

Washington State Commission on Pesticide Registration - Application Form

(Assigned by WSCPR) Project # 23PN021

PROJECT TITLE: Developing an Insect IPM Program for the Washington Raspberry Industry

APPLICANT:

User Group: WA Red Raspberry Commission
Contact: Henry Bierlink
Phone: 360-354-8767
Email: henry@red-raspberry.org

PI/RESEARCHER:

Name: Louis Nottingham, Ph.D
Institution: Washington State University, NWREC
Phone: 540-798-2044
Email: louis.nottingham@wsu.edu

DETAILS:

Is this an OP Alternative Proposal? [] Yes [x] No
Treatment Method (Select one): [x] Pesticides [] Alternative to Pesticides
Crop: Raspberry Pest: SWD, aphids, mites, leafrollers and other lepidopteran pests
Registration: % Non-Registration: 100%

CATEGORIES:

Good Laboratories Practices Research (Select all that apply): [] GLP [x] Not GLP
Impact Categories (Select all that apply):
[x] A1 [x] A2 [] A3 [] A4 [] A5 [x] B1 [] B2 [] B3 [] B4 [] C1 [] C2 [x] C3 [] C4
Project Type (Select all that apply):
[] Efficacy Trial [] Residue Study [] Pesticide Resistance Study
[] Phytotoxicity Study [x] Integrated Pest Mngmt [] Other:

FUNDING: (Must match budget form)

Start Date: 1/01/2023 End Date: 12/31/2023
WSCPR Request: \$15,767
Fund Contributions Cash: \$16,901 From: Washington Red Raspberry Commission
Fund Contributions In-kind: \$ From:
Total Project Cost: \$32,668

PROJECT SUMMARY: Spotted wing drosophila (SWD) has dramatically increased the frequency, toxicity, and expense of insecticide sprays in Western Washington raspberries. This proposal will constitute the second year of an ongoing effort toward developing raspberry IPM programs so that growers can manage all pests economically while avoiding secondary pest outbreaks. In this funding year, we will evaluate the efficacy and economic practicality of selective (IPM) spray programs, co-developed by key industry advisors, against standard conventional programs in commercial raspberry fields. We will also lay the groundwork for Extension resources, such as a real-time scouting website with management recommendations, to communicate research findings rapidly to all stakeholder groups.

To the best of my knowledge, my signature certifies that the information in this application is true and correct.

Henry Bierlink

Executive Director

User Group Applicant Name (Print)

User Group Applicant's Title

[Handwritten Signature]

11/16/2022

User Group Applicant Signature

Date

PROBLEM DESCRIPTION

Prior to the first detection of spotted wing drosophila (SWD) in Washington in 2009, Washington raspberry growers only needed approximately three to five insecticide/miticide applications per season. These applications were less common near harvest, so maximum residue limits (MRLs) were of less concern when choosing materials. By 2010, SWD was present across the entire state and became the overwhelming insect pest of raspberries. Now, effective management requires six or more insecticide applications in standard years, and eight in years with heavy pressure or in late varieties.

Raspberries become susceptible to SWD female injury (egg lay) starting about 6 to 8 weeks prior to harvest when fruit are 50% full color (red), varying among cultivar and weather. Almost 100% of Washington raspberries are grown for processing, where there is zero tolerance for SWD maggots in fruit. Raspberries (and all caneberries) are much more susceptible to SWD than any other berries such as blueberries and strawberries. Raspberries also have fewer insecticides to use against SWD than do other berries; for example, the industry does not have access to methomyl (Lannate) as do other berries. Indeed, growers are under tremendous pressure to manage SWD, due to the extremely low tolerance, high susceptibility, and lack of options.

Washington is the leading exporter of raspberries, a lucrative high value market. To export raspberries, growers/exporters must meet a host of foreign MRL requirements. Products with acceptable MRLs are mostly older products and largely consist of pyrethroid, organophosphate (OP), and neonicotinoid insecticides. Of these classes, pyrethroids and OPs are effective against SWD, while neonics and carbamates are marginal. These classes have dubious potential as long-term management solutions. First, they all have high potential for insecticide resistance due to broad-spectrum activity on natural enemies, which would provide alternative mortality against resistant individuals. Second, they are all known to flare secondary pests, such as aphids and spider mites, again, due to disruption of natural enemies. Third, all are at high risk of being phased out of agricultural use in the near future. For all these reasons, it is critical to develop more long-term management plans for SWD and other raspberry pests.

