NOTAS E COMUNICAÇÕES

ANTS MONOPOLISE PLANT RESOURCES BY SHELTER-CONSTRUCTION

Louise I. ESKILDSEN, Annika Büchert LINDBERG, Jens M. OLESEN

ABSTRACT - In Ecuadorean Amazonas, *Crematogaster* ants (Myrmicinae) were observed to construct shelters of debris and plant trichomes covering and hiding extrafloral nectaries of *Passiflora auriculata* vines. This is seen as an advanced way of excluding competing ants from a food source.

Key Words: Amazonas, *Crematogaster,* Extrafloral nectaries, Mutualism, *Passiflora*

Formigas Monopolizam Recursos através da Construção de Abrigos

RESUMO - Na Amazônia Equatoriana, observou-se que formigas do gênero *Crematogaster* (Myrmicianae) utilizam detritos e tricomas das plantas para construir abrigos, de modo a cobrir e esconder os nectários extraflorais de *Passiflora auriculata*, uma planta trepadeira. Este comportamento é visto como uma maneira avançada de excluir outras formigas competidoras dos recursos alimentares (néctar) produzido pela planta.

Palavra-chave: Amazonas, *Crematogaster*, Nectários extraflorais, mutualismo, *Passiflora*

Extrafloral nectaries (EFN) or plant glands are known from at least 20% of all families of flowering plants and they occur on all aboveground plant parts (Zimmerman, 1932). Extrafloral nectar is rich in sugars, amino acids and a range of other chemicals (Baker & Baker, 1975). Many animals and especially ants are attracted to this food resource (e.g. Oliveira & Brandão, 1991), and in several respects they respond to EFN as they do to homopterans (Hölldobler & Wilson, 1990). Ant-EFN interactions are generally regarded as an antiherbivore-defence strategy of the plant (Trelease, 1881; Bentley, 1977). A recent review of the subject is given by Koptur (1992).

Ant species which, locally, are able to monopolise this resource of food, i.e. to exclude other species, may have a selective advantage and reporting of these ant-ant interactions is important to our understanding of ant community structure and evolution of ant-plant mutualisms. Monopoly may be achieved by ants through aggressive dominance (Bentley, 1977), camouflage of EFN or homopterans by plant debris (Way, 1954; Jolivet, 1996) or as demonstrated here by the construction of a true shelter.

Although construction of shelters of EFN and homopterans might be common, only few reports document its existence (e.g. Rabenstein *et al.*, 1994). We give a report of ants monopolising EFN by constructing shelters with thin smooth walls and a narrow entrance covering an EFN. The observations were made in the lowland primary rain forest, Yasuní Na-

Dept. Ecology & Genetics, Univ. Aarhus, Ny Munkegade Block 540, DK-8000 Aarhus, Denmark
e-mail: louise.eskildsen@biology.au.dk

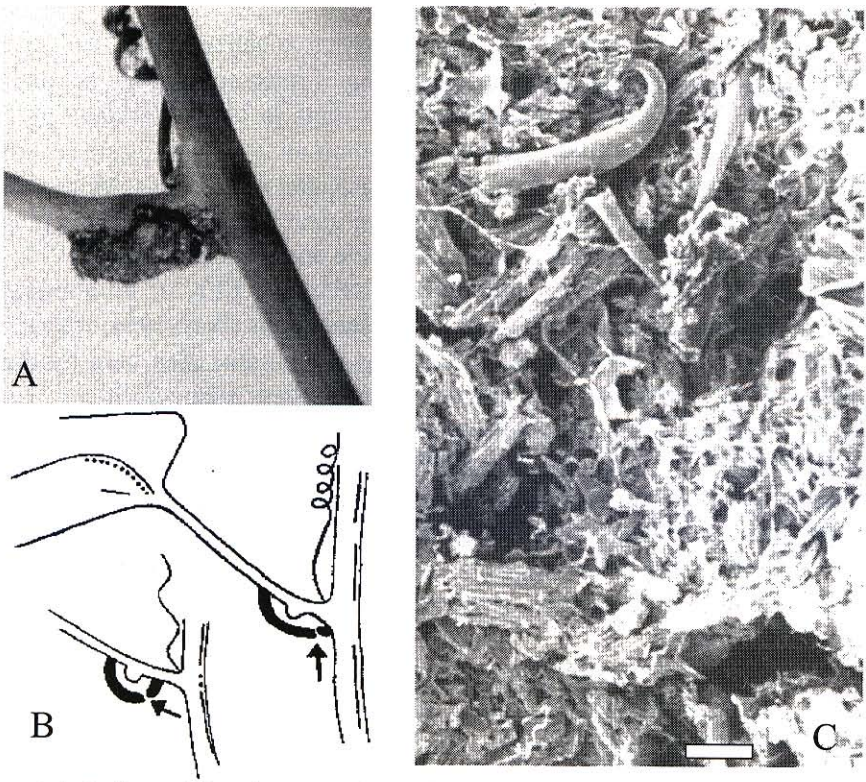
tional Park, Amazonas, Ecuador, October 5-26, 1995.

