen of the specimens provide a means of analyzing their food resources. In this study, we analyze the food webs of the winter stoneflies and other organisms on Japanese snow fields using C and N stable isotope analysis.

The stonefly specimens were collected on the snow surface at five sites in Japan during 2015. The study sites included snow fields in Shinjo in Yamagata (altitude: 150 m), in Ushitakeonsen in Toyama (490 m), in Uonumakyuryo in Niigata (210 m), in Mt. Gassan (1300m altitude), in Tateyama Mountains (2300 m). Furthermore, other specimens including springtails, spiders, leaves, snow algae and particulate organic matter in snow were collected. The stable isotopes showed that potential food sources of apterous winter stoneflies are springtails, aphids, small spiders, snow algae, particularly dead leaves.

Keywords: stonefly, food web, stable isotope