Fortunately, some recently registered products for raspberries (a WSCPR-supported project) have shown efficacy against SWD and other pests. Other selective options such as insect growth regulators, selective miticides, and repellent materials may increase control of secondary pests and even SWD if timed properly, while posing little harm to natural enemies.

It is also important to consider economic costs of IPM programs; an IPM approach is only truly useful if it is cost effective. Many selective materials are more expensive than older broad-spectrum materials, so a strategic use of selective materials with attention to costs is imperative.

Value of the Industry. The Washington raspberry industry is comprised of 8,800 acres and is valued at approximately \$110 million (\$12,500/acre) (USDA NASS 2022). This project will provide greater long-term stability to management programs. By developing

a low-risk IPM program now, the industry will save itself from a potentially devastating situation once OPs, pyrethroids, and/or neonicotinoids are ultimately phased out.

Acres Impacted. All 8,800 acres grown in Western Washington are affected by SWD and can potentially be impacted by this project.

Aggregate impact to the industry. Precise losses due to batch culling and shipment rejections are unknown. Costs of additional sorting and quality control are also unknown; however, both of these factors are certainly significant. Exact losses due to injury are unknown and vary by year. Losses due to added sprays (4 to 8 per year) are projected to be \$1.8 to \$3.5 million per year across the entire Western Washington industry, or \$200 to \$400/acre. This assumes an average spray cost of \$50/acre (including labor) for lower cost broad-spectrum insecticides.

Effect of the problem on the industry. In addition to increased costs due to the added sprays, growers have seen increases in secondary pests including mites, leps, and aphids due to disruption of biological control. SWD has also resulted in the need to increase quality control efforts during processing to ensure maggots are not detected in products. Finally, SWD prevents any potential for the Washington raspberry industry from converting meaningful acreage to organic, which invites higher returns.

Effect of the problem on consumers, society, environment, non-target species or human health. There are increased pesticide residues on raspberries, reduced amounts of raspberries for foreign consumers and serious reduction in non-target species, specifically beneficial organisms in the raspberry fields that have fruit destined for export. The use of OPs and other broad-spectrum sprays may have greater impacts on workers and local communities. This also may restrict the potential expansion of raspberries into new fields near residential areas due to perceived hazards from sprays.

Description of alternative control measures and why they are not effective or additional information on the specific need. Due to the nature of this project, any alternative selective products proven to be effective for controlling SWD or other raspberry pests may be utilized in this or future years. Currently, most available selective products have lower efficacy and are more expensive than broad-spectrum alternatives; so detailed research is needed to understand how to utilize these products in an effective and economical manner.

Funding Category

Category A - Protection of Human Health

I. Prevention of acute illness (e.g., organophosphate poisoning) – The goal of this project is to reduce the use of OPs and carbamates, of which many are acutely toxic to humans.

II. Prevention of chronic illness (e.g., carcinogenicity) – The goal of this project is to reduce the use of OPs and carbamates, of which cause chronic illness.

Category B - Protection of Environment

I. Protection of wildlife (e.g., birds, mammals, fish and other non-target organisms) – OPs, pyrethroids, and neonicotinoids are notoriously harmful to non-target organisms, particularly invertebrates that are pollinators or important food sources to fish and wildlife.

Category C - Significance to Local or Regional Economy

III. Development of an integrated pest management tactic – This project is developing an IPM program for raspberries that is sustainable and resilient to changes such as insecticide deregistration and climate change.

PROJECT DESCRIPTION

Year Two Notice: This is the second year of this project. As occurred in 2022, a parallel project will take place in Western Washington blueberries. In the 2022 season, fewer fields were scouted than initially anticipated due to realized travel and scouting time. In 2023, we have reduced the number of proposed sites to reflect this, while keeping project costs reasonable. The PI is also submitting this proposal to other agencies, such as the WSDA and USDA NIFA to increase the amount of technical help, which will allow us to increase sites and scope of work.

Eight raspberry fields in Skagit and Whatcom counties will be intensely sampled for key pests and beneficial organisms on a weekly basis. Four fields will be “grower standard conventional” (herein called “standard”) and four will be IPM. Organic fields will be included if available. Cultivars will be evenly represented among treatments.

