

ACG033-P11

Room:Convention Hall

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## Photosynthetic characteristics of vascular plants under primary succession stages in a High Arctic glacier foreland

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Photosynthetic characteristics of vascular plants were investigated to know initial colonization and establishment after deglaciation in High Arctic. The study area was located in the deglaciated area of Austre Broggerbreen, Ny-Alesund in Kongsfjorden, Svalbard, Norway. Two sites that represented different stages of succession after glacier retreat in this area were selected: transient stage and late stage. These sites were separated by a floodplain. Leaf photosynthetic characteristics were measured for the four vascular plants (*Salix polaris*, *Saxifraga oppositifolia*, *Silene uralensis*, and *Cerastium arcticum*) at the two sites corresponding to different stages of succession in mid-July 2010. *Salix polaris* and *Saxifraga oppositifolia* are common pioneers in the transient stage of succession, on the other hand, *Silene uralensis* and *Cerastium arcticum* are rare in the transient stage but common in the late stage. All of the measurements were performed at the peak bloom period of the each plant because the photosynthetic rate varies depending on the leaf age (Muraoka et al. 2002). Light - rETR (relative electron transport rate) curves were determined using a PAM fluorometer (PAM-2100, Walz) with control and analysis software under seven stepwise actinic light intensities and saturating pulse. The photosynthetic rate was expressed as the rETR, and rETRmax (maximum rETR) was calculated by the fitting equations as described by Eilers & Peeters (1988).

The maximum yield of PSII (photosystem II; PSII yields under no actinic light) indicated that the four vascular plants were in the healthy non-stressed condition in both the transient and late stages of succession. However, rETRmax obtained by the measurements of light-photosynthesis curve were different between the common pioneer plants (*Salix polaris*, *Saxifraga oppositifolia*) and otherwise (*Silene uralensis*, *Cerastium arcticum*) depending on the stages of succession. The common pioneer plants were measured at the almost same rETRmax in the both transient and late stages, but the value of the other two plants were lower in the transient stage than in the late stage.

Keywords: photosynthesis, primary succession, glacier foreland, arctic, tundra ecosystem, vascular plant