

ABSTRACT

The gall midge Asphondylia boerhaaviae (Mohn) forms bud galls on the weeds Boerhavia diffusa and B. coccinea and the shrub Commicarpus scandens. The adults are small, and short-lived. Emergence and oviposition take place at night.

In Jamaica the midge was found to be most abundant on the southeastern side of the island. The distribution of the food plants was associated with low mean annual precipitation <1500 mm, and low altitude <72 m. The midge itself was not directly associated with either physical factor.

Discriminant analysis was used to separate two size morphs in both sexes. The mean maximum potential fecundity was 125.82 for the small morph and 318.72 for the large one and was positively correlated with size for both morphs. Mean minimum achieved fecundity determined from the number of galls per plant was 67.77. The size dimorphism relates to a dispersive polymorphism which is presumably related to the impermanence of the food patches. Small female morphs have higher wing loadings (8.030 mm²/mg) than large female morphs (5.171 mm²/mg).

Accumulated and single life tables (k-factor) were developed for the developmental stages only. An approximate method for estimating mortality in samples with immature stages still present was introduced. The accumulated life tables show the total developmental mortality, which was 69.74% in the Jamaican population and 75.61% in a population in south Florida.

Developmental survival was lowest for large populations and higher, but more variable, for low and more intermediate ones. The major mortality factor within galls was due to the combined action of a complex of four parasitoids, which acted in a weakly density-dependent manner ($r=+0.313$, $P < 0.001$). The k-factor analysis done for individual patches and two local populations for >20 generations, showed the difference between mortality in samples and showed the key factor to be parasitization in the third instar. Mortality within single patches was density-independent. Density-dependent mortality from parasitoids which was undercompensating ($b=0.736$) operated at U.W.I.. while at Mona Heights the same mortality factor was not density dependent ($b=0.385$). Parasitization was related to season, being greatest in the wet season.

The overall sex ratio was female-biased (0.56 females). Unisexual families and wide fluctuations in sex ratio are features of this species, with an apparent tendency for female-biased sex ratios in the 'summer' and male-biased ones in the 'winter' months.

A cyclic population budget gave the estimate that $<90\%$ emerging females survived to reproduce. Losses during dispersal was a large factor in the ecological strategy of the midge and relates to the impermanence of the food patches. This mortality is thought to be largely density independent. The species was shown to be strongly r-selected.