



Chapter 6

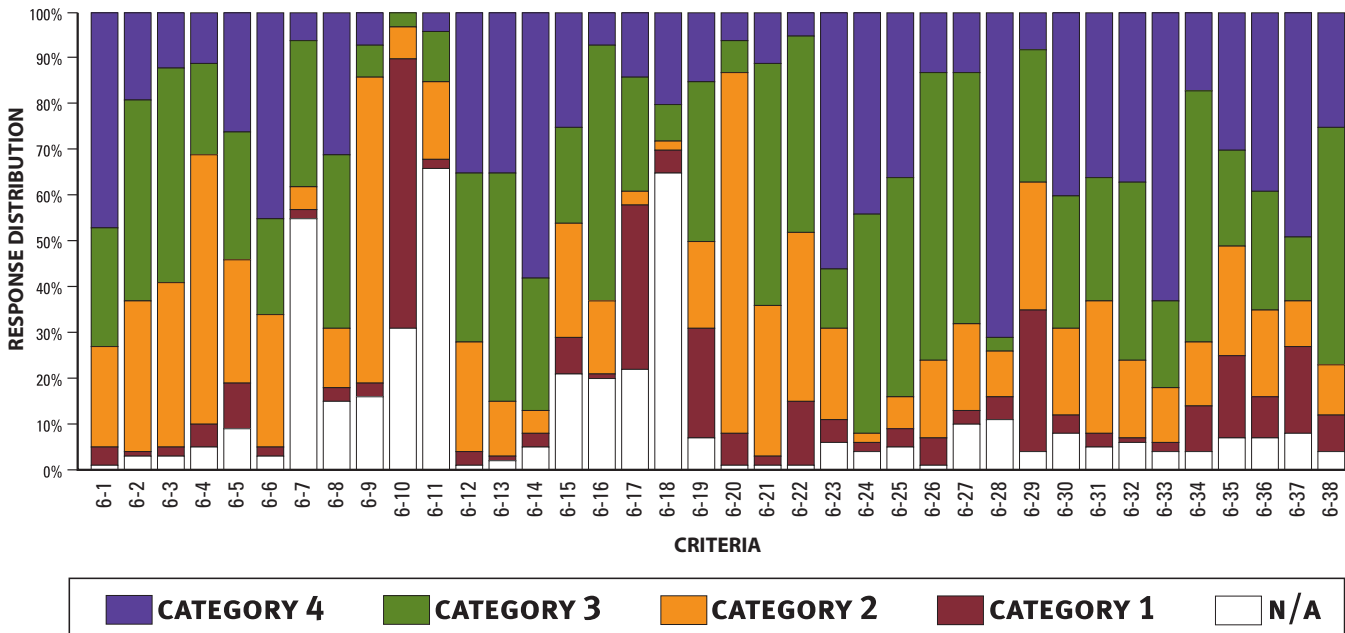
PEST MANAGEMENT

Background

Winegrowers deal with pest problems throughout the year, whether from pathogens, nematodes, insects, mites, weeds, vertebrates, or any combination thereof. Throughout centuries of farming, many approaches to pest management have been developed. Integrated pest management (IPM), best management practices (BMPs), bio-intensive pest management, biological control, and certified organic pest management are a few common examples. There are ardent supporters of each individual approach. Nevertheless, all of these approaches have many common components, generally differing mostly in tactics relied upon or required for control. In fact, all of these approaches stress safe and effective, information-based management as a fundamental principle and therefore fall under the umbrella of IPM. IPM is a sustainable approach to managing pests by monitoring for pests and their predators to determine the risks of economic losses, and if pest management is needed, combining biological, cultural, and chemical tools in a way that minimizes economic, health, and environmental risks.

The foundation of a sound IPM program is regular vineyard monitoring. Particular techniques for pest management may vary from field to field, year to year, crop to crop, and grower to grower but all sustainable pest management strategies begin with knowing first-hand what is going on in the vineyard. Finding and correctly identifying the problem as early as possible allows growers to take necessary action with minimal environmental intrusion and economic disruption.

