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Insect Pest Management Practices – Survey of Idaho, Oregon, and Washington Potato Growers – 2011 Crop Season

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Introduction

As part of a large project entitled "Area-wide Management of Potato Pests in the Pacific Northwest" (funded by the USDA-NIFA Risk Avoidance and Mitigation Program, Grant #2009-51101-20104), researchers at Washington State University, University of Idaho, Oregon State University, University of Kentucky, USDA-ARS, and the Washington State Potato Commission are seeking to better understand Pacific Northwest potato growers' experiences and perspectives related to pest management. Specific areas of interest include pest management decision-making, use of integrated pest management (IPM) practices, information dissemination preferences, and opinions about sustainability audits. Findings will guide the project's educational and outreach activities. This report presents results from a 2012 survey of Idaho, Oregon, and Washington potato growers.

Survey Methods

A survey of Idaho, Oregon, and Washington potato growers was conducted in January–March 2012. A list of growers (N=635) was compiled with information from the Washington State Potato Commission and various online sources. Growers were contacted four times by mail: an initial letter with questionnaire, a reminder postcard, a second letter with questionnaire, and a second reminder postcard. A link to an online version of the survey was provided in each mailing. Washington State University's Social and Economic Sciences Research Center (SESRC), the largest university-based survey research center in the Pacific Northwest, managed all mailings, web programming, and data entry. State-level response rates were 29.8% (Idaho), 32.0% (Oregon), and 32.5% (Washington). The overall response rate was 30.4%. This report presents aggregated results for all respondents.

Grower Demographics

Ninety-nine percent of the survey respondents were male and 1% were female. Most respondents (95%) were Caucasian; 1% were Asian; 1% were Latino; and 3% categorized themselves as "other." Respondents ranged in age from 23 to 82 with a mean age of 53 years. Respondents had spent 27 years, on average, involved in potato production as farm owners, managers, or other primary decision makers. Approximately one half (47%) of respondents had a four-year college degree and 10% had attended graduate school.

Farm Characteristics

The majority of survey respondents (86%) were farm owners, partners, or lessees, while 13% were hired managers. Two fifths (42%) described their farm operations as family corporations (see Figure 1). Respondents operated, on average, 4,521 acres of farmland in 2011. The majority (96%) of respondents produced other agricultural products (e.g., wheat, corn, alfalfa, hay, barley) in addition to potatoes. Wheat, mustard, corn, and alfalfa were the most popular crops planted in rotation with potatoes.

Figure 1. Business Structure of Farm Operation

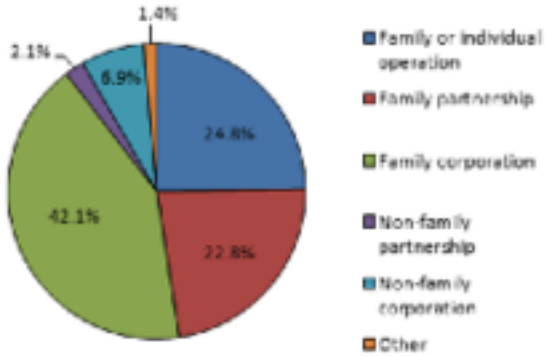
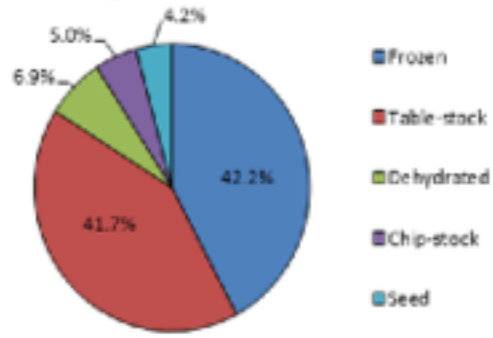


Figure 2. Potato Markets, 2011



Respondents grew, on average, 1,322 acres of potatoes in 2011. Nine percent reported having some certified organic potato acres (ranging from 6 to 800 acres with a mean of 182 acres). The most popular potato variety grown in 2011 was Russet Burbank (63% of respondents). Less popular varieties included Russet Norkotah (35%), Ranger Russet (32%), Umatilla Russet (20%), Alturas (10%), Yukon Gold (10%), Shepody (8%), and Chieftain (6%).

Over 80% of respondents' potatoes were sold for either the table-stock or frozen markets (see Figure 2). On average, 54% of respondents' potatoes were sold under contract to processors in 2011. Over one third (35%) of respondents sold all of their potatoes to processors, while 25% did not sell any potatoes to processors.

