A CONTINUOUS MASS-REARING TECHNIQUE FOR THE SOUTHERN PINE BEETLE (COLEOPTERA: SCOLYTIDAE)

Studying the southern pine beetle (SPB), *Dendroctonus frontalis* Zimmermann, during endemic periods is difficult because beetle-infested trees are often hard to locate. This is especially true during the winter months. Studies

that require a continuous supply of beetles are often jeopardized by a lack ofOF beetles. During our studies of the relationships of SPB and associated organisms, we developed a technique for mass rearing SPB in the laboratory.

The SPB colony was maintained in a small screened rearing area about 2.3 x 2.0 m in the corner of a laboratory. Metal screening enclosed two sides of this area, and one of these sides contained a screen door. All but one of the windows in the rearing area were covered with aluminum foil.

The colony was initiated in November 1981, with beetles collected from a natural infestation on the Homochitto National Forest in Mississippi. Two trees containing pupae and teneral adults were felled, and several bolts (100 cm long) cut from these trees were placed in the rearing area. When beetles began to emerge, two fresh loblolly pine (*Pinus taeda* L.) bolts, 75-90 cm long and 15-20 cm in diameter, were placed next to the uncovered window. The ends of the bolts had been treated with White's solution (Barras 1972. J. Econ. Entomol. 65: 1504) to prevent microbial contamination. The bolts were set upright on four nails that had been driven into the bottom of each bolt to prevent contact with the floor. This prevented moisture buildup in the bolts and reduced fungal contamination. A 1-dr plastic vial containing about 1 ml of a 2 to 1 mixture of α-pinene and frontalin (Kinzer *et al.* 1969. Nature 221: 477-8) was hung on each fresh, uninfested bolt. The bolts were usually infested within 2-3 days; bolts were then moved away from the uncovered window, and fresh bolts were placed in front of the window at this time. A fresh green tree was usually cut every 10 to 14 days, and these bolts were stored for up to two weeks in the laboratory or until they were needed.

We have maintained our original colony for more than a year. During this time, beetle generations tended to overlap as they do in natural infestations. Southern pine beetles of all stages were available throughout the year. We observed no noticeable decline in the vigor of the colony throughout the year, although no measures of beetle vigor were recorded. The size of the colony can be varied by varying the number and size of fresh bolts introduced each week. A new colony can easily be started by introducing field-collected beetles.

Clark and Osgood (1964. U.S. Dep. Agric. For. Serv. Res. Note SE-30, 4 p.) described a technique for mass-rearing bark beetles using 20-gallon trash cans as rearing containers. Because our technique does not involve rearing containers, it is much easier and less time consuming. Furthermore, we had none of the problems associated with high phloem moisture that is usually a problem when rearing bark beetles in cut logs (Clark and Osgood ibid.; Gaumer and Gara 1967. Contrib. Boyce Thompson Instit. 23: 373-7; Webb and Franklin 1978. Environ. Entomol. 7: 405-10).

Although our primary purpose in establishing a laboratory colony was to have a continuous source of SPB, other uses of such a technique became apparent. The technique could be used to study the interactions between SPB and other organisms. The effects of mites on SPB development could be evaluated by originating a colony with mite-free beetles (Moser and Bridges 1983. Ann. Entomol. Soc. Am. 76: 942-5). By introducing *Ips* engraver beetles into a SPB colony, the competitive interactions of these species could be studied. SPB could be inoculated with one of its symbiotic fungi (Bridges

1983. Environ. Entomol. 12: 858-61) and then used to establish separate colonies of SPB having only one fungus, offering an opportunity to compare the effects of fungi on SPB development under controlled conditions. Another use for this technique is to provide a source of beetles for field experiments (F. P. Hain, personal communication). Infested bolts from the laboratory could be transported to field plots to initiate a SPB infestation under controlled conditions.

The technique is a practical means of maintaining a supply of SPB for research purposes, especially during the winter months or during periods of low SPB population levels. Having a dependable and constant supply of SPB reduces the time and money spent on searching for SPB-infested trees. – J. Robert Bridges and John C. Moser, USDA Forest Service, Southern Forest Experiment Station, 2500 Shreveport Highway, Pineville, LA 71360. (Accepted for publication June 28, 1984)

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