PEST MANAGEMENT BENCHMARK DATA



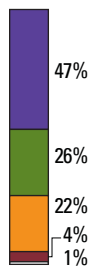
A sustainable pest management program is never complete, instead being in a state of continuous improvement. The reason is growers have learned more about their crops, pests and their natural enemies over time, and have used this knowledge to refine their monitoring programs. By combining chemical, biological, and cultural control techniques to manage a pest problem, growers can develop a broad-based strategy that will still be successful even if one particular technique does not work.

An often overlooked but very important area of sustainable winegrape growing is sprayer calibration and proper spray coverage. Both are very important in minimizing the negative impacts of spraying and optimizing the efficacy of a spray application. Simple maintenance of the equipment insures that sprayers are properly calibrated and nozzles are functioning properly.

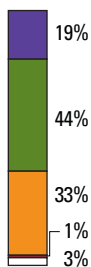
When pesticides, e.g. insecticide, herbicides and fungicides are used, safety is of paramount importance. Safety issues examined in this chapter include establishing buffer zones in sensitive areas, minimizing drift by monitoring environmental conditions before applying materials, and properly handling the loading and cleaning of the spray equipment at all times.

Benchmark Data

Grower Response

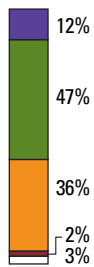


6-1. VINEYARD MONITORING Monitoring the vineyard is one of the most effective ways to discover a pest problem and effectively nip the problem in the bud if treatment is needed. 73% of the growers monitor, or have their Pest Control Advisor (PCA) monitor their vineyards for pests and their predators on a weekly basis and use the information for pest management decisions. 47% also keep a written record of what was found. 22% of growers or their PCA monitor periodically with 4% rarely monitoring. 1% replied N/A, not applicable or information not available.

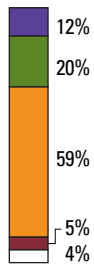


6-2. ECONOMIC THRESHOLDS & PEST-NATURAL ENEMIES RATIOS Each grower should develop his/her own economic threshold for important vineyard pests through the collection of quantitative pest data and spray results vs. damage due to pests at various population levels. This eliminates unnecessary spraying which creates potential for environmental and public health impacts, and wastes money. 63% of the growers are using economic thresholds in their control decisions. 19% are also assessing the potential for natural biological control based upon amounts of Anagrus egg parasitism and mite predators present in the vineyard. 33% base their control decisions on the presence of pests in the vineyard. 1% base decisions on the time of year (calendar basis) and past experience. 3% replied N/A, not applicable or information not available.

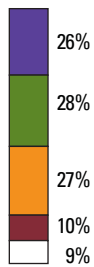
Grower Response



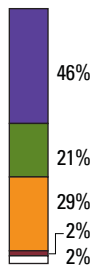
6-3. USE OF BROAD-SPECTRUM INSECTICIDES & MITICIDES When using pesticides, it is important to carefully consider the types of chemicals or materials and whether these pesticides might negatively impact non-target organisms. 12% of the growers do not use insecticides or miticides of any kind as a result of natural processes (e.g. natural enemies) and the use of cultural controls. 47% consider the impact on beneficial insects and mites but never use broad-spectrum/long-residual insecticides and miticides. 36% consider the impact on beneficial insects and mites but sometimes use broad-spectrum/long-residual insecticides and miticides at lower rate possible. 2% never consider the impact on beneficial insects and mites and use broad-spectrum/long-residual pesticides on a calendar basis. 3% replied N/A, not applicable or information not available.



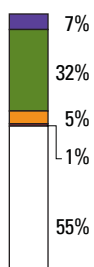
6-4. USE OF REDUCED-RISK INSECTICIDES & MITICIDES Reduced-risk insecticides and miticides can be used with less harm to the environment and non-targeted beneficial insects and mites. 12% of the growers do not use insecticides or miticides of any kind as a result of natural processes (e.g. natural enemies) and the use of cultural controls. 20% use only reduced-risk materials if a treatment is necessary. 59% use reduced-risk materials at least every other spray when a treatment is necessary. 5% never use a reduced-risk spray and 4% replied N/A, not applicable or information not available.



