University of Basel
Department of Environmental Sciences

Plant Ecology & Evolution
https://duw.unibas.ch/en/ecoevo/

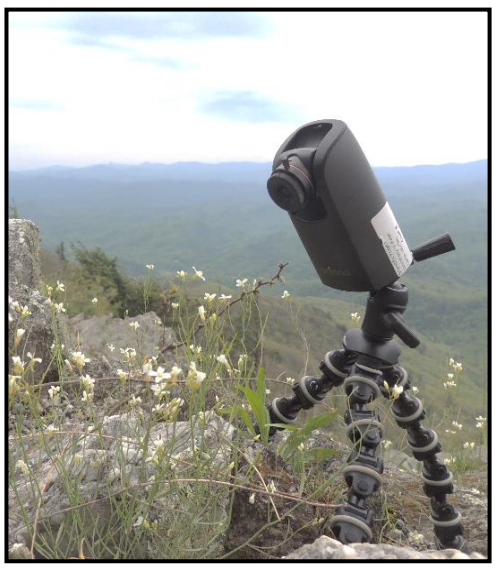
Pollination biology

Terrestrial insects have been rapidly declining in central Europe, and the reasons are not entirely known. Given that most plant species depend on insect pollinators for successful reproduction, it is of high importance to find out more about pollinator communities in central Europe in general, their composition and densities of species.

We need to know: How variable are communities of generalist pollinators across types of plant communities? Is pollinator diversity dependent on plant diversity? Does pollinator abundance depend on the size of habitat? How important is habitat connectivity for pollinator abundance?

You will learn: planning and executing a field project, improving your taxonomic knowledge of insects and plants, statistical analyses, presentation of scientific results

Interested? – contact *georg.armbruster@unibas.ch*



Time-laps cameras focusing on flowers take pictures every 3 seconds (picture: Darío Sánchez-Castro)

Pollinators visiting flowers of the same plant species, *Arabidopsis lyrata* (pictures: Darío Sánchez-Castro)

University of Basel
Department of Environmental Sciences

Plant Ecology & Evolution
https://duw.unibas.ch/en/ecoevo/

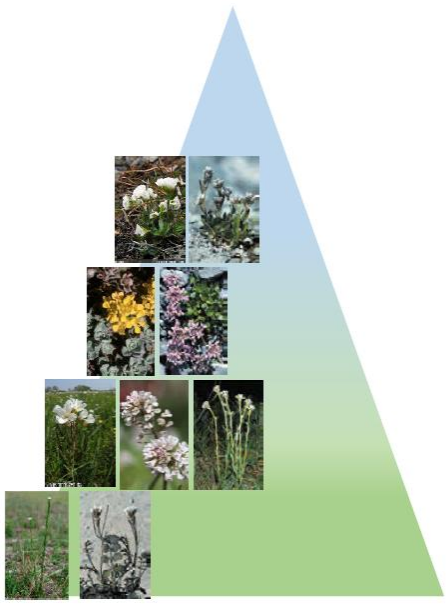
LIVING IN THIN AIR: Alpine species under global change

Under current climate warming, plant species have been shifting their elevational distribution upward. However, shifts in distribution manifest themselves also by species losing terrain at the lower end of distribution. So far, it is not clear what the problem at the warm end of distribution is. You will test the hypothesis whether a sequential erosion of plant vigor causes the disappearance of alpine species at their lower end of distribution.

Study system are three pairs of Brassicaceae species, each consisting of a low- and a high-elevation species. You will raise them at high and low elevation in the field and by experimental manipulation expose them to several stressor treatments.

