



CALIFORNIA PEAR SUSTAINABILITY PRACTICES SURVEY

2013





INTRODUCTION

From March through July 2013, the California Pear Advisory Board and SureHarvest, Inc. carried out a survey of California pear growers to assess their continued use of Best Management Practices related to several key areas of “sustainability.” Two previous surveys have been done. The purpose of the first, done in 2009, was to benchmark the California pear growing community’s level of participation in “sustainable” farming practices and to establish a baseline upon which to measure future advancements in sustainability for the California pear industry. The purpose of the second survey, done in 2010 and reported on in early 2011, was to confirm the baseline level of sustainable farming practices being used, and determine if there was an increase in adoption over time of some practices. The survey questions in the 2011 survey included all those from the 2009 survey plus a few additional ones asking about amounts of important farm inputs like fertilizers, water and energy. The purpose of the 2013 survey was to continue to track the use of Best Management Practices by the California Pear growing community and highlight areas where improvements have been made as well as highlight any areas where improvements can be realized. The 2013 survey included all the questions from the 2009 and 2010 surveys as well as new ones concerning practices in four farm management areas not covered in the previous surveys: Financial Management, Food Safety Planning and Management, Waste Management, and Neighbors and Community. These were added to make the survey more complete.

The survey was designed and administered by SureHarvest Inc., a leading agricultural sustainability program design firm. It was made available to California pear growers in two different forms; a printed version sent to them by mail, and an electronic version that was available through the SurveyMonkey® internet website. The California Pear Advisory Board, which is a state marketing and research program representing California pears, provided SureHarvest with a list of California pear growers along with their contact information so they could be sent the survey in the mail and also be emailed the instructions for filling out the survey on-line. Each grower was given a confidential username and password to access the on-line survey so they could fill it out in confidence. Approximately one-half the growers chose to fill out the survey on-line. Of the 47 grower names provided to SureHarvest by the California Pear Advisory Board, 53% (25) participated in the survey – a highly significant percentage of the industry. However, this was down from the 71% response rate to the 2010 survey. The 26 growers completing the 2013 survey manage 63% of the approximately 10,000 acres of pear orchards in California.

Practices Assessed

The practices assessed in the 2009 survey were identified by a committee of California pear growers, handlers (packers and processors), crop consultants, and representatives of the California Pear Advisory Board and the Pear Pest Management Research Fund. The 2010 survey contained additional questions concerning the use of nutrients, energy and water. Forty two questions, reviewed by growers on the California Pear Advisory Board Sustainability Committee, were added to the 2010 survey in the farm management areas noted above. The survey now contains a total of 183 questions.

While definitions of sustainability can differ dramatically between various advocates of different aspects of sustainable agriculture, for the purposes of the pear sustainability surveys, sustainability was defined as:

“the concept and practice of balancing economic prosperity, environmental stewardship, and social responsibility so they together lead to an improved quality of life for ourselves and future generations.”

With this in mind, the best practices assembled for the 2013 pear sustainability survey were related to the following farm management areas with the survey being divided up into these parts:

- General Farm Management
- Integrated Pest Management
- Soil & Nutrient Management
- Water Management
- Ecosystem Management
- Employer Practices
- Air Quality
- Energy Management
- Financial Management
- Food Safety Planning and Management
- Waste Management
- Neighbors and Community

The list of practices included in the 2009 and 2010 surveys drew heavily on the University of California's *Pear Year-round IPM Program Annual Checklist* and the SYSCO Farm/Ranch IPM/Sustainable Audit Checklist v09.01. SYSCO is a major purchaser of California pears for processing and its sustainability program has been influential in the world of food processing. The new questions added to the 2013 survey were developed as a part of a California Department of Food and Agriculture Specialty Crop Block grant to SureHarvest. One of the goals of the grant was to work with specialty crop groups in California, including the California Pear Advisory Board, to develop a self-assessment template of practices that could be used by any specialty

crop group to develop a self-assessment workbook for their specific crop. The template developed by this project included the farm management areas that were added to the 2013 Pear growers' survey, which until that time had not been addressed by the California Pear Sustainability Survey.

Key Findings of the 2013 California Pear Grower Survey

The survey data show that the California pear grower community continues to use best management practices which demonstrate good stewardship of important resources and also care for employees. Furthermore, the level of adoption of many practices has increased. Since the level of adoption was already high in many areas, the level of improvement is small in these cases. Listed below are the key findings from the 2013 survey:

- As also shown in the 2009 and 2010 surveys, an overwhelming majority of California pear growers use Integrated Pest Management (IPM) to manage their orchard pests. This is almost certainly the outcome of the many years of investment by the industry in IPM research and outreach. For example, over 93% of growers report scouting for key pests throughout the year to inform their pest management decisions. Furthermore, 91% of growers report using pheromone mating disruption as the primary management tool for codling moth, the most important insect pest of pears in California.
- Growers applied smaller amounts per acre of the key nutrients nitrogen (N), phosphorus (P) and potassium (K) than they did in 2010; 9% less N, 27% less P, and 30% less K.
- All growers are keeping accurate records of their nutrient applications for at least 3 years.
- Fifty six percent of growers have developed nitrogen management plans for their orchard, up from 45% in 2010.
- Growers have increased their adoption of important water management practices: 39% have updated their water management plans - up from 29%; 95% test their irrigation water for bacterial levels - up from 29%; more growers have installed flow meters on their irrigation pumps, 50% - up from 38%; and

growers applied 4 inches less water per acre in 2013 compared to 2010 (this could be related to a difference in rainfall between the two survey years).

- Growers have significantly increased their adoption of many important human health and safety practices: the number of growers having pesticides stored within a secondary containment device, not a legal requirement, has doubled from 29% to 60%; 97% of the growers have spill response/cleanup kits in pesticide storage facilities - up from 80%; 95% of the growers maintain organized legal documentation pertaining to employee health and safety - up from 82%.
- More than half the growers have succession plans for passing on their farm to the next generation and 68% have written wills and estate plans in place for the farm.
- Sixty five percent of the growers track revenues and returns for each orchard. A great way to determine where improvements are working, or in other situations, where they need to be made.
- There is a very high level of implementation of practices related to food safety and management by California pear growers. Over 90% of the growers use all of the practices listed in the Food Safety Planning and Management section (Q26.1 – Q26.9).
- Waste management is considered by California pear growers to be a very important part of farm management. Over 90% of the growers use all of the practices listed in the Waste Management section (Q27.1 – Q27.10).

Data Interpretation

For some of the sustainable practices assessed in this survey, the responses from California pear farmers demonstrate a very high level of adoption of sustainable farming practices. In the key areas focusing on adoption of Integrated Pest Management practices, as with past survey results, those from the 2013 survey indicate the California pear industry has a higher level of IPM adoption when compared to other crop producers where data is available. For example, the 93% adoption rate for IPM practices, such as scouting for key pests in pear orchards, is significantly greater than

figures published by the California Sustainable Winegrowing Alliance which found that 77% of its growers scouted for pests in a 2009 report.

In other important farm management areas, the survey results indicate that California pear growers have not implemented on as wide a scale sustainable practices being used by growers of other crops for which data is available. The California Winegrowing Alliance 2009 Sustainability Report showed that 92% of the winegrape growers have developed comprehensive water management strategies while 39% of California pear growers have written or updated water management plans for their orchards.

These comparisons provide California pear industry data identifying farm management practices that could be topics of targeted education for the California pear grower community that may help increase adoption of important best management practices. Suggestions on where to focus are:

- Nutrient management. Fifty six percent of California pear growers have developed nitrogen management plans. Since having such plans may become required in the near future by the Regional Water Quality Control Boards, the California Pear Advisory Board should consider sponsoring workshops for helping pear growers develop nitrogen management plans for their orchards.
- Water management. Water has been identified by almost everyone in both urban and rural settings in California as being the state's most impacted resource going into the future. While implementation of some water management practices is relatively high among California pear growers, for example 50% have flow meters on their wells and 40% have water management plans, the importance of water is so great the level of implementation of many water management practices should be higher. The California Pear Advisory Board might consider sponsoring workshops for helping pear growers' develop water management plans and expose them to practices which may improve their water use efficiency, such as using evapotranspiration measurements in irrigation scheduling, a practice currently being used by only 22% of the growers.
- Energy management. Energy costs will increase in the future. Moreover, there is more and more interest in the carbon footprint of agriculture, which is directly

correlated with energy use. It is clear from the survey results (Q22.1 to Q22.7), that most growers are not tracking fuel and electricity use in fine detail, which would be necessary to identify areas of management where energy use could be reduced or made more efficient. The California Pear Advisory Board might consider sponsoring workshops for helping growers develop energy management plans and identify ways of increasing energy use efficiency on the farm.

Conclusions

The grower surveys of 2009, 2010, and now 2103, have clearly established the very high level of adoption of sustainable practices in many areas of farm management by the California pear community, from the use of reduced-risk Integrated Pest Management activities, adoption of prudent use of fertilizers; utilizing natural vegetation to enhance habitat for pest natural enemies as well as prevent soil erosion; and high level adoption of practices related to food safety planning and waste management.

These successes are not only the result of the pear farmers' need to conserve resources but also due to applying the results from years of research funded by the California pear industry. In order to survive and remain economically viable, the pear growing community has come together to fund and share information on effective farming strategies. Knowledge of systems and practices that work has been shared among growers and they, as a result, are working to perpetuate the sustainability of the industry.

This same spirit of cooperation will prove useful as the California pear industry strives to achieve greater adoption of environmentally and economically sound practices in other areas. By continuing to periodically carry out this survey, the California Pear Advisory Board will be able to show the commitment by the growers to sustainable farming, as well as to continue to identify areas where practice adoption can be increased.



The following pages of this report present the survey responses for each question averaged over all the responses. The California Pear Advisory Board will use the information gained from this self-assessment to pursue opportunities to further the sustainability of the California Pear community.



About the California Pear Advisory Board - Established in March 1992, the California Pear Advisory Board (CPAB) is a state agricultural marketing order covering both fresh and processed Bartlett pears produced in California. Its programs include promotion, research, standardization and the cumulating of industry statistics and information.



About SureHarvest, Inc. - Since 1999, SureHarvest, Inc. has provided solutions through professional services and technology for growers and agrifood companies pursuing sustainability strategies – to increase efficiencies, enhance product quality and practice environmental stewardship.

2013 Pear Sustainability Survey Results



Total Assessed Acres: 6,285 (63%)

1.0 Introduction & Instructions

Q1.2 What is the number of acres of pears that you own:

Average Response: 171

Q1.3 What is the number of acres of pears that you farm IN ADDITION TO those you own (if any):

Average Response: 102

Q1.4 Orchard Age

Average year planted (oldest orchard): 1911 Average year planted (youngest orchard): 1984

Year planted of oldest orchard: 1846

2.0 General Farm Management

Q2.1 Have you applied biosolids (treated sewage sludge) on your orchard in the last year? (Check with your shipper/packer or processor for limitations on use of biosolids. Many of their customers do not allow its use.)

Yes: 0.0% No: 95.8% Not Applicable: 4.2%

Q2.2 Are there any 'genetically modified' (GMO) pear trees in your orchard(s)?

Yes: 0.0% No: 100.0% Not Applicable: 0.0%

Q2.3 In the past year, have you burned waste in your orchard(s) (other than diseased/infested prunings or materials you are legally mandated to burn such as certain types of pesticide containers)?

Yes: 8.3% No: 91.7% Not Applicable: 0.0%

Q2.4 In the past year, have you chipped all orchard prunings?

Yes: 91.7% No: 8.3% Not Applicable: 0.0%

Q2.5 If you removed an orchard in the past year, were the trees chipped?

Yes: 20.8% No: 12.5% Not Applicable: 66.7%

Q2.6 In the past year, did you recycle any materials used in orchard operations - such as plastic containers, bags, pesticide containers, etc.?

Yes: 91.7% No: 8.3% Not Applicable: 0.0%

Q2.7 In the past year, did you participate in any on-site environmental and/or social practice audit programs (e.g. GlobalGAP, Food Alliance, Fish Friendly Farming)? If so, please list the program(s) in the comment box.

No: 29.2% Yes: 70.8% Not Applicable: 0.0%

Q2.8 In the past year, did you give money, equipment, or supplies to support research projects?