6-5. CULTURAL PRACTICES FOR INSECT & MITE MANAGEMENT Cultural practices, such as leaf removal, can be an effective tool in the pest management tool kit for specific pests like leafhoppers and mites. 81% of growers maintain vine vigor to a level appropriate to reduce pest pressure. 54% also do leaf removal and 26% add non-tillage of the vineyard floor and where relevant, sanitation (e.g. berm-sweeping). 10% do not use cultural controls and 9% replied N/A, not applicable or information not available.

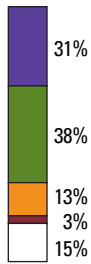


6-6. DUST ABATEMENT IN & AROUND VINEYARDS For mite pests, the minimization of dust in the vineyard helps deter outbreaks. 96% of growers control vehicle speeds on roads surrounding the vineyard. 67% also maintain a permanent cover crop in the vineyard and 46% of these also seal the roads with environmentally acceptable sealants or they are watered as necessary. 2% of the growers do not use preventative actions for mitigating dust. 2% replied N/A, not applicable or information not available.

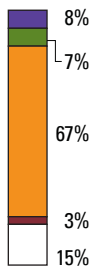


6-7. USE OF WEATHER DATA & DEGREE-DAYS For specific pests such as moths, weather data and degree-day information can add to the tools in the grower's sustainable winegrowing toolkit. Before taking remedial action, 44% of growers confirm problem population levels through in-field monitoring and economic thresholds. 7% also use data on captures from pheromone traps and from weather stations to calculate degree-days and determine the best time for in-field monitoring and potential treatment. The other 32% of the growers base treatments on time of year or stage of grapevine development. 1% treats for moths when it is convenient to do so. 55% replied N/A, not applicable or information not available.

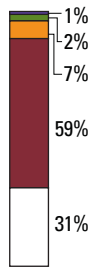
Grower Response



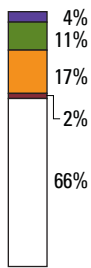
6-8. MITE AND LEAFHOPPER TREATMENT When pests are discovered in the vineyard, it might seem like good management policy to treat the entire vineyard to make sure that the threat is addressed. More often, this approach is the most expensive strategy to implement and the one with the most risk potential. Treating the specific areas of the vineyard where economic thresholds have been exceeded is both economically and environmentally sustainable. 69% of growers treat only the portion of the vineyard identified as exceeding the economic threshold (hot spots) with 38% also treating a buffer strip around the hotspot. 13% identify pest hotspots but treat the entire vineyard and 3% treat the entire vineyard without identify pest hotspots. 15% replied N/A, not applicable or information not available.



6-9. EMPLOYEE TRAINING No one person can do all of the things necessary to operate a sustainable vineyard. Any operation that has employees should ensure proper employee training to identify insects and mites. 82% of growers train and encourage employees to monitor for insects and mites with 8% providing the training information bilingually. 67% train their employees to identify specific pests and associated damage. 3% do not train or encourage employees to identify pests. 15% replied N/A, not applicable or information not available.

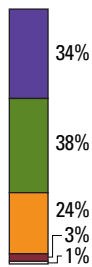


6-10. RELEASING PREDATORY MITES Most living organisms have natural enemies that limit their populations. In the case of mites on winegrapes, growers can release predatory mites to reduce numbers of pest mites. 3% of growers release predatory mites into historical hotspots and along upwind edges before grape destroying mites build up. Prior to the release, 1% of these growers check for numbers of predators per plant and their viability. 7% of growers release predatory mites after populations of mite pests explode. 59% of the growers don't release predatory mites even if not already present. 31% replied N/A, not applicable or information not available.

