Control of the Eastern Spruce Gall Aphid

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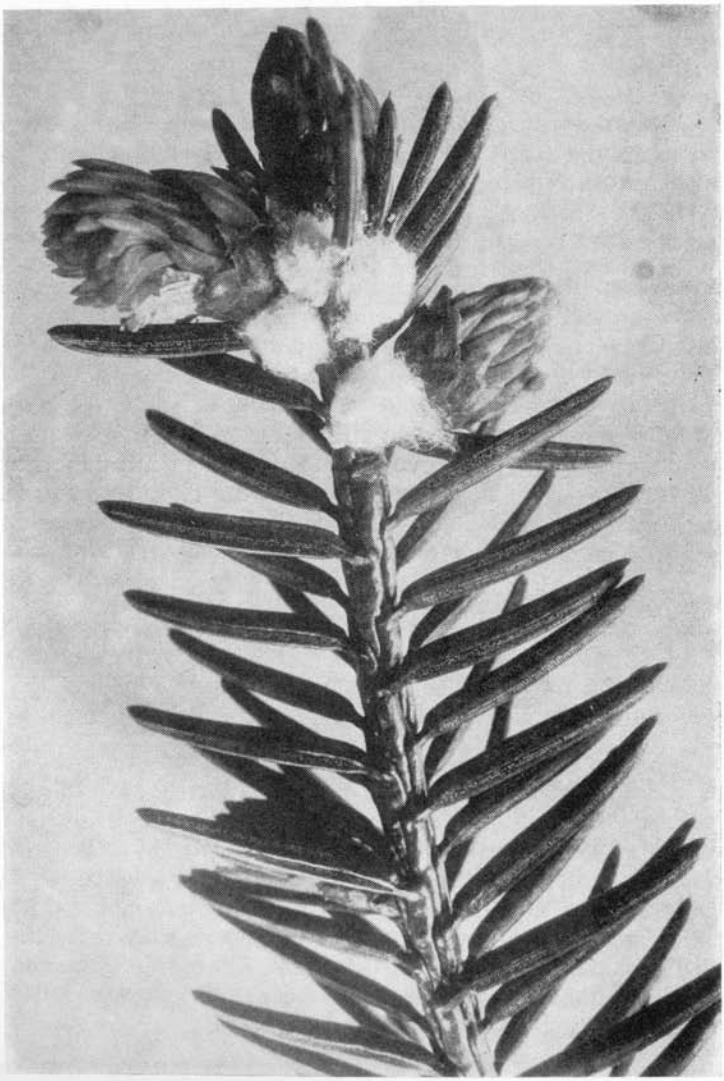

"Cotton" protecting female aphids and eggs at base of new growth.

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The Eastern spruce gall aphid (*Chermes abietis*) occurs in eastern United States and Canada. It is a European species that was accidentally introduced into the western hemisphere early in the nineteenth century (Friend, 1936). It is notably injurious to white and Norway spruces and may also occur on red and black species.

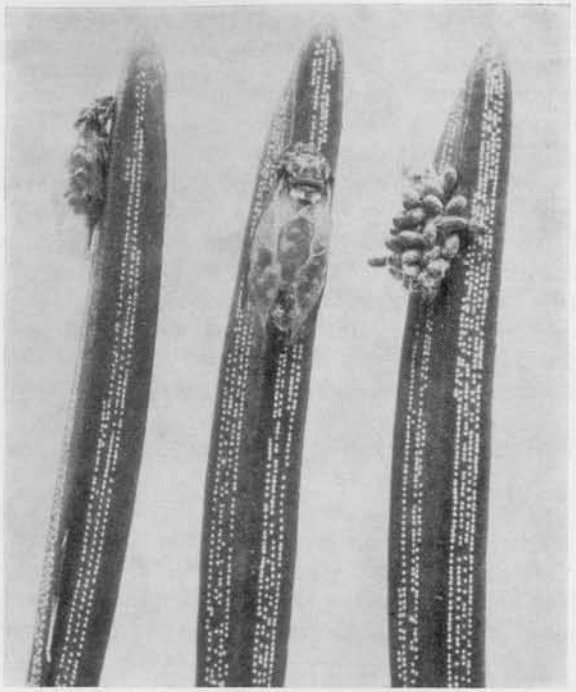
It causes small ½- to ¾-inch pineapple-like galls to develop at the base of new growth during the spring months. They are most noticeable in August when they turn dark brown. Seriously infested trees may be checked in their growth resulting in stunting and deformity. Small, newly planted trees may be killed when badly infested, whereas older, healthier ones sometimes overcome an infestation. An interesting natural phenonmonon, frequently observed, is freedom from infestation in some specimen trees even when the trees are growing close to many infested ones. This indicates individual resistance to the pest.

Life History and Habits

The aphids overwinter in the nymphal stage. They develop in the spring into wingless females and cover their bodies with waxy filaments resembling cotton or wool. As the nymphs hatch from eggs deposited under the cotton, they insert their beaks at the base of the new twigs and feed.

In a recent year, eggs were first observed in early May. By the 11th of the month, 88% of the "stem mothers" (females) were surrounded by eggs averaging 95 per female in a range of 44 to 185. About 3% had hatched. Furthermore, the base needles of the new growth (½" to ¾" long) were swollen and pinkish in color. This abnormal condition indicated the presence of immature galls that were started by the overwintered "stem mothers." At first (May 11), infestation appeared to be confined to terminal buds. However, as eggs continued to hatch some of the nymphs migrated to lateral buds.

