Name of research institute or organization:

University of Bern, Institute of Plant Sciences, Biotic Interactions

Title of project:

Effect of low atmospheric pressure on diploid sexual and triploid apomictic dandelions (*Taraxacum officinale* agg.)

Project leader and team:

Project leader: Prof. Matthias Erb
Team: Dr. Carla Arce and MSc. Zoe Bont

Project description:

Background and scientific objective

The species complex *Taraxacum officinale* agg. consists of a mixture of triploid apomictic and diploid sexual individuals. Interestingly, opposite latitudinal and altitudinal patterns are found regarding cytotype distribution. At higher altitudes, diploid *T. officinale* genotypes are found predominantly, while triploid are commonly found at low altitudes. By contrast, diploid *T. officinale* are prevalent in the south, while triploids are found at northern latitudes. *T. officinale* produces pressurized lacticifer cells. Therefore, one factor which may constrain the growth of triploids in high altitudes is the low atmospheric pressure. To test this hypothesis, we evaluate the growth of diploid and triploid *T. officinale* plants under controlled conditions and atmospheric pressure at different altitudes.

Experimental approach

We collected the seeds of diploid and triploid *Taraxacum officinale* agg. genotypes from different altitudes ranging from 300-1600 m above sea (Table 1). We germinated them at the University of Bern (IPS UniBe). After 3 weeks, plants were transferred to four locations which follows an atmospheric pressure gradient according its altitude (Bern at 500 m.a.s.l., Adlemsried at 1000 m.a.s.l., Kleine Scheidegg at 2000 m.a.s.l. and Jungfraujoch research station at 3400 m.a.s.l.). To evaluate the performance of the different genotypes, we measured the number of leaves, average rosette diameter, length and average width of the longest leaf every 15 days. At the end of the experiment, plants will be harvested to quantify biomass production.

Preliminary results

Across all the genotypes, we observed that plants grew better at higher altitudes relative to their altitude of origin (Fig. 1). In a next step, we will harvest the plants and determine their latex production and ploidy level to determine whether ploidy influences the altitudinal response and whether altitude influences the lacticifer cells.

Table 1. Dandelion genotypes used in the experiment were collected in different locations across Switzerland.

Location	Altitude (m)
Rheinfelden	300
Altdorf	438
Zürich/Fluntern	556
Visp	639
Salen-Reutenen	718
Elm	958
Disentis/Sedrun	1197
Scuol	1303
Grächen	1605

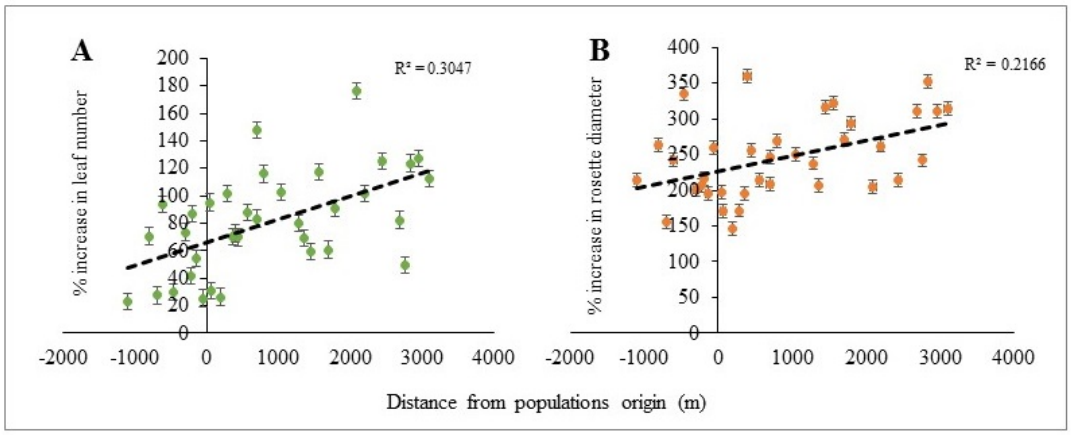

Figure 1. Growing plants at higher altitudes than their original environment increases growth. Relative changes in leaf numbers (A) and rosette diameter (B) are shown.

Key words:

Taraxacum officinale agg., altitude, diploid, triploid

Collaborating partners/networks:

Kleine Scheidegg, Jungfrau Railways train station - Andre Hofer

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