

Bruchid seed infestation and development time in three host species of *Acacia*

(Coleoptera, Bruchidae)

David Ward, Iris Musli, Keren Or, Thomas Gbenro, Orit Skutelsky

Abstract. Recruitment of *Acacia* trees in the Negev desert and the Arava valley (Syrian-African Rift) of Israel is highly negatively affected by bruchid beetles. The effects of three *Acacia* tree host species were examined on the life histories of four bruchid beetle species that commonly occur in the Negev. There was extreme variance in the development time of these beetles, ranging from one month to one year. Additionally, mean values of *Acacia* seed infestation by bruchids were about 13% of seeds in the laboratory, where newly-hatched bruchids were removed from the population, yet values as high as 97% of seeds were infested in the field, which is due to re-infestation of seeds by newly-hatched bruchids. There were highly significant differences in the presence/absence of bruchid beetles across *Acacia* species. *A. raddiana* and *A. tortilis* occurred in the same habitats yet differed in the numbers of bruchid individuals of each species. The four bruchid species infest all three *Acacia* species but their effects are markedly different. Most prominent are the presence/absence of bruchid species in certain host tree species.

Key words. Seed predation, niche overlap, emergence time.

Introduction

Most bruchid beetles and, indeed, most herbivorous insects feed on relatively few of the plant species available to them (Fox & Morrow 1981, FOX et al. 1994). Many bruchid beetles that may be considered generalists at the species level are specialists at the population level (FOX & MORROW 1981). The reason for this differentiation is usually that the geographic distributions of many generalist bruchid beetles differ from those of their host plants. This results in a situation where only a subset of host plants is available at any given site (FOX et al. 1994). Differential performance of insect genotypes on different host plants indicates that different plants may represent distinct selective environments for insects (VIA 1990, FOX 1993, FOX et al. 1994). According to FOX et al. (1994), non-concurrent geographic distributions between bruchids and their hosts may cause these insects to experience coarse-grained spatial variation in natural selection on characters affecting adaptations to their hosts, and populations differing in host use should differ in their abilities to survive and grow on these plants.

Here, the differences in the life histories of four bruchid beetle species developing on three *Acacia* (Fabaceae: Mimosoideae) tree species, *A. raddiana*, *A. gerrardii* and *A. tortilis*, were examined in the Negev desert highlands and Arava (Syrian-African Rift) valley, Israel. Two of these *Acacia* species, *A. raddiana* and *A. tortilis* are syntopic in the ephemeral rivers of the Negev and Arava, while *A. gerrardii* is mostly geographically isolated in the southern Negev highlands (HALEVY 1974).