



Getting a handle on weeds

Area treated with topramezone 4 fl.oz./acre; six weeks post treatment in *Abies balsamea* × *fraseri*. PHOTO COURTESY OF JATINDER AULAKH

A closer look at topramezone as a post-emergence option for Christmas tree growers

BY JENNIFER GRAY

For Christmas tree growers, weeds are more than a nuisance. They compete directly with trees for water, nutrients, light, and space. They can slow growth, delay harvest, and reduce quality.

Post-emergence weed control options for Christmas tree growers, especially for broadleaf weeds, are limited. That challenge has pushed researchers to evaluate whether newer herbicides used in other crops could safely expand weed management options.

A recent study published in the *Journal of Environmental Horticulture* takes a close look at one of those options — topramezone, an HPPD-inhibiting herbicide already registered for use in Christmas trees as a pre-emergence application before budbreak or as a post-emergence directed spray.

The research, conducted in Connecticut, evaluated whether post-emergence applications could be safe-

ly applied over actively growing trees and how well the herbicide performs on some of the most common and troublesome weeds growers face.

Historically, selective early-season (mid-May to mid-June) broadleaf weed control in actively growing Christmas trees relied primarily on clopyralid. While clopyralid effectively controls horseweed, nightshades, ragweed, smartweeds, and vetches, it is not effective against common lamb's quarters, pigweeds, and members of the mustard family.

Similarly, the three-way tank mixture (clopyralid + glyphosate + oxyfluorfen), applied from mid-June onwards, frequently resulted in unsatisfactory weed control. By mid-June, the new growth has hardened enough to tolerate contact with the mixture, but the weeds are often too large for optimal control, limiting effectiveness.

It was the combination of these factors that led researchers to this study.

"There was a strong need to identify a new selective, broad-spectrum herbicide capable of providing effective early summer control of both grassy and broadleaf weeds," stated Jatinder Aulakh, an associate scientist at Connecticut Agricultural Experiment Station's Windsor Valley Laboratory, and lead researcher for the study.

Testing crop safety across species

The study evaluated topramezone tolerance in two settings: an outdoor container experiment and a two-year field trial on a commercial Christmas tree farm in Connecticut. In both cases, applications were made to actively growing trees, when the new growth was about 3 to 4 weeks old, rather than dormant plants.

In the container study, researchers applied topramezone over the top of eight species commonly grown for Christmas trees, including balsam fir, Canaan fir, Fraser fir, Nordmann fir, Norway spruce, white pine, Colorado blue spruce, and Douglas fir. Applications were made at three rates: half the labeled rate, the labeled rate (4.0 fl.oz/acre), and double the labeled rate.

Most species showed no injury at any rate. Balsam fir, canaan fir, Fraser fir, Nordmann fir, Norway spruce, and white pine tolerated all applications without visible chlorosis, necrosis, or stunting of new growth.

Colorado blue spruce and Douglas fir showed some sensitivity at the highest rate tested — double the labeled rate. In those cases, researchers observed temporary bleaching or yellowing of new growth, peaking about three weeks after treatment. »

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Injury levels averaged 9% in Colorado blue spruce and 23% in Douglas fir, and the symptoms declined as the season progressed. By 6 weeks after treatment, Colorado blue spruce had fully recovered, while Douglas fir still showed minor chlorosis.

Importantly for growers, no injury was observed in these species at the labeled application rate.

“Our research has shown that topramezone is safe for use around most Christmas trees when the new growth is about 4 weeks or older,” Aulakh notes. “Growers are advised to use a directed post-emergence application to avoid contact with the new foliage before it is 4 weeks old and again during ‘Lammas growth,’ otherwise significant bleaching and needle burn may occur. Frequency (topramezone) label also recommends a directed

spray and forbids over-the-top applications to avoid injury to Christmas trees.”

Field results mirror container findings

To test how these results translate under real production conditions, the research team conducted a two-year field study on a *Abies fraseri* × *balsamea* hybrid fir planting. Topramezone was applied post-emergence, either over the top or semi-directed to the base of trees. Researchers used the same three rates as in the container study.

Across both years, the hybrid firs showed no visible injury from any application method or rate. Leader growth was also unaffected by topramezone, with no differences observed among treated and untreated trees when measured 12 weeks after application.

These results suggest that postemer-

gence applications of topramezone, used at labeled rates, can be made safely on actively growing *Abies fraseri* × *balsamea* hybrid fir without sacrificing growth. According to Aulakh, starting around 4 weeks after budbreak, growers can make up to four applications of Frequency (topramezone), each at 4.0 fl. oz/acre, during the growing season.

“The maximum seasonal use rate for Frequency (topramezone) is 16 fl. oz/acre and the maximum application rate in an application should not exceed 4.0 fl.oz/acre,” Aulakh stated. “Topramezone requires a 30-day interval between two applications. Growers are also advised to look for Lammas growth and withhold application until (about 4 weeks) the Lammas growth has sufficiently hardened.”