Yes: 70.8% No: 29.2% Not Applicable: 0.0%

Q2.9 In the past year, did you conduct (or allow researchers to conduct) on-farm research in your orchard(s)?

Yes: 58.3% No: 41.7% Not Applicable: 0.0%

3.0 Research Question

Q3.1 If research was done on your farm, was the research conducted with scientific, statistically valid methodologies?

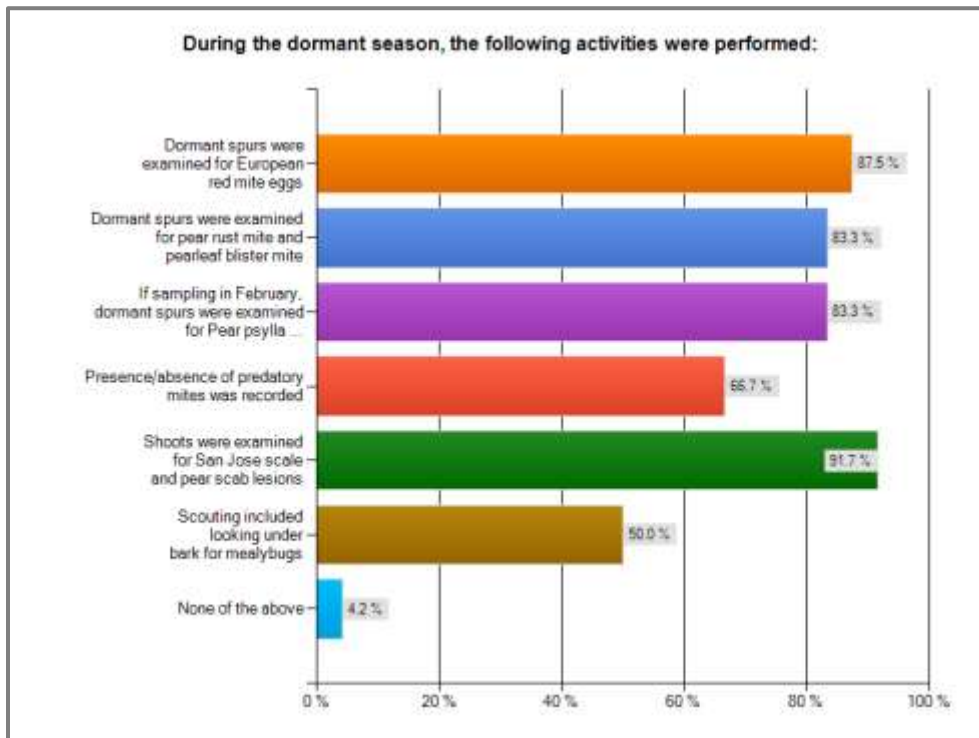
Yes: 100.0% No: 0.0% Not Applicable: 0.0%

4.0 Pest Management: Dormant/Delayed-Dormant Season Activities

Q4.1 During dormant season, beating tray samples were taken for pear psylla adults (the recommended rate is 100 samples per 20-acre block).

Yes: 87.5% No: 12.5% Not Applicable: 0.0%

Q4.2 During the dormant season, the following activities were performed:



Q4.3 In areas where frost and russetting are likely, weeds and ground cover were eliminated before bloom. In areas where frost and russetting are less likely, resident vegetation or cover crop was mowed before bloom.

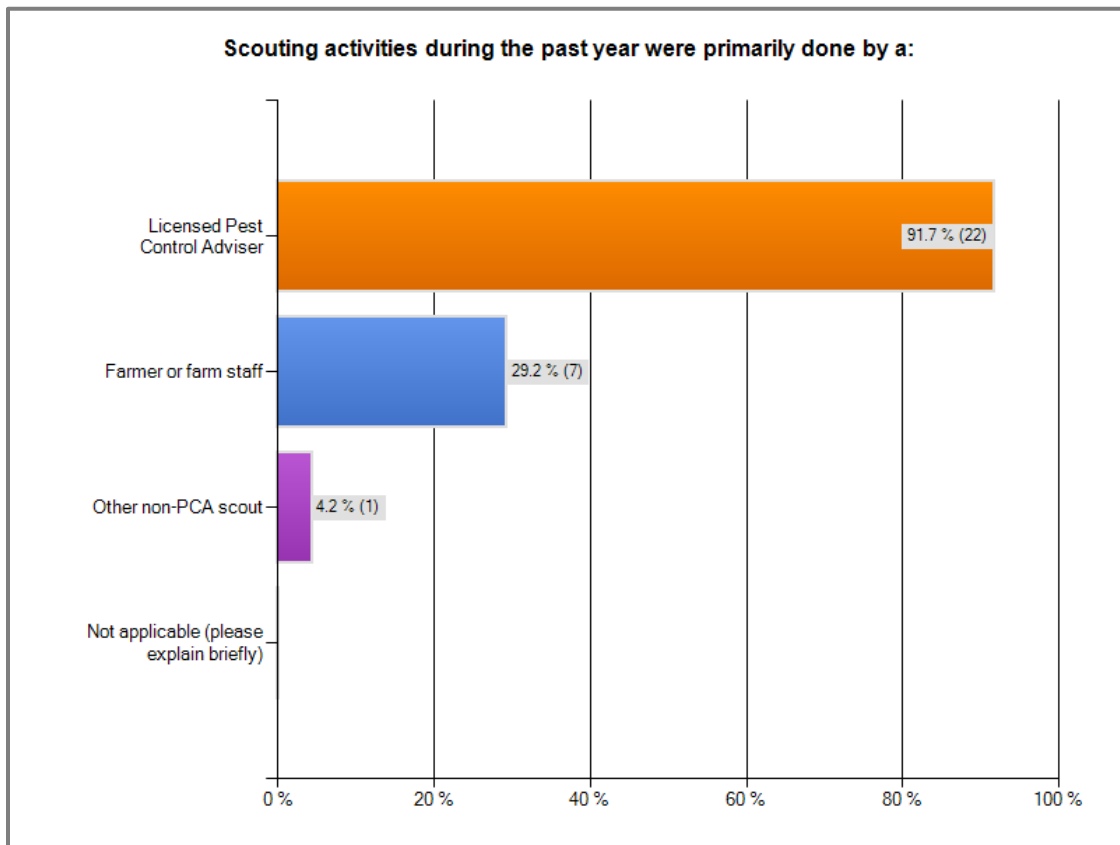
Yes: 91.7% No: 8.3% Not Applicable: 0.0%

Q4.4 If the orchard is in the Central Valley, did you monitor hours during the dormant season for chilling requirement?

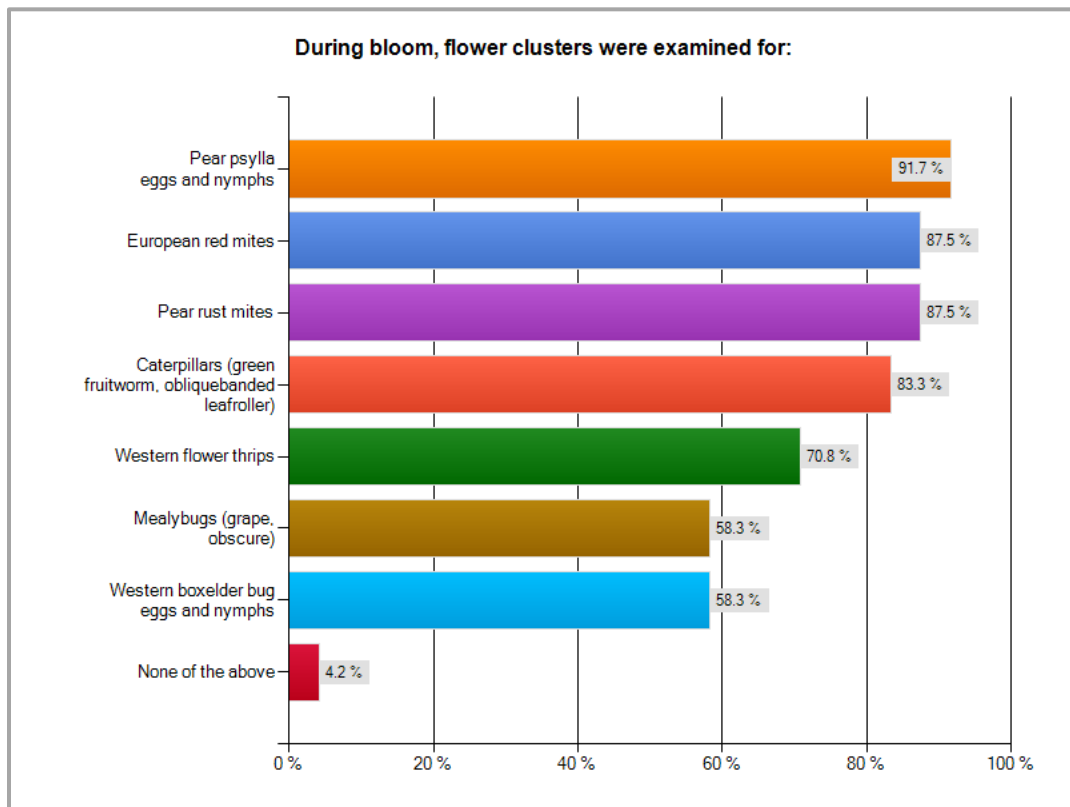
Yes: 58.3% No: 0.0% Orchard is not in the Central Valley: 41.7%

5.0 Pest Management: Bloom Season Activities (green tip to petal fall)

Q5.1 Scouting activities during the past year were primarily done by a:



Q5.2 During bloom, flower clusters were examined for:



Q5.3 Pheromone traps were placed in the orchard for codling moth and other lepidopterous pests in March or as conditions became favorable.

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q5.4 Conspire stink bug is monitored in early April or as conditions become favorable.

Yes: 73.9% No: 17.4% Not Applicable: 8.7%

Q5.5 Pheromone traps were checked at least weekly and counts recorded.

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q5.6 Mating disruption for codling moth was used and pheromone dispensers were placed in the orchard at biofix.

Yes: 91.3% No: 4.3% Not Applicable: 4.3%

Q5.7 Weather conditions are monitored in the spring for hours and temperature of wetting to forecast pear scab potential.

Yes: 95.8% No: 4.2% Not Applicable: 0.0%

Q5.8 If pear scab was treated, leaves and emerging fruit are checked for pear scab lesions after an infection period to assess the effectiveness of treatment.

Yes: 87.5% No: 8.3% Not Applicable: 4.2%

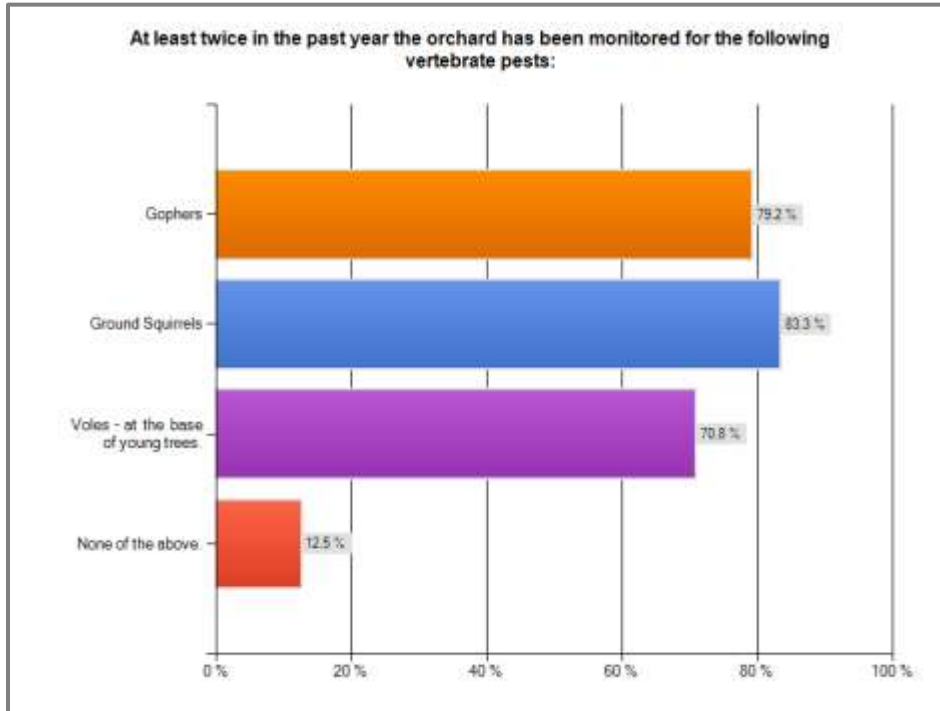
Q5.9 Weather conditions are monitored in the spring for degree hours and precipitation to forecast fire blight.