You will learn: planning and executing a field project, experimental design, plant physiological analyses, statistical analyses, presentation of scientific results

Interested? – contact *yvonne.willi@unibas.ch*



University of Basel
Department of Environmental Sciences

Plant Ecology & Evolution
https://duw.unibas.ch/en/ecoevo/

Assisted gene flow to help plants under a warming climate

It is a somewhat trivial insight that under climate warming organism need adapt or move, or they go extinct. Adaptation to a fast changing climate may be hindered by insufficient genetic variation. Therefore, for many organisms, moving may be a more successful strategy to cope with change. But many plants have the problem that they are not great dispersers. One possible solution is assisted gene flow, where outbreeding is promoted to achieve increased tolerance to specific environmental threats such as drought. The approach has already been used in plant breeding, and in conservation biology to overcome the problem of inbreeding, but not yet in the context of climate warming.

You will test for a positive effect of inter-population outcrossing on heat tolerance of plants. You will work with an *Arabidopsis* species, with seeds collected at its southern edge of distribution. You will cross plants of southern populations among each other and with those of northern populations and assess whether those southern populations can restore heat tolerance by inter-population outbreeding.

You will learn: planning and executing a crossing and a greenhouse experiment, experimental design, plant physiological analyses, statistical analyses, presentation of scientific results

Interested? - contact *jessica.heblack@unibas.ch*

University of Basel
Department of Environmental Sciences

Plant Ecology & Evolution
https://duw.unibas.ch/en/ecoevo/

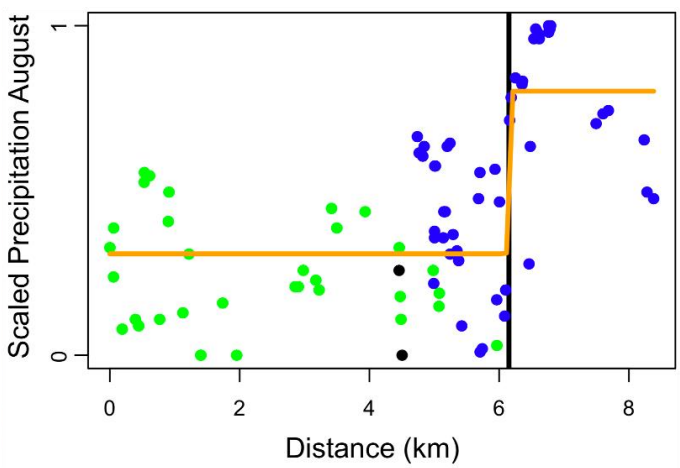
Ecological differentiation between closely related Alpine butterfly species?

Many Alpine butterflies survived in different glacial refugia during the last ice age and came in secondary contact following their postglacial range expansion. Zones of secondary contact provide the opportunity to study the evolutionary barriers that keep species apart. Potential barriers can be ecologically driven, e.g. through different micro-habitat use.

The study system are two sibling species of the genus *Erebia* – *E. tyndarus* and *E. cassioides* that form very narrow secondary contact zones in the Swiss Alps. A preliminary study showed that hybridization occurs only rarely, suggesting that different isolating barriers exist. Ecological differentiation may be one of them. Extracting ecological data from databases you will first test for ecological differentiation between the two species and assess if such a differentiation may be reinforced in the zones of secondary contact. Using an existing dataset, you will try to identify the genomic footprint of ecological differentiation. Additional data can be collected in the field.

You will learn: State-of-the art multivariate ecological analyses combined with bioinformatic approaches on next generation sequencing data.

