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# PACIFIC NORTHWEST PEST ALERT NETWORK DELIVERS STRATEGIC IPM INFORMATION TO AGRICULTURAL AND URBAN AUDIENCES

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## ABSTRACT

PNWPestAlert.net was created in 2002 by University of Idaho and Oregon State University Extension faculty. This unique network system utilizes a broad base of partners to create and distribute alerts to agricultural and more recently, residential subscribers, delivering timely, research-based Integrated Pest Management (IPM) information on the emergence, identification and management of common pests and diseases of concern through email and text messages. Twelve years of survey data show that users increased their knowledge of IPM, adopted recommended IPM strategies, reduced pesticide use by 6 percent, and minimized adverse pest and pesticide impacts on the environment and human health in the region.

## INTRODUCTION

The Treasure Valley in Idaho and Oregon encompasses one of the largest contiguous irrigated agricultural production regions in the Pacific Northwest, supporting the production, processing, and marketing of dozens of crops. Idaho is ranked 7<sup>th</sup> nationally for agricultural goods and food product exports per capita. According to the Census of Agriculture (USDA, 2012), the farm gate value of crop production in the Treasure Valley of Idaho is approximately \$2.8 billion annually.

A wide range of economically important disease, insect, and invasive and persistent weed pests exist within the Pacific Northwest's complex agro-ecosystem. Pest management and crop protection issues are extremely important from economic, environmental, and human health perspectives. Based on University of Idaho Crop Enterprise Budgets (2013, 2015), pesticide expenses range from 18 percent to 39 percent of the operating costs of the Treasure Valley's high value crops alfalfa seed, onions, potatoes, and sugar beets.

The area has also supported significant urban and suburban residential population increases since 1990, growing from 295,851 residents to 674,675 at latest count (Boise Valley Economic Partnership, 2016). At least 30 percent of these new residents are coming from outside Idaho, and are unfamiliar with this region's soils, climate, and plant materials. Many of these consumers spend a considerable amount of time and money creating and enjoying their landscapes and outdoor spaces; however, they need education about the requirements for maintaining them in Idaho.

Homeowners use hundreds of millions of pounds of pesticides every year, and at per acre rates much higher than their agricultural neighbors (Donaldson, et al. 2007). Between 85 and 90 percent of households in the United States report the use of pesticide products in and around their homes and landscapes (Lang, 1993). Approximately 10 percent of the conventional household, landscape and garden pesticides used annually in the US are routinely applied around the home whether needed or not. (Adgate, et al, 2000; Donaldson, et al, 2004).

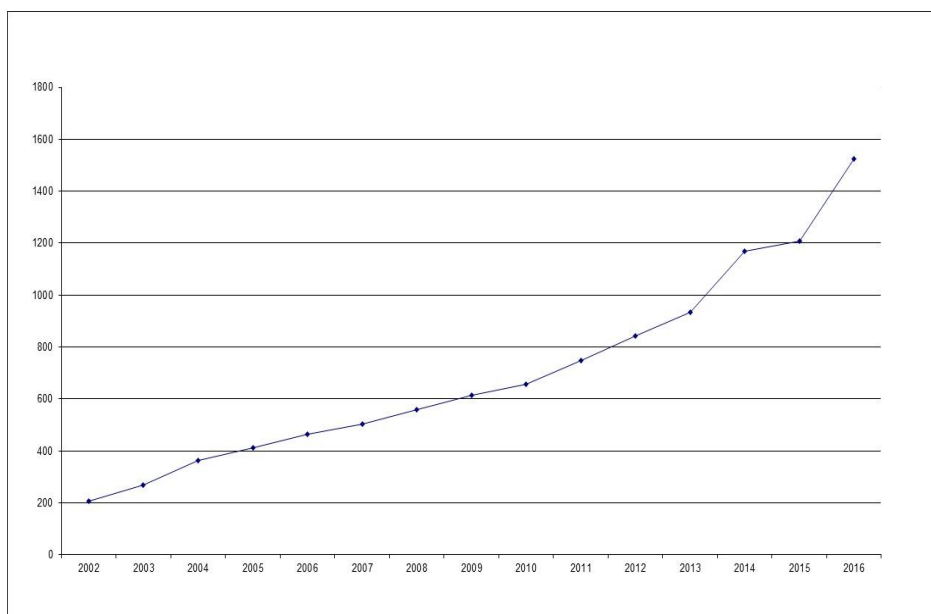
Most homeowners have never heard of Integrated Pest Management (IPM) or have difficulty fully understanding the concept (Wilen, Lazaneo & Parker, 2011). To minimize the occurrence of infestations and reduce the need for unnecessary pesticide applications, homeowners need to be educated on IPM practices (Dingha, et al, 2013). In order to better understand IPM, gardeners, landowners, and retailers require access to timely pest emergence and activity information and research-based, appropriate management options. Using an IPM based decision making process, in both agricultural and residential settings, provides timely management of pest problems while reducing overall costs and pesticide impacts to human health and the environment.