Yes: 95.8%

No: 4.2%

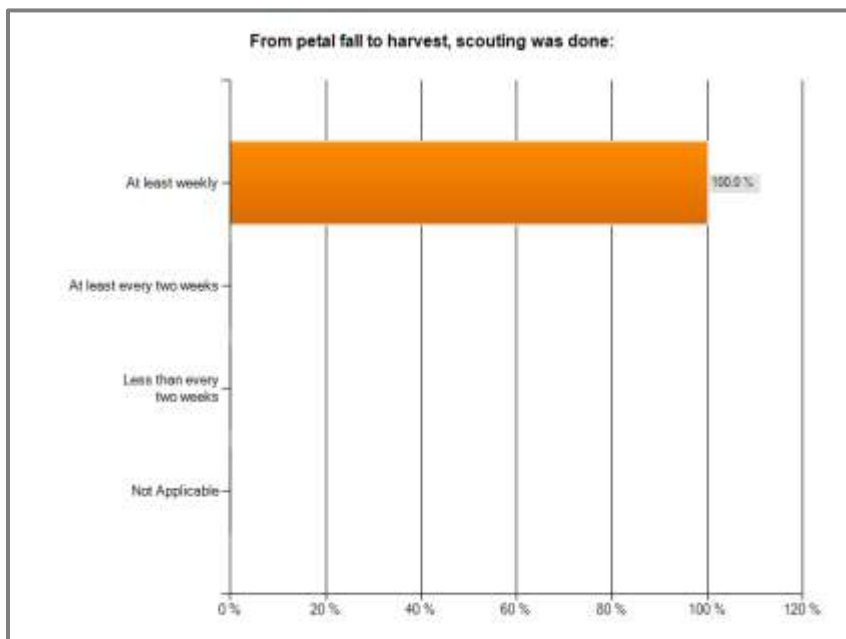
Not Applicable: 0.0%

Q5.10 At least twice in the past year the orchard has been monitored for the following vertebrate pests:

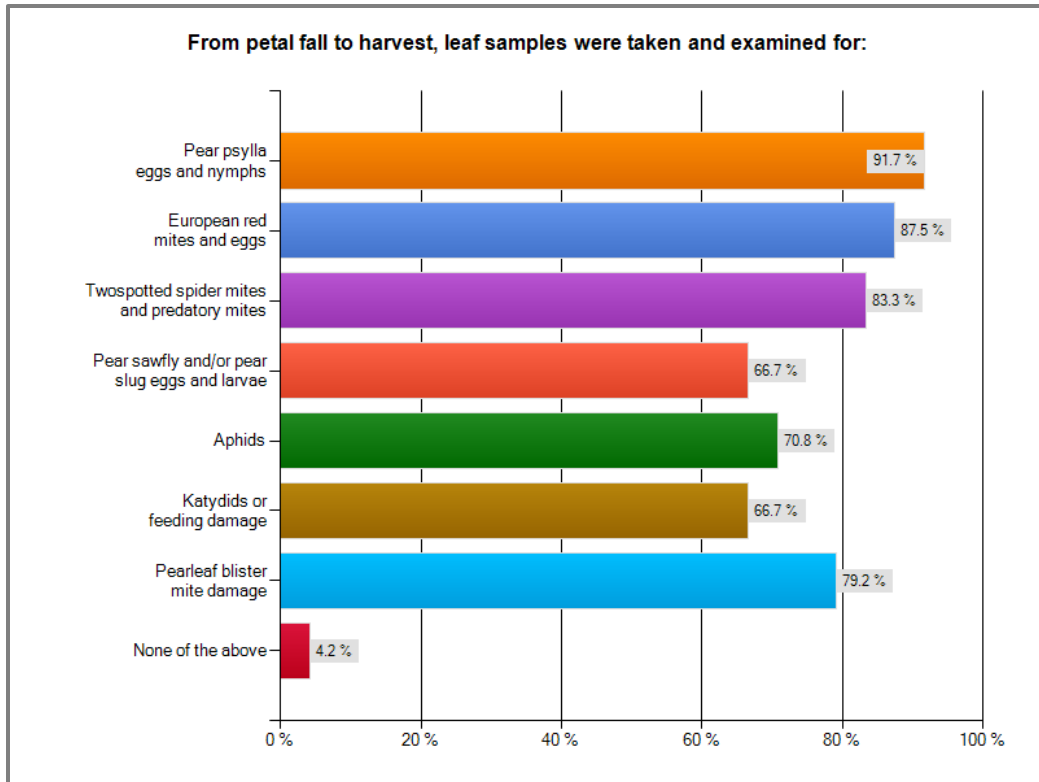


6.0 Pest Management: Fruit Development Period Activities (Petal Fall to Harvest)

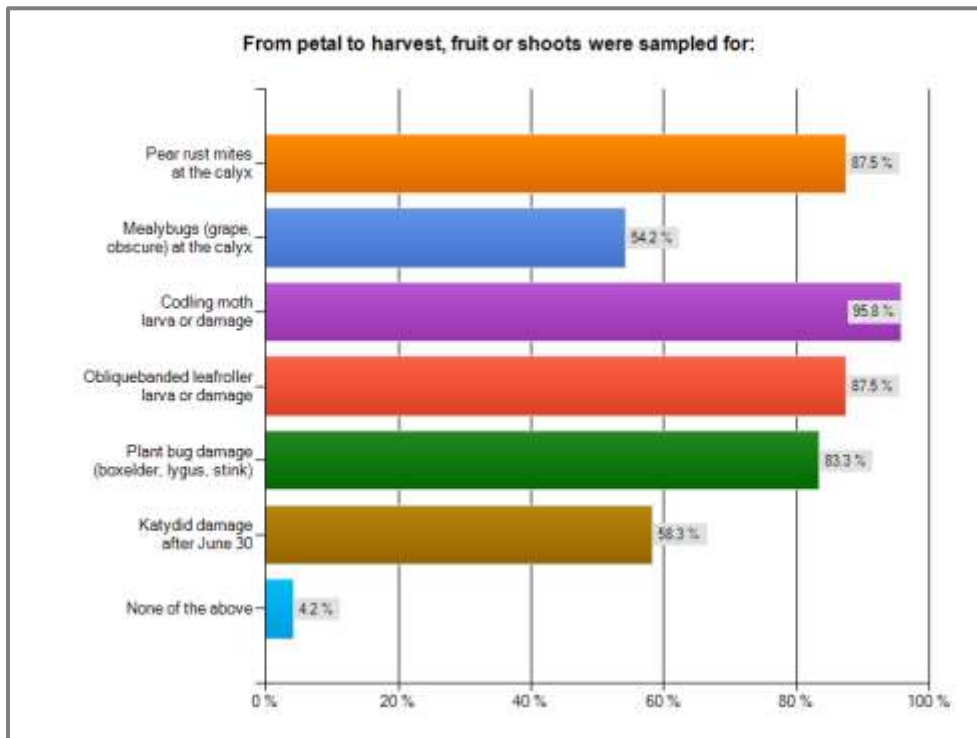
Q6.1 From petal fall to harvest, scouting was done:



Q6.2 From petal fall to harvest, leaf samples were taken and examined for:



Q6.3 From petal to harvest, fruit or shoots were sampled for:



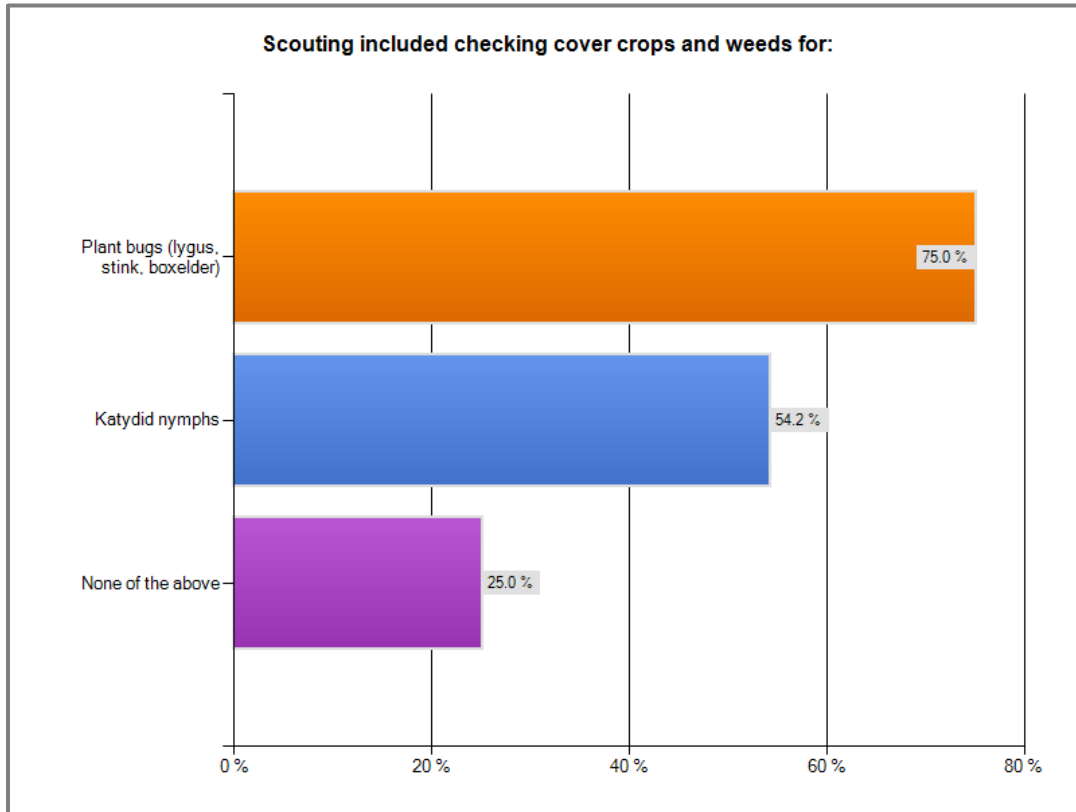
Q6.4 Degree days were monitored and recorded for codling moth beginning with biofix and traps are monitored throughout the season through mid-September.

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q6.5 At 800 to 900 degree-days from biofix, fruit is monitored for damage.

Yes: 95.8% No: 4.2% Not Applicable: 0.0%

Q6.6 Scouting included checking cover crops and weeds for:

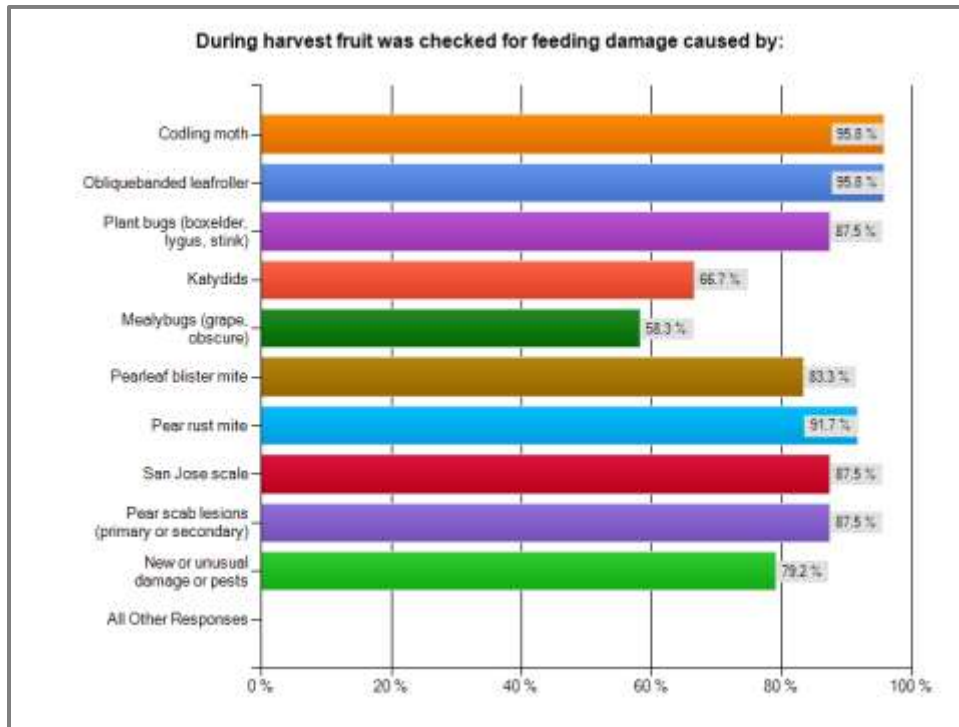


Q6.7 During rattail bloom weather conditions were monitored for fire blight.

