

The ROBUSTALPS project: a sylvopastoral system in *Alnus viridis*-encroached alpine pastures

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Context

Green alder (*Alnus viridis*) is a pioneer shrub species that has expanded over former pastures in Central Europe due to land abandonment, leading to a reduction in biodiversity and an increase in nitrate leaching and soil acidification.

Aims of the project

The RobustAlps project aims at:

- Studying the **spatial distribution of Highland cows** in green alder-encroached pastures with the strategic placement of attractive points (molasse-based blocks).
- Evaluating the **impacts of Highland cows** on green alder encroachment and on herbaceous vegetation.

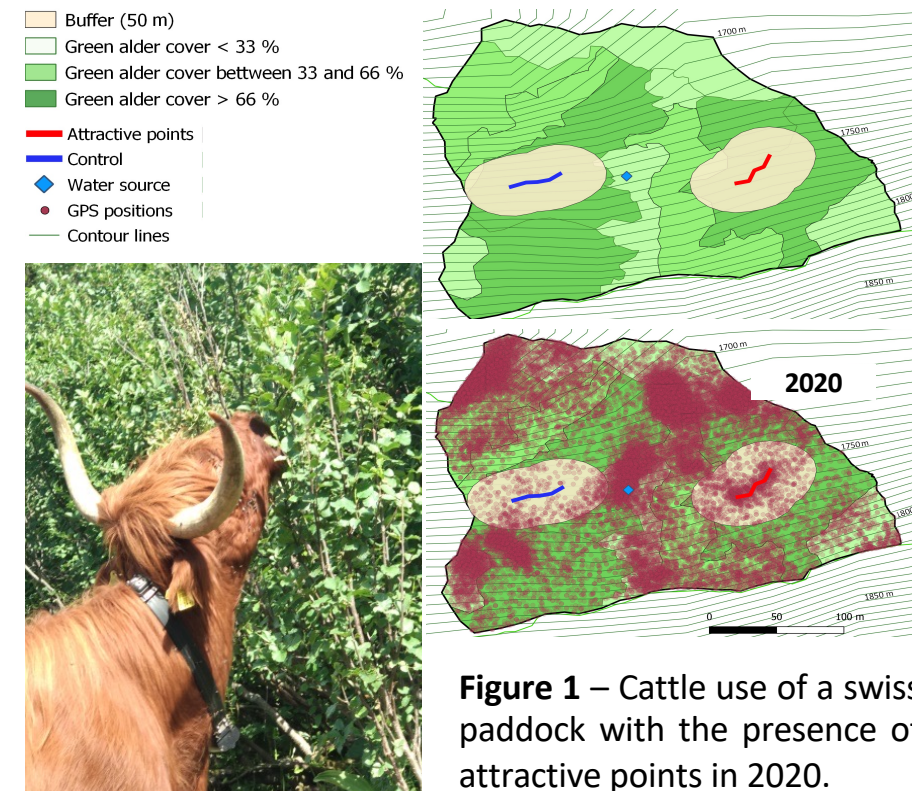


Figure 1 – Cattle use of a Swiss paddock with the presence of attractive points in 2020.

Methods

In 2019 and 2020, Highland cattle equipped with **GPS collars** were placed in three encroached paddocks in the Alps (Paddock 1-2 in CH and 3 in IT). **Molasse-based blocks** (versus control points) were placed in encroached parts of the paddocks to attract the herds (Fig.1).

Botanical surveys and green alder leaf count were carried out before and after grazing. We determined the grazing effects (before versus after grazing) using response ratio calculated as (Value after - Value before) / Value before.



