Pine Tortoise Scale

Louis F. Wilson[1]

The pine tortoise scale *(Toumeyella numismaticum* (Pettit & McDaniel)) is a soft scale insect that periodically kills hard pines. It is a native insect and was first reported in eastern Nebraska in 1911 and later officially described in 1920 from specimens obtained in northern Wisconsin. It was probably carried into Nebraska from Wisconsin on infested, wild jack pine seedlings used to establish an experimental planting in 1891.

The currently known range is from eastern New York south to Maryland and west through the North Central States to the Great Plains wherever its hosts are found. It is also known to occur in Manitoba and Ontario, Canada.

The taxonomy of the genus *Numismaticum* is still undecided, and it is possible that some reports of *T. pini* King actually refer to the pine tortoise scale. Some collections of *T. pini* from Pennsylvania, Maryland, and West Virginia are now considered to be at least a form near *T. numismaticum.*

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Hosts

Trees of all sizes are attacked. Preferred hosts are Scotch and jack pines. Austrian pine (*P. nigra* var. *austriaca* A. & C.) also is commonly attacked, but red pine is attacked only when it is growing adjacent to or mixed with the preferred hosts. The form of *Toumeyella* considered to be near *numismaticum* attacks Virginia pine.

Damage and Evidence of Attack

Heaviest damage occurs on seedlings and young saplings, although pole-sized trees are sometimes severely injured. Feeding of the nymphs and adult females on the twigs causes branches to die (flagging). Heavily attacked trees turn yellow and finally die. In most heavily infested jack pine stands, a few trees escape attack completely, apparently because of an inherited immunity.

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Associated with this scale is a sooty mold that grows on honeydew—a secretion given off by the immature female scales. Together, the honeydew and the black mold (fig. 1) on the needles give the

Figure 1.—Heavy attacks cause a sooty mold on the foliage. (Courtesy Ohio Agricultural Experiment Station.)

tree a shiny dark appearance. Ants often feed on the honeydew.

Description

The eggs are ovoid, pinkish, almost transparent, and about 1/64 inch long. To the naked eye they appear collectively as a fine powder beneath the female scale.

