

## Connecticut Agricultural Experiment Station

New Haven

### THE EUROPEAN PINE SHOOT MOTH

#### A Potential Enemy of Pines in Connecticut

R. B. FRIEND

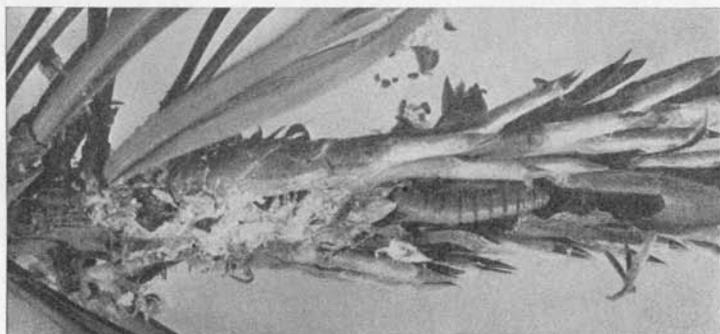


FIGURE 15. Larva of the European pine shoot moth in new growth of red pine. Enlarged twice.

During recent years the European pine shoot moth, first discovered in Connecticut 16 years ago, has become a serious enemy of pines in many parts of the State, including both ornamentals and those in forest plantations. This insect, a native of Europe, infests not only many species of European pines which have been imported into this country, but several native North American species as well, including red, jack, lodgepole, western yellow, longleaf and loblolly. Larvae are sometimes found in white pine, but injury to this tree is relatively rare and has not assumed any importance to date.

### Appearance of the Insect

The egg is minute in size, white in color when first laid, and usually found on the twigs near the terminal buds. The larva is brown in color, with a black head, and a fully grown individual measures about five-eighths of an inch in length. It may be found boring in the buds from the first of August until the last of the following May, and its presence is easily detected by the appearance of pitch on the outside of the buds. Very frequently the dead buds are bent over into a somewhat crescentic shape. The pupa is brown in color and about one-half inch in length. It

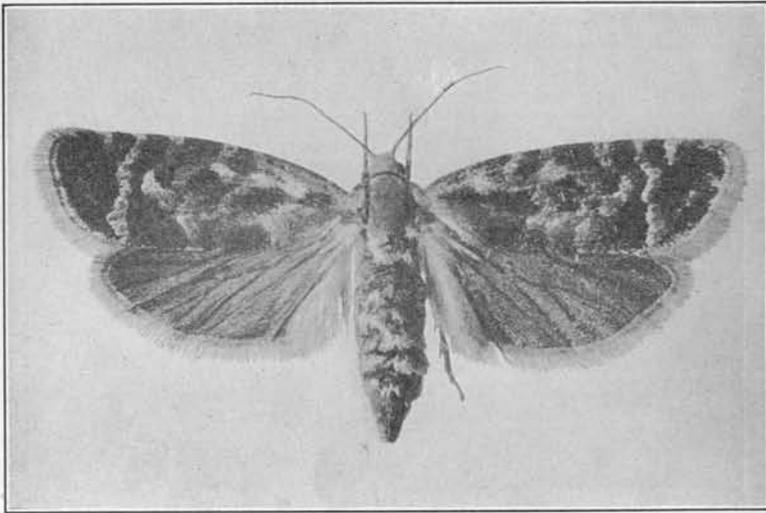


FIGURE 16. European pine shoot moth, adult, four times enlarged.

remains in the larval burrow until the adult is ready to emerge, at which time it wriggles out until almost all of the body is exposed. The emerging adult leaves the cast pupal skin projecting from the shoot. The adult moth has a wing spread of about two-thirds of an inch, and the fore wings are reddish-brown in color with two silvery bands near the tips. The hind wings and body are grayish. The moths may be found flying around the trees at dusk during the last part of June and the first part of July. During the day they tend to remain quiescent on the foliage.

### Life Cycle and Habits

The insect has but one generation a year. The larva hibernates in the buds of the host tree and pupates in its burrow about the first of June. The adult moth emerges during the latter part of June and individuals are in flight from then until the middle of July, during which time the eggs are laid.



FIGURE 17. Young red pine with typical tip injury to leader and branches caused by the larvae of the European pine shoot moth.

This insect does not appear to fly very far and seems to prefer young trees. The infestations found to date in Connecticut have been most severe on small ornamental trees and young plantations of red pine. Trees 2 to 20 feet in height appear to be particularly susceptible. Once the insect becomes established in a plantation,

the infestation increases in intensity until the trees are severely damaged. Several small plantations of red pine have been observed in which the tip of almost every lateral branch and terminal has been killed and no increase in height has occurred during the last three or four years at least.