## METHODS

### Development of the Pacific Northwest Pest Alert Network

The PNWPestAlert.net network was developed in 2002 by University of Idaho and Oregon State University Extension faculty as an IPM tool to increase communication to agricultural producers about pest outbreaks and recommend research-based, appropriate management options when pest outbreaks occurred in southern Idaho and eastern Oregon crops (Neufeld, et al., 2007). The network has successfully been used by agricultural producers for 15 years and has increased their use of field scouting and reduced the number of unnecessary pesticide applications. At the conclusion of the first year there were 115

subscribers to the network. To date, 1526 individuals have elected to receive alerts through the network (Figure 1). These subscribers represent many farms, agribusinesses and individuals located across production areas from eastern Idaho to southwest Idaho and eastern Oregon.



**Figure 1.** Number of PNWPestAlert.net Subscribers, 2002-2016

It is difficult to rapidly deliver pest outbreak information over such a wide geographic region. Knowledge of current pest conditions, both insect and diseases, is widely scattered among growers and crop industry professionals. PNWPestAlert.net is a real-time notification network that delivers timely pest management information over a highly diverse irrigated growing region. The network quickly disseminates information on pest outbreaks and provides research-based pest management practices.

#### **Expanding the Audience for PNWPestAlert.net**

Each year, 1500-2500 homeowners in the Treasure Valley region of Southwest Idaho call, e-mail or visit their local University of Idaho Extension offices for assistance in identifying, diagnosing and solving landscape and garden insect or disease problems. In many cases, the client has experienced a series of failed attempts to get accurate information from a variety of sources. By the time the problem makes it to an Extension office, it may be too late to recommend effective pest management strategies. Extension Educators and volunteers often find themselves in a frustrating cycle of reactivity, not proactivity, when helping clientele address their landscape and garden pest management needs. In response, PNWPestAlert.net was expanded in 2015 to include new categories for residential landscape and garden pests and homeowner and green industry audiences in southwestern Idaho. The same year the network was also redesigned to interface with mobile devices such as smartphones and tablets.

#### **Integrating Extension Master Gardener Volunteers**

Despite best efforts to educate the public through traditional Extension public outreach and teaching methods, studies show that consumers most frequently turn to friends or neighbors for advice first, followed by retail garden center staff, then gardening books, magazines and the internet (Kelley & Wehry, 2006). The thousands of homeowners who visit retail garden centers or “big box” stores with a garden department are served by employees who may have little or no formal training in horticulture, entomology, or plant pathology. Despite good intentions, they have an obvious primary directive to sell products to consumers who are more than eager to purchase and apply them in hopes of finding a solution. Retail store employees habitually use popular press as primary information sources when giving pesticide advice, not Extension or research based publications (Cecil & Czapar, 2001).

University of Idaho has a mature Extension Master Gardener program that trains and certifies 75-100 new Extension Master Gardener Volunteers annually in the Treasure Valley. Additionally, 150 or more Master Gardeners remain active or earn Advanced Master Gardener status each year. Increasingly, diagnostic services are provided by these trained and knowledgeable volunteers, under the supervision of an Extension Educator or Program Coordinator.

Extension Master Gardeners are highly educated and aware of pest issues in their communities, and can serve as an excellent source of reliable, localized information for home landscape and garden IPM (Castroville, P., personal communication, November 26, 2014).

The knowledge and talent of Master Gardener volunteers has been utilized to create content for a proactive, urban horticulture IPM program now delivered through PNWPestAlert.net. Guided by Extension faculty, local volunteers use historical data from over 10 years of in-house diagnostic clinics to identify key common, invasive, and emerging pests and diseases of importance to home gardens, turf and landscapes in the region. With these data, action thresholds for local pests have been developed along with regular scouting schedules including trapping and monitoring. Degree day calculations and predictive models are also used to estimate pest pressure or activity. This pest information is used to provide timely pest alerts and valuable proactive IPM strategies to homeowners.