Yes: 95.8% No: 0.0% Not Applicable: 4.2%

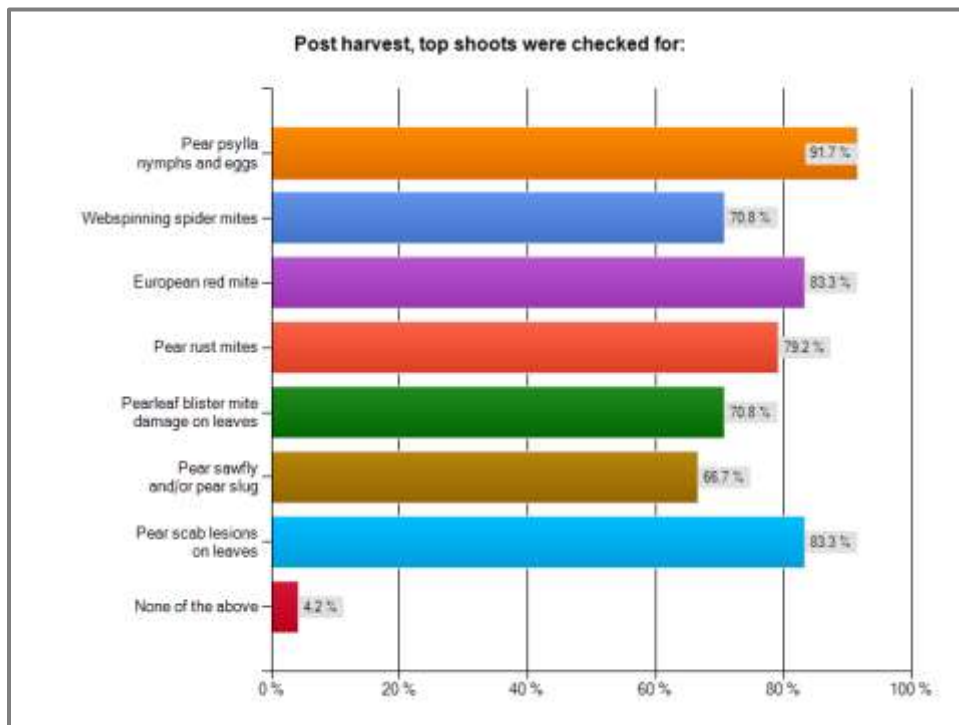
7.0 Pest Management: Harvest Activities

Q7.1 During harvest fruit was checked for feeding damage caused by:



8.0 Pest Management: Post-Harvest Activities

Q8.1 Post harvest, top shoots were checked for:



Q8.2 Fruit left on trees after harvest was sampled for coding moth and/or damage.

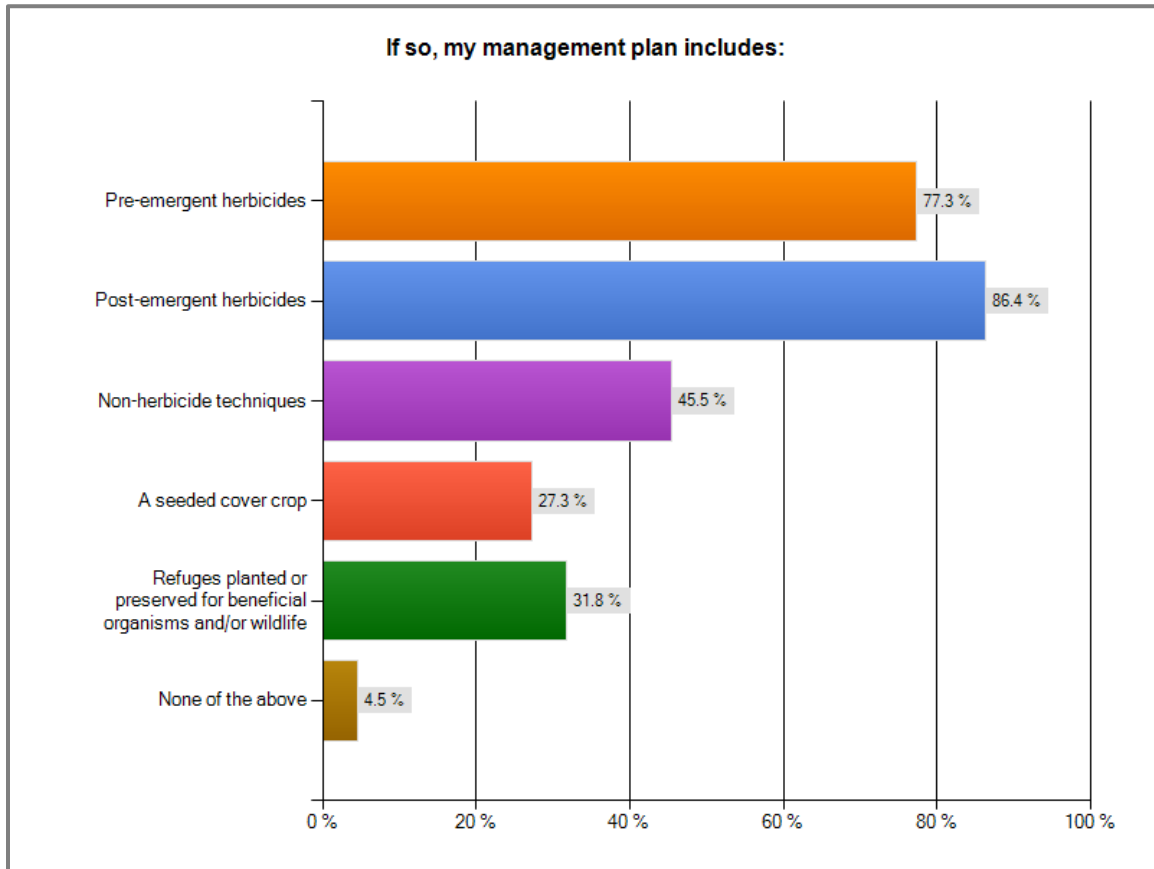
Yes: 69.6% No: 26.1% Not Applicable: 4.3%

9.0 Pest Management: Orchard Floor Vegetation

Q9.1 Do you have an orchard floor vegetation management plan?

Yes: 91.7% No: 8.3% Not Applicable: 0.0%

Q9.2 If so, my management plan includes:

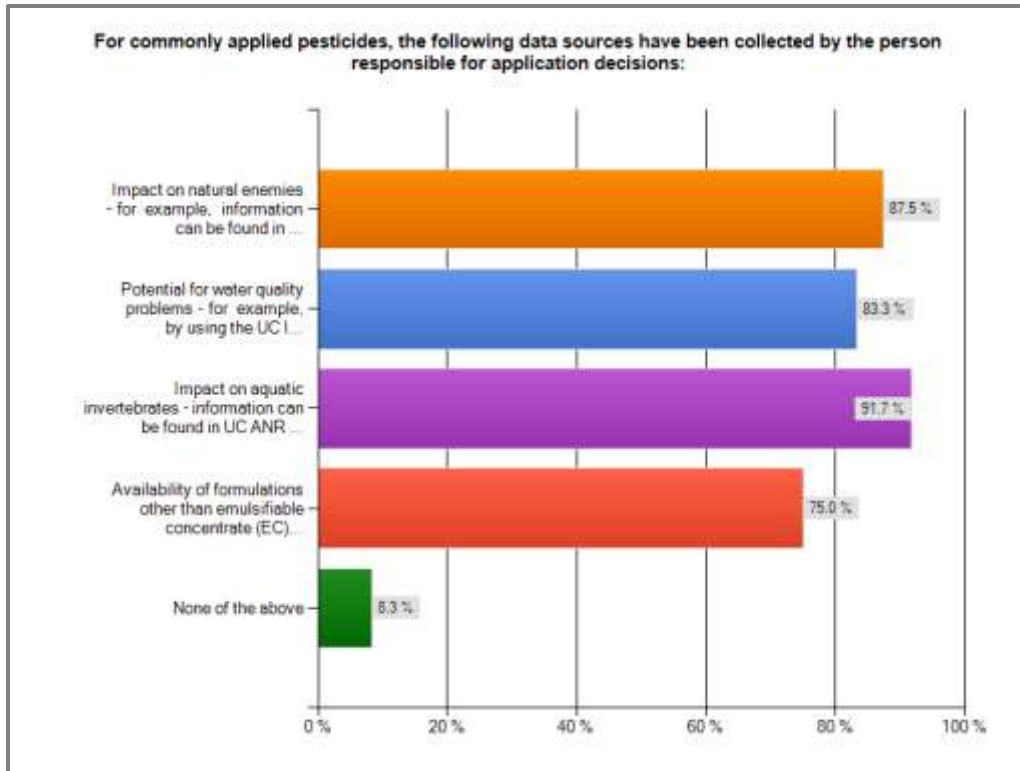


10.0 Pest Management: Pesticide Application Tools

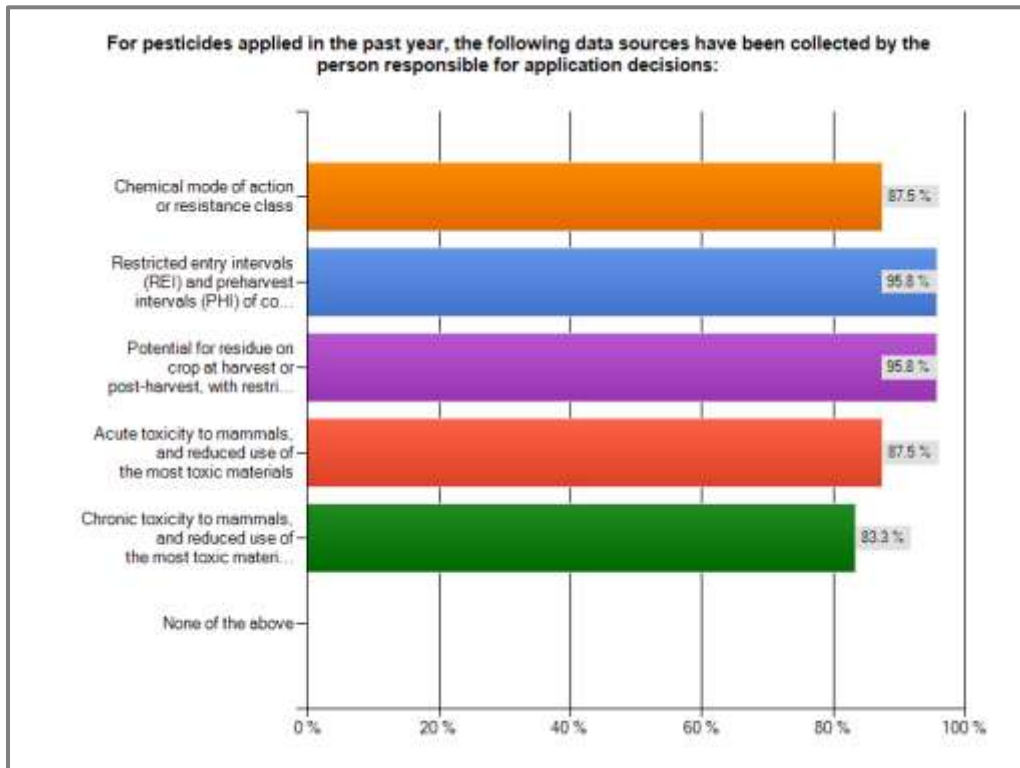
Q10.1 Do you use a custom applicator for pesticides applications?

