



2021 AVF Research Priority Survey Respondent Comments

Viticulture Research Priorities Respondent Write-In Comments:

1. Trunk Diseases!!!!
2. Vineyard bed management. Non-harmful weed control.
3. Impact of climate change on quality and production of grapevines.
4. I'd like to fund someone to evaluate all the various FPS clones by examining the FPS vineyards to at least describe morphological differences like cluster architecture, differences in ripening, maybe flavors. With > 100 selections of popular varieties like CS & PN, how is anyone to make a decision regarding newer clones?
5. 1.- Wine grape Mechanical Pruning: Variety Suitability & Long term yield production.
2.- Economics of Sustainable Wine grape production in the SJV.
6. Use of CRISPR technology to quickly improve grape variety performance.
7. Heat effects and upper thresholds of heat stress by variety.
8. Mealy Bug Control - Huge priority.
9. Adapting to Climate Change.
10. Expanding knowledge of bio protection and its role in preventing grape and vine diseases and improving wine quality.
11. Dealing with climate change and drought. Techniques? Variety/climate matches?
12. Help stop Pierce Disease.
13. Predicting the impact of wildfire smoke on grape quality.
14. How will climate change affect variety selection by region.
15. Addressing climate change and water insecurity.
16. More research needs to be done for better drought tolerant rootstocks. All of our information on rootstocks is 100 years old or older.
17. Red blotch and others (leaf roll) are huge. Crown-gall needs to be eliminated.
18. Red Blotch; PD treatment.
19. Best practices in vineyards for managing climate change.
20. Abiotic- plant material tolerant to drought, better water management practice, farmer education.
21. Climate change!
22. Soil management especially for shallow soils with poor drainage.
23. Effects of climate change on rootstock selection and varietal location.
24. Red blotch, leaf roll virus.
25. Smoke exposure research.
26. Economic modeling of any of the above.

27. Smoke affected character research and analysis.
28. Rootstock/scion research to develop tolerance/resistance to the sudden vine collapse.
29. Farming in a drought, balancing fire prevention with environmental sustainability. Pierce's disease and the spittle bug vector. Organic weed control.
30. Just good old practical research.
31. I actually think that vineyard profitability needs more attention, but not in the manner suggested (mechanization and greater efficiency can help with profitability, but they are not necessarily the best route to profitability for every farmer, as we are seeing).
Winegrape quality.
32. Climate change and optimal varieties.
33. Guidance for best practices due to climate change. Options for better drought tolerant varieties in changing climate zones.
34. Waterberry has become a real off and on problem for us. Clones and rootstocks don't seem to make a difference.
35. Assistance with placement for grapes.
36. Control of Red Blotch and prevention of its spread.
37. Smoke Taint - industry wide collaboration in standardizing acceptable/rejectable limits of smoke taint markers.
38. How to respond to global climate change: reducing impacts of smoke taint and higher temperatures.
39. Effect of soil microbes on winegrape chemistry.
40. Variety & rootstock evaluation for water use efficiency (do more with less).
41. Irrigation control and best practices.
42. Carbon sequestration reducing the carbon footprint of grape cultural practices , vineyards as carbon sinks.
43. Climate smart or climate conscious farming practices should be considered in a new specific category.
44. Research to characterize damage to fruit by wildfire smoke in the vineyard.
45. As per farmers like Gabe Brown the soil are already degenerated. Before will look at sustainability we need to have programs in place for regeneration.
46. Fire resistant vineyard scapes.
47. Water management.
48. Improving water access with help from our State to store and provide scarce water.
49. Clonal and rootstock research to address climate change. In the Napa Valley, how do we maintain Cab S. quality given climate change for generations to come.
50. Heat stress in today's climate.
51. Protection for Old Zin Vineyards.

52. 1. Smoke baselines in winegrapes and process of sampling and detection.
2. Fertility baselines for winegrapes on common rootstocks.
53. Pierce's disease research.
54. Mealybug control, expanded control measures.
55. How to mitigate smoke taint issues with ozone.
56. Smoke taint, vine mealy bug.
57. Renewal of NGR vineyards (ag infrastructure).
58. Smoke exposure mitigation and remediation techniques.
59. Reduce overall pesticides being used- what is best practice?
60. Climate adaptation.
61. Need clear data on clones and rootstocks compiled for making nursery order decisions. Don't need more crazy chemistry stuff, need more long term data showing what mechanization does.
62. Grapevine nutrition.
63. I would like to see research into how to protect fruit on the vine from smoke. contamination and best practices for fire resistant vineyards. I would also like to see research on how viticultural practices affect wine chemistry and flavor characteristics such as norisoprenoid development.
64. Impacts of climate change on vineyard productivity, sustainability, methods to mitigate impacts. How are shifts in timing of heat and cold events, drought, higher night time temperatures impacting grapevine phenology, crop levels and characteristics of resulting wines.
65. Smoke Taint - we need a definitive test to detect smoke taint in grapes before harvest.
66. Vine response to reduced irrigation; impacts of management practices on soil microbiological communities- especially related to drought tolerance.
67. Smoke taint testing and threshold levels by grape variety. Develop a new California guide on high heat tolerant and drought tolerant grape varieties.
68. Climate Change adaptation - Fire resilience, effects of regenerative farming on quality and yield, improve water use efficiency and irrigation.
69. Addressing smoke taint.