Fifteen shelters were found covering every petiolar extrafloral nectary on a shoot of *Passiflora auriculata* H. B. K. (Passifloraceae) (Fig. 1a-b). Only the youngest leaves lacked shelters. These were constructed of debris and plant trichomes (Fig. 1c). Each shelter was approximately 7 mm long and its entrance hole approximately 0.7 by 0.9 mm in diameter. The ants constructing the shelters belonged to the genus *Crematogaster* (Myrmicinae). Species of this genus are known to visit EFN of many genera and also of other *Passiflora* species (Lanza, 1988). No other ant species were observed to enter these indoor-nectaries, whereas several species foraged outside on the stem and visited EFN on shoots not covered by shelters.

Crematogaster ants constructing shelters that exclude other ant species from extrafloral nectar seem to demonstrate a behaviour towards resource specialisation or monopoly, and such a behaviour is more complex than in ants that just camouflage nectar sources with a loose net of debris (Jolivet, 1996).

ACKNOWLEDGEMENTS

We thank L. Arcos Terán, R.



Figures 1. A, B. Shoot of *Passiflora auriculata* with ant-built shelter covering a petiolar extrafloral nectary (arrows indicate ant entrance); **C**, SEM-photograph of wall of shelter, scale = 100 μm.

Valencia, G. Onora, and E. D. Parker for providing working facilities in Yasuní and for comments on the manuscript. JMO was supported by the Danish Natural Science Research Council (11-9025-1), and ABL by the Fiedler Fund.

Literature cited

Baker, H. G.; Baker, I. 1975. Studies of nectar-constituents and pollinator-plant coevolution. *In*: Gilbert, L. E.; Raven, P. H. (Eds). *Coevolution of plants and animals*. University of Texas Press, Austin. p. 100-140.

Bentley, B. L. 1977. Extrafloral nectaries and protection by pugnacious bodyguards. *Annual Review of Ecology & Systematics*, 8: 407-427.

Hölldobler, B.; Wilson, E. O. 1990. *The ants*. Springer, Berlin.

Jolivet, P. 1996. Ants and plants. An example of coevolution. Backhuys, Leiden.

Koptur, S. 1992. Extrafloral nectary-mediated interactions between insects and plants. *In*: Bernays, E. (Ed.). *Insect-plant interactions*. CRC Press, Boca Raton, Vol. 4: 81-129.

Lanza, J. 1988. Ant preferences for *Passiflora* nectar mimics that contain amino acids. *Biotropica*, 20: 341-344.

Oliveira, P. S.; Brandão, C. R. F. 1991. The ant community associated with extrafloral nectaries in Brazilian cerrados. *In*: Cutler, D. F.; Huxley, C. R. (Eds.). *Ant-plant interactions*. Oxford University Press, Oxford. p. 198-212.

Rabenstein, R.; Hajildris, A.; Yusoof, N.-R.; Maschwitz, U. 1994. The ant's world: A study of feeding habits. *Nature Malaysiana*, (March): 5-12.

Trelease, W. 1881. The foliar nectary glands of Populus. *Botanical Gazette*, 6: 284-290.

Way, M. J. 1954. Studies on the association of the ant *Oecophylla longinoda* (Latr.) (Formicidae) with the scale insect Saissetia zanzibarensis Williams (Coccidae). *Bulletin of Entomological Research*, 45: 113-134.

Zimmerman, J. 1932. Über die extrafloralen Nektarien der Angiospermen. *Beihang Botanische Zentralblatt*, 49: 99-196.

Aceito para publicação em 06/12/2000