

**A Technique for Inducing Attacks and Mating of the Mountain Pine Beetle, *Dendroctonus ponderosae* (= *monticolae*) (Coleoptera: Scolytidae)<sup>1</sup>**

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Studies of population dynamics within the laboratory depend largely upon known population densities for experimentation. This fact requires the development of techniques that insure successful attack and mating by the parent adults.

METHOD

Log billets, or slabs, of lodgepole pine (*Pinus contorta* var. *latifolia* Engelm.), were used as food and habitat for the mountain pine beetle, *Dendroctonus ponderosae* Hopkins. These billets, 12 in. diam, 14 in. long, were cut in the fall and stored under outdoor temperature (32°-50°F) and humidity (60%-90%). When needed for experiments, slabs were cut longitudinally with a 12-in. face. The exposed sides were sealed with paraffin after each cutting to reduce loss of moisture.

A cork borer (3/4-in. diam) was used to cut through the outer bark and phloem layers to the sapwood. Removal of this plug formed an attack chamber.

Beetles were sexed by using measurements of overall length, overall width, width of scutellum, and based on the discriminant function analysis. This technique does not harm the insect.

Successful matings were increased by allowing the female to start gallery construction. The male was introduced headfirst into a cleaned entrance 24 hr later. The chamber was examined after 24 hr to determine if the attack was successful; if so, the frass was removed from the entrance hole and nuptial chamber made by the female. Frequently, the stridulations made during the mating procedure could be heard within minutes after introduction of the male.

The chamber then was covered by tightly stapling a 2×2-in. square of heavy-duty plastic to the surrounding bark. The plastic proved superior to either paper or aluminum foil in preventing escape, probably because of its pliable nature and tight fit to the bark. The plastic permitted examination of the beetles without disturbance and allowed light to enter the chamber.

The cover was removed 24 hr later. If additional frass was found, a successful mating was assumed.

This induced-attack method was 90% successful in the first introductions. Of the unsuccessful attacks, 85% were successful upon the second attempt. Thus, 98.5% of the attacks were successful within the 72-hr period required for 2 attempts. The number of progeny depends upon several other factors, such as proximity of attack and competition. Using single gallery per face, one can expect from 3 to 6 new adults/single gallery.

This technique has been proved reliable by repeated experiments and has been adopted as our standard procedure in establishing stock and known brood densities for laboratory use.

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