#### **Delivering PNWPestAlert.net**

Access to the PNWPestAlert.net is available by either visiting the website homepage to view the alerts or through a free subscription. The subscription service will push alerts out to subscribers, as they are posted to the website.

The following information is collected from subscribers to facilitate push alerts, via email or text messages to mobile devices.

Name

E-mail

Password

Text phone number

Phone carrier

Type of alert to be received (crops or landscape and garden or both).

Specific crops of interest.

Geographic location the subscriber wants the alert to cover (Eastern Idaho to eastern Oregon).

PNWPestAlert.net is designed to receive information from Extension personnel, growers, field consultants, Master Gardener volunteers, homeowners or other subscribers by e-mail, fax, telephone, or text message. Extension Educators and/or Specialists trained in how to use the website then verify the information before posting an alert. During the alert posting process an e-mail notice is automatically sent to all subscribers registered for the affected crop. The e-mail identifies the crop and pest, and contains a link to the comprehensive alert. Alerts contain links to research-based pest management information for the region. Subscribers can also receive text message notices when new alerts are posted to the website. Additionally, landscape and garden alerts have been programmed to automatically share on the University of Idaho Extension Horticulture's Facebook and Twitter social media sites.

### Types of Pest Alerts

The PNWPestAlert.net website provides three types of alerts.

**Forecasting Alerts** – These alerts contain information about a pest that is predicted to emerge or occur within a few days and have a yellow-colored background. Forecasting alerts are most commonly based on research based growing degree day models and are designed to inform subscribers that a particular pest problem will most likely occur within the next few days. With this information they can start scouting for that pest in their fields and take appropriate actions if deemed necessary (Figure 2).

**Confirmed Outbreak Alerts** – These alerts confirm the outbreak or presence of a particular pest and have a red-colored background. The information about the pest will contain general geographic information about where the pest has been found. However, the information will not be so specific that an individual field could be located. This information is delivered in real-time for subscribers so they can check their own fields immediately and take appropriate pest management measures (Figure 3).

**Announcements** – These alerts will generally contain information about regulatory announcements related to pest management or notifications for upcoming pesticide license recertification programs or field days. These alerts have a blue-colored background on the website (Figure 4).

**Pacific Northwest Pest Alert Network**

Thanks to our 2016 Sponsors: Idaho Potato Commission

**Current Alerts**

- Crop Alerts
- Landscape & Garden

**Join Alert Mailing List**

**Report a Pest**

**Past Fruit Advisories**

**PPTs From Winter Meetings**

**Impacts Newsletter**

Search Alerts

Search

Potato Alerts Sponsored By:

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**sugarbeet root maggot 2016**

Sugarbeets All Locations  
sugarbeet root maggot  
Posted on: April 26, 2016 by Jerry Neufeld

The degree day calculator (hosted by the Integrated Plant Protection Center at Oregon State University; <http://uspest.org/cgi-bin/ddmodel.us>) for the sugar beet root maggot fly shows that—depending on your location in the Treasure Valley—we have accumulated 347 growing degree days since March 1, 2016. Peak flight of root maggot flies should occur after 360 accumulated growing degree days when the maximum high temperature exceeds 80 degrees F. In the Treasure Valley this will be in a few days. We are 4 days ahead of last year, 12 days ahead of 2014, and 10 days ahead of the 30 year average. Though we are ahead of last year in degree day development, adult flies will not be active until warmer (and calmer) weather arrives.

Root maggot flies will lay eggs near sugarbeet plants. After the larvae hatch they will begin feeding on the young sugarbeets. AMSCO representatives I spoke with have not seen any adult flies yet. Look for these pests to appear in the western end of the Treasure Valley first. If you haven't applied a treatment for sugarbeet root maggot, now is the time to do so. The link below from the 2016 PNW Insect Management handbook contains additional information. Visit with your field consultant from AMSCO for treatment options.

- » <http://insect.pnwhandbooks.org/search/content/sugarbeet%20root%20maggot>
- » <http://uspest.org/cgi-bin/ddmodel.us>
- » [sugarbeet root maggot larvae](#)
- » [sugarbeet root maggot damage](#)
- » [sugarbeet root maggot adult](#)

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Figure 2. Homepage of PNWPestAlert.net Showing Forecasting Alert.

