

GROWING KNOWLEDGE

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An ongoing series provided by Oregon State University in collaboration with the United States Department of Agriculture and in partnership with the Oregon Association of Nurseries



Prioritizing nursery pest challenges

Figure 1: IR-4 Project works hand-in-hand with researchers to conduct trials that determine the safety and efficacy of new pesticides for crops that are important to the nursery and greenhouse industry. PHOTO COURTESY OF USDA-ARS

Input critical to helping IR-4 Project identify most pressing nursery challenges

BY JERRY WEILAND

Are you facing challenges with diseases, pests, or weeds in your nursery? Or are your current pesticides and biological control agents less effective than you would like? The IR-4 Project is here to help and is asking for your participation in a survey to identify the Pacific Northwest's most pressing nursery challenges.

Your input is critical to making sure

that new pesticides and biocontrol agents become available for the types of specialty crops that you grow. Once the IR-4 Project receives your input through the Grower and Extension Survey, they work hand-in-hand with researchers to conduct trials that determine the safety and efficacy of new pesticides for crops that are important to the nursery and greenhouse industry (Figure 1, above).

The minor use problem

With an annual farm gate value of \$1.22 billion, nursery and greenhouse plants are big business in Oregon. Insect, disease, and weed control is an important

part of keeping the industry profitable. Many growers rely on pesticides — including fungicides, insecticides, herbicides and more — as part of an integrated pest management program to protect their investment and to produce healthy plants.

However, before these pesticides can be used by growers, agrochemical companies must first ensure these chemicals are safe and effective for their intended use. Each pesticide undergoes rigorous testing to determine the application rates that are effective for controlling diseases, pests, and weeds without causing phytotoxicity to the crops that they will be applied to.

In addition, agrochemical compa- ➤



Figure 2: In crop safety studies, pesticides are applied to minor use crops at different rates to see if phytotoxicity develops. Results from this type of study determine the pesticide rates that are safe to apply to crops without damaging them. PHOTO COURTESY OF USDA-ARS

panies must also collect data showing that the pesticides are safe for human health and the environment when used appropriately. This information is then sent to the Environmental Protection Agency (EPA), who evaluates the pesticide's risks and benefits during a process called registration.

If the pesticide meets the standards for registration, it is labeled and approved for use.

All of this testing is expensive. Therefore, agrochemical companies focus most of their registration efforts toward large-scale agricultural crops (think corn and soybean) where the return on investment is large, rather than for minor use crops where the return is much lower. Minor use crops are defined as those having less than 300,000 acres in production and include specialty crops such as fruits, nuts, vegetables, and herbs, as well as most nursery, floriculture, and greenhouse crops like annuals, perennials, ornamental trees and shrubs, and houseplants.

In practice, this means that many newer pesticides may not get labeled for use on minor use crops when the costs for testing outweigh the potential profit of adding these crops to the pesticide label.

This problem, known as the "minor use problem," was recognized in the late 1950s and early 1960s. Soon after, Congress approved funding for a new federal program known as the Inter-regional

Research Project #4 or IR-4.

What is the IR-4 Project?

The IR-4 Project is a federally funded, nationwide program whose mission is to support the registration of safe and effective chemical and biological-based pesticides for food and environmental horticulture (i.e., ornamental) crops. That funding allows IR-4 to cover the costs for testing, shifting the expense away from agrochemical companies, so that new pesticides can be approved for the minor use crops that are important to our industry.

Since 1977, IR-4 has secured over 60,000 pesticide registrations for ornamentals, including fungicides, insecticides, herbicides, botanical extracts, biological control agents, and even plant growth regulators.

The process of selecting and testing pesticides for use on minor use crops takes several years and begins with the Grower and Extension Survey ([TinyURL.com/IR4GrowerSurvey](https://www.tinyurl.com/IR4GrowerSurvey)).

This survey is conducted biennially and is designed to identify any pest, disease, or weed issues that you, as a grower, are having difficulty controlling and for which there are few or no management options.

The survey is short and only takes a few minutes to complete, covering questions about the pest management strategies that you use, the kinds of plants that you grow, and for any additional informa-

tion you have about the specific insects, weeds, or diseases that you are having problems with. That's it! Click submit and you are done.

After the surveys are received, IR-4 summarizes the results and meets with pesticide company representatives, regulatory agencies, researchers, and growers at the biennial Environmental Horticulture Workshop to decide which pesticides should be prioritized both nationally and regionally for testing. IR-4 then coordinates testing with researchers from around the nation to conduct two types of experiments — crop safety studies and efficacy studies.

In crop safety studies, pesticides are applied to minor use crops at different rates (no pesticide, and low, medium, and high rates) to see if phytotoxicity develops. Results from this type of study determine the pesticide rates that are safe to apply to crops without damaging them (Figure 2, above).

In efficacy studies, pesticides are applied to the crops at different rates, volumes, and frequencies to see which method best controls the pest, disease, or weed in question. Results from this type of study are used to write the application instructions for crops included on the pesticide label.

Once the testing is completed, the results are compiled and evaluated to determine which pesticides are consistently safe and effective. The data are then submitted to the EPA for registration and, if

the results are favorable, a new pesticide is labeled for use on a minor use crop.

IR-4 in action

Many growers don't know that the largest ornamentals IR-4 program in the nation is right here in the heart of Oregon, in Corvallis. Initially established by Bob Linderman, Ph.D., management of the program was recently taken over by me at the Horticultural Crops Disease and Pest Management Research Unit (HCDPMRU).

