

Environmental factors associated with snow algal bloom in the deciduous forest of Mt. Gassan, Yamagata prefecture, Japan

*Akane Watanabe¹, Nozomu Takeuchi¹

1. Graduate School of Science, Chiba University

Snow algae are photosynthetic microbes inhabiting alpine and polar snow fields. They bloom on melting snow and change snow color from white to red or green. Colored snow appears widely in mountainous regions in Japan. However, the conditions for the algal bloom are still not understood well. In this study, we aim to describe the temporal change of snow algae and physical and chemical conditions of surface snow in Mt. Gassan, Yamagata prefecture, Japan. Study site is located in the Japanese beech forest at an elevation of 750 m a.s.l. Field studies were carried out three times from April to May of 2016. We collected samples of surface snow and snow pit down to the ground surface at the study site. In laboratory, we measured chlorophyll-a concentrations, EC, pH, and soluble chemical compositions in the samples.

Field observations revealed that algal green snow appeared patchy after the late April. The algal patches were frequently observed in the snow surface under trees compared with the open sunny surface. The chlorophyll-a concentration in the surface snow gradually increased during the study period. The analysis of major soluble ions revealed that the phosphate concentration in the surface snow under the trees increased up to 51.4 $\mu\text{eq/L}$ while it in the open snow surface kept low value during the study period. Results suggest that the phosphate is supplied with rain water from canopy of the trees to the snow surface and that it causes the patchy algal bloom on the snow surface.

Keywords: snow algae, nutrients, deciduous forest