As the galls increase in size they produce a number of open cavities or chambers that ultimately close, entrapping the nymphs. In August, the galls turn brown, the cavities crack open, and the mature aphids emerge. Wings expand and the aphids fly to nearby spruce trees or remain in the ones where they developed. Eggs deposited on the needles during August and September hatch in 7 to 10 days. Many of the nymphs crawl to the base of the new buds whereas others remain on the twigs



Adult spruce gall aphids depositing eggs on needles.

or near the needles. Feeding commences at once. Only those at the base of the buds appear to be winterhardy, all others die before spring (Friend, 1936). There are two annual generations.

Control

On April 17, Ethion Superior 60 Oil diluted at the rate of 1½ and 3 quarts of formulation in 100 gallons of water was applied to 4- to 5-foot Norway spruce trees to control overwintered aphids. The treatment was repeated once. A 3-gallon hand-pressure sprayer was used to drench the trees with the treatment. There were a number of untreated trees.

On May 8, 2- to 3-inch twigs were taken from each of the treated trees and examined with a binocular microscope. A total of 880 dead and no live aphids was counted. All aphids were alive in the check trees.

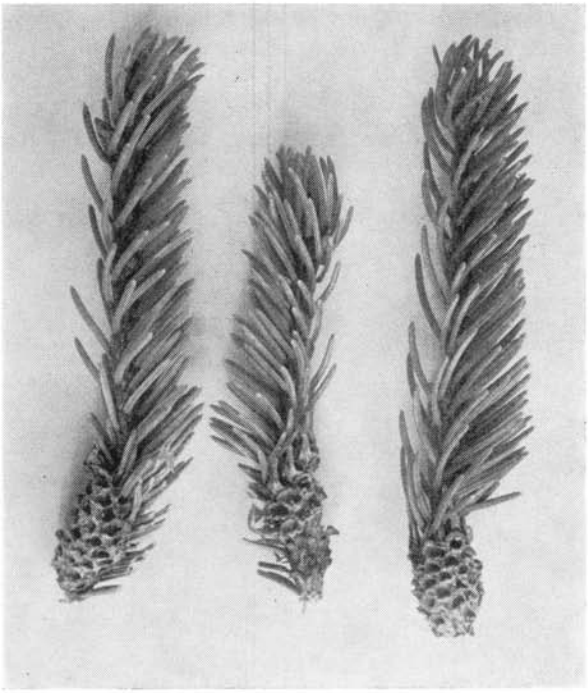
On April 4, several dozen 4- to 5-foot white spruce trees were treated with malathion 4% and Thiodan 3% dusts. A Solo shoulder-mounted dusting machine was employed to obtain complete coverage of the branches and twigs. In addition, Thiodan 24% emulsion diluted at the rate of 1 gallon of formulation in 100 gallons of water was sprayed onto an equal number of trees with a Solo shoulder-mounted spraying machine. The treatment achieved complete coverage of branches and twigs.

Table 1. Control of overwintered Eastern Spruce Gall Aphid.

Insecticide	Treatment	No. 3″ - 4″ twigs examined	Aphids		Percent control
			Dead	Alive	
Malathion	4% dust	12	1316	108	91.7
Thiodan	3% dust	12	512	4	99.2
Thiodan	1 gal./100	9	882	0	100
Checks		6	0	579	

Control data obtained on April 13 (Table 1) indicates somewhat better control of overwintered Eastern spruce gall aphids with Thiodan than with malathion.

A later experiment was undertaken on April 24 using both Thiodan and malathion dusts on several trees. At this time, the "stem mothers" were well protected by waxy filaments and many unhatched eggs were present. Control assay on May 1 indicated 25% kill of females with Thiodan and about 35% with malathion. Poor control in these instances was attributed to inability of the dusts to penetrate the waxy filaments



Gall at the base of new growth.

covering the females and hatching nymphs. Nymphs that had crawled away from the colonies were dead.

In a concluding test undertaken on May 16, Thiodan dust was used on trees in which the galls were enlarging and nymphs were present within open cavities. The treatment was applied in late morning when the atmosphere was clear and warm. All free-living nymphs (those crawling on twigs and needles) were killed during the first four hours subsequent to dusting. In addition there were fewer live nymphs inside the open galls in the treated (99 in 270 galls) than in the untreated trees (747 in 81 galls). A reassessment of control at the end of May indicated 100% kill of nymphs in the dusted galls and no control in untreated ones. Moreover, the galls in the treated trees had ceased to develop and their cavities had remained open. These small immature galls turned brown in August.

Summary

The Eastern spruce gall aphid is a serious pest of white and Norway spruces in Connecticut. It may be controlled during early to mid-April with Ethion Superior 60 Oil or Thiodan emulsion or dust. Malathion dust was somewhat less effective. Treatments applied in late April or May killed the aphids but rudimentary galls had already formed.

Registrations

All of the insecticides discussed in this Circular are registered for use in controlling insects on ornamentals and trees.

Reference

Friend, Roger B. The Eastern spruce gall aphid. Tree Pest Leaflet, Mass. Forest and Park Association, Oct. 1936: 4pp.

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