

Working title: Beyond the mean, how plant growth-defence strategies influence intrapopulation variation of herbivory

Lead: Andrea Galmán

Co-leaders: Karen Abbott, Betty Benrey, Emilio Bruna, Carlos Bustos, Ivalu Cacho, Emmanuel Defosse, Lee Dyer, Michael Eisenring, Susan E Everingham, Martin M. Gossner, Patrick Grof-Tisza, Phil G Hahn, Brian D. Inouye, Sergio Rasmann, Mar Sobral, Nora Underwood, Susan R. Whitehead, William C. Wetzel.

Abstract:

Plants face the dual challenge of acquiring resources and defending against herbivores, these pressures have led plants to develop a wide variety of growth and defence traits and strategies. In particular, plant traits follow predictable axes that represent alternative approaches to balancing resource acquisition and defence investment. These strategies range from investment in deterrent defences to mechanisms that support rapid regrowth after damage.

While much research on plant-herbivore interactions has focused on how mean herbivory damage drives plant-herbivore interactions, this perspective overlooks the role of variability, an important factor influencing ecological and evolutionary outcomes. Plant strategies can shape not only the mean, but also the variability of herbivory within systems. With this project we aim to explore how these different strategies influence patterns of herbivory variability and we discuss future directions and suggest that understanding intraspecific variability is critical for advancing theories of plant-herbivore coevolution and interaction dynamics. To do so, we conduct two different studies, a review and a data paper. First, for the review paper we present hypotheses and predictions about how different growth and defence strategies influence patterns of variability in herbivory and discuss the implications for ecosystem functioning and the evolution of plant-herbivore dynamics. Second, for the data paper we combine herbivory data from HerbVar and trait data from the TRY Plant Trait Database to test some of our hypotheses about how different plant growth and defence strategies influence herbivory variability.

Data:

HerbVar dataset, trait data obtained from TRY

Response variables:

Herbivore damage per species

Variability in damage within species

Predictor variables:

Growth traits

Defense traits

Timeline:

1) Review paper

Generating Hypothesis and Predictions: Started in October 2023, working group in Neuchatel.

Writing: October 2023-December 2024

Submission by February 2025

2) Data paper

Data cleaning TRY data: May - December 2024

Analyses January - March 2025

Writing Apr - Aug 2025

Submission by Oct 2025