Fourteen percent of respondents had less than $1 million in gross farm income in 2011; 26% had $1 to $2.4 million; 21% had $2.5 to $4.9 million; 11% had $5 to $7.4 million; 11% had $7.5 to $10 million; and 16% had more than $10 million. On average, 57% of respondents' total farm income was from the sale of potatoes. Nine percent of respondents reported that at least 90% of their total farm income was from the sale of potatoes.

Pest Management Decision-Making

When making pest management decisions for their potato fields, survey respondents consider economic cost, environmental impacts, and human health impacts, among other factors. Approximately 74% of respondents believe human health impacts are "very important" in pest management decision-making, 66% believe economic cost is "very important," and 53% believe environmental impacts are "very important" (see Table 1).

Table 1. Importance of Selected Factors in Pest Management Decision Making for Potato Fields

	Not Important (%)	Somewhat Important (%)	Very Important (%)
Human Health Impacts	2.6	23.7	73.7
Economic Cost	3.3	30.5	66.2
Environmental Impacts	4.6	42.8	52.6

The most important sources of information for making pest management decisions for potato fields were agricultural chemical distributor fieldmen, crop consultants, and insecticide label information. The least important sources of information for making pest management decisions were marketing organizations, immediate neighbors, and pesticide applicators (see Table 2).

Table 2. Importance of Sources of Information for Pest Management Decisions for Potatoes

Information Source	Mean Score on Scale from 1 ("Not Important") to 5 ("Very Important")
Agricultural chemical distributor fieldmen	3.83
Crop consultant	3.79
Insecticide label information	3.76
Industry-sponsored conferences, workshops, or seminars	3.34
University research scientists	3.25
University conferences, workshops, or seminars	3.23
University Extension professionals	3.19
Trade publications (magazines, etc.)	3.11

Table 2. (Continued)

Information Source	Mean Score on Scale from 1 ("Not Important") to 5 ("Very Important")
Other potato growers	3.10
University websites	2.85
Formal education or continuing education classes	2.84
In-house pest management consultant	2.80
Internet-based resources (not including University websites)	2.78
Processor or distributor	2.77
Field days or farm tours	2.76
Field workers	2.69
Private pest management consultant	2.68
Family members	2.65
Commodity or grower associations	2.64
Pesticide applicators	2.50
Immediate neighbors	2.34
Marketing organizations	2.06

Table 3. Potato Growers' Frequency of Contact with UI, OSU and/or WSU in 2011

Type of Contact	Not At All (%)	Once (%)	Twice (%)	Three Times or More (%)
Read bulletin, report, or pest management guide	16.2	13.5	22.3	48.0
Visited website	43.4	17.2	11.7	27.6
Attended meeting, workshop, or field day	29.1	27.0	27.7	16.2
Visited office	71.6	12.2	7.4	8.8
Research collaboration	76.4	10.1	5.4	8.1
On-farm visit	70.8	15.3	7.6	6.3

Survey respondents reported varying levels of contact with University of Idaho (UI), Oregon State University (OSU), and/or Washington State University (WSU) with regard to pest management for potato fields. Reading Extension/Research bulletins, reports, and pest management guides was the most popular form of contact. On-farm visits, research collaborations, and Extension/ Research office visits were much less common (see Table 3).

Two thirds (66%) of the survey respondents used the services of one or more pest management consultants. Of those respondents, 10% followed all of the advice provided by consultants and 72% followed most of the consultants' advice.

Approximately 51% of respondents regularly access the Internet for pest management information. Respondents were asked about their preferred methods for receiving pest management information. The most preferred methods of information dissemination were Internet/E-mail (64%), meetings/workshops (59%), and printed materials (55%). The least preferred methods were field days/farm tours (38%), one-on-one consultations (37%), and courses/trainings (27%).

Perception of Pest Problems

Respondents were asked to rate the severity of specific insect pests and diseases in their potato fields during the 2011 growing season. Aphids were rated as a "moderate" or "severe" problem by 48% of the respondents, followed by loopers (47%), Colorado potato beetles (39%), wireworms (33%), and potato leafroll virus (31%). None of the pests and diseases were rated as a "severe" problem by more than 5% of the respondents.

Insect Pest Monitoring

All respondents reported that they and/or other individuals scouted, sampled, and/or monitored their potato fields for insect pest problems in 2011. Most respondents (87%) did their own scouting. Two thirds (68%) relied in crop consultants, 48% relied on agricultural chemical distributor fieldmen, and 33% relied on farm employees.

Insecticide Use

Nearly all respondents (95%) used chemical insecticides on their potato fields in 2011. One fifth (21%) used biological or microbial insecticides. Approximately half of respondents indicated that "reducing risk to handlers," "reducing development of resistance," and "reducing risk to the environment" were "very important" considerations when selecting insecticides. One third (32%) indicated that "reducing risk of injury to natural enemies" was "very important."