Interested? – contact *kay.lucek@unibas.ch*



University of Basel
Department of Environmental Sciences

Plant Ecology & Evolution
https://duw.unibas.ch/en/ecoevo/

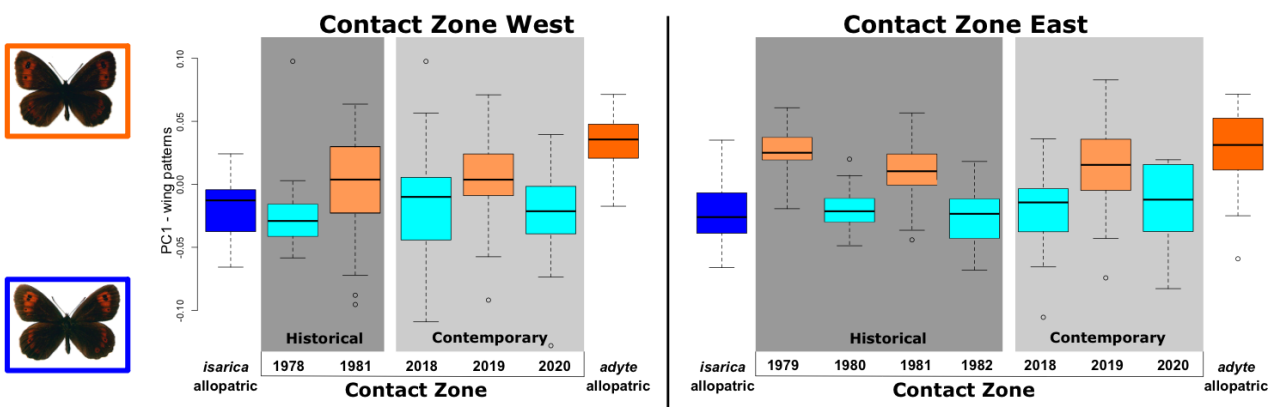
Temporal isolation through allochrony as a barrier to gene flow between closely related Alpine butterfly species

Many Alpine butterflies survived in different glacial refugia during the last ice age and came in secondary contact following their postglacial range expansion. Zones of secondary contact provide the opportunity to study the evolutionary barriers that keep species apart. Temporal isolation (allochrony) is one of the classic examples for such barriers, but only few examples are known.

The study system are two lineages of *Erebia euryale* – *adyte* and *isarica* that form very narrow secondary contact zones in the Swiss Alps. In a preliminary study we showed that the two lineages fly primarily at between different years, *i.e. adyte* in even years and *isarica* in uneven years, while both can be found at allopatric sites. The goal of this project is to extend on the preliminary study and assess if allochrony could be reinforced upon secondary contact by analyzing occurrence data from across Switzerland. This project requires fieldwork in the Swiss Alps.

You will learn: State-of-the art phenotypic and statistical analyses. Depending on the interest, next generation sequencing data can also be included.

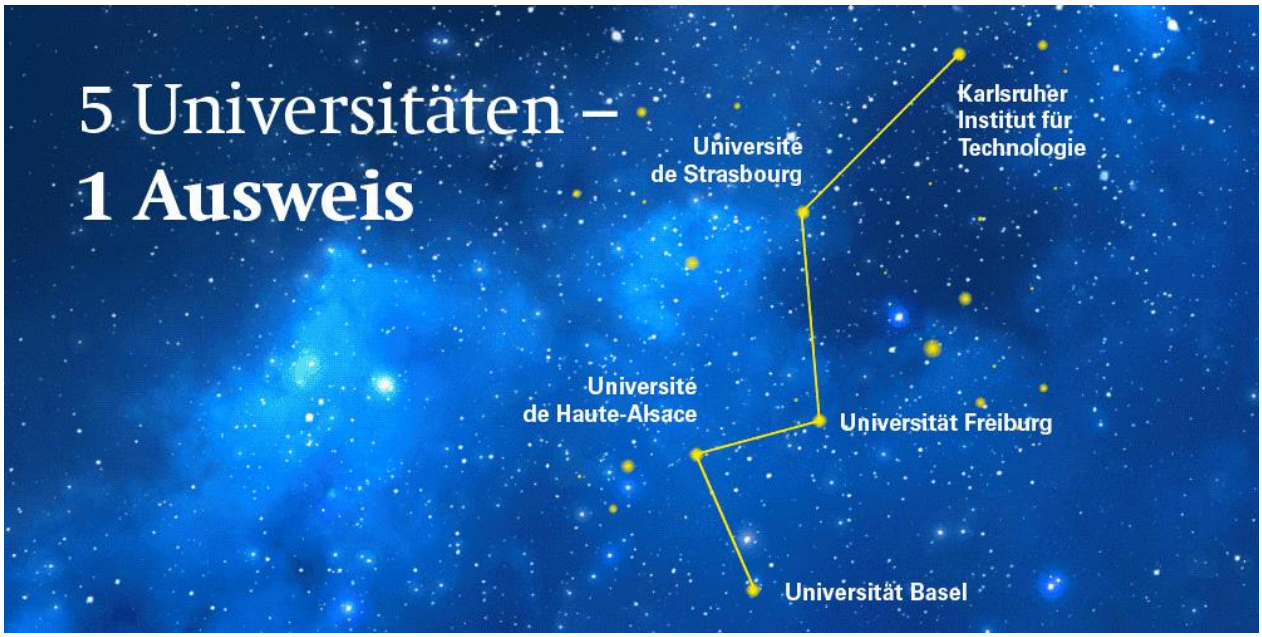
Interested? – contact kay.lucek@unibas.ch