September 2, 2016 – Psyllid numbers continue to rise

Potato All Locations

potato psyllids

Posted on: September 2, 2016 by Amy Carroll

The two fields in western Idaho that were reported two weeks ago to exhibit high incidence of ZC symptoms were found to be negative for ZC after molecular testing. Stem-end discoloration appears to be prevalent this year, and that might explain the misdiagnosis by field personnel. The symptomatic plants observed by Kimberly R&E Center staff did test positive for ZC, so we do have confirmed ZC at least in the Magic Valley.

Potato psyllids were collected this week on sticky traps in potato in the following counties: Malheur (OR) (1 field), Payette (3 fields), Owyhee (5 fields), Canyon (13 fields), Ada (2 fields), Elmore (1 field), Gooding (2 fields), Twin Falls (8 fields), Jerome (9 fields), Blaine (1 field), Minidoka (3 fields), Cassia (5 fields), and Power (1 field).. Additionally, potato psyllid nymphs (9 total) were captured on leaf samples from Ada County (2 fields) and Jerome County (1 field), and 24 potato psyllid adults were captured in vacuum samples taken from three intense fields in Canyon and Gooding counties.

This week, we collected 1,539 psyllids from sticky cards (1,138 from Light sites and 401 from Intense sites). Of the total 1,563 psyllids captured this week, 1,382 came from the Treasure Valley. We found psyllids in 54 of the 82 fields (66%) that were sampled this week. To put these numbers into perspective, we captured a total of approximately 1,100 psyllids for the entire year during each of the 2013 and 2015 seasons.

With the recent increase in psyllid numbers and attrition of our summer help, we ran Lso testing on a subset of psyllids collected last week (up to ten psyllids per site). So far, none of the psyllids tested last week was positive for Lso. About 50% of samples remain to be test, and we expect to have those Lso results early next week.

Because of the recent prevalence of Lso and the relatively high numbers of potato psyllids that we have been collecting each week, we urge growers to maintain their IPM programs targeting psyllids and to be on the lookout for plants exhibiting ZC symptoms over the coming weeks. Foliar symptoms should be manifested about three weeks following infection, but will need to be confirmed by examining and testing tubers. See link below for description and photos of ZC symptoms, and please take suspicious plant samples to the Kimberly R&E Center or to your local UI Extension Center.

More information and resources on potato psyllids and ZC, including management, scouting recommendations, and ZC symptomology can be found at the links below.

[http://oregonstate.edu/dept/hermiston/sites/default/files/pnw633\\_0.pdf](http://oregonstate.edu/dept/hermiston/sites/default/files/pnw633_0.pdf)

Detailed results from the "Light" sites can be found here:  
<https://docs.google.com/spreadsheets/d/1EruNcKgfqJ0RUpleaHBpODfw8ZlqDyT4l-9MPKZBYcY/edit#gid=0>

Detailed results from the "Intense" sites can be found here:  
[https://docs.google.com/spreadsheets/d/1Uk6GBxEgZeGWWWhT84wymaWfHRS2it\\_Eg02eWPFLgWsl/edit#gid=0](https://docs.google.com/spreadsheets/d/1Uk6GBxEgZeGWWWhT84wymaWfHRS2it_Eg02eWPFLgWsl/edit#gid=0)

» <http://www.uidaho.edu/extension/news/psyllid-management>

» <https://docs.google.com/spreadsheets/d/1EruNcKgfqJ0RUpleaHBpODfw8ZlqDyT4l-9MPKZBYcY/edit#gid=0>

» [https://docs.google.com/spreadsheets/d/1Uk6GBxEgZeGWWWhT84wymaWfHRS2it\\_Eg02eWPFLgWsl/edit#gid=0](https://docs.google.com/spreadsheets/d/1Uk6GBxEgZeGWWWhT84wymaWfHRS2it_Eg02eWPFLgWsl/edit#gid=0)

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Figure 3. Confirmed Outbreak Alert from PNWPestAlert.net

Canyon & Owyhee County Conservation District Tour

All Crops Treasure Valley

Posted on: September 9, 2016 by Bill Buhrig

An opportunity to learn more about no-till planting, cover crops as forage, and free range chickens (wait, chickens?) are but a few of the topics available to interested folks on a tour being offered on September 22nd. This free tour is sponsored by the Canyon and Owyhee Conservation Districts, NRCS and the Lower Boise Watershed Council and will originate from the USDA office in Marsing @ 9:00AM sharp. Local farmers will be showing their work on the aforementioned topics and how they pertain to improving water quality and soil health. It promises to be a good time and they will feed you lunch at the tour conclusion for free! The gang does ask that you RSVP to Lori @ [208-454-8684](tel:208-454-8684) x126 by September 19th. Check out the attached flier.