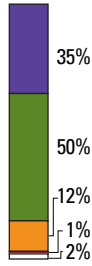


6-11. PSEUDOCOCCUS MEALYBUGS The Pseudococcus mealybugs are increasing concerns for growers. Since these relatively new pests are expanding their range, a proactive approach to pest management is good insurance for any grower. 15% of the growers monitor their vineyard for mealybug throughout the year, map the infested areas, treat ants if necessary and only treat infested vines with a handgun sprayer. 4% also monitor for parasitism, clean equipment of vine debris when moving between infected and non-infected areas, do not allow workers to work in infected and non-infected areas on the same day, and only make necessary applications against ants using environmentally sensitive materials. 17% treat the vineyard every year for mealybugs based on an annual monitoring program. 2% treat the entire vineyard every year without monitoring for them. 66% replied N/A, not applicable or information not available. A non-Pseudococcus mealybug, vine mealybug, is a relatively new and critical concern for growers due to its voracious feeding by multiple generations each year. An aggressive, proactive approach to management of this pest is crucial.

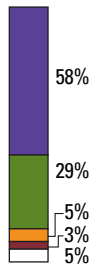
Grower Response



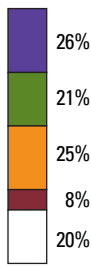
6-12. VINEYARD MONITORING FOR DISEASE In addition to insect and mite pests, growers must also monitor the vines for disease. 72% of the growers or their PCAs monitor at least weekly and use the information to make management decisions. 34% of the growers or their PCAs also keep a written record of what is found. 24% of the growers or their PCAs monitor periodically while 3% rarely if ever monitor. 1% replied N/A, not applicable or information not available.



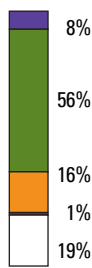
6-13. POWDERY MILDEW MANAGEMENT Powdery mildew is the most significant disease in California vineyards and can cause substantial reductions in winegrape yield and quality. 85% of the growers use cultural practices (e.g. leaf removal, shoot thinning, shoot positioning), make spray decisions based on weather patterns and rotate fungicides with different modes of action and only use the organic compound sulfur throughout the season. 12% make spray decisions based on an established calendar program and rotate at least two fungicides of different modes of action, with 1% of these using the highest label rates of materials and do not rotate. 2% replied N/A, not applicable or information not available.



6-14. USE OF REDUCED-RISK FUNGICIDES Even in the face of major threats such as powdery mildew, sustainable winegrowing requires using the best reduced-risk fungicides available. 58% of the growers only use reduced-risk fungicides and rotate different modes of action every treatment. 34% of the growers rotate reduced-risk fungicides with higher-risk materials, with 29% rotating different modes of action at least every season and 3% not paying attention to rotating the different modes of action. 5% replied N/A, not applicable or information not available.

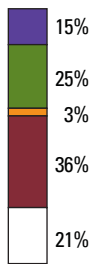


6-15. CANKER MANAGEMENT When developing a management strategy for disease causing cankers, an integrated approach has the best potential for success. 72% of the growers late prune susceptible varieties to manage cankers. 47% also prune off diseased wood and adjust machines to minimize spur damage if the fruit is mechanically harvested. 26% practice integrated disease management by marking diseased wood, removing it from the vineyard and then destroying it. 8% don't have a specific canker management program. 20% replied N/A, not applicable or information not available.

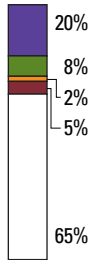


6-16. BOTRYTIS MANAGEMENT BUNCH rot of winegrapes is the most serious on the tight-bunched varieties, such as Zinfandel, Riesling, Chardonnay and Chenin Blanc. 64% of growers remove leaves around fruit to increase air circulation and implement practices to reduce physical berry damage. 8% also practice integrated disease management (e.g. trellis selection to increase air circulation, shoot thinning, leaf removal), destroy mummy fruit and use weather data to time fungicide treatment. The other 56%, as well as an additional 16% apply fungicides only at bloom and bunch closure, or as protection against bunch rot during long periods of wet weather in the spring or pre-harvest. 1% make fungicide applications on a calendar basis. 19% replied N/A, not applicable or information not available.

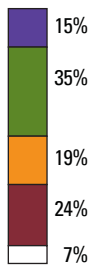
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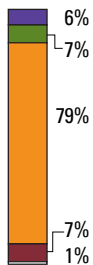
6-17. IDENTIFICATION OF CAUSAL AGENT OF BUNCH ROT Identifying the causal agent of bunch rot is essential for selecting appropriate control measures. 40% of growers identify the casual agent as either sour rot or Botrytis. 15% also examine the clusters for physical damage. 36% give no consideration to the casual agent of bunch rot and 21% replied N/A, not applicable or information not available.



