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## **Predator effects on herbivore host switch: an eco-evolutionary experiment**

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### Abstract

The population dynamics of herbivorous insects is importantly determined by the equilibrium between natural enemy pressure and plant nutritional quality. Insect herbivores maximise fitness by exploiting plants where they are at low risk of enemy attack, and which have high nutritional value. This question has been particularly explored in the frame of the enemy-free hypothesis whereby herbivores are selected to exploit suboptimal plant resources if feeding on them reduces natural enemy pressure. A little explored question is whether herbivores may switch to plants of suboptimal quality because they provide a niche with low levels of intraspecific competition. To test this idea, we study the dynamics over several generations of an experimental community composed of two plants, three herbivores (one of them an inferior competitor), and two natural enemies each specialised on each of the two superior competitors. We hypothesise that in the absence of natural enemies, the superior competitors will capitalise plant resources, but in their presence the inferior competitor will thrive. In agreement with this, we found that the inferior competitor switched between plants depending on the natural enemy present, even when the plant available had a poor nutritional value. Further experiments revealed that host plant switch led to the evolution of particular traits that may allow development on a suboptimal nutritional source. This experiment is an example of an eco-evolutionary dynamics triggered by indirect effects of natural enemies.