LODI RULES is entering the 4th Edition of Standards!

Included here are a set of new and revised LODI RULES Standards drafted over the last several years following lengthy discussions by the LODI RULES Committee with input from participants, scientists, Protected Harvest, and the auditors. New Standards address topics such as sustainability communication, beneficials, invasive species, erosion, mealybugs, and viruses. New and revised Standards are indicated with a red box around the page.

As a reminder, each LODI RULES Standard must:

1. Address at least one of the three aspects of sustainability (environment, people, business).
2. Be measurable/auditable.
3. Be economically feasible to implement.
4. Be based in science (not a trend).

The goal of the 4th Edition is to improve the LODI RULES sustainability certification program based upon new knowledge. By improving the program over time, the certification continues to be relevant and progressive, and stays at the forefront of sustainability innovation. Too many changes too often can be confusing to growers and the community. Since we are transitioning to a new pesticide risk model, this is the prime time to add in a small number of new Standards and/or revise existing Standards.

Kindly provide your feedback on the proposed 4th Edition LODI RULES Standards by sending an email to stephanie@lodiwine.com with the subject "LODI RULES." Include your name, title, company, and phone number along with which Standard(s) you are commenting on and a clear suggestion for improvement. All comments will be given careful consideration by the LODI RULES Committee. You are encouraged to provide feedback on existing, new and/or revised Standards. **All feedback is due by noon on August 15, 2022.**

We're also in the process of adding helpful resources to the Companion Information below each Standard in the LODI RULES binder. Feel free to share any resources you have found useful, letting us know which Standard they apply to.

1.4 Risk Management Plan

***REVISED* Standard**

The farming operation has a written and implemented **risk management plan** that includes the following components: financial risk (access to capital); crop loss risk (crop insurance, invasive pests); market risk (winery contracts, customer ~~diversification~~ and farm/variety diversification); technical risk (access to technical information or expertise); risk of the unexpected (natural disasters, harvest interruptions, pandemics); labor risk (long-term procurement, shortage back-up plans, written contracts with labor contractors); and a plan review and update schedule.	**YES = ~~2~~4**
	NO = 0

Companion Information

Scope: The entirety of the vineyard operation submitted for **LODI RULES** certification.

Purpose: To ensure participants have thoroughly considered their business risks and addressed them.

Verification: Visual inspection of the risk management plan document and copies of any/all applicable supporting documents (for example, a crop insurance policy, training certificates for invasive pests, copies of labor contracts, etc.).

The Lodi Winegrape Commission's grower website includes an online directory, which contains contact information for insurance agencies: lodigrowers.com/directory/growerandsupplierdirectory/.

References:

Davidson, D. *The business of vineyards*. Davidson Viticultural Consulting Services, Glen Osmond, SA, Aust. 2001.

Hussey, C. *Risk management for vineyards*. Practical Winery and Vineyard. pp. 5-10. Sep/Oct 2005.

Kay, RD, and Edwards, WM. *Farm management*. McGraw-Hill, New York. 1994.

Seufer, JL. *Managing orchard and vineyard production risks*. USDA ~~/~~Risk Management Agency, Spokane Regional Office.

- https://farmanswers.org//Library/Record/managing_orchard_and_vineyard_production_risk (Last accessed on 09Apr21)
- *Internet search terms*: managing orchard and vineyard production risks

Thrupp, A, Browde, J, Francioni, L, and Jordan, A. *Reducing risks through sustainable winegrowing: A growers' guide.* California Sustainable Winegrowing Alliance, San Francisco, CA. 2008.

- sustainablewinegrowing.org/agrowersguide.php (Last accessed on 09Apr21)
- *Internet search terms*: reducing risks through sustainable winegrowing

USDA Risk Management Agency. *Risk Management Checklist*: https://www.rma.usda.gov/-/media/RMA/Publications/Risk-Management-Publications/risk_management_checklist.ashx?la=en (Last accessed on 09Apr21)

Risk Management Plan Background and Organization:

Risk management plans highlight critical aspects of a business that are insured, and thereby protected from risk. Relevant types of **insurance** include crop insurance, price insurance, yield insurance, theft insurance, and insurance against natural disasters.

Winery contracts reduce risk by securing economic return on investment and by enabling financial planning. **Written contracts with labor contractors** reduce risk by providing clarity, communication, and a legal foundation in the event that it may be needed.

Diversification of the products produced and markets reached can reduce dependence on a single financial stream.

Knowledge is power. Consider describing efforts to increase understanding of risk factors such as weather patterns, market trends, ecological and biological processes, crop pest and disease trends, and/or innovative farming methods and technologies.

Outline:

- Financial risk (access to capital)
- Crop loss risk (crop insurance, invasive pests)
- Market risk (winery contracts, customer and farm/variety diversification~~, and variety diversification~~)
- Technical risk (access to technical information or expertise)
- Risk of the unexpected (natural disasters, harvest interruptions, pandemics)
- Labor risk (long-term procurement, shortage back-up plans, written contracts with labor contractors)
- A plan review and update schedule

1.13 Knowledge Sharing ~~Bonus Points~~

***REVISED* Standard**

A. ***Within the last year***, a farming operation representative shared sustainable viticulture knowledge with people outside of the operation by hosting an educational vineyard tour, hosting an intern, speaking as part of an educational event, or a similar activity.	**~~+~~2 ~~(bonus)~~**
B. ***Within the last year***, a farming operation representative *did not share* sustainable viticulture knowledge with anyone outside of the farming operation.	**0**

Companion Information

Scope: Anyone working for the farming operation and any part of the farming operation.

Purpose: To award participants who share and promote sustainable viticulture knowledge.

Verification: A written explanation of the knowledge sharing experience, including the date and number of people who learned from the experience (one paragraph). Visual inspection of physical documentation, which may include copies of emails or text messages to schedule the event/internship and/or a photo taken during the event/internship.

To place an intern job posting, see winejobs.com or wineserver.ucdavis.edu/careers/venjobs/.

Contact your local grape grower organization or tourism office to become involved in hosting vineyard tours.

If you are interested in speaking on grower panels at educational events, contact your local grape grower education coordinator or the LWC (209) 367-4727.

1.15 Sustainability Communication Meetings

***NEW* Standard**

A. ***Within the last two years***, the farming operation held a meeting for key participants (select employees, pest control advisors, consultants, clients, and/or buyers, etc.) to discuss winegrape growing philosophies, to review the company's sustainable vision plan and mission statement, and to review long- and short-term work goals.	**2**
B. ***Within the last four years***, the farming operation held a meeting for key participants (select employees, pest control advisors, consultants, clients, and/or buyers, etc.) to discuss winegrape growing philosophies, to review the company's sustainable vision plan and mission statement, and to review long- and short-term work goals.	**1**
C. The farming operation *has not held a sustainability communication meeting for key participants* ***in over four years.***	**0**

Companion Information

Scope: The entirety of the vineyard operation submitted for **LODI RULES** certification.