Enology Research Priorities

Respondent Write-In Comments:

1. Effects vineyard microbiology and or soil health effect wine quality.
2. Work on Mitigation for Climate Change issues such as smoke taint, disease impacts of our wines such as mold from botrytis or mealybugs, what varieties do where in a changing climate.
3. Adapting to climate change
4. Microbial interactions; between microbes in uninoculated and inoculated fermentations, and microbial interactions post-fermentation and its impact on wine stability and quality
5. 1. dealing with waste sustainably.
6. Effects of wildfire smoke on wine quality Mitigating smoke impact in wines Winery automation and sensing Efficient cleaning methods
7. Expand enology practices relating to hybrid varieties, co fermentation of primary & ML? Protein management, high acid management. Yeast & enzymes research per hybrid varieties, color stabilization & oak barrel aging of hybrids
8. We need yeast to be less efficient and thus product less ETOH.
9. None of the above are broken. If anything we have started too many chemicals to our wines and we need to step back from just adding stuff.
10. Best practices in winemaking to manage for climate change.
11. Tannin reduction.
12. Please work on how traditional, natural techniques work and succeed rather than focusing on controlling and manipulating nature—native yeast and bacteria, time on yeast lees, natural oxygen inclusion in juice/must and wine, the benefits of SO₂ (have you read Jancis Robinson's summary of an MW paper connecting SO₂ additions with lower biogenic amine formation by bacteria?).
13. Effects of smoke from wildfires.
14. Interested in research on High Elevation Vineyard management and winemaking. We are 4350 ft and info on this altitude is scarce.
15. Smoke taint.
16. Wildfire smoke research.
17. Redo free so₂ numbers needed for microbial stability, it's all based on a 5 min contact time in a study from 40 years ago.
18. Removing smoke taint.
19. Global warming response: how to guard against effects of smoke taint, higher temperatures.
20. Microbial management.
21. Please prioritize vineyard over winery.
22. Wildfire affected grapes (smoke Taint) sensory threshold, development in grapes and wine, approaches to mitigation.

23. Smoke taint research is the number one priority!
24. Smoke taint removal.
25. Reduce net CO2 emissions.
26. Reduced Carbon Footprint in transportation of case goods.
27. Smoke exposure rapid testing and smoke exposure true remedies.
28. Smoke Impact - measurements, mitigation, and prevention - is my number one priority for Enology, but this may fall under the Wine Aroma and Mouthfeel Characterization?
29. smoke exposure mitigation and remediation techniques
30. Smoke taint analysis and removal. Climate change and effects on wine industry.
31. Smoke taint - detection and how to ameliorate.
32. Our non-invasive winemaking techniques are not defined within any of the choices given.
33. Smoke analysis.
34. Determine what compounds are involved in smoke impact, quantifying smoke impact, predicting smoke impact from grape to bottle, mitigation methods for smoke impact.
35. Rapid tests and treatments for smoke taint.
36. Anything related to smoke taint.
37. Link grape chemistry to wine chemistry to wine sensory.
38. Smoke issues should be #1.
39. Smoke taint characteristics and measurement.

**What is the single most important industry research need
from your point of view?**

1. Tools for dealing with climate change.
2. Mechanization. This year was a huge struggle with labor, we need more options.
3. Water use.
4. Viticulture is always most valuable when it carries the trial through winemaking and sensory work. I can't implement potential vineyard improvements without first understanding how they will impact the wine.
5. Vineyard disease control. Worried about other vineyards, other counties and other countries bringing in diseases that could destroy your industry.
6. A peer review of research proposals.
7. Water use efficiency.
8. Disease control.
9. Climate change & new varieties. e.g., Spanish and Portuguese. Support of NGR which seems underfunded. Each time I've visited Wolfskill, it seems to be in worse shape. It should be seen as infrastructure for agriculture that needs to be upgraded/replanted.
10. Grape vine sustainability of production using regenerative, organic production practices.

