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CAN DISPERSAL EXPLAIN THE COEXISTENCE OF TWO PREDATORS IN RECIPROCAL INTRAGUILD PREDATION?

par

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📌 It is usually assumed that herbivore suppression is larger when the diversity of natural enemies is larger too. This principle, however, can be challenged when natural enemies engage in higher-order antagonistic interactions such as IGP (intraguild predation). IGP can ultimately have negative impacts on herbivore suppression and have been long discussed particularly for their implications in pest control in diverse ecosystems. IGP theory predicts that species that engage in IGP can only coexist under certain and quite restrictive circumstances, and that under these circumstances this interaction can even stabilise predator-prey dynamics and increase suppression over the resource. However, when IGP is reciprocal, conditions for coexistence are even harder. Theory and experimental works have revealed that under reciprocal IGP both predators are unable to persist at the same time so that the stronger competitor usually excludes the weaker one. Despite these evidences, reciprocal IGP is very common in nature particularly in some groups of arthropods like predatory mites.

📌 The aim of this study was to explore the mechanisms that allow coexistence of two predators, and the consequences of their coexistence for herbivore suppression. We first studied the long-term dynamics of a community of two herbivorous thrips *Frankliniella occidentalis* and *Thrips parvispinus* and two predatory mites *Amblyseius swirskii* (AS) and *Proprioseiopsis mexicanus* (PM) in replicated population cages. This experiment revealed that thrips suppression is stronger when both predators are present than when they are alone, although AS has a negative effect on PM, and AS is more voracious than PM.

📌 To further understand these results, we performed laboratory experiments to explore whether the two predators differed in terms of predation and cannibalism over young predatory stages as avoidance of cannibalism by AS may explain its superiority. This second experiment revealed that AS is more predatory on heterospecific larvae than PM. Dispersal behaviour may help understand persistence of reciprocal IGP if PM the poorer competitor is capable of avoiding patches dominated by the superior competitor, or is able to disperse at large densities of the superior IGP.