Purpose: Communication of the farming operation's values, goals, and commitment to sustainability for buy-in of key participants and continued company success.

Verification: Visual inspection of management meeting records. Note that a farming operation may choose to combine LR Standard 1.3 (Management Planning Meetings) with LR Standard 1.15 (Sustainability Communication Meetings) in the same meeting.

References:

Chan, B. *4 Steps to Engage Stakeholders on Your Sustainability Journey*. Schneider Electric Blog. https://perspectives.se.com/blog-stream/4-steps-engage-stakeholders-sustainability-scope-3. (Last accessed on 9Apr21)

Davidson, D. *The business of vineyards*. Davidson Viticultural Consulting Services, Glen Osmond, SA, Aust. 2001.

Grant, S. Vineyard Management Self-Evaluation. lodigrowers.com/vineyard-management-self-evaluation/. (Last accessed on 2Feb17)

Kay, RD, and Edwards, WM. *Farm management*. McGraw-Hill, New York. 1994.

Ohmart, CP, Storm, CP, and Matthiasson, SK (Eds.). *Lodi Winegrower's Workbook*, 2nd Ed. Lodi Winegrape Commission. pp. 111-141. 2008.

1.16 Sustainability Marketing

***NEW* Standard**

Select all that apply:

1.16.1 Vineyard Signage The farming operation publicly advertises their commitment to sustainability by displaying a LODI RULES, CALIFORNIA RULES, or CERTIFIED GREEN sign on their property.	**YES = 1** **NO = 0**
1.16.2 Grape Marketing The farming operation promotes their commitment to sustainability in their grape marketing materials, which may include a website, social media, a vineyard tech sheet, a brochure, business cards, and/or presentations.	**YES = 1** **NO = 0**
1.16.3 Winery Communication The farming operation has communicated the ability to use one of our three LODI RULES seals on a wine label with their grape buyer(s) by sharing a copy of the LODI RULES Winery Handbook* ***AND/OR*** the winegrapes from this vineyard block are already used in a wine label bearing a certified sustainable seal.	**YES = 1** **NO = 0**

*Wineries may choose from three seal options (LODI RULES, CALIFORNIA RULES, or CERTIFIED GREEN). Winery Handbooks, in print and PDF form, are available from the Lodi Winegrape Commission by contacting (209) 367-4727. There is no extra cost for wineries to use a seal on a wine label, but the wine must contain at least 85% LODI RULES certified grapes and wineries need to sign a License Agreement with the Lodi Winegrape Commission before using a seal.

Companion Information

Scope: The entirety of the vineyard operation submitted for **LODI RULES** certification.

Purpose: The marketing of sustainability contributes to the sustainability of winegrowing and may enhance the profitability of the farming operation.

Verification: Visual inspection of applicable signage, marketing materials, emails about the Winery Handbook, or a photo of a wine label with the appropriate seal.

Resources: *LODI RULES Grower Marketing Tools Newsletter* by Stephanie Bolton, PhD. https://www.lodigrowers.com/wp-content/uploads/2021/02/LODI-RULES-Grower-Marketing-Tools-Feb-2021-with-hyperlinks.pdf. February 2021.

References:

Grant, S. *Vineyard Business Identity and Marketing*. Lodi Winegrape Commission Coffee Shop Blog. https://www.lodigrowers.com/vineyard-business-identity-and-marketing/. October 19, 2017.

Ikerd, J. *The Role of Marketing in Sustainable Agriculture*. University of Missouri. 1996-1997.

1.17 Automation Efficiencies

***NEW* Standard**

The farming operation increases efficiency via a novel, innovative* automation of at least one practice (remote irrigation scheduling, using an autonomous tractor, drone application, aerial imagery, optical berry sorting, cloud-based communications, etc.).	**YES = 1**
	NO = 0

*Typical mechanization practices in common use are excluded, such as mechanical harvesting, mechanical leafing, mechanical pruning, etc.

Companion Information

Scope: The entirety of the vineyard operation submitted for **LODI RULES** certification.

Purpose: To award participants who utilize novel, innovation automation efficiencies.

Verification: Visual inspection of novel, innovative equipment and/or inspection of the results generated by this equipment (for example, pictures from the drone, printout of irrigation schedule, emails with a third party innovative vendor, etc.).

Reference:

Matese, A, and SF Di Gennaro. *Technology in precision viticulture: a state of the art review*. International Journal of Wine Research. 2015. 7:69-81. https://doi.org/10.2147/IJWR.S69405

1.18 Paper-Free LODI RULES Audit Bonus Points

***NEW* Standard**

The farming operation is preparing for the next on-site LODI RULES audit to be conducted paper-free, with all information shared electronically.	**+2 (bonus)**

Companion Information

Scope: The entirety of the vineyard operation submitted for **LODI RULES** certification.

Purpose: To award participants who create less waste and use less paper than occurs with a typical paper audit.

Verification: Visual inspection of chosen electronic storage platform.

References:

Decisive Farming. *5 Key Advantages of Digitizing Your Farm Records*. Precision Ag – Data Management. February 26, 2020. https://www.precisionag.com/digital-farming/5-key-advantages-of-digitizing-your-farm-records/

Saiz-Rubio, V, and F Rovira-Más. *From Smart Farming towards Agriculture 5.0: A Review on Crop Data Management*. Agronomy 2020, 10, 207. February 3, 2020.

2.13 Salary Survey Participation

***REVISED* Standard**

The farming operation participates in an annual salary survey (Wine Business Monthly/Western Management Group, ~~CAWG~~Western Growers, AgCareers.com, FELS, etc.).	**YES = 1**
	NO = 0

Companion Information

Scope: The entirety of the vineyard operation submitted for **LODI RULES** certification.

Purpose: To make a positive contribution to the industry salary database.

Verification: Visual inspection of salary survey documentation, including a screenshot/print out of the completed survey prior to submission or a thank you email from the surveyor confirming participation.

References:

AgCareers.com, agcareers.com/compensation-benchmark-review (Last accessed on 12Apr21)

Farm Employers Labor Service, fels.net (Last accessed on 30Dec16)

Thach, L. Chapter 7. Human Resources Management. In: *Lodi Winegrower's Workbook*, 2nd Ed. Ohmart, CP, Storm, CP, and Matthiasson, SK (Eds.). Lodi Winegrape Commission. pp. 111-141. 2008.