» [2016Tourflyer.pdf](#)

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PNWPestAlert.net

Figure 4. Announcement Alert from

Table 1 shows the major crops and pests commonly mentioned in alerts.

Table 1. Major Crops and Pests in PNWPestAlert.net Alerts.

Major Crops	Major Pests
Potatoes	Potato Psyllid ( <i>Bactericera cockerelli</i> )
Small Grains	Cereal Leaf Beetle ( <i>Oulema melanopus</i> )

Hybrid Sweet Corn	Corn Earworm ( <i>Helicoverpa Zea</i> )
Alfalfa Seed	Lygus Bug ( <i>Lygus Helperus</i> )
Sugarbeets	Powdery Mildew ( <i>Erysiphe betae</i> )
Onions	Iris Yellow Spot Virus ( <i>Tospovirus Bunyavindae</i> )
Lawn/Turf Grass	Bluegrass Billbug ( <i>Sphenophorus parvulus</i> )
Cabbage and other Brassicas	Imported Cabbage Worm ( <i>Pieris rapae</i> )
Roses and Ornamentals	Aphid species
Apples/Pears	Coddling Moth ( <i>Cydia pomonella</i> ), Fire Blight ( <i>Erwinia amylovora</i> )
Tomatoes	Curly Top Virus ( <i>Germinivirus sp.</i> )
Cucurbit	Squash Bug ( <i>Coreoidea</i> )

### Marketing PNWPestAlert.net

Marketing the PNWPestAlert.net to the Idaho grower audience has been accomplished through a variety of outreach methods. Presentations have been made at numerous commodity meetings, grower association meetings, pesticide applicator trainings, as well as professional meetings. In addition, writing pens with the web address are distributed to audiences at various pesticide recertification presentations.

Marketing the network and website to homeowner audiences is accomplished through a variety of methods, including direct mail, traditional and social media, outreach at public events, festivals, conferences, farmer's markets, garden shows, garden classes and through printed material distributed to local retail garden centers. Potential users also have the opportunity to register for the pest alert network directly at Extension offices or on location at outreach events.

## RESULTS

### Outcomes and Impacts of PNWPestAlert.net on Agricultural Producer IPM Practices

Over 1500 agricultural producers currently subscribe to alerts, with an average increase of nearly 20 percent per year. Indicators of short term impact related to an increase in awareness and knowledge among target audiences are measured by the number of users subscribed to the network and how they apply the information they are receiving. This is tracked by analytics built into the website software. To determine outcomes and impacts, at the conclusion of each growing season a survey of subscribed users is conducted to measure knowledge increase, planned behavior changes, and adoption of IPM practices.

The on-line survey contains the following question:

Which statements below best reflect your view of PNWPestAlert.net? Indicate all that apply. As a result of information I received from the PNWPestAlert.net Network,

I increased my field scouting to document the pest level in my fields and then took appropriate action.

I was able to use additional IPM strategies to control pests.

I was able to reduce the number of sprays applied to my crop(s).

A spray I applied was more effective due to the timeliness of the application.

Increase in knowledge, changes in behavior and the adoption of IPM practices among PNW PestAlert.net users, measured through 12 years of annual surveys, have resulted in notable long term impacts:

Field scouting has increased by 37.6 percent.

Additional IPM strategies implemented increased by 23.9 percent.

Spray applications were reduced by 15.9 percent.

Pesticide applications were more effective and timely 35.7 percent of the time.

There is a significant relationship between field scouting and the reduced number of sprays ( $r(10) = .68, p < .05$ ) (Table 2). As growers increased field scouting, they decreased spraying operations. Over the past 12 years, annual survey respondents report using, on average, 5.98 percent less pesticides on their crops than they were before they used the pest alert network. If this decrease in chemical use were extrapolated to the area impacted by PNWPestAlert.net for just onions, (USA Onions, 2016) potatoes (USDA, 2015) and sugarbeets (USDA, ERS, 2016), on an annual basis it would mean approximately 29,897 fewer gallons of chemicals were put into the environment saving growers about \$6,161,626 dollars.