11. Vineyard pest and disease control.
12. Virus research specifically for red blotch.
13. Water security and efficiency.
14. Water use.
15. 1. Wine grape Mechanical Pruning: Variety Suitability & Long term yield production.
2. Economics of Sustainable Wine grape production in the SJV.
16. Red blotch.
17. Climate change.
18. Improving marketing of non-vinifera wines.
19. Managing/surviving with reduced irrigation.
20. Advances in pest management.
21. Debunking the myth that vineyard aesthetics dictate fruit quality.
22. Smoke taint and heat related issues in warm climates.
23. Vineyard profitability. Vineyards are being removed because they are no longer profitable.
24. Industry wide focus on climate change management on a day to day basis.
25. Adapting to climate change.
26. Alternatives to chemical control for diseases, particularly in the vineyard, to fight pest and diseases.
27. Adjusting to climate change.
28. Dealing with climate change/drought.
29. Short lived systemic to kill mealy bug etc that will not have residue in the fruit. Or ground application that can kill during dormancy.
30. Effects of drought-water supply/plant health, labor supply, plant disease management that works.
31. How to survive climate change in the central valley with increased drought conditions and harshening heat while still being able to produce quality fruit.
32. Pierce Disease.
33. I truly don't have a strong opinion.
34. Energy use and vineyard farming that supports people both winegrowers and consumers...using hybrids to reduce pesticide use and practices that are energy efficient.
35. Water availability.
36. Understanding and mitigating the impact of wildfire smoke.
37. Climate change, especially as it relates to smoke taint.
38. How to survive climate change effects--drought and smoke from wild fires.
39. Expand and explore & promote the ability and knowledge to grow wine grapes and produce quality wine in new wine regions.

40. Climate change and spotted lantern fly.
41. Leafroll resistance, Powdery mildew resistance, Labor.
42. Supporting and educating growers in addressing climate change.
43. Rootstocks.
44. Virus management, breeding resistance in planting material.
45. Smoke taint remedies.
46. Virus control.
47. Labor reduction in the vineyard. Can't find help.
48. Pest control alternatives to chemicals.
49. Viruses, Bacterial Diseases, and Vectors.
50. Sustainable water and energy consumption.
51. Managing for climate change.
52. Sugar accumulation disorder, all bunch disorders, bunch stem necrosis, smoke taint infiltration not only by skins but also through stomata cells in leaf (and transportation).
53. Sustainability/resilience in the broadest sense.
54. Virus control.
55. Red blotch.
56. Maintaining sustainable vineyards while embracing the impacts of climate change.
57. Finding out how and why nature works. Stop trying to control the process! Explain how nature has been making wine for 8,000 years.
58. Powdery mildew.
59. Mechanization effects to overcome labor issues.
60. Alternative varietal marketing.
61. Soil health.
62. Impacts of climate change.
63. Economic sustainability and efficiency.
64. Sustainability, especially related to water.
65. Reacting to climate change.
66. Return on Investment, and expensive crop to grow and buyers are not paying a sustainable return.
67. Water and disease management.
68. Smoke taint.
69. Water usage rates, time of year to under irrigate and still get great yields.
70. Disease and Insect Control given the increasing regulations placed upon farmers.
71. Drought tolerance.
72. Mech/quality.

73. Find a cure for red leaf viruses.
74. Labor and water.
75. Developing ways of curing or preventing viruses.
76. Climate adaptation, drought, heat salinity.
77. Smoke affected character as a result of wildfire.
78. Crop load.
79. Mechanization and wine quality.
80. Mechanization.
81. Smoke taint.
82. For us, it is the pest infestations that are destroying our vineyards, specifically mealybug. Our "weapons" (insecticides) are being taken away or not allowed by wineries without any replacement product that can stop the devastation. We are having to do major replanting in a 7 year old vineyard due to vine loss.
83. Rootstock/scion research.
84. Sustainability and resiliency (in vineyard and winery) in current times of fire, smoke and climate change.
85. Price sustainability.
86. Decreasing labor through mechanization and decreasing pollution and pesticides particularly due to legislation that will probably passed in California in coming years.
87. Mechanization.
88. Canine detection of leafroll 3 virus in the vineyard.
89. Water savings, smoke taint removal.
90. Removing smoke taint.
91. Research into the impact of climate change on premium grape growing regions.
92. Water use and management.
93. This is probably not the most important need, but red blotch has become a problem. We replace vines before we pick a grape. After 5 or 6 years young blocks are not solid any more.
94. Dealing with rising temperatures and wildfire smoke.
95. Dry land farming, with climate changes. Also, smoke taint information.
96. Smoke and wild fires.
97. Climate change.
98. Smoke Taint - industry wide collaboration in standardizing acceptable/rejectable limits of smoke taint markers.
99. How to respond to global warming.
100. Crown gall.
101. Farming for the future with increasing threat of heat.