Crop safety and efficacy experiments are conducted by Kenny Rolfe, our program's full-time technician who has been with the IR-4 Project for over 20 years.

Substantial improvements were made to the facilities in 2022, including a new shade structure and renovations to both the can yard (new gravel pad with weedmat) and greenhouse (new concrete walkways, automated drip irrigation, and



Figure 3: In 2024, a boxwood blight efficacy trial was conducted. Twelve treatments were evaluated, of which five show promise for controlling this devastating disease. PHOTO COURTESY OF USDA-ARS

new plastic sheathing). In 2023 alone, our program conducted 66 crop safety trials involving 17 pesticides on 27 different crops. To put that in perspective, this is almost 10 times the output of any other crop safety researcher in the US.

In 2024, we also conducted a boxwood blight efficacy trial (Figure 3,

above). Twelve treatments were evaluated, of which five show promise for controlling this devastating disease. Based on the results, adjustments still need to be made to application rates, and the trial will be repeated in 2025.

In addition to the program run by me, there are several other research- ➤

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IR-4 Survey



IR-4 Summaries



IR-4 Database



PNW Handbook

A sample of pesticides tested

Fungicides	Bactericides	Nematicides	Insecticides	Herbicides	Biologicals/Extracts
Benomyl	Acibenzolar	Acephate	Abamectin	Indaziflam	<i>Bacillus subtilis</i>
Boscalid	Copper hydroxide	Ammonia hydroxide	Afidopyropen	Pendimethalin	<i>Pseudomonas fluorescens</i>
Fludioxonil	Hydrogen dioxide	Chlorfenapyr	Cyflumetofen	S-metolachlor	<i>Streptomyces lydicus</i>
Fluopicolide	Kasugamycin	Dimethoate	Dimethoate	Flumioxazin	<i>Trichoderma harzianum</i>
mefenoxam	Oxatetracycline	Fluopyram	Methiocarb	Dimethenamid-p	Cinnamon oil
Propiconazole	Potassium phosphite	Methiocarb	Pyrifluquinazon	Dithiopyr	Neem oil
Pyraclostrobin	Streptomycin	Oxamyl	Spirotetramat	Oxadiazon	Thyme oil

ers in Oregon who run IR-4 trials on ornamental crops, including Marcelo Moretti, Ph.D. and Ed Peachey, Ph.D. (herbicide efficacy and crop safety); Luisa Santamaria, Ph.D. and Jay Pscheidt, Ph.D. (disease efficacy and crop safety); and Lloyd Nackley, Ph.D., (insect efficacy and crop safety).

A resource for your disease, pest, and weed control needs

If you have ever used a fungicide or antibiotic to control a disease, or an insecticide to control insects, or an herbicide to control weeds, you likely have IR-4 to thank for conducting the background testing necessary to get those products registered for your nursery crops.

Take a look at just a few of the pesticides that have been tested through IR-4 in the table above. Chances are you will have used at least one or two of these in your own day-to-day operations.

In addition, take some time to browse the research summaries online at TinyURL.com/IR4Summaries. This is a great place to find out which active ingredients have been effective against a multitude of insects, weeds, and diseases.

For example, if you were looking for a pesticide to help with nematode control, there is a new 2024 Nematode Efficacy report that summarizes nematicide tests against six different nematodes on several crops. You can also search the IR-4 database (TinyURL.com/IR4Database) for specific results by problem (insect, weed, or pathogen), crop, and pesticide.

Please note, however, that inclusion in these reports does not necessarily mean that those pesticides are yet registered for use. To find that information, always check the

pesticide label and also consult the Pacific Northwest Pest Management Handbooks (PNWHandbooks.org), our local resource for the latest insect, weed, and disease control information, including the pesticides currently registered for each crop.

Why your input matters

Historically, participation in the Grower and Extension Survey by growers from the West has been lower than the South, North Central, and Northeast regions. In fact, the West had the lowest participation ever in 2023 with only 14 respondents from 13 states and, only three people (two western growers and one researcher) showed up at the biennial meeting.

As a result, there wasn't much information about which pests and diseases were the most troublesome to western nurseries and there were few votes to advocate for western interests.

Oregon and other western states are therefore missing out on a key opportunity to have their unmet insect, weed, or disease control needs addressed through IR-4.

How you can help

1. The easiest and most significant way to make sure that Oregon's nursery and greenhouse industry continues to have access to new pesticides for crop protection is by filling out the Grower and Extension Survey (TinyURL.com/IR4GrowerSurvey). Although the deadline is August 29, 2025, consider filling it out now before you forget!
2. You can also attend the biennial meeting to advocate for priorities that are important to you and your industry. The next meeting will be held October 6–8, 2025 and attend-

ees have a vote on which pesticide trials get prioritized. Additional details will be forthcoming at the IR-4 Workshop website at TinyURL.com/IR4Workshop.

3. Lastly, you can help by providing plants for IR-4 research. Sometimes, it is extremely difficult to find small quantities (25–50 plants) of smaller-sized plants for use in IR-4 trials. For example, recent fungicide trials for flowering dogwood were cancelled because researchers could not find reasonably priced, 2–3 foot tall saplings for the experiment.

Conclusion

I hope this article has clarified IR-4's role in making new pesticides accessible so that western growers can continue producing healthy plants for the nursery and greenhouse industry. Again, please take a moment to fill out the survey if your business has any unmet pest management needs. You can also reach out to me if you have any questions. ☺

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