

Master thesis opportunity



Impact of climate change on tri-trophic interaction in alpine ecosystems

Background: Tri-trophic interactions play major roles in the ecosystem functioning by balancing the populations of the different species forming the whole community and participate to nutrient cycling. However, because of the complexity of these system, we lack knowledge about the impact of herbivore on alpine plant communities. In addition, climate change challenge the trophic interaction within a community by pushing the organism to migrate toward higher elevations (Gilman et al., 2010). Some recent studies recently conduct demonstrate that plants (Alexander et al., 2015) and insects (Descombes et al., 2020) upward migration challenge alpine ecosystems, but until now, the 3rd trophic level had been neglected.

Aims: Measure the impact of high- and low-elevation herbivores and predators on alpine meadows. For this we will establish an experiment in the Alps which include the capture of local insect communities, to place them in cages according to their functional group (i.e. herbivores or predators) and survey their impact on the local plant community.

Requested skills: The project will include intensive fieldwork in the Alps. Classic and multivariate statistical analyses will be performed in R. We therefore seek a highly motivated student with motivation of working in field and statistical skills for data analysis R. Good general knowledge in botany is recommended. Driving license is highly recommended.

Keywords : tri-trophic interactions, alpine communities, elevation gradient, climate change

Place of work : UniNe, Laboratoire d'écologie fonctionnelle and field work in the Alps (municipality of Lavey-Morcles or Orsière)

References:

Alexander, J. M., Diez, J. M., & Levine, J. M. (2015). Novel competitors shape species' responses to climate change. *Nature*, 525(7570), 515-518.

Contact:

Sergio Rasman (sergio.rasman@unine.ch)
Baptiste Bovay (baptiste.bovay@unine.ch)

Descombes, P., Pitteloud, C., Glauser, G., Defossez, E., Kergunteuil, A., Allard, P. M., ... & Pellissier, L. (2020). Novel trophic interactions under climate change promote alpine plant coexistence. *Science*, 370(6523), 1469-1473.

Gilman, S. E., Urban, M. C., Tewksbury, J., Gilchrist, G. W., & Holt, R. D. (2010). A framework for community interactions under climate change. *Trends in ecology & evolution*, 25(6), 325-331.