The first-instar nymphs—called

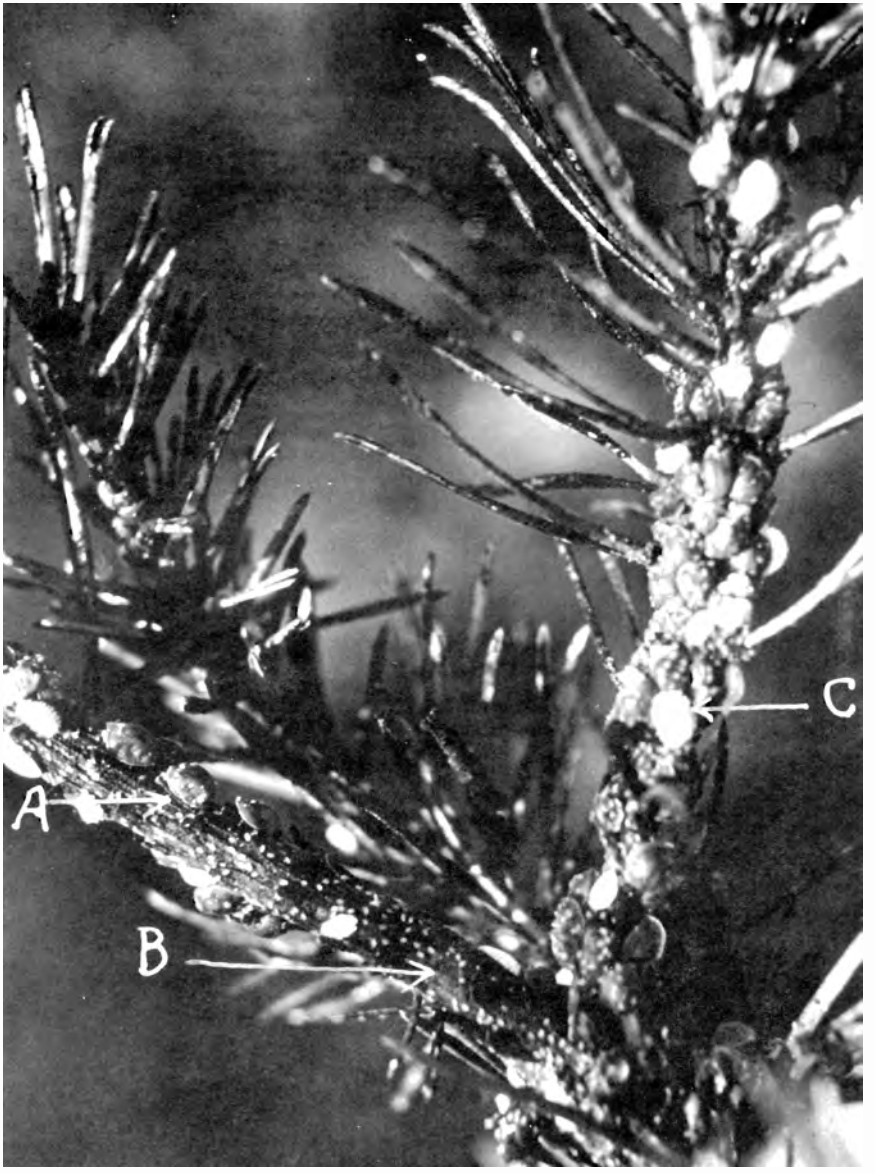

Figure 2.—The pine tortoise scale and predators: *A*, mature female scales; *B*, puparia; *C*, ladybird beetle predators. (Courtesy University of Wisconsin.)

crawlers—are nearly as large as the eggs and oval and have six short legs. They are reddish, and to the naked eye they appear as "fine red pepper" sprinkled on the twigs.