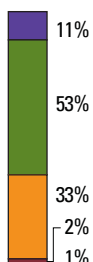
6-18. PIERCE'S DISEASE MANAGEMENT Pierce's disease is deadly to a vine and its causal agent can be transmitted by several flying insects known as sharpshooters. One of the primary vectors for this disease is the blue-green sharpshooter. 28% of the growers remove vines with Pierce's disease from the vineyard as soon as detected and use yellow sticky traps to monitor for blue-green sharpshooters. 20% also use an advanced IPM approach to manage Pierce's disease that includes management of adjacent riparian areas. 2% of the growers make insecticide treatments for blue-green sharpshooters on an annual basis. 5% have no Pierce's disease management plan. 65% replied N/A, not applicable or information not available.



6-19. GLASSY-WINGED SHARPSHOOTER MONITORING The glassy-winged sharpshooter (GWSS) is a devastating vector for Pierce's disease because of its size, ability to fly long distances and efficiency of transmission of the disease-causing bacteria. Growers have placed such a priority on controlling the disease that they pay an annual assessment to CDEA to curtail the spread of the disease and to find a containment solution for the GWSS. 69% of the growers train employees in GWSS identification. 50% also conduct weekly monitoring with yellow sticky traps. 15% of growers do weekly monitoring of at least one yellow sticky trap for every 20 acres and for other traps positioned at key vineyard access points. 24% do not train employees and do not have any traps. 7% replied N/A, not applicable or information not available.

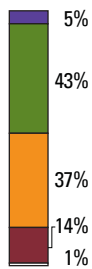


6-20. VINEYARD MONITORING FOR WEEDS Similar to that for other pests, weeds should be continually monitored in the vineyard. 92% of the growers or their PCAs monitor for weeds periodically. 13% keep a written record of the findings with 6% of these growers monitoring at least bimonthly. 7% rarely if ever monitor for weeds. 1% replied N/A, not applicable or information not available.

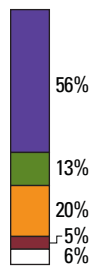


6-21. WEED KNOWLEDGE Being able to identify weeds requires a knowledge of weeds and an understanding of the life cycle of weeds so the most effective and efficient management strategy can be implemented. 64% of the growers use a weed identification handbook or on-line photo gallery to identify weeds. 53% also know the weeds in their vineyard while the remaining 11% know the life cycles of the weeds. 33% know the names of a few weeds in the vineyard. 2% rely on the PCA to identify weeds. 1% replied N/A, not applicable or information not available.

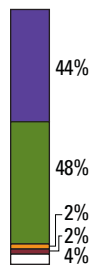
Grower Response



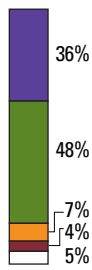
6-22. HERBICIDE CHOICE & RATE REDUCTION One method for controlling weeds in the vineyard is the use of herbicides. The choice of herbicide and rate of application are important factors to consider for minimizing environmental impacts. 5% of the growers do not use herbicides and the weeds are managed with non-chemical practices that do not contribute to PM10 problems or increase the possibility of erosion. 43% use only foliar-applied contact herbicides with the selection of product and rate based solely on weed species and size. 37% use soil-applied pre-emergent herbicides applied at rates based on weed species and soil type. 14% use a catch-all tank mix to manage all weeds. 1% replied N/A, not applicable or information not available.



6-23. HERBICIDE LEACHING POTENTIAL & MOVEMENT IN SURFACE WATER The most important concerns with herbicide use are the possibilities of contamination of surface and underground water sources. Through its groundwater monitoring program, the California Department of Pesticide Regulation has detected the herbicides simazine, diuron, and norflurazon in groundwater in California. 56% do not use these products. 13% use simazine, diuron and norflurazon only every second or third year and only in areas of low leaching potential. 20% use simazine, diuron and norflurazon annually but not on sandy, gravelly or high water areas. 5% use simazine, diuron and norflurazon, according to legal requirements but do not specifically avoid use because of leaching potential or irrigation type in their vineyard. 6% replied N/A, not applicable or information not available.