102. How to deal with water availability/quality in the vineyard and winery in the next few years.
103. Pesticide/bactericide options to combat the loss of older ones being regulated.
104. Water and climate.
105. Smoke taint definition and mitigation.
106. Regulatory costs, water availability and use.
107. Sustainability.
108. Validity of "smoke taint".
109. Virus and pest management (specifically leaf roll 3 and mealy bug).
110. Establish thresholds for common smoke taint markers both in wine and berries.
111. Climate friendly farming and winemaking , zero carbon footprint.
112. Finding ways to be sustainable while still being profitable.
113. Adapting viticulture to a changing climate while improving viticultural practices to reduce carbon emissions to lowest possible levels.
114. Virus and disease.
115. How to quantify fruit spoilage due to wildfire smoke.
116. Soil regeneration.
117. See #4.
118. Climate change.
119. Disease and insect control.
120. Identifying additional water resources i.e., recycling, desalinization, water conservation, constructing reservoirs.
121. Rootstock and variety selection better suited for hotter/dryer conditions.
122. Sustainability.
123. To research production practices that will help to ensure economic sustainability for independent grape growers to continue to produce the highest quality winegrapes for the segment of the industry their grapes are targeted. An example of this would be research on vineyard mechanization practices that not only show benefits to the grower, but carried through to final wine quality, hopefully giving both grower and winery info that can be used in future discussions on viticultural practices based on facts.
124. Virus has cost us more than any other factor---red=blotch in particular.
125. Water conservation.
126. Weed control.
127. Sustainability and water conservation.
128. Adapting to climate change.
129. Smoke taint prevention.
130. Pierce disease eradication.

131. Reacting to climate change, fires, drought.
132. Water need for vines.
133. Smoke baselines and common sampling procedures that are fair for both grower and winery.
134. Pierce's disease.
135. Virus research.
136. How do we far with fewer crop protection choices and maintain viability?
137. Red blotch.
138. Smoke taint.
139. Mealy bug control.
140. Control of red blotch vectors.
141. Smoke exposure detection and remediation.
142. Smoke Impact - measurement, mitigation, and prevention.
143. Increasing grape and wine quality while decreasing/maintaining costs.
144. Effects of climate change on wine quality.
145. Development of dry farming practices.
146. Water usage in vineyards.
147. Smoke taint.
148. Smoke taint - everything about it. Optimizing disease programs to reduce resistance.
149. Well-bred, clean planting material.
150. Smoke taint.
151. Nursery disease controls for plant material, More efficient ways to increase uptake of foliar and fertigated fertilizers.
152. Smoke taint mitigation practices in the vineyard and winery.
153. Finding the causative vector(s) for red blotch virus.
154. Research into climate change.
155. Vineyard Mechanization and Virus Control.
156. Vineyard design for labor efficiency.
157. Climate change mitigation and adaptation strategies, including smoke impact.
158. Mechanization of processes.
159. Smoke taint.
160. How to maintain grape, and thus wine, quality in the face of severe water limitations, both in irrigated and dry farmed vineyard.
161. Climate Change/Water Use/Smoke Taint and Wildfires.
162. Disease and insect control (red blotch).
163. Climate change. In particular, managing heat stress.

164. Impact of climate change on vineyard ecosystem (vine, insects, diseases, soil health) and grape / wine chemistry / style.
165. Creating a user-friendly smoke taint test for growers. Develop a method to remove smoke taint in the cellar. Create a matrix of smoke taint levels by grape variety.
166. Climate change: For example, while California is experiencing drought, Virginia is flooding. Let's use the power of basic research to solve the greatest pains rather than explore one more flavor compound in Sauvignon blanc.
167. Understanding the best way to grow quality winegrapes in a hotter and drier climate.
168. Developing data-driven metrics for quality of juice and wine and in wine processing steps. Quality attributes that are critical for quality. In God we trust, everyone else bring data!
169. Addressing climate change impacts on vineyards.

