Slash Pine Seedworm

Edward P. Merkel[1]

The slash pine seedworm, *Laspeyresia anaranjada* Miller, destroys the seeds of slash pine in the Southern United States. Economically important losses caused by this insect are confined to seed production stands and seed orchards.

Hosts

The principal hosts of the slash pine seedworm are typical slash pine, *Pinus elliottii* var. *elliottii*, and South Florida slash pine, *P. elliottii* var. *densa* Little and Dorman. The seedworm occurs throughout the natural range of these pines (fig. 1). It has been reared occasionally from mature cones of longleaf pine and rarely from cones of loblolly pine.

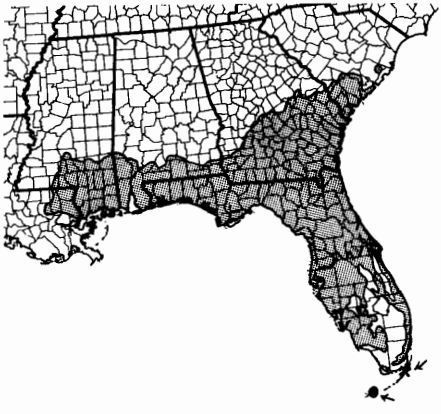

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Figure 1.—Range of slash pines and the slash pine seedworm.

Damage

Damage is caused entirely by larval feeding within the maturing seeds in second-year cones. In northern Florida, newly hatched larvae bore from the cone surface into the seeds during May. As the season progresses, the larvae tunnel from seed to seed. They completely consume the interior of each seed and fill it with excrement (fig. 2, *A*). By the time slash pine cones mature in mid-September, each larva may have hollowed out five to seven seeds.

Infested slash pine cones usually contain from one to four larvae. Mature larvae stop feeding on the seeds just before normal seed-fall and bore into the cone axis to overwinter (fig. 2, *B*).

Losses caused by this seedworm in orchards and seed production stands range from 2 to 15 percent of the total annual seed crop.

[1] Research entomologist, Southeastern Forest Experiment Station, USDA Forest Service.

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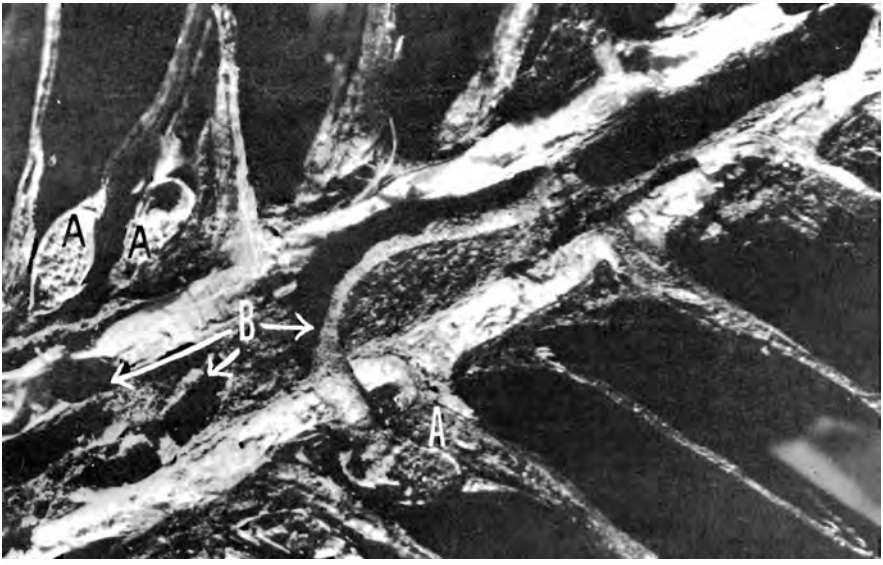

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Figure 2.—Mature slash pine cone split lengthwise to show (*A*) seed filled with larval excrement and (*B*) galleries of overwintering mature larvae in the cone axis.

Description

The moths have a wing span of 5/8 inch (fig. 3). The forewings of both sexes are yellowish orange and have prominent, transverse, silvery bars. This insect is the only known North American member of the genus *Laspeyresia* with such wing coloration—all other species have gray to black wings.

Newly hatched larvae are about 1/16 inch long and have black heads and white bodies. The bodies are creamy white throughout larval development. Fully grown larvae are about 1/2 inch long and have an amber to dark-brown head (fig. 4).

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Figure 3.—Adult of the slash pine seedworm.

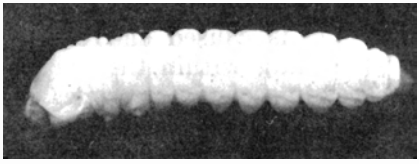

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Figure 4.—Mature larva of the slash pine seedworm.

Pupae are about 3/8 inch long and light brown to amber (fig. 5).

