
EFFECTS OF SYSTEMIC INSECTICIDES, A GROWTH REGULATOR, AND OIL
ON ELONGATE HEMLOCK SCALE AND ASSOCIATED NATURAL ENEMIES
ON EASTERN HEMLOCK

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ABSTRACT

Several species of armored scale, including *Fiorinia externa* (elongate hemlock scale), *Nuculaspis tsugae*, and *Aspidiotus cryptomeriae* (cryptomeria scale) attack, disfigure, and kill *Tsuga canadensis* in the eastern United States. Damage to trees in forest and urban landscapes results in significant economic loss and threatens to eliminate unique sources of germplasm. Our objective was to evaluate practical methods of chemical control for elongate hemlock scale. In addition, we were also interested in the effect of treatments on natural enemies. We evaluated the efficacies of oil, imidicloprid (Merit, Imicide), acephate (Acecap), an undisclosed neonicotinoid using the Arbor-jet system, and the growth regulator pyriproxfen (Distance). Oil, Merit, and Distance significantly reduced scale abundance relative to control levels. Parasitoid emergence showed a similar pattern to that of scale abundance, although parasitoid movement and generalist predator abundance did not differ among treatments. Our results suggest that some chemical controls are effective against elongate hemlock scale. Furthermore, limited disruption of natural enemy communities by chemical application may promote sustainable biological control of scales during times when natural enemy population levels are low or moderate.

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