

## Western Pine Shoot Borer

*Eucosma sonomana* Kearfott

Lepidoptera: Tortricidae

Sower, L. L.; Daterman, G. E.; Sartwell, C. 1984. Surveying populations of western pine shoot borers (Lepidoptera: Oleuthreutidae). *Journal of Economic Entomology* 77: 715-719.

**Objective:** To compare different survey methods for estimating populations of *E. sonomana* in the field.

**Abstract:** The western pine shoot borer, *Eucosma sonomana* Kearfott, is a pest of ponderosa pine, *Pinus ponderosa* Dougl. ex Laws., and can infest other pines in the western USA, by mining the pith of terminal shoots. This feeding causes an average 25% growth reduction in terminal shoots. A study was carried out in south-central Oregon to determine if the population level of *E. sonomana* could be accurately estimated using visual surveys, shoot dissections, and the trapping of male moths.

The visual assessment technique was determined to be the most practical for determining population levels of *E. sonomana*, especially if the investigators had experience assessing infestations. Visual surveys were also well correlated with the number of infested shoots as determined by shoot dissections as well as trap catches of male *E. sonomana*. Current-year infestation levels, as determined by the visual survey, accurately determined infestation levels the following year. Sampling at least 4 plots per plantation (10 trees per plot) was the recommended for trees less than 8 m tall. Also, to verify accuracy of the visual survey, a sub-sample of terminal and upper lateral shoots could be taken (10 shoots per tree) and dissected. Pheromone trapping for males was recommended if many plantations had to be surveyed. Pheromone traps should be placed in the mid-crown foliage of at least 5 sample trees at 20 m spacing.

### Sampling Procedure:

Visual survey: Pace 30 m directly into a plantation away from a road or plantation edge and select the nearest tree. Lay out a 50 by 50-m plot, marking a tree in each corner. Off each corner select a block of 24 trees (3 rows of 8 trees), and visually inspect terminal and lateral shoots for presence of short needles, which is a characteristic symptom of *E. sonomana* infestation (Stoszek 1973). The authors suggest that the leaders on as few as 10 samples of 10 trees (100 shoots per plantation) could be surveyed to provide adequate sampling accuracy.

Shoot dissection survey: Although this method is by far the most accurate means of determining infestation levels, it requires the removal and destruction of the terminal shoot. Select three adjacent trees out from each

marked corner of each plot for destructive sampling of the terminal shoot. Record shoots with larval mines greater than 5 cm in length as infested. This method is also complementary to the visual inspection of terminal leaders. For intensive, small-scale applications, sample destructively 10 vigorous lateral shoots on each of 10 trees per plantation to estimate infestation levels.

Pheromone traps: Use Pherocon II pheromone traps baited with a 0.005% pheromone in a 70 mg polyvinyl chloride (PVC) pellet (Daterman 1974). Place traps in the mid-crown of 5 trees on a 100-m loop (20 m spacing between traps) within the area to be treated. Set traps one week prior to the predicted flight period (i.e., April in south-central Oregon) and leave in place until a week after the predicted flight period (i.e., June). This trapping method is effective at detecting populations of *E. sonomana* over large scale areas. For intensive, small-scale applications, the use of many pheromone traps may actually reduce moth density when populations exist at low to moderate levels.

#### References:

- Daterman, G. E. 1974. Synthetic sex pheromone for detection survey of European pine shoot moth. Res. Pap. PNW-180. Corvallis, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 12 p.
- Stoszek, K. J. 1973. Damage to ponderosa pine plantations by the western pine shoot borer. *Journal of Forestry* 71: 701-705.