Western Growers, agsalary.com (Last accessed on 12Apr21)

Western Management Group, wmgnet.com/dnn8/Salary-Surveys/USA/Wine-Industry-Compensation-Survey (Last accessed on 12Apr21)

Wine Business Monthly, winebusiness.com/search/?q=salary+survey (Last accessed on 12Apr21)

2.14 Social Responsibility

***NEW* Standard**

The farming operation has a written and implemented policy in place to prevent illegal child labor, to protect young workers, to report any suspicious labor conditions (e.g. trafficked labor, illegal overtime), to prevent corruption, to protect the rights of all employees, to prevent sexual harassment, and to prevent discrimination ***AND*** this policy is reviewed and updated every year.	**YES = 1**
	NO = 0

Companion Information

Scope: The entirety of the vineyard operation submitted for **LODI RULES** certification.

Purpose: To ensure that employees and stakeholders are included and protected by the farming operation.

Verification: Visual inspection of social policies included in the Employee Handbook, copies of records from Farm Labor Contractors related to employment practices/compensation/working hours tracking, records of safety statistics including OSHA report and sample of accident investigation record, etc.

References:

Billikopf, G. *Labor management in agriculture: cultivating personnel productivity*, 2nd Ed. University of California, Agriculture and Natural Resources, Agricultural Issues Center Publication 3417. 2003.

Farm Employers Labor Service. *Summary of employment requirements for California winegrape growers*.

- fels.net (Last accessed on 30Dec16)
- *Internet search terms*: Farm Employers Labor Service summary employment requirements California winegrape growers

Hurst, P. Health and child labor in agriculture. *Food and Nutrition Bulletin*. Vol. 28, No. 2 (supplement). The United Nations University. 2007. journals.sagepub.com/doi/pdf/10.1177/15648265070282S216

Kay, RD, and Edwards, WM. *Farm management*. McGraw-Hill, New York. 1994.

Thach, L. Chapter 7. Human Resources Management. In: *Lodi Winegrower's Workbook*, 2nd Ed. Ohmart, CP, Storm, CP, and Matthiasson, SK (Eds.). Lodi Winegrape Commission. pp. 111-141. 2008.

UC Davis Western Center for Agricultural Health and Safety. Training – Sexual Harassment Prevention. aghealth.ucdavis.edu/training/sexual-harassment (Last accessed on 12Apr21)

3.12 ~~Habitat for Birds and Bats~~ Agrobiodiversity: Beneficial Species Habitat

***REVISED* Standard**

Select all that apply:

3.12.1 Habitat: Nesting Boxes for Raptors	**YES = 2**
Nesting boxes for raptors (owls, hawks, kestrels, etc.) are established and maintained in or around the vineyard.	**NO = 0**
3.12.2 Habitat: Natural Nesting Sites for Raptors	**YES = 2**
Natural nesting sites and perches (e.g. oak trees) for raptors are present in or around the vineyard.	**NO = 0**
3.12.3 Habitat: Nesting Boxes for Bats	**YES = 1**
Nesting boxes for bats are established and maintained in or around the vineyard.	**NO = 0**
3.12.4 Habitat: Nesting Boxes for Non-Raptor Birds	**YES = 2**
Nesting boxes for non-raptor bird species (western blue birds, wood ducks, etc.) are established and maintained in or around company property.	**NO = 0**
3.12.5 Habitat: Nesting Habitat for Non-Raptor Birds	**YES = 1**
Natural nesting sites for non-raptor bird species (western blue birds, wood ducks, etc.) are present on company property.	**NO = 0**
3.12.6 Habitat: ~~No Nesting Boxes or Perches~~Bees	**YES = 1**
~~There are *no nesting boxes* on company property and *no perches* are established or exist for birds of prey or~~ **~~bats~~Bee boxes, bee gardens, and/or shelters for native loner bees** are present on company property.	**NO = 0**
3.12.7 Habitat: Snakes	**YES = 1**
Natural nesting sites for beneficial snakes (garter snakes, gopher snakes, California mountain king snakes, etc.) are present on company property.	**NO = 0**

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To support populations of birds, bats, snakes, and bees, plus their activities in and around vineyards, including predation of vineyard pests.

Verification: Visual inspection of nesting boxes, perches, and other nesting habitat in and adjacent to individual vineyard management units.

Resource: Sonoma County Reptile Rescue. Their website has useful habitat and diet information for native snake species: sonomacountyreptilerescue.com (Click on "Native Species"; Last accessed on 24May22)

(**References** are on the following page)

References:

Heaton, E, Long, R, Ingels, C, and Hoffman, T. *Songbird, bat, and owl boxes: vineyard management with an eye toward wildlife*. University of California Agriculture and Natural Resources Publication 21636. 2008.

Lee-Mäder, E, Hopwood, J, Vaughan, M, Hoffman Black, S, and Morandin, L. *Farming with Native Beneficial Insects: Ecological Pest Solutions*. The Xerces Society. 2014.

Reeves, K. Chapter 1. Ecosystem Management. In: *Lodi Winegrower's Workbook*, 2nd Ed. Ohmart, CP, Storm, CP, and Matthiasson, SK. (Eds.). Lodi Winegrape Commission. pp. 111-141. 2008.

Robins, P, Holmes, RB, and Laddish, K. *Bring farm edges back to life!* Yolo County Resource Conservation District. 2001.

Tatarian, G. *Barn owls in the vineyard: forging a partnership with nature's rodent control specialists*. Practical Winery and Vineyard. pp. 23-28. May/June 1995.

Tartarian, G. *Creating habitat: raptors in your vineyard*. Practical Winery and Vineyard. pp. 49-54. July/August 1995.

3.15 Invasive Species Training & Recognition

***NEW* Standard**

The farming operation trains people working on the property how to identify and report the sighting of major potential invasive pests and plants of concern in the region (for example, the spotted lanternfly and nutria).	**YES = 2**
	NO = 0

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To help protect your vineyard and community ecosystem from potentially devastating invasive pests.

Verification: Visual inspection of written training documents, including meeting agendas and signature lists for attending employees, with date of training and topics covered. Please note that training may be provided by a source outside of the farming operation – for example, through a webinar or a grower outreach meeting.

References/Resources:

California -

- UC Riverside Center for Invasive Species Research. FAQ's about Invasive Species in California. cisr.ucr.edu/invasive-species (Last Accessed on 24May22)

- UC Riverside Center for Invasive Species Research. Frequently Asked Questions About Invasive Species. cisr.ucr.edu/resources/invasive-species-faqs#what_can_you_do_about_invasive_species (Last Accessed on 24May22)

Israel -

- The Society for the Protection of Nature in Israel. natureisrael.org/EPD/Biodiversity/Impact-on-Environment (Last Accessed on 24May22)

Washington -

- Washington Invasive Species Council. invasivespecies.wa.gov (Last Accessed on 24May22)

4.2 Soil Erosion & Compaction: Soil Conservation Plan

***REVISED* Standard**

The farming operation is aware of the erosion and compaction risks ~~of~~ to the vineyard soils and has a written and implemented **soil conservation plan** which addresses these risks and includes the following components: site and soil factors contributing to soil erosion by water and air (including the wind erodibility group and water erodibility or K_w factor), best management practices to minimize soil erosion and compaction, and a plan review and update schedule.	**YES = 6**
	NO = 0

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To inventory soil erosion and compaction factors and risks, and to clearly state soil conservation objectives and strategies, which will serve as guidelines for the activities of the vineyard manager and his/her management team to minimize the off-site movement of soil.