**Table 2.** Adoption of IPM Practices and Environmental Impact resulting from 12 Years of PNWPestAlert.net.

Year	Increased Field Scouting (%)	Used Additional IPM Strategies (%)	Reduced Number of Sprays (%)	Sprays Were More Effective (%)
2004	10.3	22.4	6.9	28.9
2005	11.3	28.2	9.9	50.7
2006	34.8	17.4	17.4	30.4



2007	44.7	18.4	7.9	29.0
2008	39.1	14.9	17.2	28.7
2009	39.6	17.5	20.8	25.0
2010	38.1	18.4	15.5	28.9
2011	29.6	25.0	17.4	34.7
2012	57.0	25.0	22.0	40.0
2013	37.0	41.0	12.0	26.0
2014	54.0	41.1	26.0	57.0
2015	56.2	17.8	17.8	49.3
Avg.	37.6	23.9	15.9	35.7

Qualitative responses from the survey give specific examples of how the PNWPestAlert.net benefited users:

- "I watched the reports to see if or when psyllids were in my area. Hot psyllids were not detected in my area and I chose not to spray. This saved money and prevented the use of an expensive insecticide." (2014)
- "The monitoring program cut down on my sprays. In previous years I started spraying early and kept spraying and the pest pressure turned out to be low in my area. This year I relied more on the network reports and didn't spray until pests were found." (2014)
- "Information on potato psyllid and late blight were very helpful in deciding whether or not to spray. Neither problem was reported in my area. I chose not to spray. It turned out to be the right choice because I was not affected by either problem." (2014)
- "Allowed timely application that was more effective than just spraying on a schedule which was never based on actual emergence, just myth." (2015)
- "I was able to time the applications of insecticides better, so that we could reduce the overall amount that we applied." (2015)

#### Anticipated Impact of Adding a Landscape and Garden Component to PNWPestAlert.net

With the addition of the landscape and garden section to PNWPestAlert.net, the annual evaluation in 2016 will be adapted to capture outcomes and indicators of short and long term impact from reaching these audiences.

Since the landscape and garden category was added to the website in 2015, subscribership has increased 26.4 percent. There are currently 390 garden and landscape subscribers (Table 3). The authors expect this number to increase significantly in the coming years. In 2016, the annual survey will include questions that assess the following from these new users:

Has the network increased public awareness and understanding of IPM programs relevant to home gardeners, backyard farmers and green industry professionals?

Has timely, research-based information on the emergence, identification and management of common pests and diseases of concern to these audiences been delivered?

Have these audiences been making decisions based on this information, rather than on the advice of their neighbors or other sources?

Are the methods being used to deliver the alerts meeting your needs? If not, how can we improve them?

**Table 3.** New Landscape and Garden PNWPestAlert.net Subscribers by Category between Fall 2015 and Summer 2016.

<u>Category</u>	<u>Subscribers</u>
Apple	108
Cherry	70
Grape	101
Landscape and Garden	390
Small Fruit	282
Tree Fruit	392

## SUMMARY

A localized, proactive pest alert network was developed based on input from agricultural advisory committees and their needs. The network has been running for 14 years and has increased subscribers each year. Because of information agricultural producers received through the pest alert network 38 percent have increased the use of field scouting to document pest levels before taking any actions in their fields. Nearly 25 percent of the subscribers reported using new or additional IPM strategies to manage pests, including reducing the number of pesticide applications and/or increasing the efficiency of their applications due to better timing and field scouting activities. In 2015 the pest alert network was expanded to include landscape and garden pest information. The alert network has also been revised to adapt to all mobile devices commonly used by clientele.

The documented increase in the application of IPM strategies as a result of the network continues to benefit the Treasure Valley region of Southwest Idaho and Eastern Oregon in a number of ways. The network improves awareness and understanding of IPM programs relevant to agricultural producers, small acreage landowners, home gardeners, and green industry professionals by establishing an ongoing and sustainable system whereby timely, research-based information on the emergence, identification and management of common pests and diseases of concern to these audiences is delivered. Users increasingly apply integrated pest management principles and strategies to prevent and manage pests and diseases in crop production, public and private landscapes, gardens and small acreages. Continued application of IPM principles increases productivity, reduces management costs for producers and land managers, and minimizes adverse impacts from pests and pesticides on the environment, natural resources and human health.

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