Life History and Habits

In northern Florida moths begin to emerge during the last week of April from mature cones

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Figure 5.—Pupa of the slash pine seedworm.

of the previous year's crop. By this time these cones have usually dropped to the ground. Moth emergence reaches a peak between May 10 and 20 and ends during the first week of June.

Ninety percent of all eggs are laid during the first 3 weeks of May. Eggs are deposited on sec-

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Figure 6.—Mature slash pine cone showing two damaged seeds remaining in cone after normal seeds have fallen. Note exit hole for moth made by mature larva prior to pupation in early April.

ond-year cones, invariably in the shallow groove on the tip of the cone scale. They are laid either singly or in groups of two to four with the eggs overlapping like shingles. Eggs generally hatch within 3 days after deposition. Newly hatched larvae wander over the surface of the cone for only a few hours and then bore through or between the cone scales and into the seeds.

For the remainder of the season, until slash pine cones mature in mid-September, the larvae feed within the seeds. After the contents of a seed is completely consumed and the seed is filled with excrement, the larva bores into another seed, connecting the two seeds with a tunnel of tightly spun, silken threads. Pairs or small groups of hollowed-out seeds usually remain firmly attached to the cone axis after normal seeds drop from the mature cones (fig. 6). Soon after the cones open to release their seed, the fully grown larvae enter the cone axis, where they remain until the following April.

Before pupating in April, the mature larva leaves the cone-axis gallery and returns to the seed in which the axis gallery originated the previous fall. The larva then cuts a circular exit hole nearly through the seedcoat and returns to the axis to pupate. Pupation starts in early April and lasts approximately 2 weeks. The pupa then works itself up the axis gallery into the hollowed-out seed and pushes the circular cap off the exit hole (fig. 6). The pupa usually projects about half its total length from the exit hole, thus permitting the moth to split its pupal skin and emerge from between the scales of the opened cone.

Natural Control

Very little is presently known about biological agents and environmental factors that help to control populations of the slash pine seedworm. Limited observations on open-grown slash pines in northern Florida have shown that parasitic wasps of the families Trichogrammatidae and Braconidae commonly destroy an average of 50 percent of the seedworm eggs and larvae. One braconid parasite, *Phanerotoma fasciata* Prov., matures when the seedworm larva reaches maturity and emerges in large numbers simultaneously with the host moth. Despite the apparently high incidence of parasitism in the seedworm, it is able to maintain fairly high population levels from year to year. *Phanerotoma fasciata* may be an important regulator of seedworm populations, but it does not prevent larvae from destroying seeds.

The pattern of rainfall influences seedworm populations. Abnormally high rainfall during the usual period of moth emergence causes mature cones to remain tightly closed so that the moths are either delayed in emerging or, if the rainfall persists, trapped inside the cones.

Chemical Control

Control of the slash pine seedworm with insecticides is economically feasible only in seed orchards and seed production areas.

One well-timed application of an effective insecticide is usually sufficient to control this insect. If heavy rains occur within 24 hours after the insecticide is applied, respraying of the trees is advisable. The insecticide should be applied to slash pine trees between May 5 and May 20, the peak period of moth emergence,

egg laying, and egg hatching. When hydraulic sprayers are used, the insecticide should be applied as a wetting spray; i.e., until it begins to drip from the foliage.

When applied with a hydraulic sprayer, a water suspension of azinphosmethyl will effectively control the slash pine seedworm. A spray is prepared by mixing 6 pounds of 25 percent azinphosmethyl wettable powder in 100 gallons of water. When applied with a mist blower, the concentration should be increased to 30 pounds of 25 percent azinphosmethyl in 100 gallons of water.

Pesticide Precautions

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key—out of the reach of children and animals—and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or when they may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

WARNING: Recommendations for use of pesticides are reviewed regularly. The registrations on all suggested uses of pesticides in this publication were in effect at press time. Check with your county agricultural agent, State agricultural experiment station, or local forester to determine if these recommendations are still current.

References

DISTRIBUTION OF THE PINE SEEDWORM, *Laspeyresia anaranjada*, WITH NOTES ON THE OCCURRENCE OF *Laspeyresia ingens*. E. P. MERKEL. Ann. Entomol. Soc. Amer. 56: 667–669. 1963.

LIFE HISTORY OF THE SLASH PINE SEEDWORM, *Laspeyresia anaranjada* MILLER (LEPIODOPTERA: OLETHREUTIDAE). E. P. MERKEL. Fla. Entomol. 50: 141–149. 1967.

A UNIQUE NEW NORTH AMERICAN SPECIES OF PINE-CONE-FEEDING *Laspeyresia* related to *L. ingens* Heinrich (LEPIDOPTERA: OLETHREUTIDAE). W. E. MILLER. Fla. Entomol. 42: 131–134. 1959.

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