

Connecticut Agricultural Experiment Station New Haven

A NEW AND SERIOUS INSECT PEST OF RED PINE

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Figure 1

Egg packet on underside of bark flake. This and all other photographs in this circular by Benjamin W. McFarland.

In late November, 1946, the watershed of the Hemlocks Reservoir of the Bridgeport Hydraulic Company, located in Easton, Conn., was visited in response to a request from the supervisory staff. Numbers of plantation red pines (*Pinus resinosa*) had died suddenly, and others appeared to be dying. Beneath the bark flakes on the twig pulvini, and at the bases of the needles, were found very minute, reddish sac-like objects. These were tentatively identified as preadults of a species of the genus *Matsucoccus*, a scale insect. This identification subsequently was confirmed by Dr. Harold Morrison of the Division of Insect Identification, U. S. Department of Agriculture.

Up to the present time only two species of *Matsucoccus* have been known in the Northeast, where their chief host plants are pitch pine (*Pinus rigida*) and scrub pine (*P. virginiana*). They have not been found on *P. resinosa*. While they have caused sporadic killing of twigs, neither of these scale insects has the life habits nor the lethal effects noted in the case of the species on red pine. It is assumed that the damage to red pine is caused by either a new or an imported species. A more complete account will be forthcoming when specimens of all of the various life stages have been collected.

Although the life history has not been studied in detail, some observations have been made. Mature males and ovipositing females may be found in the field from late May into the latter half of June, with the peak in early June. The wingless females are brownish-red in color, rather pear-shaped, and range in length from about 2.5 to 4.0 mm. The males are extremely small, winged, and midge-like in appearance.

The females lay their eggs in oval packets (Figure 1), preferably be-

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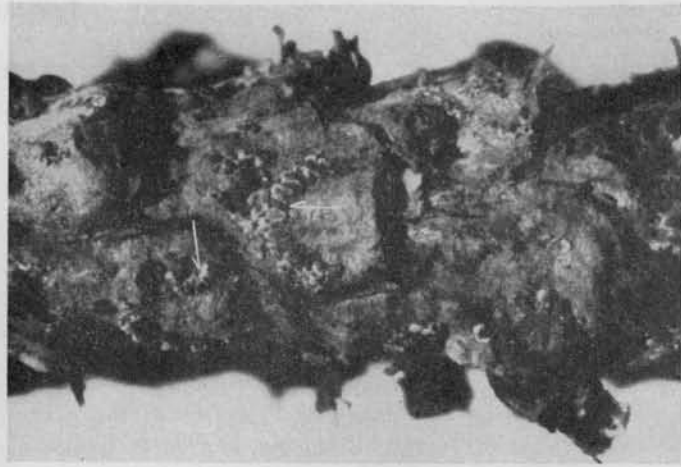


Figure 2
Hibernating preadults on pulvini of twig, covering bark flake removed.

neath partially loose bark flakes on the tree trunks and larger branches. Owing to this habit, the wax filaments forming the packet are attached to both opposing bark surfaces. It is estimated that a packet contains several hundred eggs. As the eggs are laid, the females gradually shrivel up and die at the end of the process.

When the eggs hatch, the young nymphs crawl to a suitable spot upon the twigs, and there affix themselves by penetrating the plant tissues with their stylets. On the two- and three-year twigs, they are found in the places previously mentioned (Figure 2); on the current year's growth, they may be wedged into the cracks between the pulvini. In the latter case, the bark flakes are not yet sufficiently loose to receive the nymphs. They molt once (perhaps twice), losing their appendages, and remain on the twigs as preadults until the following spring. At this stage the preadults are only about 0.3 to 0.4 mm. in length, have a peripheral edging of wax, and are very difficult to detect without a lens.

If the life history follows the pattern of some of the other species of *Matsucoccus*, the preadults resume their activity with the onset of tree growth. It is not known whether they molt more than once in the spring. With the final molt the male forms, at least, regain legs and crawl to another place to make the cocoons in which they transform to adults. In this migration they are gregarious and gather in large numbers, especially on the underside of branch axils. The cocoons may be so numerous that collectively they resemble masses of cotton fluff (Figures 3 and 4).

The females may not reach maturity in this manner, as large, flattened, empty cast skins, not enclosed in waxy filaments, have been found. Upon

maturing, the females also regain legs, and move about seeking an appropriate place to lay eggs. Under favorable climatic conditions there may be a partial second generation, as a few ovipositing females have been collected in September.

