Project acronym: ArctDapt

Project title: Genetic signs of local adaptation driven by light and climate across two Arctic plant species

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Discipline: Earth Sciences & Environment: Ecosystems & Biodiversity

Station(s): Barrow Arctic Research Center / Environmental Observatory (US)

Climate warming is causing a shift in plant species distributions across the globe. For arctic plants adapted to environmental conditions that are rapidly disappearing, adaptation is required to avoid extinction (Corlett and Westcott, 2013; Tomiolo and Ward, 2018). This project aims to identify the genetic basis of local adaptation to photoperiod and/or increasing temperatures in arctic plants. We focus on Oxyria digyna, an herbaceous and perennial plant that grows in the northern hemisphere. In North America, it can be found 83ºN to the Arizona Mountains (Mooney and Billings, 1961). In Europe, the species can be found from north Norway to France and the Alps (Wang et al., 2016). Oxyria digyna is a good model system to understand local adaptation and phenotypic plasticity thanks to:

1. Its distribution along latitudinal gradients of temperature and photoperiod (important determinants of plant fitness. Spence and Tingley, 2020' Pyhäjärvi and Mattila, 2021; Not photoperiod according to Quaglia etl al, 2021);
2. Its distribution in the US and Europe, which we will use as independent replicates;
3. Its relatively manageable genome of approximately 1 Gbases;
4. And previous/future garden experiments to confirm our results (Mooney and Billings, 1961; Bjorkman et al, 2017).