Evolutionary plant-herbivore interactions under climate change: invasive *Ambrosia artemisiifolia* and its biological control candidate *Ophraella communa*

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Plant invasions have been predicted to further increase under global warming. Biocontrol has a most successful track record for managing plant invaders. However, predictions of biocontrol outcomes, i.e. their effectiveness and risk, are challenged due to potential ecological and evolutionary changes of the plant-biocontrol agent interactions in space and time, especially so under climate change.

We first studied rapid evolutionary changes of the invasive plant, *Ambrosia artemisiifolia*, from a field experimental evolutionary study experiencing selection of herbivory by the biological control candidate *Ophraella communa* and climate warming. For this, we used second-generation *Ambrosia* seeds collected from the various selection treatments to assess adult preference and larval performance of *Ophraella* in the quarantine. To further investigate the *Ambrosia* and *Ophraella* genotype interaction, we secondly tested larval performance through genotype-by-genotype interactions, using combinations of 11 *Ambrosia* and eight *Ophraella* genotypes from different populations across three continents. Our first study suggests that *Ambrosia* populations can rapidly respond to selection by herbivory and climate change. In the second study, we found strong evidence that the plant-herbivore interaction was driven by *Ophraella* but not *Ambrosia* genotype, which may allow sustainable biocontrol management against *Ambrosia,* when using the appropriate *Ophraella* genotype.

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