The older nymphs are legless, helmet-shaped insects. The female

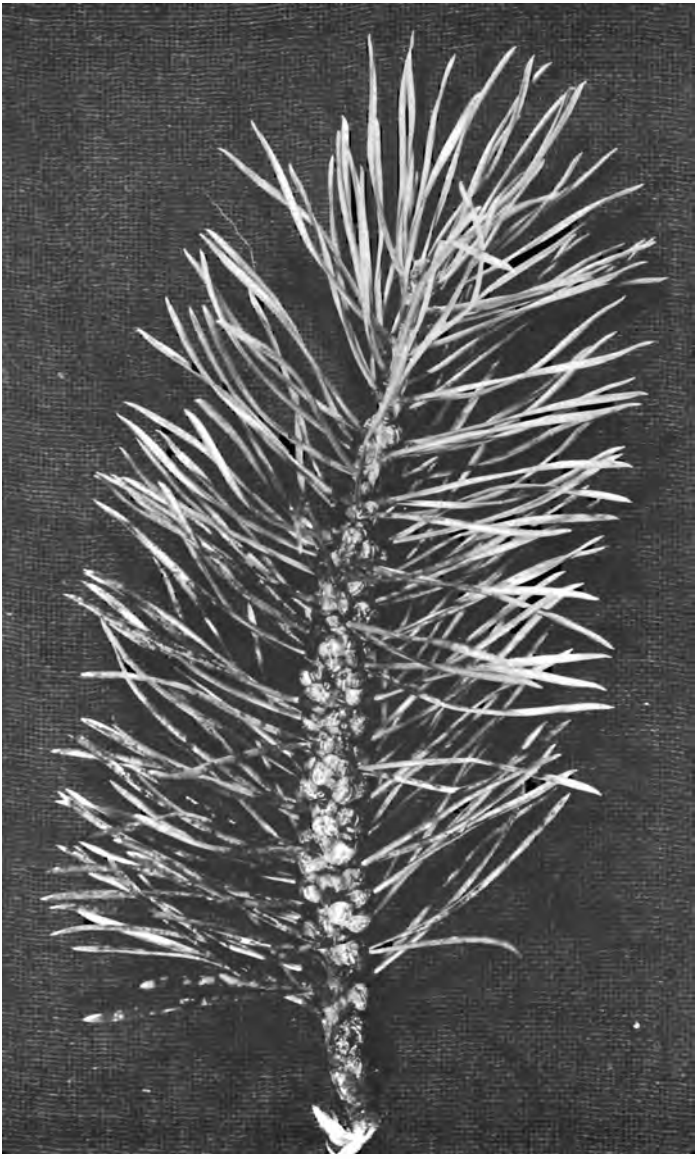

Figure 3.—Immature, hibernating female scales. (Courtesy Ohio Agricultural Experiment Station.)

nymphs are larger than the males and often wrinkled and dark brown to black. When mature, the females (fig. 2) are $\frac{3}{16}$ to $\frac{1}{4}$ inch long and reddish brown. The most obvious evidence of the presence of male scales is the puparia. These are oval, white, and translucent and about $\frac{1}{8}$ inch long (fig. 2). The adult males, which are seldom seen, are winged and barely $\frac{1}{16}$ inch long.

Life History and Habits

There is one generation per year. The female scale produces about 500 eggs, which are laid and develop under the female in June and early July. The crawlers hatch within a few hours, crawl out from under the female, and disperse. Many walk to new areas on the same host, but others are carried to new hosts by wind. Some may be carried to new localities on the feet of birds.

The crawlers settle down and suck the sap of the host and shortly afterward become sedentary, legless nymphs. A white, powdery substance develops on the margins of the young nymphs, and in about 2 weeks sexual differentiation becomes apparent. About 1 week later the smaller, male nymphs are fully developed. They pupate and emerge as small, flylike adults. They immediately search out and fertilize the still immature, immobile, female nymphs and then soon die.

The fertilized females continue to develop until late fall, when they hibernate (fig. 3). They resume activity in the spring about the time the buds begin to swell. Honeydew is secreted copiously during this time and is accompanied by the sooty mold and ants. The females mature in early June.

Natural Control

Because this scale is often controlled by natural agents, the forest owner should examine his trees to determine the abundance of these agents before resorting to the use of insecticides. Several species of ladybird beetles, both as larvae and adults (fig. 2*C*), attack the young scales and the eggs under the mature female scales. Heavy scale infestations have been almost completely destroyed by these predators. *Hyperaspis congressis* Watson, previously considered as *binotata* (Say), is by far the most abundant species. Also reported as exerting a strong controlling effect in various parts of the scale's range are *Hyperaspis signata* (Oliv.), *Chilocorus bivulnerus* Muls., *Scymnus lacustris* Lec., *Coccinella transversoguttata* Fald., *C. trifasciata* L., *C. novemnotata* Hbst., and the chalcid parasite, *Microterus fuscicornis* (Howard). The larvae of the pyralid moth *Laetilia coccidivora* (Comst.) noticeably reduced scale populations in Ohio in the late 1930's and in Maryland, West Virginia, and Pennsylvania in 1957.

Chemical Control

Malathion can be used to control the crawlers in late June and early July. An effective aerial spray consists of $1\frac{1}{2}$ pints of 57-percent malathion emulsifiable concentrate in 2 gallons of water,

applied at the rate of 2 gallons per acre.

Small stands may be treated with a 5-percent water emulsion, applied at the rate of 6 gallons per acre with a mist blower. To prepare this spray, mix 1¾ gallons of 57-percent malathion emulsifiable concentrate and 20 gallons of water.

Because malathion has a short period of effectiveness, crawlers that have become sedentary—about 1 week after hatching—will not be affected by the chemical. Consequently, spraying should be done twice—first within 4 to 5 days after the first hatching and again 5 or 6 days later.

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.

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