NOTES AND COMMENTS

PROTECTION OF *Vochysia elliptica* (VOCHYSIACEAE) BY A NECTAR-THIEVING ANT

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(With 1 figure)

ABSTRACT

Vochysia elliptica (Vochysiaceae) is a shrubby plant, which does not have EFNs. *Camponotus* ants thieve nectar, and can decrease plant fitness by making flowers less attractive to pollinators. However, ants remove herbivores, wich can be beneficial. Results show that plants from which ants were excluded had lower rates of termite (simulated herbivore) removal than did plants visited by ants. Plants accessible to ants showed higher rates of termite removal in the base of leaves and in the inflorescence, than in the tip of leaves. This occurs because ants must pass through the principal axis to reach the inflorescence. Conclusive results of this cost/benefit analysis of the *Camponotus* sp. presence for *V. elliptica* can be obtained, with experimental manipulations.

Key words: ant-plant interaction, flower nectar, plant protection, rupestrian field, *Vochysia elliptica*.

RESUMO

Proteção de *Vochysia elliptica* (Vochysiaceae) por uma formiga que rouba néctar

Vochysia elliptica (Vochysiaceae) é uma planta arbustiva que não porta NEFs. Formigas *Camponotus* roubam néctar e podem diminuir a aptidão da planta, tornando as flores menos atrativas para polinizadores. O efeito das formigas na remoção dos herbívoros, no entanto, pode ser benéfico. Resultados evidenciaram que plantas cujas formigas foram excluídas tiveram menor taxa de remoção de cupins (herbívoros simulados) do que plantas visitadas por formigas. Plantas com acesso às formigas apresentaram maior taxa de cupins removidos na base das folhas e na inflorescência do que na ponta das folhas. Isso ocorre porque formigas devem passar através do eixo principal para alcançar a inflorescência. Resultados conclusivos dessa análise de custo/benefício da presença de *Camponotus* sp. para *V. elliptica* deverão ser obtidos no futuro, com manipulações experimentais.

Palavras-chave: campo rupestre, interação formiga-planta, néctar floral, proteção da planta, *Vochysia elliptica*.

Floral nectaries are attractive to pollinators, whereas extrafloral nectaries (EFNs) attract predators, such as ants and wasps, which attack herbivores and can increase plant fitness. However, some authors identify ants and wasps which visit floral nectaries and can be useful in fighting plant herbivores (Dominguez *et al*., 1989; Yano, 1994).

Vochysia elliptica Mart. (Vochysiaceae) is a shrubby plant that lacks EFNs (Stafleu, 1948, 1952). The leaves are about 5.0 cm in length, and have a very short petiole. Each branch has only one inflorescence at the apex. The floral nectar is produced and stored in the spur, which is a derived structure of the calyx located in the frontal region of the flower (Oliveira & Gibbs, 1994: Fig. 2). An ant species, *Camponotus* sp., visits the flowers of *Vochysia elliptica* and thieves nectar from the upper part of the spurs (G. Romero, un-

publ.) which was probably previously perforated by wasps and/or bees (Young, 1980). The ants in effect act like opportunists by making the flowers less attractive to pollinators. On the other hand, preliminary observations showed that these thievish ants remove herbivores from flowers and leaves. To analyze the behaviour of *Camponotus* sp. and its effect on the fitness of *V. elliptica*, I first attempted to discover, by a simple field experiment, if this ant can remove the herbivores from *V. elliptica*.

Field work was undertaken in rupestrian vegetation (Menezes & Giulietti, 1986) in the Cipó Mountain (1300 m alt.), Minas Gerais State, Southeastern Brazil (43°35'W, 19°17'S) in May (dry season), 1998.

Twenty-four shrubs of *V. elliptica* ranging from 0.5 to 1.6 m in height were randomly chosen within a plot of about 0.3 ha. Each plant had at least two branches with inflorescence. After removing all ants and other insect species from these branches, ten live termite workers were glued as models of natural herbivores (Oliveira *et al.*, 1987a, b; Freitas & Oliveira, 1996), with non-toxic Cascolar® glue, at the following locations; 1) at the top and 2) base of the leaves, and 3) in the inflorescence. One branch was isolated at the base (about 10 cm above the ground) with Tanglefoot® resin to hinder recruitment by ants (control group), while the other branch was not isolated (experimental group). All other vegetation that was more than 10 cm in height was removed in the control group to avoid the approach of ants.

The removal rates of termites by ants were evaluated 24 h after attaching the workers. After testing normality and variance homogeneity, the removal rates were compared using the two-way ANOVA test followed by the Bonferroni *a posteriori* test (Sokal & Rohlf, 1981).

The results of the field experiment are shown in Fig. 1. The mean number of termites removed was significantly higher in the three experimental groups (at the top, base of leaves, and inflorescence) than in the control group (ANOVA, $F = 1935.3$, $p < 0.0001$). The removal rate of termites in experimental groups was significantly higher at the base than at the top of the leaves (ANOVA/Bonferroni, $t = 3.24$, $p < 0.05$), while no significant difference was observed between the top of the leaves and inflorescence (ANOVA/Bonferroni, $t = 1.49$, $p > 0.05$) and between the base of the leaves and inflorescence (ANOVA/Bonferroni, $t = 1.75$, $p > 0.05$).

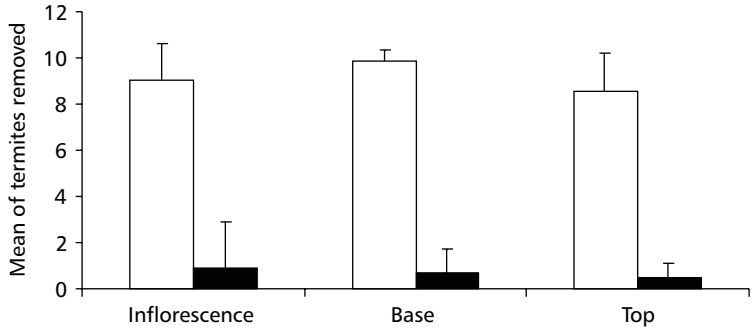

Fig. 1 — Mean (± 1 SD) of termites removed by ants at different parts of the leaf and in the inflorescence of *Vochysia elliptica*, in experimental (blank) and control (black) groups.

The results suggests that *Camponotus* sp. can potentially protect *V. elliptica* from herbivores. The higher rates of removal at the base of leaves and inflorescences seem to be related to the foraging route of ants via the principal axis towards the inflorescences. During this field experiment, up to twelve individuals of *Camponotus* sp. climbed the stem of *V. elliptica* and reached the inflorescences. Some of these individuals thieved nectar.

The elimination of herbivores from flowers, fruits, and seeds by ants has a beneficial effect on plants (Schemske, 1980; Stephenson, 1982; Del-Claro *et al.*, 1996; Oliveira *et al.*, 1999). Moreover, some ant species also play an important role in

pollination (Harber *et al*., 1981). On the other hand, nectar thief behaviour reduces the reproductive success of plants either because they become less attractive for pollinators (Galen, 1983; Irwin & Brody, 1998), or because the presence of the predator in the inflorescences can interfere with the foraging behaviours of pollinators (Bristowe, 1958; Elliott & Elliott, 1991). However, since the data suggested that *Camponotus* sp. can potentially benefit on *V. elliptica*, a cost/benefit analysis involving experimental manipulation to examine herbivory and pollination rates, is needed to better understand this ant-plant interaction.

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