



# Timber Talks



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## MANIPULATION OF INSECT POPULATIONS

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Attacks from bark beetles are common and, in many instances, pose a threat to the forest economy. Different means of control have resulted in varying degrees of success. One method to which attention has been directed involves the use of pheromones.

Pheromones are chemical compounds produced by insects, which regulate their physiological processes. Such compounds may also influence the behaviour of other individuals, attract the opposite sex, induce copulation and influence population aggregations. Speculation on the production of such pheromones by bark beetles and the possibility of using them as an effective means of manipulating populations stimulated research that produced several biologically active compounds synthetically.

Until sufficient knowledge is available on possible undesirable side effects, caution should be practised in the use of these pheromones. Consideration should be given as to how the manipulation could be accomplished as it may be hazardous if done unwisely. Species that attack "en masse" would require different manipulation than those that do not. Specific compounds may also attract parasites, predators or competitors, thereby disrupting a succession of biotic factors adverse to the insect. Competition between the synthetic pheromone and natural sources and the variations in insect behaviour due to weather, must be evaluated. The behaviour of different species in relation to the discontinuity of their habitats should be understood and the behavioural variations within species determined.

Beetles vary in their inclination to disperse. Some respond readily to hosts and pheromones; others by-pass highly attractant material and thus escape pheromone-baited traps. The latter, which have the greatest flight-capacity, would form the nucleus of a potentially hazardous endemic population that would be difficult to manipulate. Their progeny could also possess similar host-negative characteristics. Behavioural variations, developed genetically or from temperature differences during brood development, must also be understood to inhibit the development of non-responsive populations. Results of partial reduction of high density populations and of changes in the sex ratio are further matters worthy of consideration before population manipulation is attempted. Increased female broods could affect populations of species in which the male produces the attractant, and increasing the number of males could cause competition between attractants and baited traps.

Insect pheromones have a high potential for the manipulation of insect populations and their importance warrants research on their identification and synthesis. Full benefit from their use, however, can only be assured when such knowledge is combined with a thorough understanding of the biology, behaviour and genetics of the species.