

Fletcher scale management in nursery settings

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Significance to industry

Scale insects as a group have been a problem for the nursery and landscape industries. With several new insecticide chemistries available, the IR-4 Project funded research to determine which products provide reliable scale control. Although Fletcher scale is not a pest on yews after they are planted in the landscape, they can be a problem in the nursery, where up to 30% of the fields are restricted by the Department of Agriculture because they do not pass inspection.

Objectives

Evaluate efficacy of neonicotinoid insecticides for control of Fletcher scale in yews

Materials and methods

Nursery plant: *Taxus x media* L. 'Densiformis'

Insect pest: Fletcher scale; *Parthenolecanium fletcheri* (Cockerell)

Plots were set up on June 15 in a *Taxus* field near West Olive, Michigan (Ottawa Co, MI, T7N R15W Sec 34 SWSE) operated by a commercial nursery. The treatments were replicated six times with each replicate consisting of six plants (36 plants per treatment). Each replicate was in a separate row, with treatments being randomized within each row. Rows with treatments were separated from each other by a buffer row, and replicate plots within each row were separated from each other by three untreated plants. The plants were 12 inches tall at the time of the test and were planted on a 24-inch spacing. The field was sandy and not irrigated. Adult female scales were observed on most of the plants on June 15. It was determined that the population was low and would grow as the test progressed.

All of the banded applications were applied a single time on June 15 (Safari 20SG 1x, Safari 20SG 2x, Safari 20SG 4x and Flagship 25WP) using an R&D Sprayers[®] CO₂ powered, single nozzle wand, hand-held sprayer. The banded Discus application was made on June 18 due to some difficulties obtaining product. All applications were applied at a volume of 200 gallons of finished spray per acre. Insecticides were banded by treating the soil in a 12-inch band on each side of the test plants. This resulted in 24 ft² being treated around each replication with 417 ml of finished spray (200 gal/A). Foliar applications were also applied in 200 gal of water per acre. Sprays were applied in three swathes about 12 inches away from the plants, with one swath on either side of the row and one directed downward over the row. All drench and foliar applications were made at 50 psi through a flat fan 8003 nozzle.

The first set of foliar applications was applied on June 29 (Discus, all 3 rates of both Talus formulations, all 3 rates of Flagship, all 3 rates of Tristar, all 3 rates of Distance, Flagship and Dursban). The 4x rate of Talus 70WP was applied at the same rate as the Talus 70WP 1x rate as the manufacturer failed to provide enough product. All of the Talus formulations and rates were applied only once as we were unable to obtain any more product. Foliar applications of the

Discus, all 3 rates of Flagship, all 3 rates of Tristar, the 2x rate of Distance, Flagship and Dursban foliar applications were repeated on July 14. The second application of the 1x and 4x rate of Distance was made on July 20. All foliar applications with the exception of the Tristar rates had Silwet added at a rate of 2 oz/100 gal.

An attempt at taking four- to five-inch twigs from each of the six bushes per replication to sample the scale population was undertaken on July 7 after crawler emergence. It was determined that the population was too low to use clippings as a sampling method. Between August 10 and 19, each bush in the test was visually sampled for 90 seconds to count large immatures and adult scales. Counts for six bushes within a replicate were totaled. The data were converted with a log transformation prior to Analysis of Variance/Tukey's Least Significant Difference test. The data presented in the accompanying table ([click here](#) to follow link to table) are the actual scale count means per treatment. Phytotoxicity ratings were made on July 7, July 20 and August 19 by rating the plants from 0 (no damage) to 10 (a dead plant – 0, 1, 2 would be considered salable plants).

There was no evidence of chemical burn in any of the treatments tested. The row that comprised replication four had some damage in it prior to the beginning of the test due to a fertilizer application. Apparently the banded, granular fertilizer application was applied at too high a rate and burned some of the plants. As the test proceeded, the plants grew out of the damage to the point that in mid-August all of the plants in the field were healthy and growing quickly due to the fertilizer and the amount of natural rainfall.

In order to fulfill both efficacy and plant protection objectives, the protocol as originally written included 1x, 2x and 4x rates. All of the treatments were supposed to have been applied twice as per the protocol. After a conversation with the Valent R&D representative, it was determined to apply the Safari banded treatments only once so that they would compare with grower practices and the other banded treatments in the test. All of the Talus treatments were also only applied once as not enough product was sent by the manufacturer to allow for two applications. The Talus 70WP 1x and Talus 70WP 4x treatments were both applied at the same rate as there was not enough product to make up the 4x rate. It was anticipated that there would be another shipment to allow for the second application, but it did not arrive.

For the purposes of the following discussion of efficacy, only the 1x rates will be included as the higher rates will ultimately be off-label. The untreated check treatments had a mean of nine scales per replication (six bushes). The Talus 40SC treatment was significantly different from the untreated check with a mean of 2.00 scale insects. One of the Talus 70WP treatments applied at 1.225 lb ai/A was significantly different from the check treatment with a mean of 2.17 scales and the other was not significantly different with 4.83 scales. The Talus treatments would have probably worked better if they had been applied both times they were scheduled. The Safari banded treatment and the Distance foliar treatment were not significantly different from the check treatments with means of 4.67 and 8.17 scales respectively. Both the Flagship foliar and the Tristar foliar treatments were significantly different from the untreated check with 2.00 and 3.50 scale insects.

Several treatments were added to make this a more rounded protocol. Growers in Michigan have used Dursban as a foliar application for Fletcher scale in previous years. Since Flagship as a foliar and Safari as a banded application were in the IR4 protocol list, Flagship as a banded application and Safari as a foliar were included. Discus was also included as both a banded and as a foliar application. All of these added treatments gave significant control (Dursban 2.83, Flagship banded 1.67, Safari foliar 3.50, Discus banded 3.00 and Discus foliar 1.17 mean scales per replication). The Discus foliar and the Flagship banded treatments gave the best control. Distance was not effective for control of Fletcher scale.