REVIEW

HUXLEY, C.R. & D.F. CUTLER (eds.): Ant-plant interactions. Oxford University Press, 1991. 601 pp. Price £ 60.00. ISBN 0-19-854639-4.

This symposium volume gives the state of the art in the research on ant-plant interactions. A lot of new data and insights are presented. A thematic grouping of the chapters divides the book into six parts.

The first part deals with antagonistic interactions, i.e., the leaf-cutter ants. It appears that leaf-cutters collect a diversity of material, diluting the effect of toxic allelochemicals. They may collect quite inappropriate material; they have been reported to cut and bring back pieces from plastic labels.

The second part is about ant-plant interactions involving herbivorous insects. Interactions in which unspecialized plants benefit from the predacious and honeydew-collecting activities of ants are discussed. Often the tending of Homoptera by ants is deleterious for the plants and it is suggested that the presence of extrafloral nectaries may sometimes benefit the plants by attracting the ants away from the Homoptera.

Extrafloral nectary-mediated interactions are the subject of the third part. It deals with the attraction to ants of extrafloral nectaries and the benefits which these ants may or may not bring to the plants. A study of a latitudinal series of Euphorbiaceae in Malesia and Australia includes both myrmecophytic trees, extrafloral nectary species, and plants with no association with ants. In New Guinea ants reduce herbivory on extrafloral nectary species, whereas in Australia no such effect could be demonstrated. It is suggested that with increasing latitude herbivorous pressure becomes lower and that the productivity of the environment may drop making biotic defence less efficient than chemical defence.

The fourth part is the most extensive section, dealing with symbiosis between plants and ants and including systematic approaches. Two categories are distinguished, i.e., ant-trees with domatia, primarily protected by the ants from herbivores, and ant-house epiphytes housing ants in a variety of structure and benefiting mainly from nutrients collected by the ants. For nine *Macaranga* ant-tree species it is shown that they are mainly inhabited by one *Crematogaster* ant-species. This ant is highly aggressive towards insect intruders, even removing herbivore eggs, and also prunes vines. One chapter gives an elaborate outline of ant-associated epiphytes. Two different types of association are recognized, i.e., ant-house and ant-garden epiphytes. Numerous examples from many plant families are treated. Being familiar with ferns, I am very pleased by the great deal of attention paid to fern species. To make a few minor comments, as far as I know *Solanopteris* is an ant-garden species in Costa Rica (cf. Table 23.2). Furthermore, *Platycerium* is mentioned only once as an opportunist ant-host. However, two species of the staghorn ferns show a very interesting clump of base fronds specialized for housing ants. One of these two, *P. ridleyi,* I observed in Sumatra to grow together with another ant-fern, *Lecanopteris crustacea,* always being the only epiphytes on emergent trees. Very interesting are the two chapters dealing with phylogeny reconstruction as the basis for an analysis of the evolution of ant-plant associations. Ideally, both the phylogeny of the plants and that of the ants should be reconstructed, followed by a study of their congruence in view of the actual asso-

ciations found. So far, however, this has not been achieved. One study presents a cladistic analysis of *Leonardoxa* (Leguminosae), including amongst others their ant-associated morphological structures, showing how this approach is used to demonstrate co-evolutionary patterns. A second study pertains to the neotropical obligate plant-ants Pseudomyrmecinae, which inhabit a wide range of myrmecophytes. The patterns found in the association with myrmecophytes can only be explained assuming several occurrences of parallel development and the ant lines switching from one myrmecophyte to another.

The fifth part is devoted to pollination, ant exclusion, and dispersal. It includes the role of ants both in floral mechanisms and in seed dispersal and predation. Ants are rarely agents of pollination. Devices in and around the flower to exclude the access of ants are more common. Myrmecochory is a far more frequent phenomenon in plants of nutrient-poor soils than in plants of nutrient-rich areas. The explanation for this has been elusive, but has something to do with the relative costs in nutrient of ant and bird dispersal. Comparing wind dispersal with ant dispersal, the former tends to concentrate seeds around existing vegetation, whereas the latter results in a more scattered pattern.

The theme of the sixth and final part of the book, 'Ants, vegetation ecology, and the future of ant-plant research' is rather divers. The chapter dealing with problems outstanding in ant-plant interaction research mainly points to the lack of knowledge as regards the genetics of mutualistic organisms and the effects of pollinators and dispersers on gene flow. I regard a joint analysis of the phylogenies of both ants and their hosts also a very promising field of research.

In summary, this book gives a splendid overview of present knowledge and ideas about the interactions between plants and ants. It is highly recommended.

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