Verification: Visual inspection of current soil erosion and compaction prevention practices and the soil conservation plan document (including copies of supporting documents such as an NRCS document specifying erodibility/K_w factor, an invoice for farm soil conservation upgrades, etc.).

Resource:
USDA NRCS Soils.

- nrcs.usda.gov/wps/portal/nrcs/detail/soils/health/resource/?cid=nrcs142p2_053878 (Last Accessed 25May22)

Sonoma County Agricultural Commissioner's Office. Best Management Practices for Agricultural Erosion and Sediment Control. 2017. soilhub.org/wp-content/uploads/2017/06/bmp_handbook3.pdf

References (continued on the following page):

Follet, RF, and Stewart, BA. *Soil erosion and crop productivity*. American Society of Agronomy. Madison, WI. 1985.

O'Geen, AT, Elkins, R, and Lewis, D. *Erodibility of agricultural soil, with examples in Lake and Mendocino Counties.* University of California Division of Agriculture and Natural Resources Publication 8194. 2006.

O'Geen, AT, Prichard, TL, Elkins, R, and Pettygrove, GS. *Orchard floor management practices to reduce erosion and protect water quality*. University of California Division of Agriculture and Natural Resources Publication 8202. 2006.

O'Geen, AT, and Schwankl, LJ. *Understanding soil erosion in irrigated agriculture*. University of California Division of Agriculture and Natural Resources Publication 8196. 2005.

Peacock, B. *Managing Compacted Soils in Vineyards*. UCCE Pub. GV8-97.

Peterson, AE, and Swan, JB. *Universal soil loss equation: past, present, and future*. SSSA Special Publication Number 8. Soil Science Society of America, Madison, WI. 1979.

Shepard, H, and Grismer, M. *Quantifying erosion rates for various vineyard management practices*. Practical Winery and Vineyard. 29(1): 50-54, 56-58, 60-62, 64. Jan/Feb 2007.

Stimson, D, and O'Connor, K. *Multiple benefits in vineyard erosion control*. Practical Winery and Vineyard. 27(1): 62-70. Jan/Feb 2005.

USDA NRCS Soil Quality Institute. Soil Quality – Agronomy Technical Note No. 17. Soil Compaction: Detection, Prevention, and Alleviation. June 2003.

USDA Web Soil Survey. websoilsurvey.sc.egov.usda.gov/App/HomePage.htm (Last Accessed 25May22)

Soil Conservation Plan Organization:

Summary of erosion and compaction risks.

Soil conservation goals: For example, to conserve topsoil, to promote the use of on-site mineral nutrient resources through organic matter additions and associated soil microbial activities, and to optimize the efficiency of applied resources.

Site and soil factors contributing to soil erosion by wind and air.

- **Soil resource and use inventory**: May include a table of pertinent NRCS soil survey information, a soil map, an NRCS generated soil conservation plan, the presence or absence of a cover crop and its composition, and soil, water, and plant tissue analysis results, followed by a written summary of significant soil factors identified in them.

- **Soil management challenges**: May include factors identified in the soil resource inventory, such as extreme texture (sand or clay), slow permeability, restricted drainage, limited water and/or nutrient holding capacity, acidity or alkalinity, very low or very high salinity, and low or high levels of specific mineral nutrients.

Best management practices to minimize soil erosion: May include measures to improve the conditions listed as challenges, such as organic and/or mineral amendment additions, deep cultivation, cover cropping, and a mineral nutrient application schedule designed to accommodate soil conditions and vine mineral nutrient demand.

Best management practices to minimize soil compaction: May include measuring and minimizing tractor passes, using a documented and easily measurable soil moisture threshold to determine when it is safe for machines to enter vine rows (also think about a post-discing re-entry interval, when the soil can be vulnerable to compaction), checking for compaction underneath drip irrigation, and incorporating ground cover into seasonal floor management.

A plan review and update schedule.

4.13 Soil Erosion by Wind

***NEW* Standard**

Select all that apply:

4.13.1 Soil Erosion by Wind: Vineyard Floor The vineyard floor is never cultivated under dry, windy conditions (>10 mph) ***OR*** a permanent vegetative cover is maintained between every row.	**YES = 1** **NO = 0**
4.13.2 Soil Erosion by Wind: Headlands A perennial cover crop or native vegetative cover is maintained on the headlands of the vineyard.	**YES = 1** **NO = 0**
4.13.3 Soil Erosion by Wind: Windbreaks A hedgerow of trees on the upwind edge of the vineyard serves as a windbreak.	**YES = 1** **NO = 0**

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To prevent and/or minimize soil erosion by wind.

Verification: Visual inspection of photos and/or copies of bag tags for cover crop seeds if manually seeded.

References:

Grant, S. The ultimate goal of vineyard soil management: optimized root zone function. Lodi Winegrape Commission Coffee Shop Blog. lodigrowers.com/optimized-root-zone-function/. December 20, 2021.

Sonoma County Agricultural Commissioner's Office. Best Management Practices for Agricultural Erosion and Sediment Control. 2017. soilhub.org/wp-content/uploads/2017/06/bmp_handbook3.pdf

USDA Natural Resources Conservation Service. Rangeland Soil Quality: Wind Erosion. May 2001.

USDA Natural Resources Conservation Service. Soil Quality Resource Concerns: Soil Erosion. April 1996. www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051278.pdf (Last Accessed 25May22)

4.14 Soil Erosion by Water

***NEW* Standard**

All slopes in the vineyard are less than 10% ***OR*** there are slopes in the vineyard which are 10%* or greater ***AND*** the vineyard follows an erosion control plan created by Fish Friendly Farming, a Resource Conservation District, or a registered civil engineer.	**Take 4 points** (Standard **4.14.1** is N/A)
There are slopes in the vineyard which are 10%* or greater but the vineyard *does not follow an erosion control plan created by Fish Friendly Farming, a Resource Conservation District, or a registered civil engineer*.	Go to Standard **4.14.1**

*10% slope: for every 100 feet (or meters) of horizontal distance, the altitude changes by 10 feet (or meters).

