

Book review

WIRTH, R., HERZ, H., RYEL, R.J., BEYSCHLAG, W. & HÖLLDOBLER, B. 2003: Herbivory of leaf-cutting ants: A case study of *Atta colombica* in the tropical rain-forest of Panama. – Springer-Verlag, Berlin, 230 pp.

*Dr. William Hughes, School of Biological Sciences, A12, University of Sydney, Sydney, N.S.W. 2006, Australia.
E-mail: whughes@usyd.edu.au*

Few can have visited the Neotropics without marvelling at the huge nest mounds of *Atta* leaf-cutting ants or the spectacular traffic of thousands of workers along their trails, each proceeding rapidly home with a piece of leaf held like a prize above its head. The leaf-cutting ants have been described as the "dominant herbivores of the Neotropics" (HÖLLDOBLER & WILSON 1990). It is hard to look at their trails and not consider this to be the case. This appears supported by counts of the amount of leaves taken into colonies and the amount of refuse produced. Estimates stemming from such work put leaf-cutting ants as harvesting up to 17 % of leaf production in tropical forests (CHERRETT 1989). Certainly they can be important pests of agriculture, with losses in some citrus and *Eucalyptus* plantations reaching 100 %. But how ecologically important are they really in their natural habitats? This apparently simple question is what gave rise to this book.

Wirth & al. had the aim of providing a definitive answer, at least for one particular species in one particular area of rainforest. The work started as a simple question, to determine the impact of leaf removal by leaf-cutting ants upon the penetration of light into the lower canopies of the rainforest. It provides a nice example of how research can rapidly develop from an apparently simple question into an eight year interdisciplinary project involving five authors, two doctoral theses and five years of fieldwork.

The book consists of 15 chapters. It begins with nice introductory chapters into leaf-cutting ants and the field site of Barro Colorado Island in Panama. There are then three chapters on the plant ecology at the site: the species composition, light regimes and canopy structure. Four chapters follow on the colony dynamics and foraging biology of *Atta colombica*, including trail systems and plant selection. The next two chapters are the crux of the study, quantifying the herbivory rates of *A. colombica* and the impact of this herbivory upon the light regime in the rainforest. Herbivory, however, is not the only potential eco-

logical impact of the ants, and the last two results chapters investigate the role of the ants in seed dispersal and nutrient cycling. Finally the book ends with a useful conclusions chapter that pulls it all together.

While a number of earlier studies have attempted to quantify the ecological impact of leaf-cutting ants, none have taken such a thorough, comprehensive approach. And the work described in this book is certainly notable for its thoroughness. It includes for example, such undertakings as recording every *Atta* colony on the island, mapping all the trails of one particular colony for an entire year and identifying every plant species harvested by this colony in this time. Altogether, the book contains 66 figures and 32 tables, the majority of which represent new results. And the results are surprising. In contrast to the higher earlier estimates, leaf-cutting ants are found to harvest only 2.5 % of leaf production and one fifth of the total herbivory in the study area. As Wirth & al. point out though, the impact of herbivory depends upon the scale one is looking at. Leaf-cutting ant herbivory is negligible at the level of the whole island because most colonies are aggregated in a small area, but can be up to 40 % at the level of an individual tree.

The title of the book doesn't really do it justice. The book covers far more than just herbivory and it is also likely to be of as much interest to plant ecologists as to myrmecologists. The book's jacket summary may perhaps be going a little far in describing it as "an invaluable reference for researchers and land managers working in the fields of plant-animal interactions, herbivory, community ecology and biodiversity". However, it does certainly represent an important piece of work that greatly improves our understanding of the interactions between leaf-cutting ants and their rainforest habitat. While being of most interest to specialists in the subject, it also showcases a number of interesting ecological methods and I recommend it to anyone interested in plant-animal interactions in all their complexity.

References

- CHERRETT, J.M. 1989: Leaf-cutting ants. In: LIETH, H. & WERGER, M.J.A. (Eds.): *Ecosystems of the World* 14B. – Elsevier, Amsterdam, pp. 473-486.
- HÖLLDOBLER, B. & WILSON, E.O. 1990: *The Ants*. – The Belknap Press of Harvard University Press, Cambridge, MA, 732 pp.