BOOK REVIEW

Bumblebee Economics

Bernd Heinrich (1979 with a new preface 2004).

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In the current climate of controversy over the suggestion to import bumblebees into Australia, this may appear as an examination of the economics of such an introduction. It is not. This American book examines the physiological 'economics' of survival of the group commonly called bumblebees – basically two genera of large furry bees in the family Apidae, Subfamily Bombinae.

Bombus and *Psythirus* form a large group in North America – 60 species illustrated in two colour plates. For those interested in this group, most early comprehensive publications had apparently concentrated on British bumblebees, although references include many papers on single topics involving bumblebees, such as pollination.

Originally called 'humble bees' the group now called 'bumblebees' is essentially a cold-climate group not represented in Australia. They have a short growing season, at the end of which, queens and males are produced to mate and hibernate until the next spring. I found one of the most interesting chapters to be on the warming and regulation of the temperature of flight muscles, and temperature regulation of the next. "*These bees appear to be capable of a complexity of thermoregulation not observed in many higher organisms*" (p. 108).

There is a very readable introduction to the basic pattern of insect anatomy, and commentary on general habits of social insects and bees.

Bumblebees are primitively social and do not exchange food as in the more highly social bees. Neither do they communicate distance and location of potential food sources to colony mates. Queens may share all types of duties.

Chapters 3-6 examine thermoregulation in flight muscles, body and nest. Chapters 7-12 deal with energy balances in foraging, and relationships to the flowers visited. Included here is a section on the old trick of chewing through the flower to get nectar, used by some short-tongued species. This strategy is used to avoid the long route to the nectar and to prevent pollination. These topics may be of interest to compare and contrast with honeybee behaviour, or that of Australian native bees being researched. Otherwise, it is basically a study in detailed measurement in physiology and ecology.

Directions are given for captive boxes and feeding of colonies, in Appendix A.

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