**Please provide any general feedback, comments or suggestions
that you may have regardless of any specific research topic.**

1. Adapt and grow with existing conditions.
2. Develop a model of what sustainable (non-conventional Chemicals) would look like. What impacts industry wide.
3. We need to significantly improve our soil biology.
4. Biological control of the invasive Virginia creeper leafhopper is another critical need, especially for organic/sustainable growers.
5. We need more money for research! How do we get it?
6. Ability to test a larger sample size for vineyard disease before they arrive from the nurseries.
7. I would like to see more research on vineyard mechanization/automation as well as vine disease mitigation.
8. Mealybug control... can't say it enough.
9. Climate change is driving the major challenges to the wine industry. Smoke taint, vineyard viability for current wine styles, ground water supply, etc. are major issues because of Climate Change. No " " necessary.
10. Good luck - there are too many problems and not enough funding or staff to address them.
11. Feel free to toss my opinions aside, I'm coming from the point of view of a home winemaker. :-)
12. AXR#1 is a great rootstock maybe the best, except for one small issue. Why not genetically implant Phylloxera resistance into AXR#1 and then we'd have an almost perfect rootstock.
13. None.
14. Lots of work still needs to be done on smoke taint in wine.

15. Elaborate on the cost inputs of organic fungicides/fertilizers and their vineyard effectiveness. We would then do a side by side comparison of what oil/carbon inputs go into the creation, transportation and use of these materials (ie. number of applications a year and so forth). Thereafter do an identical study on conventional fungicide/fertilizers and tell us which one makes the earth and atmosphere less impacted by fossil fuels (all in regards to climate change). For an example I know that it takes less sprays with conventional materials than organic. I know harvesting organic materials from across the globe uses less oil in transport. The list goes on. What are the real advantages of being CCOF other than that fancy sign in front of your vineyard? Tell us!!! Also we use vermicompost in planting holes when establishing new vineyards. Doing a study on different components related to planting hole composts would be awesome, specifically looking at different commercially used rootstocks, their known carbohydrate storage and why some composts would be better for specific rootstock hybrids vs. others.
16. Many problems are complex and require interdisciplinary approaches and can be hard to define at the start of a project - willingness to support research in pursuit of complex problems would be helpful sometimes.
17. Academic viticulture and enology research has been useless in our winemaking for thirty years.
18. Smoke taint issues generally favor wineries over growers. There should be shared responsibility.
19. Climate change.
20. Leafroll virus and mealybug vectors.
21. Although things such as "climate change" may be important, I believe research into overcoming fanleaf virus and sudden vine collapse should be at the top of the list. Many of the older areas of the Lodi area will be forced to fallow their fields for many years if a tolerant/resistant rootstock is not developed.
22. Smoke and pests.
23. Herbicide research.
24. AVF is doing a fantastic job and you are by far my favorite viticulture research organization! Thanks for funding practical research.
25. Wineries need to understand we can't grow grapes for nothing. They are the only ones that grow and expand. We are in a very inflationary time, but they won't acknowledge that.
26. Effects of global warming, including drought, smoke, and heat, have impacted our industry by hundreds of millions of dollars in the last five years. How do we choose to respond as an industry? Going out of business should not be a first option.
27. Climate change, water management and smoke taint management.
28. Drought, fire and labor issues are weighing heavily on us now. We need virus resistant vines, they need to be able to thrive on less water, and we need machinery that can come closer to replicating the hand work necessary to produce high value wines.

29. Reduction of labor while maintaining/improving quality. This is driven by the lack of available labor, not a cost savings issue.
30. Spend some of the dollars on research in the San Joaquin Valley. It would help bring more support for research.
31. Improvement of format for presentation to reviewers of research proposals and reports.
32. Fund the development engineering type of diff mechanical machines for vineyard ops. So much just looks at the one or two current options but we need manufacturers working with researchers to improve, build more Also this survey was too limiting for those who wish to give more detail - like I want to support all mechanization topics- but don't need another 50%et vs 100%et irrigation trial.
33. Leave economics and efficiency up to the wineries. Focus academic research on diseases, wine quality and new clones & varieties.
34. Genetically modified yeasts are okay but not grapevines.
35. AVF hasn't had a ton of money, but it has done a good job of funding important project. Just can't fund enough projects to meet the needs of growers, in my opinion. Too many great projects, not enough funds. I don't have the answer, but is it possible for the AVF to reexamine its systems, procedure, and norms for distributing funds? Caps on what can be requested? Setting aside a certain number of slots that can be funded by amount- 1 over \$100,00, 3 at \$50,000, something like that? Funding part of a project like just salaries, just lab work, just field work? I don't know. None of these are attractive. I would just like to find a way for some of the smaller projects to get funded. They get beat out by important, well-designed project with big budgets which deserve funding, but eat up the amount of money in the pot.
36. I like this questionnaire. Hopefully these results resonate with the funders.
37. The importance of industry research should be better communicated.