Results and discussion

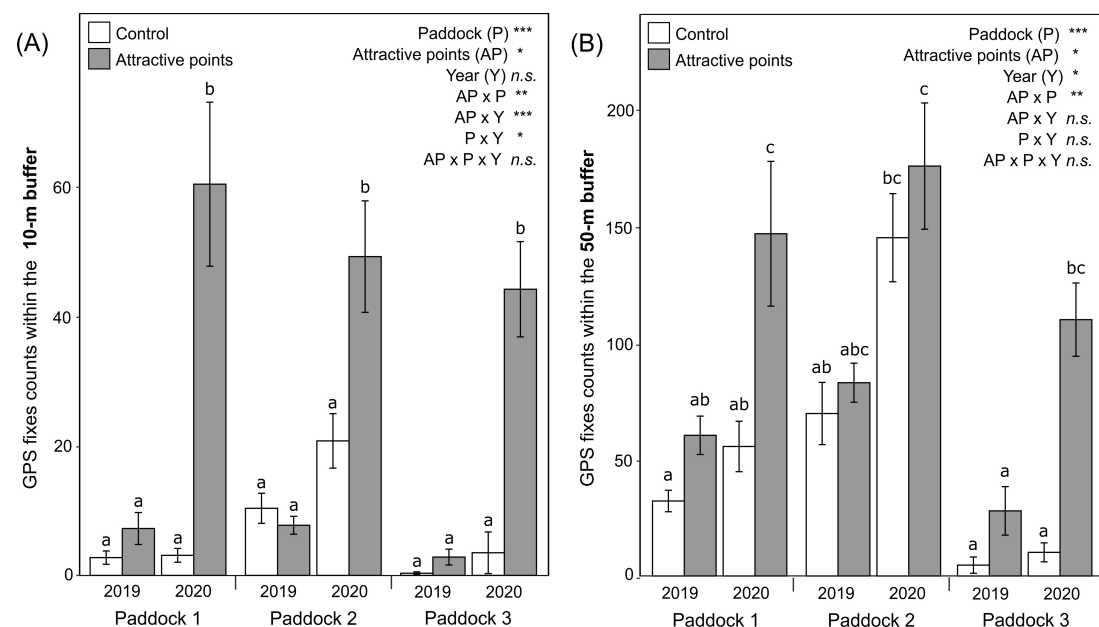


Figure 2 – GPS fixes count of cows (1 point taken every 10 min), in (A) 10-m and (B) 50-m buffers around control (white) and attractive points (grey, molasse added in 2020 only) in 2019 and 2020 in the 3 paddocks.

- Highland cattle spent more time in areas with higher forage quality but did not avoid areas with high cover of green alder, on steep slopes or far from water (Fig. 1).

- In all paddocks, attractive points **increased the presence of cattle** within the 10-m buffer (Fig. 2A) by comparison to the control and pre-treatment year (2019). The effects of attractive points within the 50-m buffer (Fig. 2B) were paddock-dependent.

- In all paddocks, the presence of attractive points induced a **decrease in herbaceous cover** (Fig. 3A) and a **decrease in the number of green alder leaves** (except paddock 2, Fig. 3B) by comparison to control areas.

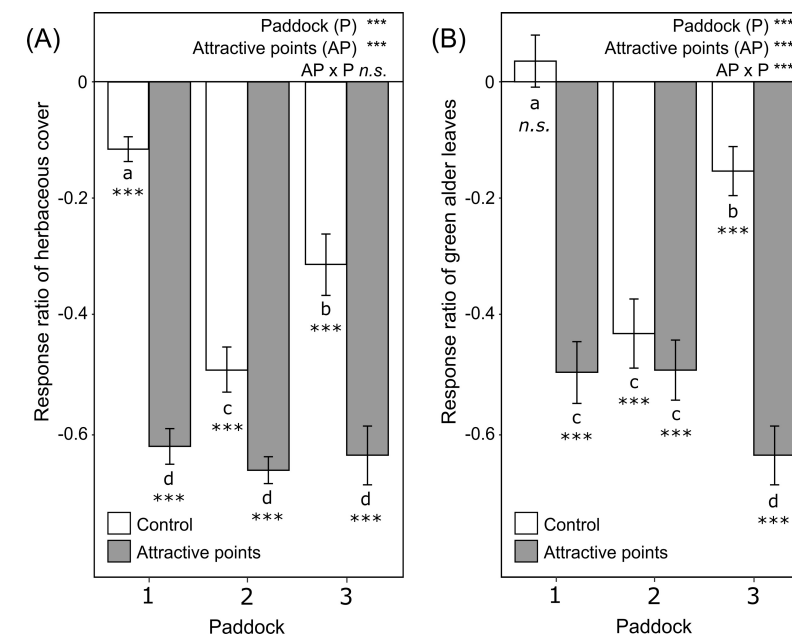


Figure 3 – Response ratio of (A) herbaceous cover and (B) green alder in the 3 paddocks for both control (white) and attractive (grey) points in 2020. Stars indicates significant difference from 0 (t-test).

Conclusion

The presence of attractive points was very efficient in attracting Highland cattle toward densely-colonized patches of green alder. Herbaceous cover and number of green alder leaves were reduced around attractive points, thus allowing light to reach new bare soil gaps. Combined with seed translocation, this could favour the reduction of shrub-encroachment in the long-term, as well as the restoration of typical pasture species.