The effect of the feeding of this insect upon the host tree is fast-acting and devastating. The foliage, first on the new growth and later on the older growth, turns a yellow- to olive-green color, and, with death, becomes brick red. In contrast, needles which have died normally are a deep straw color. Necrotic areas are to be found in the plant tissues beneath the insect. These may be caused by withdrawal of the cell contents during feeding, or by a simultaneous injection of a toxic material, but probably by a combination of both factors. In cases of massive infestation, death of the twigs may possibly be caused by girdling due to coalescence of these necrotic areas. Infested twigs frequently are swollen and cracked, as though girdled at the base (Figures 5 and 6).

Affected trees were found in several stands in the same general locality, and within comparatively short distances of each other. The infestation appears to be limited, so far, to a portion of the southwest watershed of Hemlocks Reservoir. Scouting of the red pine on the holdings of the Bridgeport



Figure 3
Mass of cocoons on lower side of branch axil.

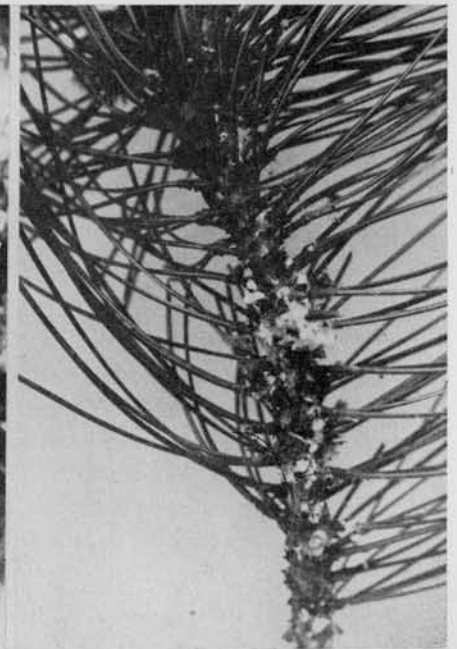


Figure 4
Cocoons on twig.

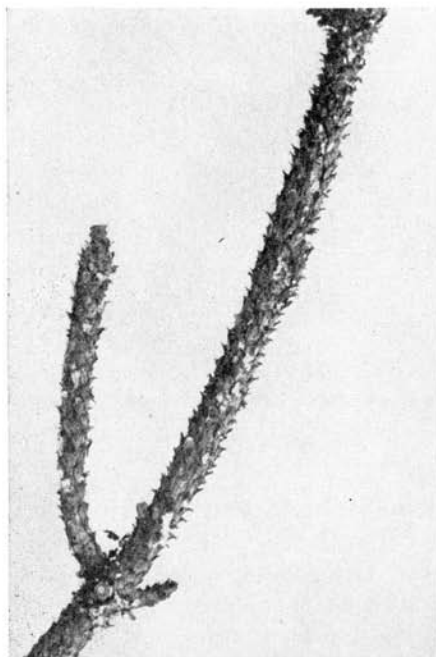


Figure 5
Swollen and cracked twigs in dying condition; with cocoons.

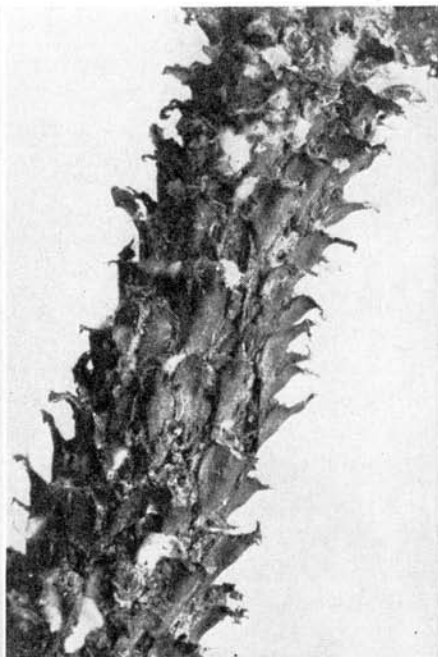


Figure 6
Same as Figure 5, enlarged.

Hydraulic Company has not revealed any other separate infestations. Although other species of pines are planted in close association to, or mixed with, the red pine, none of them has been attacked. Trees of from about four to forty feet in height have been involved. Thus, neither the age of the tree nor the degree of closure of the stand appear to offer any resistance to this insect. Approximately 10 to 12 acres of trees have been killed and cut, and further removal operations are in progress.

It is evident that this scale insect may prove to be the most serious enemy of red pine yet to appear. Its further spread will endanger many thousands of acres of plantations of this pine, and at the moment no control measures other than cutting appear feasible. The trees being cut are not a total loss, however, as the smaller age groups are being used in the manufacture of fireproof shingles, and the larger trees are being sawed into lumber and box slats.

The identity of this insect will be established, and its life history and effect on the host tissues will be determined. Chemical control measures will be attempted, but it is dubious whether these can be economically sound in forest stands.