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To acknowledge the greater capacity for water soil erosion in sloped vineyards and award points for professional soil erosion plans in those instances.

Verification: Visual inspection of professionally written erosion control plan document(s) and/or official document specifying the slope of the vineyard (including a Google Earth report).

Resources:

- Fish Friendly Farming, a certification program run by the California Land Stewardship Institute for agricultural properties managed to restore fish and wildlife habitat and improve water quality. fishfriendlyfarming.org. (707) 253-1226. Based in Napa County, California.
- USDA NRCS National Association of Resource Conservation Districts, local units of government established under state law to carry out natural resource management programs at the local level. nrcs.usda.gov/wps/portal/nrcs/main/national/people/partners/nacd/ (Last Accessed 31May22)
- "Deriving slope in Google Earth" YouTube video by Marcos Luna: youtube.com/watch?v=PqiNyGq6b3U. Google Earth is free. earth.google.com/web (Last Accessed 13Jun22)

References:

Battany, MC, and ME Grismer. Rainfall Runoff and Erosion in Napa Valley Vineyards: Effects of Slope, Cover and Surface Roughness. 2000. *Hydrological Processes*. 14(7): 1289-1304.

Grant, S. The ultimate goal of vineyard soil management: optimized root zone function. Lodi Winegrape Commission Coffee Shop Blog. lodigrowers.com/optimized-root-zone-function/. December 20, 2021.

USDA Natural Resources Conservation Service. Soil Quality Resource Concerns: Soil Erosion. April 1996. www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051278.pdf (Last Accessed 25May22)

4.14.1 Soil Erosion by Water – Sloped Vineyards

***NEW* Standard**

Select all that apply:

4.14.1.1 Soil Erosion by Water – Sloped Vineyards: Vineyard Floor A permanent vegetative cover is maintained between every row.	**YES = 1** **NO = 0**
4.14.1.2 Soil Erosion by Water – Sloped Vineyards: Headlands During the rainy season, the farming operation maintains waterbars, straw wattles, or some other device to inhibit and direct overland flow on the sloped headlands of the vineyard.	**YES = 1** **NO = 0**
4.14.1.3 Soil Erosion by Water – Sloped Vineyards: Berms Cross slope berms in the vineyard restrict overland water flow ***OR*** the vineyard rows follow the contour of the sloping land.	**YES = 1** **NO = 0**
4.14.1.4 Soil Erosion by Water – Sloped Vineyards: Downslope Edge A vegetative filter strip is maintained on the downslope edge of the vineyard.	**YES = 1** **NO = 0**

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To minimize soil erosion by water in sloped vineyards.

Verification: Visual inspection of photos to document the practices listed and/or copies of bag tags for cover crop seeds if manually seeded.

References:

Battany, MC, and ME Grismer. Rainfall Runoff and Erosion in Napa Valley Vineyards: Effects of Slope, Cover and Surface Roughness. 2000. Hydrological Processes. 14(7): 1289-1304.

Grant, S. The ultimate goal of vineyard soil management: optimized root zone function. Lodi Winegrape Commission Coffee Shop Blog. lodigrowers.com/optimized-root-zone-function/. December 20, 2021.

Sonoma County Agricultural Commissioner's Office. Best Management Practices for Agricultural Erosion and Sediment Control. 2017. soilhub.org/wp-content/uploads/2017/06/bmp_handbook3.pdf

USDA Natural Resources Conservation Service. Soil Quality Resource Concerns: Soil Erosion. April 1996. www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051278.pdf (Last Accessed 25May22)

Chapter 5: Water Management

5.1 Water Management Plan

***REVISED* Standard**

The farming operation has a written and implemented **water management plan** containing the following components: soil moisture management goals and strategies; soil water holding capacity, water intake rate, and water permeability; irrigation suitability* analysis of applied water; irrigation system design and performance; and a plan review and update schedule.	**YES = 6** ~~**NO = 0**~~ **Fail Chapter**

*See Standards **4.9** and **5.3** for more information on *irrigation suitability*.

Companion Information

Scope: The entirety of the vineyard operation submitted for **LODI RULES** certification.

Purpose: To inventory water resource factors and to clearly state water management goals, challenges, and strategies, including vineyard monitoring strategy, which will serve as guidelines for the activities of the vineyard manager and his/her management team.

Verification: Visual inspection of the water management plan document.

References:

Goldhammer, DA, and Snyder, RL. *Irrigation scheduling: a guide for efficient on-farm water management*. University of California, Division of Agriculture and Natural Resources. Publication 1989.

Grant, S. *Five-step irrigation schedule: promoting fruit quality and vine health*. Practical Winery and Vineyard. 21(1):46-52, 75. May/June 2000.

Grant, S. Comprehensive vineyard water management. Lodi Winegrape Commission Coffee Shop Blog. lodigrowers.com/comprehensive-vineyard-water-management/. August 18, 2015.

Hanson, B, Orloff, S, and Sanden, B. *Monitoring soil moisture for irrigation water management*. University of California Agriculture and Natural Resources Publication 21635. 2007.

Prichard, TL, Hanson B, Schwankl, L, Verdegaal, P, and Smith, R. *Deficit irrigation of quality winegrapes using micro-irrigation techniques.* University of California Cooperative Extension, Department of Land, Air, Water Resources, University of California, Davis. 2004.

Prichard, T, Storm, CP, and Ohmart, CP. Chapter 5, Water Management. In: *Lodi Winegrower's Workbook*, 2nd Ed. Ohmart, CP, Storm, CP, and Matthiasson, SK. (Eds.). Lodi Winegrape Commission. 2008.

Prichard, TL. *Irrigation of quality winegrapes*. 49th Annual Lodi Grape Day Proceedings. pp. 31-44. 2001.

Williams, LE, and Matthews, MA. Grapevine. In: *Irrigation of Agricultural Crops*. Stewart, BA, and Nielsen, DR. (Eds.). Madison, WI. American Society of Agronomy. pp. 1019-1055. 1990.

Water Management Plan Organization:

Soil moisture management goals and strategies: For example, to optimize vineyard water use while practicing water conservation. Other goals may be ensuring maximum moisture storage from winter rains, optimizing irrigation water application efficiency, and irrigation initiation and scheduling based on the condition of the vineyard moisture continuum: grapevine moisture status, atmospheric moisture demand, and available soil moisture supply in the root zone. What are the challenges faced in this vineyard system? Perhaps there is surface water that is too pure and with repeated applications, diminishes soil permeability to water and air, or well water that contains excessive salts, requiring additional applied water (a leaching fraction) to avoid water stress in grapevines.

Water intake rate and permeability: Take an overall water resource and use inventory. Identify the water source (well and/or surface (district, river, and/or reservoir)), **root zone soil water holding capacity** when full, soil permeability and water infiltration rate, presence or absence of a cover crop, and type and efficiency of the irrigation system.

