

Effects of induced defenses in *Trichogoniopsis adenantha* (DC) (Asteraceae) on associated arthropod guilds

Guilherme P. Pinheiro (IC), Gustavo Q. Romero (PQ), Mônica F. Kersch-Becker (PQ)

Abstract

Herbivory and subsequent induced plant responses can affect the structure of insect communities. Here we propose to evaluate the effects of induced defenses mediated by the defensive phytohormones jasmonic acid and salicylic acid on arthropod guilds associated to the native plant *Trichogoniopsis adenantha* (Asteraceae). The number of herbivores decreased and the number of predators increased on induced plants. The results suggest that changes in plant traits are influencing arthropod communities.

Key words: Herbivory, tri-trophic interactions, plant defenses.

Introduction

The study of insect-plant interactions is critical to the understanding of communities organization¹. Although plants are sessile organisms they can actively defend themselves against herbivores and pathogens. Plant defenses are activated by the induction jasmonic acid (JA) and salicylic acid (SA), two phytohormones that mediate resistance against chewing and sucking herbivores damage, respectively².

This study was developed in the Reserva Biológica da Serra do Japi (23°11'S e 46°52'W). We used *T. adenantha*³, a native plant with a rich community of arthropodes, as our focal plant. We carried out a manipulative field experiment to evaluate the direct and indirect effects of induced plant defenses on arthropods guilds associated with the shrub. To induce plant natural defenses we applied chemical elicitors of the JA and SA pathways weekly.

Results and Discussion

We recorded 842 arthropods, 51% were recorded on SA-induced plants (N=428), 34% on controls (N=284) and 15% on JA-induced plants (N=130). JA-induced plants showed lower abundance of chewing herbivores (N=1) than on controls (N=7) and SA-induced plants (N=10), as JA-mediated defenses provide resistance to chewers. Sap-sucking herbivores were also less abundant on JA-treated plants (N=117), compared to controls (N=272, 35%) and SA-induced plants (N=384).

Out of 54 predators recorded, 63% were found on SA-treated plants (N=34), whereas predators were less common on controls (N=8, 15%) and JA-induced plants (N=12, 22%). Therefore these results suggest that induced plant defenses are likely to decrease the herbivores abundance by modifying morphological and/or chemical traits of plants⁴, and by attracting more predators⁵.

Conclusions

The number of herbivores decreased on defense-induced plants, while the number of predators increased in those groups, corroborating previous studies that demonstrated that predators are attracted to herbivore-induced plants. Future directions of this study include evaluating chemical and morphological changes in plant traits and investigating the consequences of induced defenses on plant fitness.

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