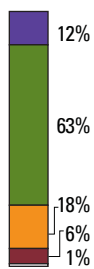


6-24. TIMING OF TREATMENT OF PERENNIALS Some of the toughest weeds to manage in the vineyard are the perennials. 44% of the growers treat perennials when they are the most susceptible and use mechanical weed management at the proper timing. 48% treat the tough perennials before they set seed and 2% treat perennials after seeding. 2% do not control perennial weeds in the vineyard and 4% replied N/A, not applicable or information not available.

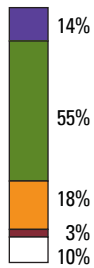


6-25. AREA TREATED WITH HERBICIDES As with pest management, treating the hot spots of the vineyard for weeds is not only environmentally protective it is also economically sustainable. 91% of the growers tolerate some weeds in the vineyard. 84% maintain a small treated berm and 36% of growers additionally use foliar-applied herbicides to spot treat instead of spraying the entire berm or vine row. 7% of growers with larger, treated berms tolerate some weeds while 4% do not. 5% replied N/A, not applicable or information not available.

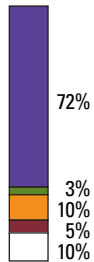
Grower Response



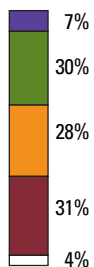
6-26. VINEYARD MONITORING FOR VERTEBRATE PESTS As if pests, disease and weeds were not enough to deal with in an effort to produce winegrapes, growers must also contend with vertebrate pests. 75% of the growers or their PCAs monitor the vineyard at least monthly and train employees to identify vertebrate pest activity and damage. 12% of the growers or their PCAs monitor bi-weekly and keep written records of what they find. 18% of the growers or their PCAs monitor once a quarter or less. 6% rarely monitor and 1% replied N/A, not applicable or information not available.



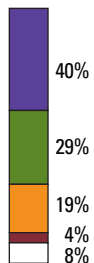
6-27. VERTEBRATE PEST MANAGEMENT Once vertebrate pests are found in a vineyard it is important to develop a sustainable management plan for effectively dealing with them. 14% of growers manage vertebrate pests through habitat alteration (e.g. elimination of brush piles, cover crop selection) and/or by exclusion (e.g. bird scare devices, grow tubes with chicken wire), and if exclusion fencing is used it is directed only at target species. 55% of growers use habitat modification and/or exclusion techniques and use anti-coagulant or strychnine baits during outbreaks. 18% use anti-coagulant or strychnine baits on a regular basis with protection from ingestion by non-target organisms, or they use fumigants or explosive devices to control vertebrate pests, such as gophers, with 3% of the growers not considering non-target species when these controls are used. 10% replied N/A, not applicable or information not available.



6-28. AREA OF VINEYARD TREATED FOR VERTEBRATE PESTS Selecting the necessary area of the vineyard for treatment is an important element of the vertebrate pest management plan. 85% of the growers only treat problem areas of the vineyard for vertebrate pests. 5% treat the entire vineyard and 10% replied N/A, not applicable or information not available.

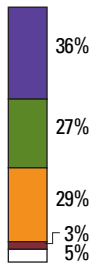


6-29. VERTEBRATE PEST PREDATORS One of the benefits of a diverse ecosystem is that there are pest predators that can assist the grower in keeping vertebrate pest populations in check. 65% of the growers provide an owl box for every 100 or less vineyard acres. Of these, 37% provide raptor perches. 7% have owl boxes for every 40 acres, and also provide kestrel and bat boxes. 31% provide no owl boxes and 4% replied N/A, not applicable or information not available.

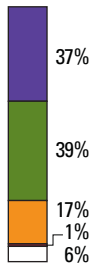


6-30. LOW-VOLUME VINE CANOPY SPRAYERS If a grower decides to spray for pest management, it is important that the sprayer effectively, efficiently and safely delivers the necessary amount of materials to targeted areas. 40% of growers use low-volume electrostatic sprayers or low-volume conventional sprayers. 29% use conventional sprayers with small droplets. 19% use conventional sprayers with large droplets. 4% use conventional dilute sprayers and do not know the size of the droplets. 8% replied N/A, not applicable or information not available.