Survey respondents were asked about the importance of various factors for determining the need for and timing of sprays for key insect pests in their potato fields. Scouting or sampling of fields was the most important factor for spray decisions, followed by economic thresholds and consultant recommendations (see Table 4).

Table 4. Importance of Various Factors for Determining Need for and Timing of Sprays for Key Insect Pests

	Mean Score on Scale from 1 ("Not Important") to 5 ("Very Important")
Scouting or sampling of fields	4.61
Economic thresholds or injury levels	4.26
Recommendation by crop consultant of pest management consultant	4.09
Crop growth stage	4.08
Informal field observations	3.94
Time of year	3.82
Monitoring natural enemies	3.53
Processor or contract requirement	3.46
Recommendation by chemical company representative	3.39
Local information (from other growers, radio, TV, etc.) about pest presence	3.02

Pest Management Practices

Survey respondents were asked their use of various IPM and other pest management practices in 2011. Three quarters (77%) of respondents rotated insecticides from different classes (i.e., insecticides with different modes of action) to keep insects from becoming resistant. Three quarters (77%) kept written notes or field maps about insect problems and insecticide applications. Very few respondents adjusted planting or harvesting dates (6%) or adjusted row spacing or plant density (1%) to control insect pests.

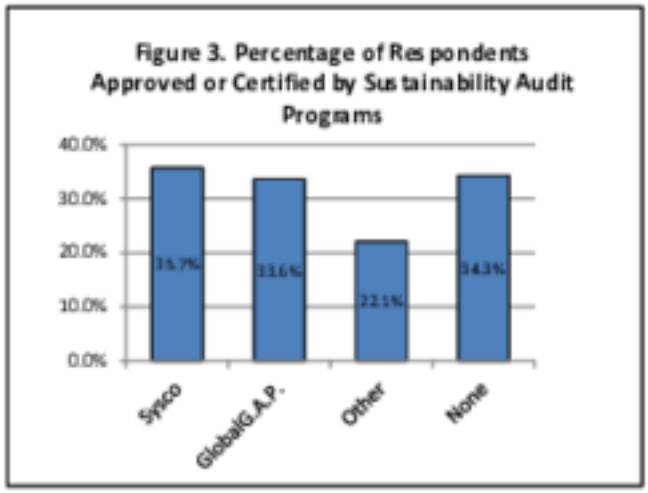
Respondents were asked about their frequency of use of specific pest management practices. The most frequently used practice was field scouting for insect damage; 87% of respondents indicated they "often" used this practice. Other frequently used practices included leaf sampling, economic thresholds, and soil sampling (see Table 5). Nearly 14% of respondents reported that their use of practices listed in Table 5 had increased during 2009–2011.

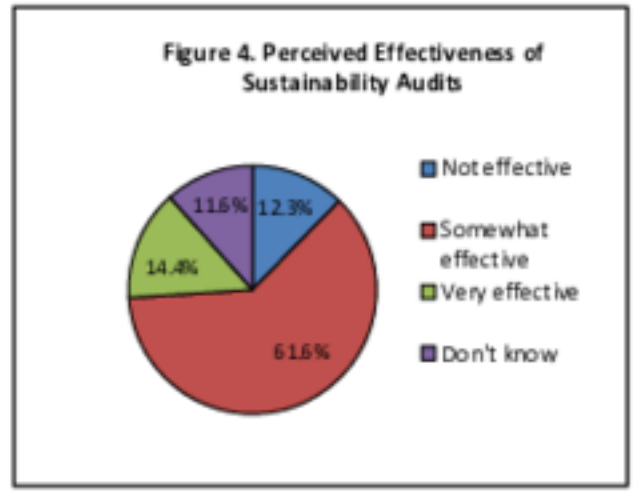
In terms of biological control practices, 55% of respondents minimized factors (e.g., broad-spectrum insecticides) that harm natural enemies, 9% enhanced natural enemy habitats (e.g., by planting flowers or border crops), and 4% released commercially produced natural enemies to control insect pests in their potato fields in 2011.

Respondents were asked to describe their "most critical needs" with respect to insect pest management. Critical needs mentioned by five or more respondents included aphid control, timing of insecticide applications, psyllid control, insect resistance management, Colorado potato beetle control, and zebra chip disease prevention.