Early in the season, monitor grapevines for threshold moisture status (e.g. arrested shoot growth or water potential < -10 bars) and after the onset of irrigations, regularly (at some specified time interval) monitor grapevine moisture status, atmospheric moisture demand (evapotranspiration or ET), and level of moisture in the soil reservoir.

Irrigation suitability analysis of applied water: At a specified time interval, collect irrigation water samples and submit for analysis, and based on the analysis results, modify irrigation schedule and irrigation system maintenance actions as needed.

Irrigation system design and performance: Using a specified time interval, regularly monitor irrigation system flow and pressure both before and after the filters, and inject materials to prevent clogging based on stated criteria.

A plan review and update schedule.

Chapter 6: Pest Management

This Chapter includes several management plans addressing specific pests and pathogens, which for expediency, may be combined into a single pest and disease management plan document.

6.1 Insect and Mite Pest Management Plan

The farming operation has a written and implemented **insect and mite pest management plan** containing the following components: goals; guidelines for written vineyard scouting/pest monitoring reports~~monitoring records~~; frequency and location of monitoring; action and economic thresholds for each pest based on pest numbers, natural enemy type/number considerations, amount of leaf and/or fruit damage present, time of year, canopy vigor, winegrape variety; timing of treatments; and a plan review and update schedule.	**YES = 6**
	~~NO = 0~~ Fail Chapter

Companion Information

Scope: The entirety of the vineyard operation submitted for **LODI RULES** certification.

Purpose: To inventory pest management factors and to clearly state pest management goals, challenges, and strategies, including vineyard monitoring, which will serve as guidelines for the activities of the vineyard manager and his/her management team.

Verification: Visual inspection of the pest management plan document.

Resource: Webinar and handout covering the Insect and Mite Pest Management Plan plus vineyard scouting/pest monitoring reports. lodigrowers.com/lodi-rules-management-plan-webinar-workshops/.

References (continued on following page):

Bentley, WJ, Varela, LG, Zalom, FG, Smith, RJ, Purcell, AH, Phillips, PA, Haviland, DR, Daane, KM, and Battany, MC. *Leafhoppers*. UC IPM Pest Management Guidelines. University of California Agriculture and Natural Resources Statewide Integrated Pest Management Program. 2008. Reviewed 2015.

- ipm.ucdavis.edu/PMG/r302300111.html (Last accessed on 30Jan17)
- *Internet search terms*: UC pest management guidelines grape leafhopper

Bentley, WJ, Varela, LG, Zalom, FG, Smith, RJ, Purcell, AH, Phillips, PA, Haviland, DR, Daane, KM, and Battany, MC. *Webspinning spider mites*. UC IPM Pest Management Guidelines. University of California Agriculture and Natural Resources Statewide Integrated Pest Management Program. 2008. Revised 2011.

- ipm.ucdavis.edu/PMG/PESTNOTES/pn7405.html (Last accessed on 30Jan17)
- *Internet search terms*: UC pest management guidelines spider mites

Flaherty, DL, Wilson, LT, Welter, SC, Lynn, CD, and Hanna, R. Spider mites. In: *Grape Pest Management*, 2nd Ed. Flaherty, DL, Christensen, LP, Lanini, WT, Marois, JJ, Phillips, PA, and Wilson, LT. (Eds.). University of California Division of Agriculture and Natural Resources Publication 3343. pp. 180-192. 1992.

Flint, ML, and Dreistadt, S. *Natural enemies handbook: an illustrated guide to biological pest control*. University of California Agriculture and Natural Resources Publication 3386. 1998.

Insecticide Resistance Action Committee, Irac-online.org (Last accessed on 30Jan17)

Ohmart, CP, Storm, CP, and Gubler, WD. Chapter 6, Pest Management. In: *Lodi Winegrower's Workbook*, 2nd Ed. Ohmart, CP, Storm, CP, and Matthiasson, SK. (Eds.). Lodi Winegrape Commission. pp. 187-267. 2008.

Varela, LG, Bentley, WJ, Haviland, DR, Phillips, PA, Smith, RJ, and Shrestha, A. *Monitoring insects and pest mites*. UC IPM Pest Management Guidelines. University of California Agriculture and Natural Resources Statewide Integrated Pest Management Program. 2008. Reviewed 2015.

- ipm.ucdavis.edu/PMG/r302900611.html (Last accessed on 30Jan17)
- *Internet search terms*: UC pest management guidelines monitoring insect spider mite

Wilson, LT, Flaherty, DL, and Peacock, WL. Grape leafhopper. In: *Grape Pest Management*, 2nd Ed. Flaherty, DL, Christensen, LP, Lanini, WT, Marois, JJ, Phillips, PA, and Wilson, LT (Eds.). University of California Division of Agriculture and Natural Resources Publication 3343. pp. 140-152. 1992.

Insect and Mite Pest Management Plan Organization:

Insect and mite pest management goals: For example, to optimize cultural and biological control of insect and mite pests and when chemical control becomes necessary, to ensure maximum insecticide or miticide efficacy with negligible undesirable side effects. The farming operation practices in-season vine management for growth balance and moderate water stress, environment management for minimum dust and maximum beneficial insect activity, and pesticide selection and application for effective control.

Guidelines for written vineyard scouting/pest monitoring reports~~monitoring records~~, including frequency and location: For example, the vineyard is monitored every 7 days during the growing season for insects and mites and written monitoring records are kept.

Action and economic thresholds for each pest: Base thresholds on pest numbers, natural enemy type/number considerations, amount of leaf and/or fruit damage present, time of year, canopy vigor, and/or winegrape variety. Include **treatment timings**. For example, treatments for leafhoppers are applied only when the number of nymphs per leaf is greater than 5 OR there is moderate to heavy leaf damage due to leafhopper feeding and a moderate to heavy population of adults present. The farming operation treats for mites when greater than 60% of the leaves are infested OR greater than 20% of the leaves are infested and a miticide, such as Agrimek, is used which requires treating before numbers get too high. When an insect or mite treatment is necessary, only that portion of the vineyard where a problem exists is treated, such as edges or hot spots, and not the whole vineyard.

6.9 Training ~~of Employees~~ for ~~Pest~~ Recognition of Pests and Their Natural Enemies

***REVISED* Standard**

~~Farming operation employees are trained for recognition of vineyard pests ***OR*** there are no employees, but the owner is trained in pest recognition.~~	~~**YES = 2**~~ ~~**NO = 0**~~
A. The owner and/or farming operation employees are trained for recognition of vineyard pests ***AND*** natural enemies.	**3**
B. The owner and/or farming operation employees are trained for recognition of vineyard pests ***OR*** natural enemies.	**2**
C. *Neither the farming operation owners nor any employees are trained* for pest or natural enemy recognition.	**0**

Companion Information

Scope: The entirety of the vineyard operation submitted for **LODI RULES** certification.