How well did it control weeds?

In the field study, researchers evaluated control of several common weeds, including common ragweed, horseweed, fall panicum, large crabgrass, and yellow foxtail. Topramezone (frequency) was applied to 4- to 6-inch-tall common ragweed and grassy weeds and 6- to 8-inch-tall horseweed. A methylated seed oil on a 1% v/v basis was added to all topramezone treatments. Weed control was assessed at 4, 8, and 12 weeks after treatment.

At the labeled rate, topramezone provided strong control of several problem species:

- **Fall panicum** and large crabgrass were consistently controlled at high levels throughout the season.
- **Horseweed control improved** over time, exceeding 95% by 8 weeks after treatment at the labeled rate.
- **Common ragweed** was also effectively controlled, with high levels of suppression maintained through 12 weeks.
- **Yellow foxtail** was more challenging. While control improved as rates increased, the labeled rate provided only moderate season-long suppression. The results suggest that sequential applications at labeled rates may be needed for effective yellow foxtail control. Aulakh noted, “Alternative-

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ly, a graminicide (clethodim, fluazifop, or sethoxydim etc.) may be applied as a follow-up treatment to improve control of yellow foxtail and perennial grasses.”

Weed density measurements supported the visual ratings. Plots treated with topramezone showed substantial reductions in weed numbers compared to untreated areas, particularly in ragweed, horseweed, fall panicum, and large crabgrass control.

Adding a new mode of action

For growers, one of the most important takeaways may be less about a single herbicide and more about what it represents. Weeds resistant to PS II-inhibitor (atrazine or simazine-resistant common lamb's quarters, horseweed, and redroot pigweed), ALS-inhibitor (halosulfuron- or sulfosulfuron-

resistant horseweed and common ragweed) herbicides are present on many Christmas tree farms.

Furthermore, many Christmas tree farms in Connecticut, where the study took place, are located next to source populations of multiple herbicide resistant Palmer amaranth, horseweed, and waterhemp which may eventually end up on a Christmas tree farm.

Topramezone works by inhibiting carotenoid biosynthesis in susceptible plants, leading to bleaching and eventual death of weeds. This mode of action — HPPD inhibition — differs from many herbicides commonly used in Christmas tree production.

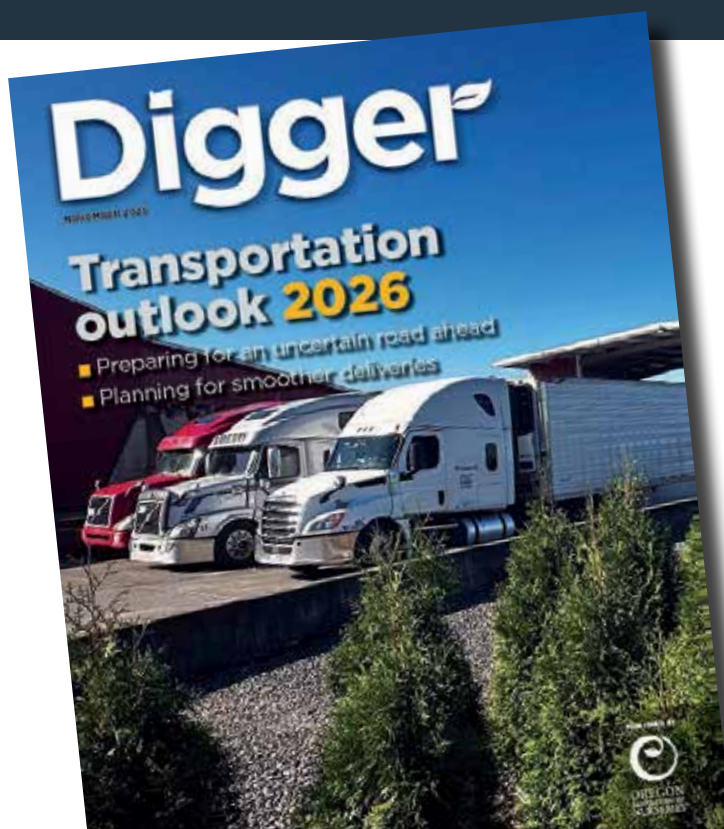
The bottom line for growers

Taken together, the research shows that postemergence applications of topramezone at labeled rates can be made

safely around several major Christmas tree species and can effectively control a range of annual grasses and broadleaf weeds. While not a silver bullet, especially for species like yellow foxtail, it offers growers another tool to fine-tune their weed control programs. ☺

This article provided through OAN's partnership with the Horticultural Research Institute (HRI), supporting research-driven advancement in the Christmas tree industry. Jennifer Gray is Administrator for the Horticultural Research Institute (HRI), where she leads industry-driven research and workforce development initiatives that connect science with practical industry impact.

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