University of Basel
Department of Environmental Sciences

Plant Ecology & Evolution
https://duw.unibas.ch/en/ecoevo/

Eucor – The European Campus



Tri-National Plant Sciences Master Program TREE

Ausgangslage

- Ergänzendes Lehrangebot an 5 Universitäten
- Forschungsorientierter Unterricht
- Regionale Forschungszusammenarbeit

Eucor: **Grenzüberschreitender Verbund** von 5 Universitäten in der Region am Oberrhein

Partner

- Universität Basel
- Albert-Ludwigs-Universität Freiburg
- Université de Strasbourg
- Université de Haute-Alsace
- Karlsruher Institut für Technologie

Angebot

- Besuch von Lehrveranstaltungen
- Studienaufenthalt an Partnerhochschule
- Fachübergreifende Zusatzmodule ablegen
- ECTS werden angerechnet

- An ‘Heimatuniversität’ eingeschrieben
- Keine Gebühren an Gastuniversität
- Fahrkostenpauschale

www.eucor-uni.org

Eucor: Pflanzenwissenschaften - Schwerpunkte der Partner Institute

http://www.botanik.kit.edu/eucor/68.php

http://www.botanik.kit.edu/eucor/75.php

➔ A la carte Angebot für Studierende: z.B.

Zeitraum	Januar-März	April-Juni	Juli-September	Oktober-Dezember
University of Basel	BAS01_Internship BAS02_Master_Thesis	BAS01_Internship BAS02_Master_Thesis	BAS01_Internship BAS02_Master_Thesis	BAS01_Internship BAS02_Master_Thesis
Universität Freiburg	FR02 Advanced Topics FR03_Master_Thesis	FR01_Elective_Module_1 FR02 Advanced Topics FR03_Master_Thesis	FR01_Elective_Module_1 FR02 Advanced Topics FR03_Master_Thesis	FR02 Advanced Topics FR03_Master_Thesis
Université Strasbourg	STRA01_Vegelab individual internship	STRA01_Vegelab individual internship	STRA01_Vegelab STRA09_functional_food individual internship	STRA01_Vegelab individual internship
Karlsruhe Institute of Technology	KIT01_Plant_Cell KIT02_Plant_Evolution KIT05_Photorezeptoren KIT06_Phytohormones KIT13_Project_Module KIT14_Master_Thesis	KIT02_Plant_Evolution KIT03_Kryptogamen KIT08_Photosynthese KIT09_Genome_Engineering KIT10_Pflanzenzüchtung KIT12_Mycorrhiza KIT13_Project_Module KIT_14_Master_Thesis	KIT04_Saatgut KIT13_Project_Module KIT14_Master_Thesis	KIT01_Plant_Cell KIT06_Phytohormones KIT07_Protein_Crystallisation KIT09_Genome_Engineering KIT11_Plant_Microbe KIT13_Project_Module KIT14_Master_Thesis
Université de Haute Alsace Colmar		Colmar1_Vine_Wine		