

Identifying unidentified plant defenses against unseen herbivores

Sub title: Study of plant-herbivore interactions through naturalist history observation

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Herbivorous insects have eaten plants for 350 million years, which provides a sufficient amount of time for plants to evolve defense mechanisms against herbivore attacks. Plants can perceive herbivore damage, trigger signaling pathways, and express resistance-associated traits. In the same period of time, insect herbivores have also tried to disarm the plant defenses to facilitate their feeding. Plants and insects form antagonistic interactions based on their strategies. Herbivores have colonized different parts of a plant with different types of feeding guilds. Particularly, endophytic herbivores, that live inside (endo-) of the plant (-phytic) during their development provide novel insights into plant-herbivore interactions. To begin, I would like to talk how wild tobacco, *Nicotiana attenuata*, defends itself against a stem-boring herbivore (*Trichobaris mucorea*): the defensive role of chlorogenic acids and lignin. Further, I will present novel ecological study systems to unveil the secrets of endophytic herbivores: *Erigeron annuus* & stem longhorn beetles - and *Capsella bursa-pastoris* & seedpod weevils.