Early in 2023, the user group PI (Bierlink) and research PI (Nottingham) will assemble and meet with the technical working group of key industry decision-makers (crop advisors and/or growers) to develop guidelines for standard and IPM programs. Guidelines will not be binding but will help growers stick to similar materials and programs to reduce variability within treatments. The IPM programs will receive an adaptive chart with seasonal options based on pest presence (e.g., between late green and 10% red, if 1-2 leaves out of 20 have spider mites -> spray Cinnerate). IPM programs will also be required to adhere to certain limitations of broad-spectrum products in the OP, carbamate, pyrethroid, and neonic classes (to be determined with industry advisory group). For instance: IPM plots shall not use more than two broad-spectrum sprays per season, and they must be spaced no less than three weeks apart.

Each field will be at least 2 acres, and sampling location will be stratified to include interior on edges. All fields will be sampled for pests and beneficial insects once per week, using various methods: beat sheets, leaf inspections, lure baited SWD traps (either wet or sticky card, TBD). Fields will be sampled for 16 weeks, starting in late May or June. SWD fruit injury will be sampled twice, once at 75% color and again near the end of harvest, by performing fruit salt baths to sample for SWD larvae. Other sampling methods will be trialed in the season at a subsection of sites, and if useful and time efficient, expanded to all sites: vacuum samples, cardboard traps for predatory earwigs and spiders, and yellow sticky cards for lacewings and parasitoid wasps. Insect scouting data will be graphed and provided to cooperating growers each week via website updates and a newsletter. In addition, each grower will receive weekly IPM recommendations based on insect counts in their fields.

An important aspect of this project will be Extension communication. We will create a raspberry scouting and management webpage (and blueberry, if that corresponding project is funded) within the WSU Extension website, wherein we will post weekly scouting data and IPM guidelines. The level of detail published for each site (particularly geographic location) will be at the permission of the cooperating grower.

At the end of the season, grower spray records will be collected for cost analysis and comparison to insect management outcomes. Spray records will not be publicized or given to another source other than to PI without permission from the grower. A meeting will be held with the advisory group once data are analyzed to determine where improvements can be made to IPM programs for following years, and if other objectives should be included.

Who certified this budget for accuracy?

Name: Sarah Murt

Title: WSU CAHNRS Grant Pre-Award Coordinator

Email: sarah.murt@wsu.edu

Accurate Table 1 Calculations

Accurate Table 2 Calculations

Table 1 Totals = Table 2 Totals

Totals = Funding Totals on Application Form

TOTAL PROJECTED [ESTIMATED] EXPENDITURES:

TABLE 1	WSCPR Request	FUND CONTRIBUTIONS			TOTAL
		Cash	In-kind	In-kind Time	
Salaries ¹	\$15,767	\$3,833	\$	\$	\$19,600
Benefits	\$	\$2,243	\$	\$	\$2,243
Temp/Hourly Workers	\$	\$9,000	\$	\$	\$9,000
Travel ²	\$	\$1,625	\$	\$	\$1,625
Equipment ³	\$	\$	\$	\$	\$
Other ⁴	\$	\$200	\$	\$	\$200
TOTAL	\$15,767	\$16,901	\$	\$	\$32,668

¹ Research Associate and PI.

² Fuel and motor pool rental for travel to field sites

³ NA

⁴ Sticky cards

PROJECTED [ESTIMATED] EXPENDITURES BY QUARTER:

TABLE 2	2023 Q1 (Jan-Mar)	2023 Q2 (Apr-Jun)	2023 Q3 (Jul-Sept)	2023 Q4 (Oct-Dec)	2024 Q1 (Jan-Mar)	2024 Q2 (Apr-Jun)
WSCPR Funds	\$3,941	\$3,942	\$3,942	\$3,942	\$	\$
Fund Contributions	\$4,226	\$4,225	\$4,225	\$4,225	\$	\$
TOTAL	\$8,167	\$8,167	\$8,167	\$8,167	\$	\$

Has this project been funded previously by WSCPR?

YES

NO

↳ **IF YES:** What was the WSCPR Project #: 22PN028

↳ **IF YES:** For how long and with what progress? (*Summarize in less than 200 words*)

↳ Fields were sampled in Whatcom on a weekly basis. Each field was split between grower standard practices and the more advanced IPM practices. Prior to application of insecticides, growers discussed treatment options for the IPM section of the field. The data for this trial are currently being analyzed and will be submitted with the annual report.