Yes: 0.0% No: 100.0% Not Applicable: 0.0%

Q10.2 For commonly applied pesticides, the following data sources have been collected by the person responsible for application decisions:



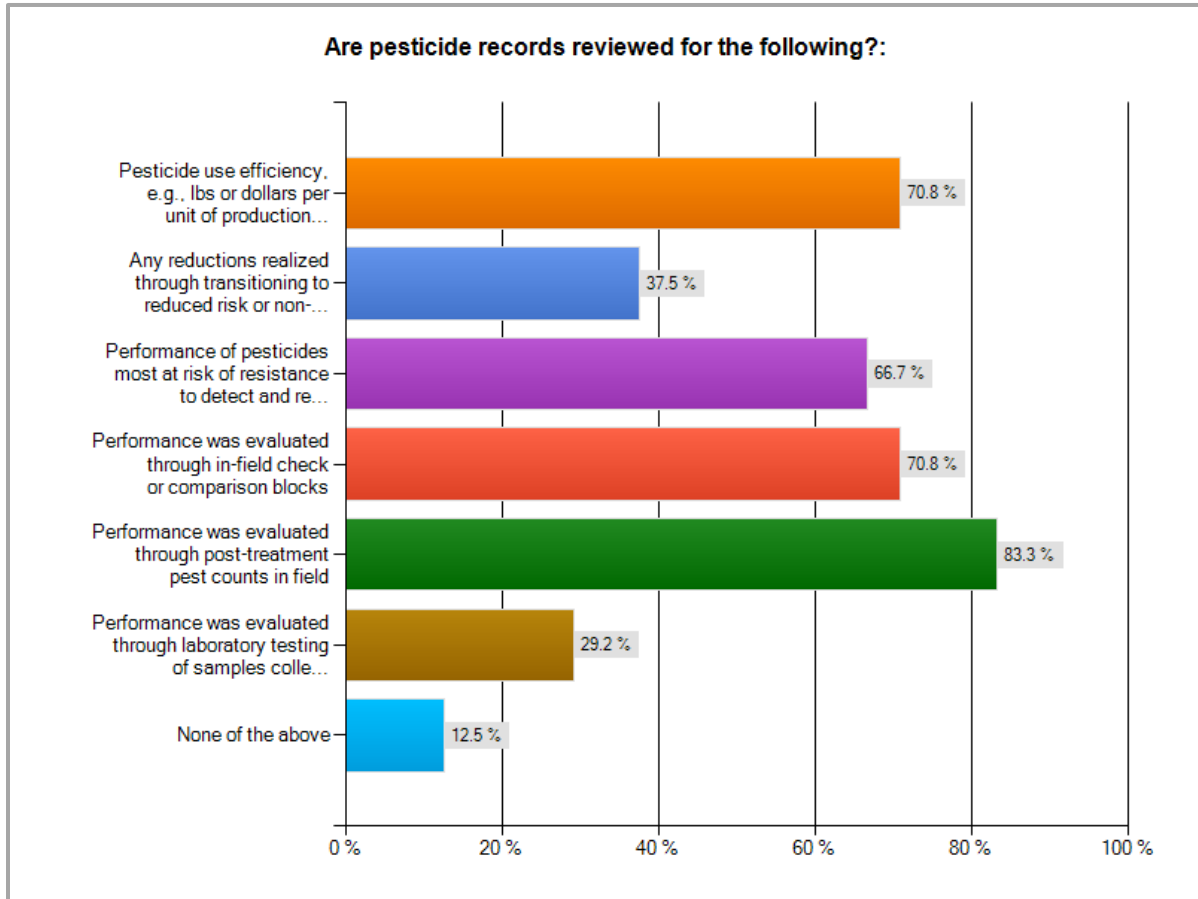
Q10.3 For pesticides applied in the past year, the following data sources have been collected by the person responsible for application decisions:



Q10.4 Complete, legible pesticide application records are kept available and maintained for at least three years. Records include target pest, date, time, location, material applied, rate, applicator, application method, weather conditions, estimated or measured wind speed.

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q10.5 Are pesticide records reviewed for the following?:



Q10.6 Staff members most directly responsible for pest management have met the minimum continuing education requirements for pesticide applicator licensing/certification.

Yes: 95.7% No: 0.0% Not Applicable: 4.3%

Q10.7 Staff members most directly responsible for pest management have participated in IPM/sustainable ag training events in the previous year beyond minimum legal requirements.

Yes: 87.5% No: 8.3% Not Applicable: 4.2%

Q10.8 Does your operation maintain organized legal documentation pertaining to pesticide usage?

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q10.9 Does your operation maintain organized records on pesticide applicator licensing/certification for its applicators?

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q10.10 Does your operation maintain organized legal documentation pertaining to worker protection standard/ right-to-know material and availability of personal protective equipment (PPE) for pesticides used?

Yes: 95.8% No: 0.0% Not Applicable: 4.2%

Q10.11. In the past two years, has your operation been cited for chemical application violations?

Yes: 4.2% No: 95.8% Not Applicable: 0.0%

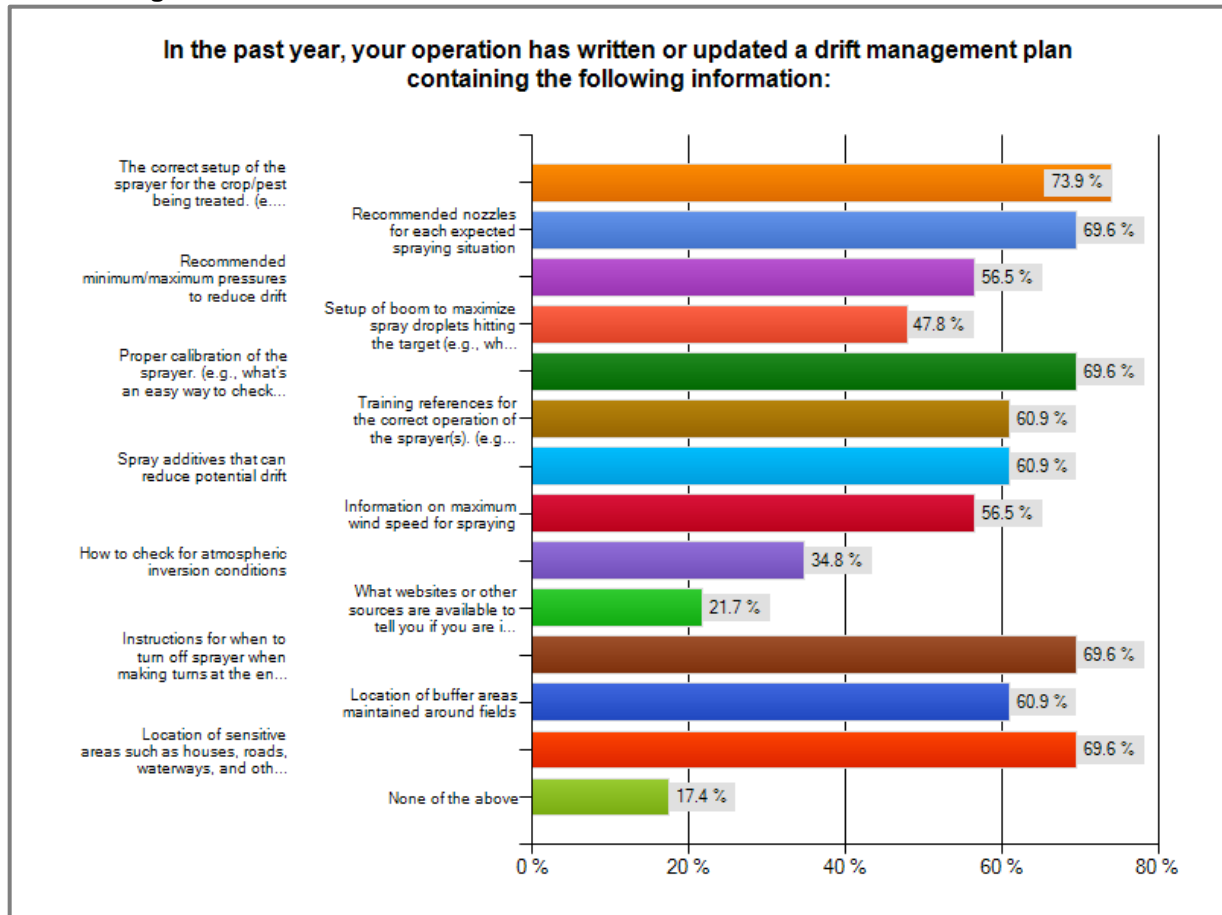
11.0 Resolving Citations

Q11.1 If yes, have all the citations been resolved or in the process of being resolved?

Yes: 0.0% No: 0.0% Not Applicable: 100.0%

12.0 Pest Management: Drift Management Plan

Q12.1 In the past year, your operation has written or updated a drift management plan containing the following information:



Q12.2 In the past three years, has the operation been cited for off-target application of agrochemicals (i.e., drift)?

Yes: 4.2% No: 95.8% Not Applicable: 0.0%

13.0 Drift Citations

Q13.1 If so, have you documented the response internally?

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

14.0 Soil & Nutrient Management

Q14.1 In the past year, have you developed or updated a written nutrient management plan?

Yes: 56.5% No: 43.5% Not Applicable: 0.0%

Q14.2 In the past year, have you taken or done tissue nutrient testing at least once to determine macro-and micronutrient levels in the tree tissues?

Yes: 73.9% No: 26.1% Not Applicable: 0.0%

Q14.3 Does your nutrient management plan use previously recorded nitrogen use efficiency rates (e.g., total N per acre) to forecast orchard nutrient needs?

Yes: 54.5% No: 31.8% Not Applicable: 13.6%

Q14.4 In the past year, were your application rates kept at or below university recommended rates, as correlated to your tissue testing results?

Yes: 81.8% No: 13.6% Not Applicable: 4.5%

Q14.5 Do you track and record information on nutrient applications made to your orchards?

Yes: 87% No: 8.7% Not Applicable: 4.3%

Q14.6 Do you maintain nutrient application records for a minimum of three years?

Yes: 91.3% No: 4.3% Not Applicable: 4.3%

Q14.7 Do you use fertigation technology to apply nutrients?

Yes: 36.4% No: 63.6% Not Applicable: 0.0%

Q14.8 Does your operation maintain records pertaining to nutrient applications?

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q14.9 Have you tested soil organic matter in the last five years?

Yes: 65.2% No: 34.8% Not Applicable: 0.0%

Q14.10 Have you tested soil salinity levels in the past five years?

Yes: 60.9% No: 39.1% Not Applicable: 0.0%

Q14.11 Are the row middles of your orchard maintained in resident vegetation or cover cropped?

Yes: 95.7% No: 4.3% Not Applicable: 0.0%

Q14.12 In the past two years, have you added soil organic matter amendments?

