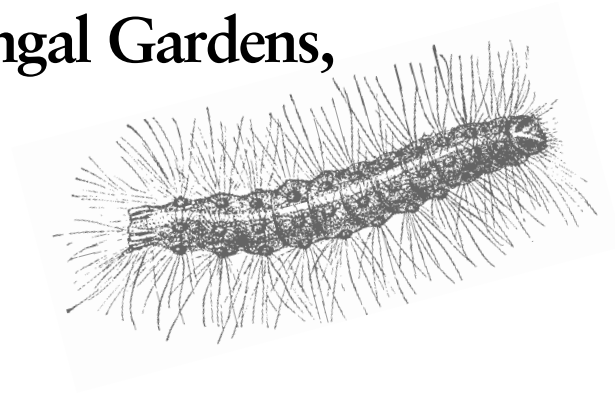
Life in the Pits, Fly Hearing, Fungal Gardens, and A New Order of Insects



Edited by Gene Kritsky

Life in the Pits

Lomascolo, S., and A. G. Farji-Brener. 2001. Adaptive short-term changes in pit design by antlion larvae (*Myrmeleon* sp.) in response to different prey conditions. Ethol. Ecol. Evol. 13: 393-397.

The authors examined the causes of variation in antlion pit design using antlion larvae collected in the Palo Verde National Park in Costa Rica. Once the larvae were placed singly in containers 60 cm in diameter and 25 cm deep filled with sand taken from the park, they immediately started to dig pits. Six hours after the digging had stopped, the larvae were presented ants in different ways to simulate different feeding situations, such as a few prey that could not escape, many prey that could not escape, and many prey, all of which could escape. The diameter, depth, and slope of the pits were determined before and after prey presentation. The results indicated that antlion larvae would modify pits depending on prey availability. The larvae would increase the diameter (but not the depth) of the pit if prey were scarce, which was thought by the authors to increase the probability of encountering prey. Moreover, the antlions increased the depth of the pit if prey were successful in escaping, reducing the likelihood of prey escape. This study contradicts other studies and supports the hypothesis that flexible antlion behavior is an adaptive strategy for living in areas with unpredictable food resources.

Fly Hearing

Robert, D., and M. C. Gopfert. 2002. Acoustic sensitivity of fly antennae. J. Insect Physiol. 48: 189-196.

The role that Dipteran antennae play in hearing was examined in a tachinid, a calliphorid, two muscids, *Drososphila melanogaster*, and a syrphid. The authors determined acoustic sensitivity of the antennae using a microscanning laser vibrometer with the laser positioned at different parts of the antennae. Three males and three females of each species were tested. The results indicated that flies from a wide taxonomic range may use their antennae to detect sounds. Indeed, extrapolation of the results of this study extends antennal hearing to 120,000 species of flies. Several functions have been proposed for such hearing in flies. Previous studies have shown that *Drosophila* spp. use hearing in mating behavior, and callophorids use antennal hearing to obtain information on flight speed. The authors also suggested that flies might be able to use their antennae to detect echoes from approaching objects, which would explain how some flies can land softly in total darkness.

Fungal Gardens

Abril, A. B., and E. H. Bucher. 2002. Evidence that the fungus cultured by leaf-cutting ants does not metabolize cellulose. Ecol. Lett. 5: 325-328.

It has been widely believed that the fungus cultivated by leaf-cutting ants digests the cellulose in the leaves, producing more fungus, which the ants in turn consume. Thus leaf-cutting ants' ecological role has been considered equivalent to termites. The authors tested the cellulose-degrading properties of the fungus by growing fungus on artificial media that ensured that cellulose was the only carbon source in the diet. They also examined the lignin/cellulose ratio of refuse taken from leaf-cutting ant colonies to determine cellulose consumption. They found that no fungus grew on media that had only cellulose as the carbon source, whereas it grew on the control that included glucose. Furthermore, the lignin/cellulose ratios were lower than ratios from refuse taken from termite colonies, supporting the view that cellulose was not being broken down in ant colonies. These results suggest that the leaf-cutting ants are ecologically not like termites at all, but rather more like non-ruminant herbivores that consume large quantities of plant materials to survive.

A New Order of Insects

Klass, K. D., O. Zompro, N. P. Kristensen, and J. Adis. 2002. Mantophasmatodea: a new insect order with extant members in the Afrotropics. Science 296: 1456–1459.

The entomological world was treated to another discovery recently: a new insect order, the Mantophasmatodea, which is the first to be described since 1914. The Mantophasmatodea have hypognathous chewing mouth parts, long antennae, cursorial legs, and one-segmented cerci. They are wingless as adults, and dissections of their digestive tracts show that they are predaceous. This order is possibly related to the grylloblattids and the phasmids, but their hypognathous mouthparts separate them from these orders. These characteristics of the order were described from fossils preserved in 45 million-year-old Baltic amber, and from two museum specimens, designated as different species, from Namibia and Tanzania. The determination of their relationship to the other orders awaits further anatomical and molecular study. However, the Baltic amber and African specimens do suggest they had a more wide-ranging distribution in the past.