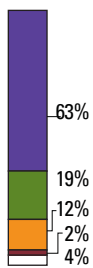
Grower Response



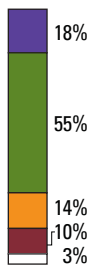
6-31. SPRAYER CALIBRATION & MAINTENANCE Another important consideration is to ensure that sprayers are calibrated and maintained for optimal performance. 63% of the growers calibrate the sprayer and check coverage, replace worn nozzles every year, recalibrate when conditions dramatically change, and include sprayer components in the yearly maintenance schedule. 36% also check coverage when row spacing or canopy density changes and monitor nozzle discharge if an electrostatic sprayer is used. 32% check nozzle wear and variation every other year or less with 3% calibrating their sprayer every year. 5% replied N/A, not applicable or information not available.



6-32. COVERAGE Adjusting parameters to achieve proper spray coverage to a developing canopy over the season is important for effectively delivering spray to targeted areas. 93% of the growers have the nozzles positioned and opened or closed as required by the season. Of these growers, 76% drive their air blast sprayer 3.5 mph or slower and attain tractor speed and sprayer pressure prior to entering the row. 37% also train their employees in proper equipment use and coverage parameters, and verify spray coverage. 1% do not adjust nozzles throughout the year and drive as fast as ground conditions allow. 6% replied N/A, not applicable or information not available.

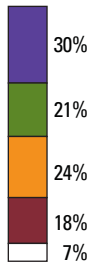


6-33. BUFFER ZONE The vineyard is part of a larger ecosystem with other plant and animal communities in close proximity. These areas can be exposed to the materials and practices used in the vineyard. Buffers are one way to help ensure that these materials and practices do not intrude into other ecosystems. 94% of the growers establish reasonable buffer zones near sensitive areas and avoid applications when winds are blowing towards sensitive areas. 63% also adjust the timings and within-field sequences to minimize human activity and disturbance of sensitive areas. 2% meet the legal requirements of the pesticide label but give little attention to establishing buffer zones and 4% replied N/A, not applicable or information not available.

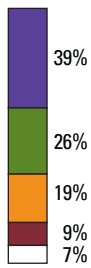


6-34. DRIFT When a decision is made to spray materials in a vineyard a grower must take into account the possibility of drift. By minimizing drift a grower is protecting the environmental quality of the area and public health, and they are also insuring the pesticide is targeted on the vines for effective pest control. 87% of the growers avoid any applications when winds exceed 7 mph or are less than 2 mph, low effective rates are used, and nozzles are selected and maintained to deliver the largest recommended droplets of uniform size. 73% also shut off dusters and sprayers at row ends near sensitive areas, and 18% use additional low-drift spray technology (e.g. low-drift sprayers, drift-reducing nozzles.) 10% do not exceed the legal wind limits by checking the labels for federal and state limits, and with the Ag Commissioner for additional county restrictions. 3% replied N/A, not applicable or information not available.

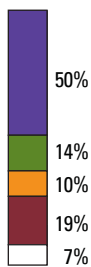
Grower Response



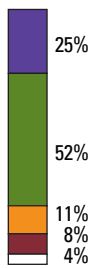
6-35. PESTICIDE STORAGE Even when not being used, pesticides can still pose a potential liability if not properly stored. 21 % of growers only order enough pesticide for each application to limit on-site storage. 45% of the growers store dry pesticides above liquid ones, store them more than 300 feet from a well, have a storage area with an impermeable floor and sump to contain leaks, and only store undamaged containers. 21% of the growers order enough pesticides for a season with no storage over the winter, and return unopened containers to the supplier while the remaining 24% do store some pesticides over the winter. 18% follow the minimum legal requirements for pesticide storage. 7% replied N/A, not applicable or information not available.