Yes: 13% No: 87% Not Applicable: 0.0%

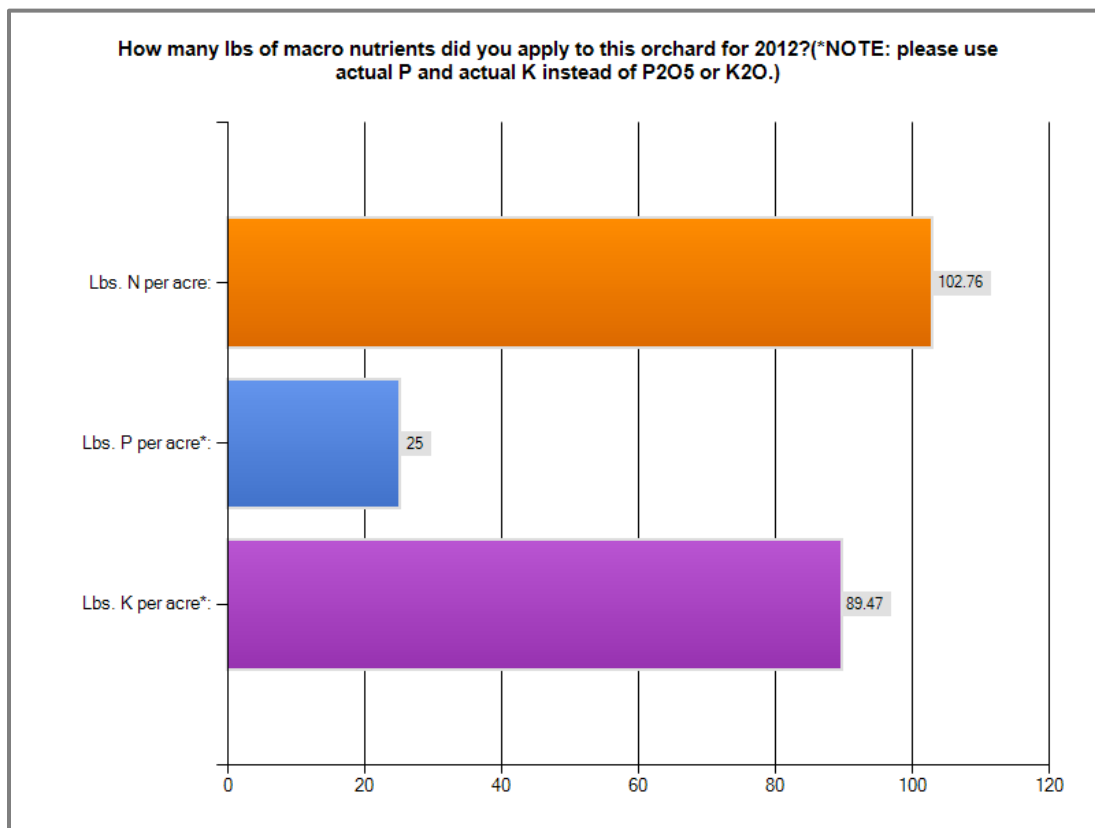
Q14.13 The farm property outside of the orchard has no visible erosion, OR erosion potential is being reduced or corrected through one or more of the following techniques: windbreaks, terraces, cover crops, mulches, contours, managed drainage, buffer or filter strips, minimum tillage.

Yes: 73.9% No: 13.0% Not Applicable: 13.0%

Q14.14 Orchard(s) has no visible erosion, OR erosion potential is being reduced or corrected through one or more of the following techniques: terraces, cover crops, mulches, contours, managed drainage, buffer or filter strips, minimum tillage.

Yes: 78.3% No: 8.7% Not Applicable: 13.0%

Q14.15 How many lbs of macro nutrients did you apply to this orchard for 2012?



15.0 Water Management

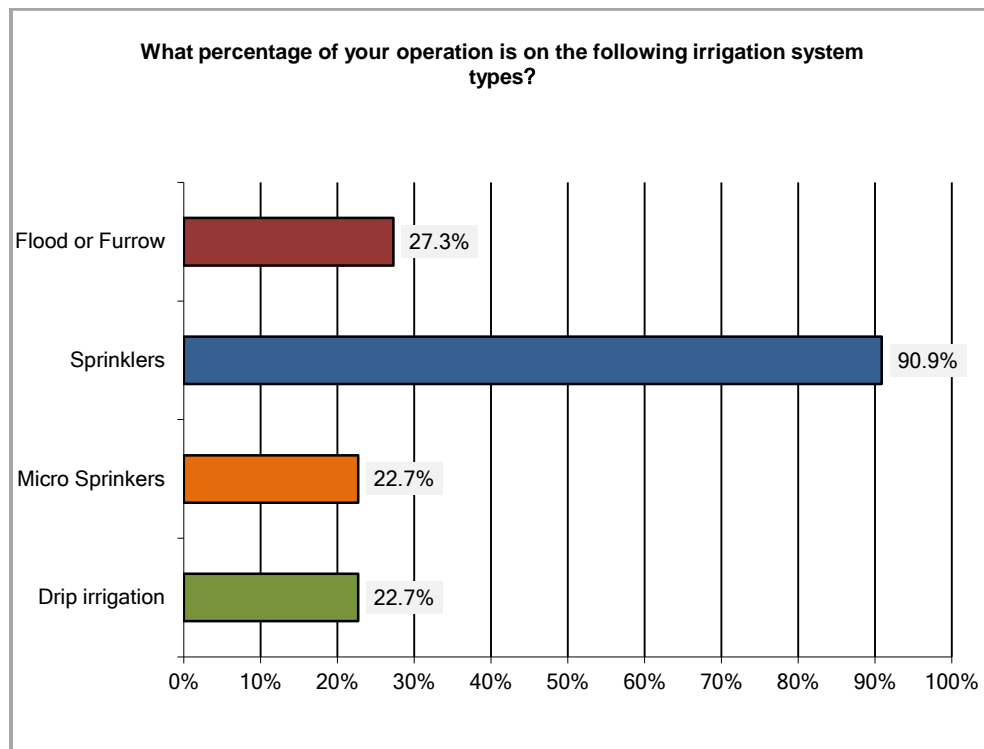
Q15.1 In the past year, have you written or updated a water management plan for your orchard(s)?

Yes: 39.1% No: 60.9% Not Applicable: 0.0%

Q15.2 In the past year, did you track and record information on irrigation applications made to your orchard(s)?

Yes: 78.3% No: 21.7% Not Applicable: 0.0%

Q15.3 What percentage of your operation is on the following irrigation system types?



Q15.4 If your operation uses flood/ furrow irrigation, was the orchard(s) laser leveled prior to planting?

Yes: 10.5% No: 21.1% Not Applicable: 68.4%

Q15.5 Do you use soil moisture monitoring devices?

Yes: 43.5% No: 56.5% Not Applicable: 0.0%

Q15.6 Do you use an evapotranspiration (ET) model to schedule irrigations?

Yes: 21.7% No: 78.3% Not Applicable: 0.0%

Q15.7 Have you tested conveyed irrigation water annually for nutrients, pH and salinity?

Yes: 31.8% No 59.1% Not Applicable: 9.1%

Q15.8 In the past five years, have you sampled well water used for irrigation for nutrients, pH and EC?

Yes: 52.2% No: 21.7% Not Applicable: 26.1%

Q15.9 In the past year, has your irrigation water been tested for bacterial levels?

Yes: 95.7% No: 4.3% Not Applicable: 0.0%

Q15.10 Does your operation irrigate with “gray” water (treated water from sewage facilities) as irrigation water?

Yes: 0.0% No: 95.7% Not Applicable: 4.3%

Q15.11 Have you done a pump efficiency test in the past five years?

Yes: 30.4% No: 65.2% Not Applicable: 4.3%

Q15.12 Are flow meters installed on at least some of your pumps?

Yes: 50.0% No: 45.5% Not Applicable: 4.5%

16.0 Recording Water Volume

Q16.1 If so, did you record your water volume usage?

Yes: 75% No: 25% Not Applicable: 0.0%

17.0 Water Applied

Q17.1 How many acre inches of water did you APPLY as irrigation to this orchard for 2012?

Average Acre Inches: 25.71

18.0 Ecosystem Management

Q18.1 Have you converted any environmentally sensitive areas to pear production within the past three years?

Yes: 0.0% No: 95.7% Not Applicable: 4.3%

Q18.2 Do you have a current map of your orchard(s) identifying environmentally sensitive areas? (Sensitive areas are those areas on or around your farm that are either potential sources of hazards or susceptible to environmental damage, such as surface water bodies, wetlands, wellheads, endangered/threatened species habitat, chemical storage sites, drainage areas, fuel tanks, or dwellings.)

Yes: 56.5% No: 39.1% Not Applicable: 4.3%

Q18.3 Does your map delineate buffer zones around sensitive areas?

Yes: 43.5% No: 39.1% Not Applicable: 17.4%

Q18.4 Are sensitive areas marked by signs or fenced off to prevent activities which might negatively impact these areas?

Yes: 17.4% No: 60.9% Not Applicable: 21.7%

Q18.5 Are filter strips established around riparian or drainage areas of your property(ies)?

Yes: 43.5% No: 43.5% Not Applicable: 13%

Q18.6 In the past three years, have you identified and taken action to remove invasive plants on your property?

Yes: 82.6% No: 8.7% Not Applicable: 8.7%

Q18.7 Is a portion of your property maintained in an undeveloped state?

Yes: 43.5% No: 52.2% Not Applicable: 4.3%

Q18.8 In the past 12 months have you visually monitored sensitive areas in your orchard(s) and recorded the status and any corrective actions you have taken to protect the area?

Yes: 26.1% No: 47.8% Not Applicable: 26.1%

Q18.9 Are pesticides stored on the farm in a locked containment area?

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

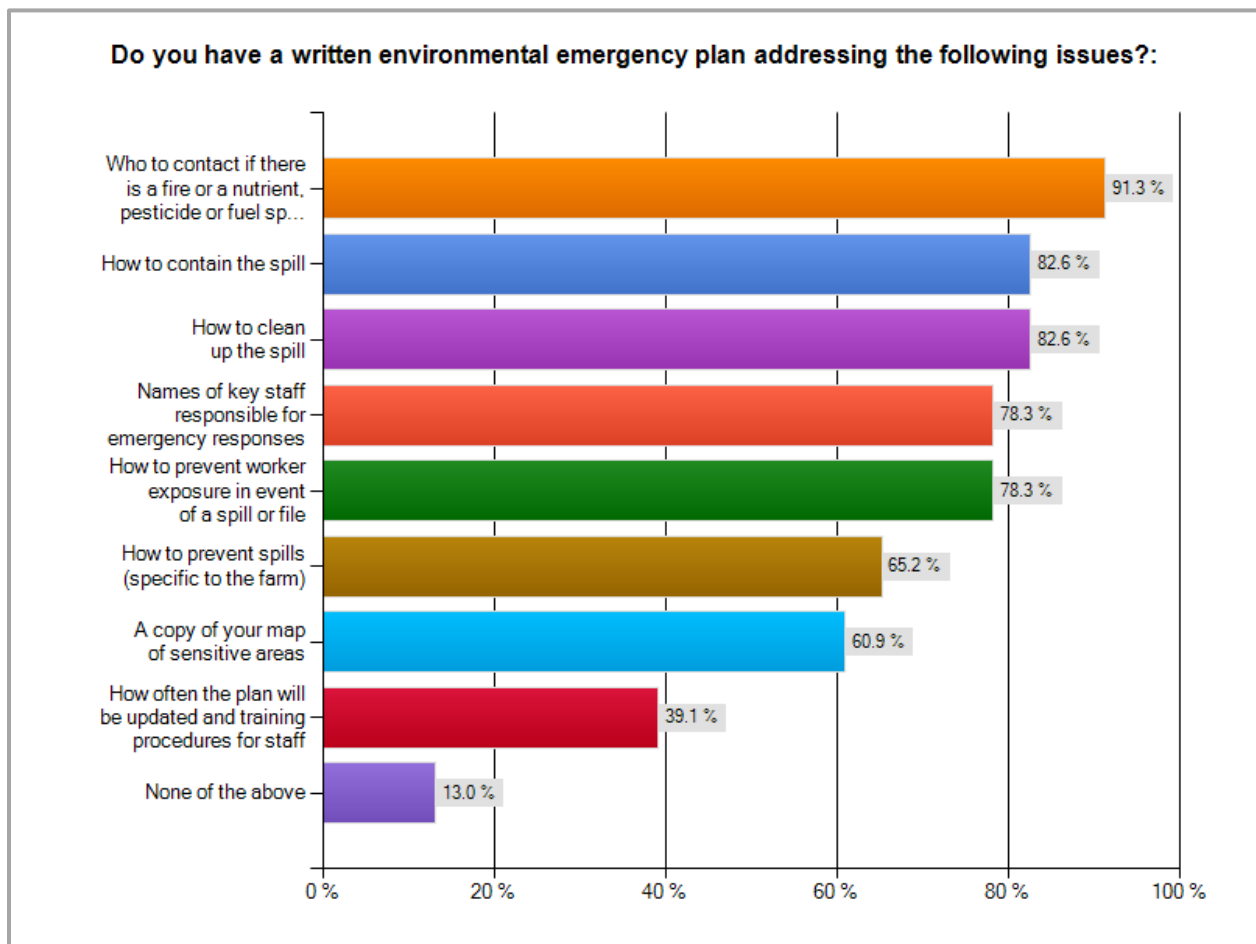
Q18.10 Are pesticides stored within a secondary containment device or structure?

Yes: 60.9% No: 34.8% Not Applicable: 4.3%

Q18.11 Is a spill response/cleanup kit in the pesticide storage facility?

