

**Section VIII****Mites and Sap-sucking Insects****IMIDACLOPRID (ADMIRE®) - A WELCOME ALTERNATIVE FOR  
COOLEY SPRUCE GALL ADELGID MANAGEMENT  
ON CHRISTMAS TREES****A. L. Antonelli****Department of Entomology,****Washington State University Puyallup****7612 Pioneer Way East****Puyallup, WA 98371-4998****206-840-4563****S.L. Foss****Washington State Department of Agriculture****Pesticide Management Division****P.O. Box 42589****Olympia, WA 98504-2589****206-902-2049**

Production of Christmas trees on 23,000 acres in western Washington is a major agricultural industry that contributes significantly to the economy of a region that has been troubled by restrictions on tree harvesting. Like most monocultured crops, however, Christmas trees suffer damage from weed competition, insect feeding, and pathogenic fungi. The Cooley spruce gall adelgid (*Adelges cooleyi*) is a major pest on Christmas trees in the Pacific Northwest. The insect forms small cottony tufts on new needles soon after it hatches. A severe infestation of these sucking insects may cause a heavy shedding of foliage, and if left unchecked can severely damage the tree. The crawler is the target of control efforts when new growth is expanding in the spring.

Presently, options for chemical control of the adelgid are limited to chlorpyrifos (Lorsban or Dursban), and endosulfan (Thiodan). Chlorpyrifos and Thiodan have a very high toxicity to fish and aquatic invertebrates. Indeed Thiodan 3EC has a restriction on the label that prohibits its aerial application within a distance of 300 feet of streams, lakes, ponds, and estuaries. New efficacious safer alternatives for insect control are imperative for helping growers maintain their productivity.

A new insecticide alternative, imidacloprid, (Admire®), is particularly suitable for controlling sucking insects, and therefore may be very useful on Christmas trees. Admire® is a new class of insecticide chemistry that represents a major advancement in pest management



due to its high degree of environmental and applicator safety. It is a systemic insecticide earmarked for foliar application by air or ground in Christmas tree plantations. It has very low contact activity but is extremely toxic to insects when ingested. This characteristic significantly reduces the hazard to beneficial predators and parasitoids; thus, it promises to be a very important product in integrated pest management systems.

In May 1994 several experiments were run in portions of Christmas tree plantations. In one series of experiments, (experiments 1-3), Admire® was applied by ground at an equivalent rate of 6.4 ounces (0.1 pounds active ingredient) per acre to three replicated fields. Shoot samples were randomly taken nine days after treatment from each of 20 trees from each treatment and numbers of adelgids were counted. Adelgid numbers were significantly (DMRT at 5% level), reduced by Admire® and Thiodan, which was used as a standard for comparison. Furthermore, both insecticides gave similar levels of control.

In another experiment, (experiment 4), Admire® and Thiodan were applied by helicopter over unreplicated blocks of Douglas-fir trees. The pesticides were applied without additional adjuvant and at lower spray volumes (10 gallons of spray solution per acre) compared to the ground trials (40-55 gallons of spray solution per acre). Preliminary results indicate that Thiodan suppressed adelgid numbers better than Admire®. Further research is needed to determine the role adjuvants and higher spray volumes have on the efficacy of aerially applied Admire®.

The research trials conducted thus far demonstrate that ground applied Admire® provided effective control of Cooley spruce gall adelgid in Douglas fir. When applied aerially or to trees with a dense canopy, spray coverage and use of an adjuvant could be critical factors affecting the efficacy of Admire®. Uniform coverage of a tree is not as critical when using Thiodan because this insecticide may have some biological activity in the vapor state. Although further research is needed, the desirable environmental safety of Admire® makes it a suitable candidate for IPM systems in Christmas tree plantations.

Mean live adelgids per terminal

Trt.                       $\bar{x}$  Exp 1<sup>1</sup>                       $\bar{x}$  Exp 2<sup>1</sup>                       $\bar{x}$  Exp 3<sup>1</sup>                       $\bar{x}$ Exp 4

Trt.	$\bar{x}$ Exp 1 <sup>1</sup>	$\bar{x}$ Exp 2 <sup>1</sup>	$\bar{x}$ Exp 3 <sup>1</sup>	$\bar{x}$ Exp 4
Check	2.99a	9.92a	7.89a	11.2a
Thiodan	0.15 b	0.40 b	0.27 b	4.7 b
Admire®	0.25 b	0.20 b	0.95 b	8.1ab

<sup>1</sup>DMRT at 5% level.