



## DDT Spray for Control of the Ponderosa Pine Tip Moth (*Rhyacionia zozana* [Kearfott])

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**ABSTRACT:** A water emulsion spray of DDT applied by hand sprayer to young trees infested with eggs and early-instar larvae of the ponderosa pine tip moth halted further larval activity and effectively prevented all damage.

The ponderosa pine tip moth (*Rhyacionia zozana* (Kearfott)) often infests young ponderosa pines in California. It destroys new growth and causes a minor amount of tree

deformity. Natural controls usually limit moth populations to levels at which the damage is of little or no consequence.

In some instances, however, even a little damage is intolerable. Such a situation occurred at the Badger Hill seed orchard near Placerville, El Dorado County (elevation 3,200 feet). Grafted scions of Jeffrey and sugar pines there were being destroyed by tip moth larvae, interfering with tree improvement work. Because of heavy damage to scions in 1962 and 1963, we decided to try preventive measures in 1964.

DDT is effective against the European pine shoot moth (*R. buoliana* (Schifferrmüller)), a closely related species (Miller and Neiswander 1955).<sup>1</sup> Using this information to guide us, we applied a single DDT spray to infested trees at Badger Hill when most of the tip moths were in the early larval stages.<sup>2</sup> When the larval feeding period had ended we found that none of the sprayed trees was damaged by tip moths; adjacent unsprayed trees sustained damage comparable to that of previous seasons.

### Spray Formulation

The insecticide used was DDT in water formulated to provide 2 lbs. of actual DDT for each 100 gallons of spray. A 25-percent

<sup>1</sup>Miller, W. E., and Neiswander, R. B. Biology and control of the European pine shoot moth. Ohio Agr. Expt. Sta. Res. Bul. 760, 31 pp., illus. 1955.

<sup>2</sup>Carl Fowler and LeRoy Johnson, foresters, U.S. Forest Service tree improvement program, Placerville, applied most of the spray and otherwise assisted in this test. Their help is gratefully acknowledged.



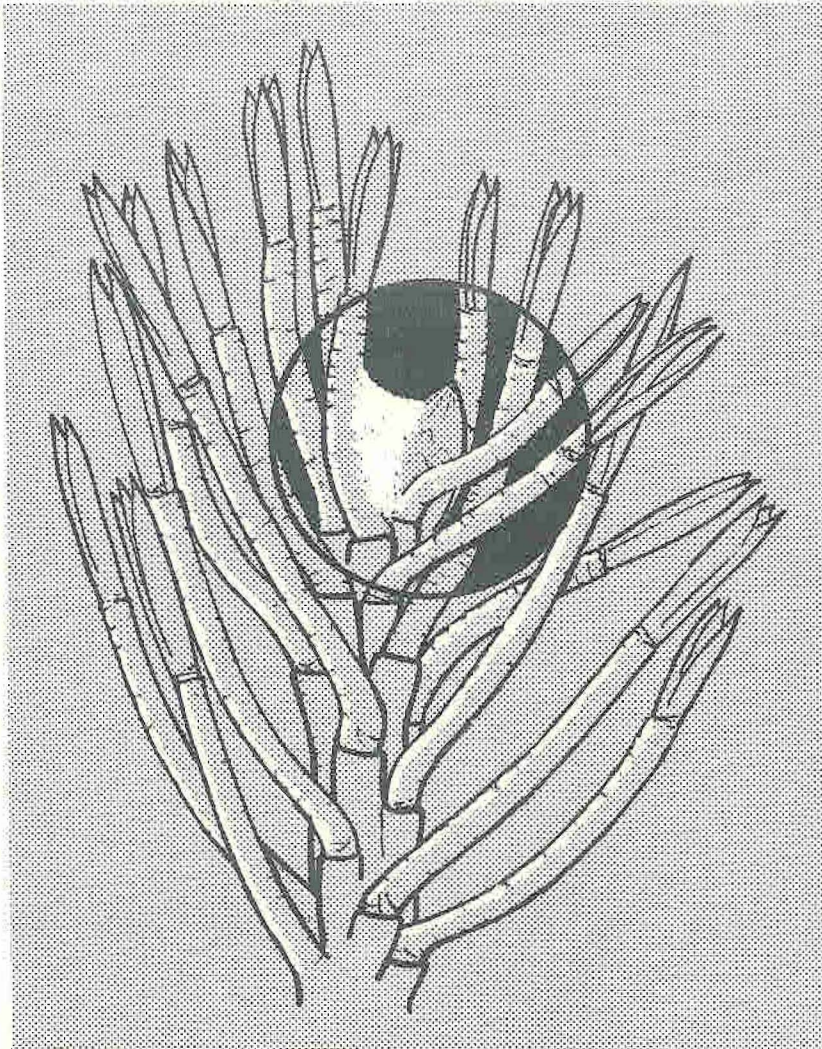


Figure 1.--''Tents'' of pitch-coated silk enclose young tip-moth larvae at the time the insects should be sprayed.

DDT emulsion concentrate was used in the 1964 trial; DDT in wettable powder form should also be suitable--providing the spray is adequately agitated.

#### Dosage and Method of Application

The spray can be applied with any standard compressed-air or backpack-type sprayer. It is necessary to spray only the shoots that are to be protected. But for trees less than 2 feet tall it is generally convenient to spray the entire tree. The spray should be applied to the point of runoff. At Badger Hill, we used 8 gallons of spray to protect about 500 trees, which ranged from 6 inches to 4 feet tall, and averaged about 2 feet tall.

### Timing

There is considerable latitude in timing the spray because the larvae feed for several weeks on needle bases and the outer bark before starting to mine within the shoot. The spray should be applied when the eggs are hatching and the tiny larvae are beginning to mine in the needle bases and outer surface of the shoot. This activity can be determined precisely by observing the initial formation of the resinous "tents" that enclose the young larvae (fig. 1). Generally it coincides with the early stages of ponderosa pine needle elongation--when the needles have just begun to emerge from the fascicle sheaths (fig. 1). At Badger Hill in 1964 this elongation occurred early in May.

CAUTION: DDT, like all insecticides, is a poison. Read and follow closely the directions on the container label.

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