Yes: 95.7% No: 4.3% Not Applicable: 0.0%

Q18.12 Do you have a written environmental emergency plan addressing the following issues?



Q18.13 Have you experienced an environmental emergency in your orchard operations within the past three years?

Yes: 0.0%

No: 100.0%

Not Applicable: 0.0%

19.0 Employer Practices

Q19.1 Do you have employees in your orchard operations?

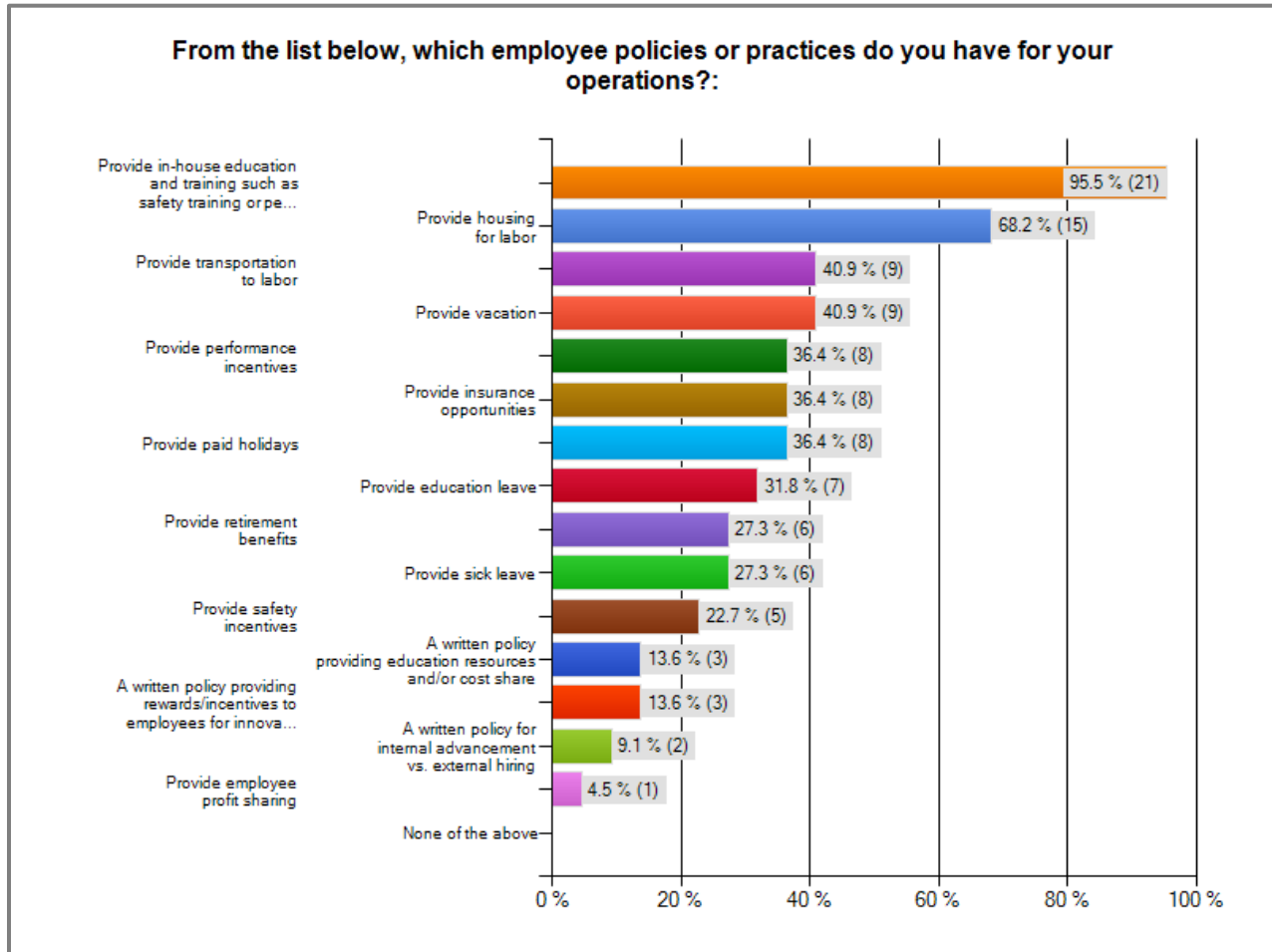
Yes: 95.7%

No: 4.3%

Not Applicable: 0.0%

20.0 Employee Practices & Safety

Q20.1 From the list below, which employee policies or practices do you have for your operations?



Q20.2 Does your operation maintain organized legal documentation pertaining to employee health and safety?

Yes: 95.5%

No: 4.5%

Not Applicable: 0.0%

21.0 Air Quality

Q21.1 Are speed limits posted on unpaved roads to reduce dust generation?

Yes: 23.8%

No: 66.7%

Not Applicable: 9.5%

Q21.2 Is vehicle access to unpaved roads physically restricted?

Yes: 31.8% No: 59.1% Not Applicable: 9.1%

Q21.3 Do you apply water or organic dust suppressants (e.g., road oil, polymers) or layers of mulches, chips, sand, or gravel to unpaved roads and/or equipment yards?

Yes: 86.4% No: 9.1% Not Applicable: 4.5%

Q21.4 Are at least some farm roads and/or equipment yards paved or maintained in vegetative cover.

Yes: 72.7% No: 22.7% Not Applicable: 4.5%

Q21.5 Are orchard row middles in mature orchards primarily maintained in vegetation?

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q21.6 Are methods other than tillage used to control weeds (e.g., herbicides, mowing, heat)?

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q21.7 Do you have a written plan in place for your orchard that sets guidelines to reduce passes by equipment and vehicles?

Yes: 17.4% No: 82.6% Not Applicable: 0.0%

Q21.8 Is engine maintenance done on a regular basis?

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q21.9 Are low-emission vehicles (e.g., flex fuel, hybrids, biodiesel) used by your farming operation?

Yes: 17.4% No: 78.3% Not Applicable: 4.3%

Q21.10 Have engine emissions been reduced by retrofitting/replacing diesel engines to Tier III or IV standards?

Yes: 34.8% No: 52.2% Not Applicable: 13.0%

Q21.11 In the past year did you use alternative fuels for vehicles in at least some of your orchard operations (may include pickups)?

Yes: 4.3% No: 91.3% Not Applicable: 4.3%

Q21.12 Have diesel engines been replaced (or retrofitted) with technology relying on cleaner-burning fuel (e.g., propane, natural gas, biodiesel) or electricity?

Yes: 17.4% No: 73.9% Not Applicable: 8.7%

Q21.13 Is irrigation generally done during off-peak hours when ozone formation and water evaporation are lower?

Yes: 52.2% No: 43.5% Not Applicable: 4.3%

Q21.14 Does the irrigation system for this orchard have no emissions (e.g., solar-powered pumping system, gravity-fed flood/furrow system)?

Yes: 21.7% No: 73.9% Not Applicable: 4.3%

Q21.15 Is extra effort made to reduce VOCs during the peak ozone period (May 1 to October 31) by avoiding use of emulsifiable concentrates and fumigants and considering low-rate spray technologies?

Yes: 50.0% No: 31.8% Not Applicable: 18.2%

Q21.16 Are precision sprayers (e.g., low-volume sprayers, “smart sprayers” with remote sensors) used to reduce pesticide use and increase on-target deposition?

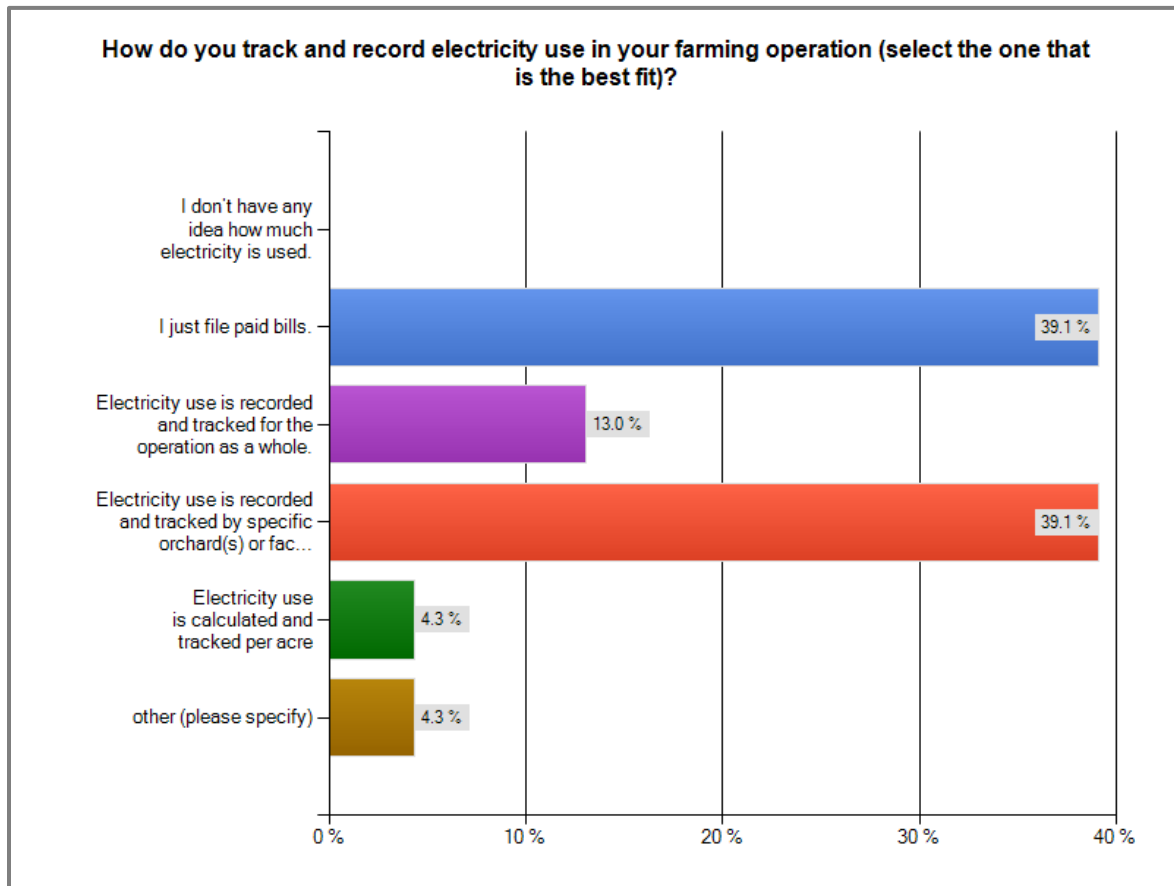
Yes: 26.1% No: 69.6% Not Applicable: 4.3%

22.0 Energy Efficiency

Q22.1 Is your production in an orchard that requires frost production regularly?

Yes: 43.5% No: 56.5% Not Applicable: 0.0%

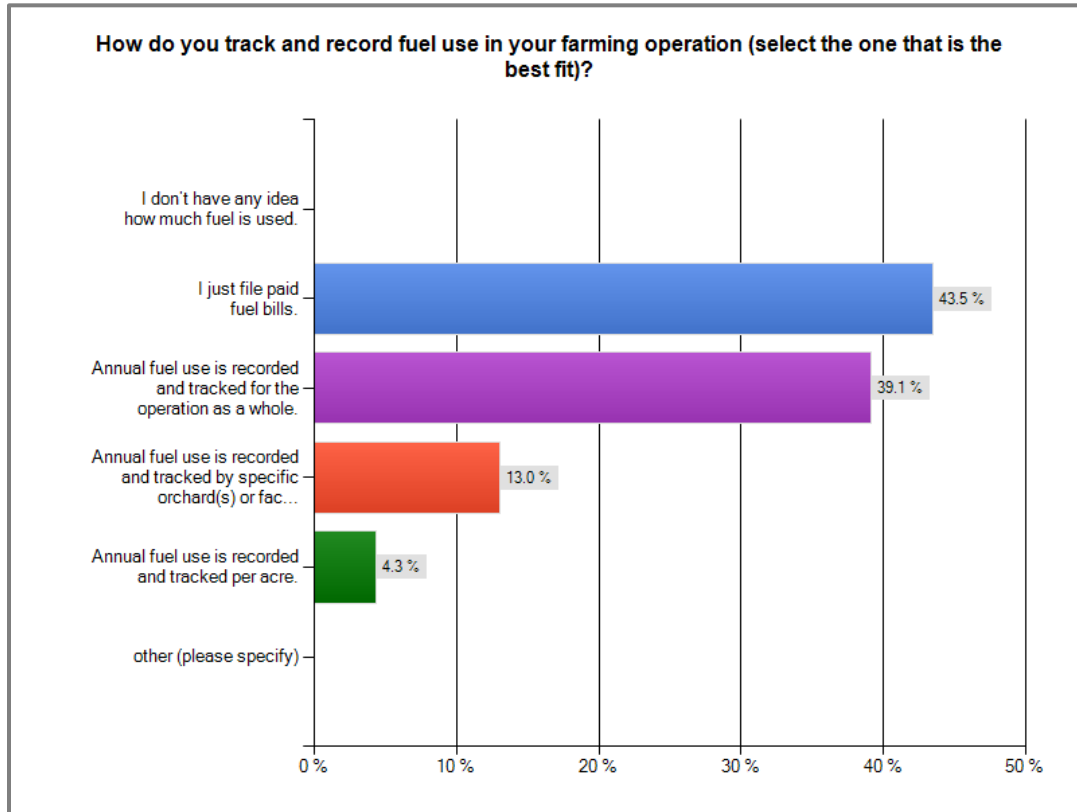
Q22.2 How do you track and record electricity use in your farming operation?



