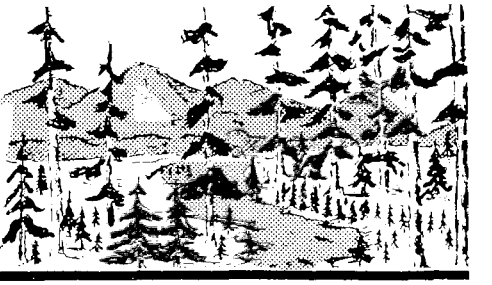
DEPARTMENT OF FORESTRY · CANADA ·

Timber Talks



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FAT IN DOUGLAS-FIR BEETLES

No. 5

The Douglas-fir beetle causes heavy loss in the forests, and insect attractants may be used in the future as a means of control. To plan such a program a knowledge of insect behaviour is essential. Differences exist amongst bark beetles in their inclination to fly and to enter host material. It has been demonstrated that these differences are related to the amount of stored fat. Those which have a fat content in excess of 20% of their dry body weight are most likely to disperse.

An investigation was undertaken on the effect of rearing temperature on the fat accumulation in Douglas-fir beetles. Male and female beetles were placed in logs which were maintained at three rearing conditions of temperature and relative humidity. Size of progeny were measured and the fat accumulation at different stages of the insect's development determined.

Progeny development was slower when the constant rearing temperature was 13° C. than when it was 23° C. Initially, larvae hatched at 13° C. were smaller than average and accumulated fat very slowly. During the later stages of development these increased in size and accumulated reserves of fat quite rapidly. Insects reared outdoors under high mid-summer temperatures showed a marked reduction in fat accumulation in the late stages. Differences in fat content are related to the duration of periods of activity and diapause, rate of feeding, and metabolism; these processes are influenced by temperature.

The environment in an undisturbed forest where bark beetles breed is unlike that of a cut-over forest where they become a pest. The former is shady, cool and has a minimal diurnal range of temperatures, and the latter is exposed with a wide range of diurnal temperatures. Thus, beetles in undisturbed forests must have the capacity and fat reserves for long-range dispersal. However, the importance of the capacity for long-range dispersal is reduced by the concentration of suitable host material that is found after a logging operation.

REPORT: The Effect of Rearing Temperature on the Size and Fat Content of the Douglas-Fir Beetle. M. D. Atkins, Forest Research Laboratory, Victoria. B. C.