Purpose: To increase the intensity of pest and natural enemy monitoring by training owners and/or farm employees to recognize them ~~pests or at least, ensuring the vineyard operator has sufficient pest recognition training~~.

Verification: Visual inspection of pest and/or natural enemy recognition training records, including meeting agendas and signature lists for attending employees.

References:

Lee-Mäder, E, Hopwood, J, Vaughan, M, Hoffman Black, S, and Morandin, L. *Farming with Native Beneficial Insects: Ecological Pest Solutions*. The Xerces Society. 2014.

Ohmart, CP, Storm, CP, and Gubler, WD. Chapter 6, Pest Management. In: *Lodi Winegrower's Workbook*, 2nd Ed. Ohmart, CP, Storm, CP, and Matthiasson, SK. (Eds.). Lodi Winegrape Commission. pp. 187-267. 2008.

6.9.1 Beneficial Insects

***NEW* Standard**

Select all that apply:

6.9.1.1 Beneficial Insects: Releases The farming operation released beneficial insects (predatory mites, *Cryptolaemus* beetles, and/or *Anagyrus* wasps, etc.) in the vineyard ***during this certification year***.	**YES = 1** **NO = 0**
6.9.1.2 Beneficial Insects: Monitoring To ensure that no or minimal harm is done to beneficial insect populations, the farming operation reviews pesticide risk ***before application*** and monitors beneficial insect populations ***after any applications which may pose a concern for beneficials***.	**YES = 1** **NO = 0**

Companion Information

Scope: The entirety of the vineyard operation submitted for **LODI RULES** certification.

Purpose: To enhance biocontrol activities for integrated pest management.

Verification: Visual inspection of beneficial insect application records (including purchase invoices), written monitoring records included or separate from standard pest monitoring records, pictures of beneficials taken in the vineyard, and/or a beneficial insect risk chart used for application decisions.

Resources/References:

Altieri, MA, Nicholls, CI, Wilson, H, and Miles, A. Habitat Management in Vineyards: A growers manual for enhancing natural enemies of pests. UC Berkeley College of Natural Resources. 2010.

Lee-Mäder, E, Hopwood, J, Vaughan, M, Hoffman Black, S, and Morandin, L. *Farming with Native Beneficial Insects: Ecological Pest Solutions*. The Xerces Society. 2014.

Ohmart, CP, Storm, CP, and Gubler, WD. Chapter 6, Pest Management. In: *Lodi Winegrower's Workbook*, 2nd Ed. Ohmart, CP, Storm, CP, and Matthiasson, SK. (Eds.). Lodi Winegrape Commission. pp. 187-267. 2008.

6.15.2 Bunch Rot Management

***REVISED* Standard**

Select all that apply:

6.15.2.1 Bunch Rot: Early Season Thinning ***Early in the growing season***, **shoots are thinned** to increase air movement within the fruit zone.	**1**
6.15.2.2 Bunch Rot: Gibberellin Application ***While clusters are elongating***, **gibberellin is applied** to stretch clusters, reduce contact between berries, and enhance cuticle development on berry exteriors.	**1**
6.15.2.3 Bunch Rot: Leaf and Shoot Removal ***As soon as possible after fruit set,*** but ***before bunch closure,*** **leaves and/or lateral shoots in the fruit zone are removed** to increase air movement**.**	**1**
6.15.2.4 Bunch Rot: Fungicide Application ***During and following bloom***, a **fungicide is applied** to reduce bunch rot inoculum when dead flower parts adhere to clusters.	**1**
~~**6.15.2.5 Bunch Rot: No Bunch Rot Control**~~ ~~There is a history of bunch rot in the vineyard, but *no actions are taken* to control this problem.~~	~~**0**~~

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To foster bunch rot control through the integrated use of several low impact management practices.

Verification: Visual inspection of shoot thinning, leaf removal, and/or lateral shoot removal in the field, and growth regulator and fungicide application records.

References (continued on the following page):

Bulit, J, and Dobos, B. Botrytis bunch rot and blight. In: *Compendium of Grape Diseases*. Pearson, RC, and Goheen, AC. (Eds.). APS Press, St. Paul, MN. pp. 13-14. 1988.

Fungicide Resistance Action Committee, frac.info (Last accessed on 30Jan17)

Gubler, WD, Smith, RJ, Varela, LG, Vasquez, S, Stapleton, JJ, and Purcell, AH. *Botrytis bunch rot*. UC IPM Pest Management Guidelines. University of California Agriculture and Natural Resources Statewide Integrated Pest Management Program. 2008. Reviewed 2014.

- ipm.ucdavis.edu/PMG/r302100111.html (Last accessed on 30Jan17)

6.16 Canker Disease Management

***REVISED* Standard**

Select all that apply:

6.16.1 Canker: Pruning Schedule The **pruning schedule** is prioritized based on canker disease risk.	**YES = 1** **NO = 0**
6.16.2 Canker: Pruning Methods **One or more of the following pruning methods** are used to minimize infection: double pruning, cane pruning, or box/minimum pruning.	**YES = 1** **NO = 0**
6.16.3 Canker: Protecting Pruning Wounds **Pruning wounds** are protected with one or more fungicides or wound sealant.	**YES = 1** **NO = 0**
6.16.4 Canker: Remove/Dispose of Infected Wood ***Before the next growing season,*** **infected wood is removed and disposed of** to reduce inoculum.	**YES = 1** **NO = 0**
6.16.5 Canker: Shoot Thinning ***Early in the growing season,*** **shoots are thinned** to reduce the number of pruning wounds.	**YES = 1** **NO = 0**
~~**6.16.6 Canker: No Controls**~~ ~~*No actions to control canker diseases* are taken.~~	~~**0**~~

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To promote the long-term viability of vineyards through the integrated use of several low impact management practices.

Verification: Visual inspection of pruning records, vine pruning in the field, fungicide application records, wood disposal records, and shoot thinning.

References:

Carter, MV. Eutypa dieback. In: *Compendium of Grape Diseases*. Pearson, RC, and Goheen, AC. (Eds.). APS Press, St. Paul, MN. pp. 32-34. 1988.

Fungicide Resistance Action Committee, frac.info (Last accessed on 30Jan17)

Gubler, WD, Smith, RJ, Varela, LG, Vasquez, S, Stapleton, JJ, and Purcell, AH. *Bot canker*. UC IPM Pest Management Guidelines. University of California Agriculture and Natural Resources Statewide Integrated Pest Management Program. 2008. Reviewed 2014.

