

## ABSTRACT

The biology and population dynamics of three species of bark beetles (Scolytidae) were studied in Jamaica from 1977-1980, adding to the scanty knowledge about the group in the tropics. Phloeosinus neotropicus Schedl attacks Juniperus barbadensis Linn. (Taxodiaceae) which occurs scattered in the indigenous forests of the Blue Mountains. Ips grandicollis (Eichhoff) and Ips calligraphus (Germar) attack several species of Pinus (Pinaceae) which occur in plantations in various parts of the island.

The mean fecundity of P. neotropicus was  $52.40 \pm 5.34$  eggs/♀ and was greater in logs of circumference  $> 30\text{cm}$  than in logs smaller than this. Developmental mortality was 90.16%. The sex ratio at emergence was  $0.59 \pm 0.08$  females. A cyclic budget gave the estimate of dispersive loss as 73.52% and 61.37% of the females and males respectively.

The mean number of eggs per I. grandicollis gallery was  $19.29 \pm 3.04$  in Pinus caribaea and  $29.91 \pm 1.34$  in Pinus patula. In both species of food-plant, the number of eggs per gallery decreased as the density of eggs increased and in P. patula there was a linear increase with circumference. The mean developmental mortality of I. grandicollis was  $84.45 \pm 5.00\%$  in Pinus caribaea and  $58.52 \pm 6.51\%$  in Pinus patula; and was positively correlated with egg density. Nematodes, fungi and intraspecific competition were the most important mortality factors. The sex ratio at emergence ( $0.505 \pm 0.028$  females) was significantly lower than that in the gallery systems

( $0.743 \pm 0.014$  females). A cyclic budget gave the estimate of minimum dispersive loss as 36.89% and 79.70% of females and males respectively.

The mean number of eggs per I. calligraphus gallery was  $26.74 \pm 6.86$  in Pinus caribaea,  $43.21 \pm 6.36$  in Pinus massoniana and  $88.13 \pm 12.28$  in Pinus patula. In Pinus caribaea the number of eggs per gallery was greater in logs  $> 30$ cm in circumference than in those less than this; while in Pinus patula it was greater in logs  $> 20$ cm in circumference than in those that were smaller. The mean developmental mortality of I. calligraphus was  $91.91 \pm 2.11\%$  in Pinus caribaea,  $63.16 \pm 6.65\%$  in Pinus massoniana and  $60.06 \pm 9.67\%$  in Pinus patula. There was an increase in developmental mortality as the density of eggs increased in P. massoniana but not in P. caribaea and P. patula. Nematodes and fungi were the most important mortality factors. Sex ratio at emergence ( $0.572 \pm 0.028$  females) was significantly different from that in the galleries ( $0.735 \pm 0.002$  females). A cyclic budget gave the estimate of minimum dispersive loss as 35.32% and 69.87% of females and males respectively.

In all three species of beetles, natural control of numbers at the upper limit was mainly by dispersive loss resulting mainly from "local shortage" of suitable food-plants. At the lower limit extinction was prevented by temporal and spatial variation in the environment, which ensured that a part of the population always found suitable food-plants. The same factor, habitat heterogeneity, allows co-existence between the two Ips species.