Table 5. Frequency of Use of Selected Pest Management Practices

Practice	Never (%)	Rarely (%)	Occasionally (%)	Often (%)
Field scouting for insect damage	0.0	0.7	12.6	86.8
Leaf sampling	9.4	14.1	20.8	55.7
Economic thresholds or injury levels	2.8	11.9	35.0	50.3
Soil sampling	8.9	16.4	32.9	41.8
Field scouting for natural enemies	5.4	24.3	36.5	33.8
Insect traps or barriers	28.4	28.4	21.6	21.6
Spot or border sprays	22.1	26.2	34.9	16.8
Degree day models	32.2	32.2	21.5	14.1
Computer-aided decision tools	46.9	32.7	15.0	5.4





Sustainability Audits

Nearly all survey respondents (96%) were familiar with sustainability audits (also known as GAP, IPM, or On-Site Environmental Practice audits) as a means of promoting sustainable potato production systems. Seventeen percent of respondents helped create indices, metrics, and/or standards used in sustainability audit questionnaires. Eighty-six percent had participated in one or more sustainability audits. Two thirds (66%) were approved or certified under an audit program (see Figure 3).

Most respondents (76%) believed sustainability audits are "somewhat effective" or "very effective" at measuring whether or not potato growers are using sustainable practices (see Figure 4).

Survey respondents were asked whether they disagreed or agreed with several statements about sustainability audits (see Table 6).

Table 6. Potato Growers' Opinions about Sustainability Audits

	Strongly Disagree (%)	Disagree (%)	Neither Disagree or Agree (%)	Agree (%)	Strongly Agree (%)
Positive Statements					
Sustainability audits help potato growers farm more sustainably.	7.4	23.5	41.6	26.2	1.3
Sustainability audits help potato growers market their products as "sustainable."	2.7	9.5	29.7	45.9	12.2
Sustainability audits help reduce production costs.	34.5	43.2	19.6	2.7	0.0
Sustainability audits help minimize risks to the environment.	9.5	22.4	33.3	32.0	2.7
Sustainability audits help protect the health of farm workers.	9.5	23.0	32.4	29.1	6.1
Sustainability audits help establish trust between growers and consumers.	6.1	6.8	34.5	43.2	9.5
Sustainability audits should be mandatory for all potato growers.	23.0	27.7	33.8	9.5	6.1
Negative Statements					
Sustainability audits take too much time.	2.0	8.1	29.1	43.9	16.9
Growers' opinions were not considered when developing sustainability audits	1.4	10.3	35.6	33.6	19.2
Sustainability audits are too expensive.	2.0	8.8	49.0	22.4	17.7

Table 6. (Continued)

Sustainability audits are not an effective method of measuring sustainability.	0.7	15.5	39.9	33.1	10.8
There are too many different types of sustainability audits	0.7	2.0	29.1	38.5	29.7
Sustainability audits do not benefit potato growers.	4.1	30.4	39.2	20.3	6.1
Sustainability audits are an example of industry "greenwashing."	2.8	6.2	44.1	30.3	16.6

A majority of survey respondents agreed or strongly agreed that sustainability audits help potato growers market their products as "sustainable" (58%) and help establish trust between growers and consumers (53%). One third agreed or strongly agreed that sustainability audits minimize environmental risks (35%) and protect farm worker health (35%). Approximately two thirds of respondents agreed or strongly agreed that there are too many different types of sustainability audits (68%) and that sustainability audits take too much time (61%). Most respondents (78%) did not agree that sustainability audits reduce production costs. Half (51%) did not think sustainability audits should be mandatory for all potato growers.

Sustainable Agriculture Goals

Survey respondents were provided with a list of potential goals for sustainable agriculture and asked the degree to which their potato operations contributed to each goal. Table 7 lists mean scores in descending order. The goals with the highest scores were "protect human health," "provide safe working conditions for farm workers," and "support local businesses." The goals with the lowest scores were "promote social justice/equity," "reduce dependence on external inputs," and "create direct producer-consumer linkages."

Table 7. Potato Growers' Contribution to Selected Sustainable Agriculture Goals

Sustainable Agriculture Goal	Mean Score on Scale from 1 ("No Contribution") to 5 ("Significant Contribution")
Protect human health	4.46
Provide safe working conditions for farm workers	4.45
Support local businesses	4.44
Provide a living wage to farm workers	4.38
Promote soil conservation	4.28
Protect water resources	4.21
Provide adequate farm income	4.20
Make efficient use of nonrenewable resources	4.09
Establish relationships of trust with consumers	3.97
Preserve traditional knowledge	3.97
Reduce toxins released into environment	3.97
Improve the quality of rural life	3.93
Enhance rural economic development	3.84
Teach children about farming	3.77
Provide wildlife habitat	3.76
Teach community members about farming	3.52
Reduce dependence on large corporations	3.50
Protect biodiversity	3.42
Create direct producer-consumer linkages	3.25
Reduce dependence on external inputs	3.24
Promote social justice/equity	3.20