### Injury

The injury that this insect causes to pines is unique and easily recognized. The larvae kill the buds and bore a short distance

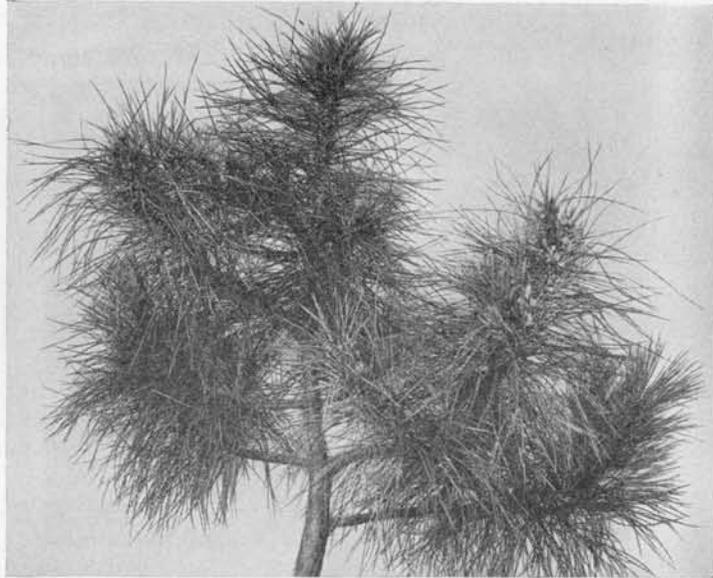


FIGURE 18. Young red pine with bushy tips caused by bud injury due to feeding of larvae of European pine shoot moth.

into the shoot. One larva may kill several buds in a cluster during the feeding period. Quite frequently the larva will also eat the tender bark on the side of a growing shoot, causing the latter to bend over. Red pine trees will produce adventitious buds below the tip on which the terminal buds are killed, and when these adventitious buds are killed in turn, the growth of the branch or terminal is permanently arrested. In some cases the development of a shoot from a lateral bud will cause a typical "bayonet tip" to form. This, of course, distorts the trunk of the tree. A very common result of injury by the larvae of this insect is the formation of a "bunched" or "bushy" tip.

In view of the fact that infestations in red pine plantations increase in intensity from year to year and that young trees appear to be particularly susceptible to injury, it is essential that control measures should be inaugurated as soon as the insect is discovered. This holds true for any species of pines that the insect will attack, but the increased planting of red pine in Connecticut and the susceptibility of this tree to injury by the insect make it particularly important in this respect.



FIGURE 19. Young red pine with tips of branches injured by the larvae of the European pine shoot moth.

Ornamental pines may be infested, and the insect will fly from these to any susceptible species planted nearby. It is essential, then, to determine whether or not the insect is already present in the neighborhood of an area to be planted and to eradicate the pest if possible. It is also obviously necessary to be certain that the insect is not brought into a region on nursery stock. The following trees are known to be host plants. *Pinus sylvestris*, *P. laricio*, *P. pinaster*, *P. austriaca*, *P. montana* var. *mughus*, *P. strobus*, *P. resinosa*, *P. sabiniana*, *P. ponderosa*, *P. taeda*, *P. contorta*, *P. banksiana*, *P. muricata*, *P. densiflora*.

### Control Methods

The most practicable method of control is to cut off the infested shoots containing the insects and burn them. This may be done any time between the middle of August and the first of the following June, but it is better to do this before the larvae become active in the spring, as the insect is then destroyed before the maximum injury occurs. The presence of the larva is indicated by masses of pitch on the buds, by a few dead needles at the tip of the branch, and by the dead curved buds. This method of control can be carried out until the trees are seven or eight feet high and should be an annual procedure.

Certain spraying methods offer some promise, and where they can be carried out should markedly reduce the numbers of the insect. At present, one of the most promising insecticidal mixtures consists of nicotine sulfate, diluted one part to 400 parts of water, with enough Penetrol to make one per cent by volume. Penetrol is a patented petroleum derivative that forms an emulsion with water. The trees should be thoroughly sprayed three times at weekly intervals beginning about June 21.

The European pine shoot moth appears to be a serious potential enemy of red pine plantations in Connecticut. If the trees are inspected annually while young and control measures are carried out, there seems to be no reason at present why a plantation cannot be protected against serious injury. This also applies to ornamental pines. Where the insect has become firmly established and no control measures have been adopted, serious injury to the trees has resulted.