Q22.3 If you record and track annual electricity use per acre, what is that amount for 2013?

Insufficient response (4)

Q22.4 How do you track and record fuel use in your farming operation?



Q22.5 If you record and track fuel use per ton of fruit, what is that amount for 2013?

Insufficient Response (2)

Q22.6 In the past 5 years, has the operation been audited by a qualified expert (e.g., utility representative or paid consultant) to identify opportunities to improve electricity use efficiency?

Yes: 21.7% No: 78.3% Not Applicable: 0.0%

Q22.7 In the past 5 years, have you developed an energy management plan and budget for short and long term (e.g., 1, 3 and 5 year) improvements?

Yes: 8.7% No: 91.3% Not Applicable: 0.0%

Q22.8 Are tire pressures for tractors and other vehicles checked regularly throughout the year to ensure proper inflation?

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q22.9 Are tractors and other vehicles serviced and maintained regularly throughout the year, including timely replacement of oil, fuel, and air filters?

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q22.10 Are lighter vehicles used for road trips that do not require a large vehicle (e.g., small pick-up instead of a large pick-up, car instead of a pick-up, etc.)?

Yes: 73.9% No: 26.1% Not Applicable: 0.0%

Q22.11 Are ATVs, bicycles, motorcycles, golf carts, self-propelled light spray rigs, or other small-engine vehicles used instead of tractors for on-farm transportation and for jobs requiring less horsepower?

Yes: 95.7% No: 4.3% Not Applicable: 0.0%

Q22.12 Are purchases of tractors or other motorized equipment based on calculated horsepower needs and fuel efficiency?

Yes: 78.3% No: 13.0% Not Applicable: 8.7%

Q22.13 Have you painted/coated above ground fuel storage tanks white or aluminum to reflect solar radiation (note that some air districts have restrictions on the type of paint which may be used).

Yes: 60.9% No: 34.8% Not Applicable: 4.3%

Q22.14 Are above ground fuel storage tanks shaded (if allowed under local regulations)?

Yes: 56.5% No: 39.1% Not Applicable: 4.3%

Q22.15 Do above ground fuel storage tanks use pressure-relief vacuum caps rather than conventional caps (if allowed under local regulations)?

Yes: 13.0% No: 78.3% Not Applicable: 8.7%

Q22.16 Are most or all of your shop/plant and yard lighting options more efficient than incandescent bulbs?

Yes: 56.5% No: 39.1% Not Applicable: 4.3%

Q22.17 Is your shop lighting designed with task or area lighting to allow work without lighting unused spaces?

Yes: 60.9% No: 13.0% Not Applicable: 26.1%

Q22.18 Do motion sensors or timers control your yard and/or shop lights?

Yes: 34.8% No: 52.2% Not Applicable: 13.0%

Q22.19 Is your shop lighting augmented with natural light from skylights or windows to reduce the need for electrical lighting during the day?

Yes: 68.2% No: 22.7% Not Applicable: 9.1%

Q22.20 Are your irrigation pump motors or engines maintained regularly?

Yes: 91.3% No: 4.3% Not Applicable: 4.3%

Q22.21 Has your irrigation pumping system been tested for energy efficiency within the last three years (and repairs or improvements made if appropriate)?

Yes: 17.4% No: 78.3% Not Applicable: 4.3%

Q22.22 Is your irrigation pumping done during off-peak hours whenever possible (for electric pumps)?

Yes: 65.2% No: 30.4% Not Applicable: 4.3%

Q22.23 Are variable speed drives installed on pumps which have variable loads (for electric pumps)?

Yes: 9.5% No: 66.7% Not Applicable: 23.8%

Q22.24 Is solar energy used to generate electricity for your operation?

Yes: 8.7% No: 91.3% Not Applicable: 0.0%

Q22.25 Is wind power used/generated by your operation?

Yes: 4.3% No: 95.7% Not Applicable: 0.0%

Q22.26 Does your operation have a contract with your electrical utility to purchase energy from renewable sources?

Yes: 8.7% No: 91.3% Not Applicable: 0.0%

23.0 Financial Management: Planning and Risk Management

Q23.1 A marketing and production plan has been developed for my farm and seasonal outcomes are compared to these plans:

Yes: 39.1% No: 60.9% Not Applicable: 0.0%

Q23.2 A succession plan is in place for the farm:

Yes: 56.5% No: 43.5% Not Applicable: 0.0%

Q23.3 I have a written will and estate plan for the farm:

Yes: 68.2% No: 27.3% Not Applicable: 4.5%

Q23.4 A business continuation plan, for serious events such as flooding, food safety recalls, and other disasters, has been developed for the farm:

Yes: 39.1% No: 60.9% Not Applicable: 0.0%

Q23.5 Key personnel in the company have health insurance:

Yes: 73.9% No: 26.1% Not Applicable: 0.0%

Q23.6 Key personnel in the company have disability insurance:

Yes: 60.9% No: 39.1% Not Applicable: 0.0%

Q23.7 Key personnel have life or accidental death insurance:

Yes: 52.2% No: 43.5% Not Applicable: 4.3%

Q23.8 The crop is insured in the event of significant loss due to weather or other catastrophic events:

Yes: 69.6% No: 30.4% Not Applicable: 0.0%

Q23.9 There is an Injury and Illness Prevention Program (IPP) in place for the farm:

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

24.0 Financial Management: Accounting and Financial Analyses

Q24.1 A financial accounting system is used to track and report farm finances and to make decisions about the farming operation:

Yes: 86.4% No: 13.6% Not Applicable: 0.0%

Q24.2 I understand how to interpret both cash and accrual financial statements including a balance sheet, income statement, cash flow, and financial ratios:

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q24.3 A financial advisor is consulted on an annual basis:

Yes: 60.9% No: 39.1% Not Applicable: 0.0%

Q24.4 Financial profitability analyses for investments are done if investments are made:

Yes: 50.0% No: 40.9% Not Applicable: 9.1%

Q24.5 The revenue and returns are tracked for each orchard/management unit in financial management reports:

Yes: 65.2% No: 34.8% Not Applicable: 0.0%

Q24.6 The costs for important inputs, such as fertilizers, pesticides, water and energy are tracked for each orchard/management unit:

Yes: 73.9% No: 26.1% Not Applicable: 0.0%

Q24.7 Costs and returns are tracked for all important farming practices:

Yes: 91.3% No: 4.3% Not Applicable: 4.3%

Q24.8 Costs and returns are tracked for implementing new sustainability practices and compared to costs and returns of practices they replaced:

Yes: 59.1% No: 31.8% Not Applicable: 9.1%

Q24.9 Sensitivity analysis, i.e. change in crop prices over time, is used to analyze financial risk over time:

Yes: 59.1% No: 40.9% Not Applicable: 0.0%

25.0 Financial Management: Purchasing and Borrowing

Q25.1 More than one quote is obtained for major input purchases such as pesticides and fertilizers:

Yes: 72.7% No: 27.3% Not Applicable: 0.0%

Q25.2 Interest rates and services from more than one lending institution are compared before borrowing a significant amount of money:

Yes: 61.9% No: 19.0% Not Applicable: 19.0%

26.0 Food Safety Planning & Management

Q26.1 A written food safety policy is in place for the farm that includes a commitment to food safety, how it is implemented, and how it is communicated to the employees:

Yes: 90.9% No: 9.1% Not Applicable: 0.0%

Q26.2 A written food safety plan is on file and implemented on the farm:

Yes: 90.5% No: 9.5% Not Applicable: 0.0%

Q26.3 If so, the plan meets Global Food Safety Initiative (GFSI) guidelines:

Yes: 85.0% No: 0.0% Not Applicable: 15.0%

Q26.4 The food safety plan is reviewed and updated at least annually:

Yes: 90.5% No: 0.0% Not Applicable: 9.5%

Q26.5 Records are kept to demonstrate the food safety plan is being followed:

Yes: 90.5% No: 0.0% Not Applicable: 9.5%

Q26.6 A person has been designated as being responsible for food safety functions on the farm:

Yes: 95.2% No: 0.0% Not Applicable: 4.8%

Q26.7 All employees are trained in food safety procedures and practices on the farm:

Yes: 90.5% No: 0.0% Not Applicable: 9.5%

Q26.8 My Company participates in a third- party food safety certification/verification program (e.g. Agriculture Marketing Service GAP Certified, Scientific Certification Systems, PrimusGFS, GLOBALG.A.P.):

Yes: 86.4% No: 13.6% Not Applicable: 0.0%

Q26.9 If so, the program is Global Food Safety Initiative (GFSI) compliant or approved:

Yes: 81.8% No: 0.0% Not Applicable: 18.2%

27.0 Waste Management

Q27.1 The farm has an established recycling program for metal, cardboard, plastics, paper and glass:

Yes: 81.8% No: 18.2% Not Applicable: 0.0%

Q27.2 All unused or worn out items such as appliances and electrical equipment, are taken to the proper recycling centers for disposal:

Yes: 95.5% No: 0.0% Not Applicable: 4.5%

Q27.3 Tires, batteries and lubricants are recycled:

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q27.4 Employees are trained on the proper handling and disposal of hazardous materials (e.g. solvents, cleaning materials, explosives, compressed gases, fuel, acids, and lubricants):

Yes: 95.5% No: 0.0% Not Applicable: 4.5%

Q27.5 Employees are trained on legal requirements related to cleaning of farm equipment with water or steam cleaners and the resulting runoff:

Yes: 90.9% No: 4.5% Not Applicable: 4.5%

Q27.6 Hazardous materials no longer used, as well as their containers, are disposed of according to legal requirements:

Yes: 100.0% No: 0.0% Not Applicable: 0.0%

Q27.7 The farm participates in the pesticide container recycling program:

Yes: 90.5% No: 9.5% Not Applicable: 0.0%

Q27.8 Dumpsters and/or recycling containers are on cement pads to contain spills:

Yes: 54.5% No: 36.4% Not Applicable: 9.1%

Q27.9 Dumpsters and/or recycling containers are periodically inspected for leaks, spills, and litter. Problems noticed are corrected:

Yes: 81.8% No: 4.5% Not Applicable: 13.6%

Q27.10 Bi-lingual signs are posted near the dumpster and/or recycling containers indicating what can or cannot be put in the container:

Yes: 54.5% No: 36.4% Not Applicable: 9.1%

28.0 Neighbors & Community

Q28.1 My company is involved in regional land use planning:

Yes: 27.3% No: 72.7% Not Applicable: 0.0%

Q28.2 My company is involved in initiatives, through time commitment and/or donations, that enhance the community such as the Chamber of Commerce, schools/education programs, churches, public health, affordable housing:

Yes: 45.5% No: 54.5% Not Applicable: 0.0%

Q28.3 My company is involved in regional water issues such as the regional water quality coalition, irrigation districts, ground water use planning, and/or the irrigated lands waiver program planning:

Yes: 86.4% No: 13.6% Not Applicable: 0.0%