6-36. PESTICIDE MIXING & LOADING The time of greatest exposure to pesticides is during the mixing and loading of the material. 84% of the growers provide personal protective equipment (PPE) for all workers and the water sources for filling the sprayer has a double-check valve or a six-inch air gap. 65% also maintain the loading/mixing area at least 30 feet from any well and have a berm around the well head to prevent surface water from contaminating the well. 39% of the growers also use a separate water supply tanks for pesticide mixing and maintain the mixing/loading area at least 100 feet from the well head. 9% of the growers follow the minimum legal requirements or less for PPE. 7% replied N/A, not applicable or information not available.



6-37. PESTICIDE EMERGENCY RESPONSE PLAN If a spill incident does occur during pesticide mixing or loading, it is critical that the spill is properly handled and appropriate treatment is available. Having an emergency response plan is critical to preventing or minimizing human and environmental exposure. 64% of the growers have an emergency response plan posted and spill clean-up, wash facilities and first-aid equipment available. 50% also train their workers to follow the plan. 10% of growers either have an emergency response plan posted or make spill clean-up and first-aid equipment available. 19% maintain the minimum legal requirements or less for a pesticide emergency response plan. 7% replied N/A, not applicable or information not available.



6-38. RESTRICTED-USE MATERIALS The greatest threat to worker health and the environment comes from the use of high-risk materials. The pesticides with the highest risk are known as Category 1 materials. Other materials that pose a significant risk are known as Restricted-Use Materials. 25% of the growers never use Category 1 and Restricted-Use Materials in the vineyard. 52% only use Category 1 and Restricted-Use Materials in emergency situations such as the introduction of an exotic pest. 11% of the growers avoid the use of Category 1 and Restricted-Use Materials in the vineyard. 8% use Category 1 and Restricted-Use Materials whenever it is convenient. 4% replied N/A, not applicable or information not available.

Best Practices

Statewide Strengths: The majority of growers report practices that together constitute an excellent insect, mite, disease, weed and vertebrate pest management program. The majority of growers also report implementing practices for using pesticides in an effective and safe manner including calibrating and maintaining application equipment; applying for proper coverage; using buffer zones; and going beyond legal requirements to manage drift, and reduce risks during storage, mixing and loading.

Brad Lange and his twin brother Randy farm about 6,500 acres of vineyards in four counties: San Joaquin, Solano, Sacramento and Yolo. Lange Twins, Inc. practices include controlling disease and insect pests through no-till practices, cover crops, removing leaves, putting in plants that attract predator insects to control vineyard pests, and using softer, carefully-targeted chemicals only when the need is urgent. The Langes say they're not "calendar applicators" who apply pest-control materials according to season.

"As we've gotten to where we are now, we've come to recognize the value of maintaining natural habitat," Lange said. "Different generations have different goals. Now our emphasis is on sustainable agricultural practices — as few chemical inputs as possible." We live amongst what we do. We want to be as easy on the environment as possible and still make a living."

Lange and his brother grew up on the ranch. When they were young they whiled away summer days playing in the river, building rafts and chasing birds. And then the brothers married and had children of their own. They built homes in their vineyards and their children grew up the same way they had.

"When you live with an environment for generations, it's not hard to talk about changes and the ways things have gotten better," Lange declared. "Take native oaks. Today, if we find a sapling near the vineyard we don't pull it out. We water it and stake it and train it up."



Targets and Timelines

Statewide Opportunities for Improvements: There is an opportunity for the majority of growers to train their vineyard employees to assist with insect and mite pest monitoring (criteria 6-9), improve weed monitoring protocols (criteria 6-20), and implement practices to increase vertebrate pest predators (criteria 6-29). Though the majority of growers report implementing best practices, there is an opportunity with the remaining minority of growers to improve pest management practices for most criteria

The California Sustainable Winegrowing Alliance has set a desired goal of demonstrating improvement in the scores indicated below. By harvest 2009, CSWA will strive to move the average scores to the positions marked in green. When these goals are attained, practices will have improved from the initial benchmark averages by 20%. To reach these goals, CSWA needs partners. If you are interested in improving pest management practices within the wine community, please contact info@sustainablewinegrowing.org.

