

ABSTRACT

THE POPULATION DYNAMICS IN JAMAICA OF

LIRIOMYZA COMMELINAE

(FROST) (DIPTERA; AGROMYZIDAE).

David Christopher Smith

The population dynamics of Liriomyza commelinae (Frost) was studied in Jamaica from 1983 to 1986, adding to the knowledge of the dynamics of tropical leafminers in general and the Agromyzidae in particular. L. commelinae is an oligophagous miner of plants in the genera Commelina and Tradescantia (Commelineaceae).

Temporal variation in population intensity was strongly dependent on rainfall. Dense populations often appeared after heavy rains had caused an increase in food plant density. Spatial distribution was limited by altitude.

An accumulated life-table, based on the fate of 9318 eggs, was prepared for the island population. A period equivalent to 47 consecutive generations from 1984 to 1986, was covered and a correction due to

Hudson to account for the fate of sample living instars was used. Real developmental mortality was 96.4%. A cyclic budget estimated that the pre-reproductive loss of females was <63%. Additionally, life tables for five sites studied in detail were prepared for the same period. Mortality due to hymenopterous parasitoids, mainly Chrysocharis majoriani (Girault), was 41%, but the ant species Crematogaster brevispinosa Mayr, when present, imposed mortalities of up to 39%. Developmental mortality was not related to rainfall.

Key-factor analysis of two sites at Mona, using a modification of the method of Podoler and Rogers (1975), showed that parasitoids were the key mortality factor at one site. However, at the other site, where ants were densely populated, they principally determined the level of mortality.

Spatial density-dependence was investigated at four levels, namely, between leaves, stems, square metres of patch and between patches. Mines were highly aggregated on all levels. Spatial density-dependence in mortality from leaf to leaf was found at two of five sites. Density-dependence between stems was detected at two sites out of three.

There was no dependence of mortality on the density of mines per square metre nor per patch.

Temporal density-dependence between generations and between consecutive months was investigated. Survivorship within each generation was positively related to initial generation size at one site of the two investigated. Mortality was not correlated with monthly population density at either site.

The presence of polytene chromosomes in larvae and pupae was demonstrated. The relevance of this to the discipline of Ecological Genetics was discussed.