- ucdavis.edu/PMG/r302101011.html (Last accessed on 30Jan17)
- *Internet search terms*: UC pest management guidelines grape bot canker

6.28 Mealybug Management

***NEW* Standard**

Select all that apply:

6.28.1 Mealybug Management: Monitoring Effectiveness The farming operation records applicable mealybug*, mealybug predator, and mealybug parasite levels over time ***AND*** uses these records to monitor the effectiveness of their management program.	**YES = 1** **NO = 0**
6.28.2 Mealybug Management: Mitigating Spread The farming operation ensures that equipment and workers entering the vineyard move from less-infested to more-infested vineyards during a workday ***OR*** equipment and workers practice disinfection/sanitation in between vineyards.	**YES = 1** **NO = 0**
6.28.3 Mealybug Management: Marking Hotspots The farming operation marks and treats any mealybug hotspots during the growing season and closely monitors these locations the following season.	**YES = 1** **NO = 0**
6.28.4 Mealybug Management: Mating Disruption Pheromone mating disruption is applied as a mealybug preventative measure if the vineyard is at risk for infestations, as a treatment if the vineyard has low populations of mealybugs, or as a spread mitigation strategy if the vines are infected with leafroll virus and/or vitiviruses.	**YES = 1** **NO = 0**

*Trapping alone may be ineffective – close visual inspection is recommended.

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To apply integrated pest management for mealybugs, especially the invasive vine mealybug, since mealybugs can vector leafroll virus and vitiviruses.

Verification: Visual inspection of vineyard scouting/pest monitoring reports, pertinent vineyard and/or labor records for the above practices, and/or a map with any hotspots marked or a photo showing hotspot marking in the vineyard.

Resource:
Video - Vine Mealybug Biocontrol in Lodi Vineyards. 2020. youtube.com/watch?v=QF4hc1hS3-I

References (continued on the following page):
Bolton, SL. *What Every Winegrower Should Know: Viruses*. 2020. Lodi Winegrape Commission.

Daane, KM, Almeida, RPP, Bell, VA, Walker, JTS, Botton, M, Fallahzadeh, M, Mani, M, Miano, JL, Sforza, R, Walton, VM, and T Zaviezo. *Chapter 12: Biology and Management of Mealybugs in Vineyards*. In *Arthropod Management in Vineyards: Pests, Approaches, and Future Directions*. 2012. nature.berkeley.edu/almeidalab/wp-content/uploads/2015/11/Daane12.pdf

Daane, KM. "Managing Vine Mealybugs in Grapes." Presentation at Lodi Mealybug & Virus Outreach Meeting. 2019. youtube.com/watch?v=d4-1I84QB8I&t=2s

UC IPM. Vine Mealybug. ipm.ucanr.edu/agriculture/grape/vine-mealybug/#:~:text=Vine%20mealybugs%20are%20small%20(adult,margin%20and%20the%20posterior%20end). (Last Accessed 31May22)

6.29 Grapevine Virus Management Plan

***NEW* Standard**

The farming operation has a written and implemented **virus management plan** (for leafroll virus and red blotch virus, plus any other economically important viruses of concern – fanleaf virus, vitiviruses/sudden vine collapse, etc.) which includes training employees who work in the vineyard, staying informed, scouting, testing, mapping, vine removal, and prevention of spread to other vineyards, plus a plan review and update schedule.	**YES = 4**
	NO = 0

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To inventory virus management factors and to clearly state virus management goals, challenges, and strategies, including vineyard monitoring, which will serve as guidelines for the activities of the vineyard manager and his/her management team.

Verification: Visual inspection of the virus management plan which follows the template on the following page, including written supporting documents such as training records, vineyard monitoring records which specify the virus(es) of concern, written lab results, pictures of vine removal process if applicable, etc.

Resources/References:

Almeida, RPP, Daane, KM, Bell, VA, Blaisdell, GK,Cooper, ML, Herrbach, E, and Pietersen, G. Ecology and management of grapevine leafroll disease. 2013. *Frontiers in Microbiology*. frontiersin.org/articles/10.3389/fmicb.2013.00094/full

Bettiga, LA. *Grape Pest Management*, 2nd Ed. 2013. University of California Division of Agriculture and Natural Resources Publication 3343.

Bolton, SL. *What Every Winegrower Should Know: Viruses*. 2020. Lodi Winegrape Commission.

Fuchs, M. "Viruses." Presentation at Lodi Mealybug & Virus Outreach Meeting. 2019. youtube.com/watch?v=tqxuvej2WAY

Pietersen, G. "Grapevine leafroll disease." Presentation at Lodi Mealybug & Virus Outreach Meeting. 2019. youtube.com/watch?v=7yKLfJwx2lw

Grapevine Virus Management Plan Organization:

Identifying viruses of concern: It is crucial to understand which virus(es) the vineyard is at risk for and/or currently infected with in order to maximize the vineyard investment and to reduce the spread of virus. List the virus(es) by name and include the means of transmission (vectors, etc.) for each type. Estimate the current percentage of infection for each virus to the best of your ability.

Grapevine virus education: Indicate any virus-related trainings and write down how the farming operation stays informed about current grapevine viruses and their management, which may include attending seminars, reading articles and websites, or being a member of a group who meets regularly to discuss pest and disease issues.

Scouting, testing, mapping, rogueing (vine removal): List the farming operation's protocols for scouting the vineyard for virus symptoms, testing, mapping and rogueing/removing infected vines based upon the economic feasibility of the vineyard block. Include pertinent contact information and timing. Note that removal of virus inoculum is a best practice for viruses that are easily spread, but it may not be economically feasible or desirable in certain cases. Knowing where your infections exist is also important, and mapping can be as simple or as sophisticated as is economically feasible. Record keeping is crucial for virus management.

Preventative measures: State the measures in place to prevent new virus infections and/or to prevent the spread of current infections as much as possible. Especially in instances where there is no rogueing/removal of virus inoculum, vector management and mitigation of spread to neighboring vines and vineyards is crucial.

Rootstock and neighboring vineyard or regional susceptibility: Risk for certain viruses may increase based upon rootstock type or vineyard location. Note any risk factors and how these risks are being mitigated.

A plan review and update schedule.

6.30 Virus Status of Vineyard Block

***NEW* Standard**

A. A high (greater than 25%) percentage of the vineyard is estimated to have a transmissible virus infection (such as leafroll, vitiviruses, or in some regions, red blotch) based upon testing ***AND*** vectors are controlled to mitigate the spread to healthy vines and other vineyards until it is economically feasible to remove the infected vineyard.	**Take 3 points** and go to Standard **6.31** (Standard **6.30.1** is **N/A)**
B. A high (greater than 25%) percentage of the vineyard is estimated to have a transmissible virus infection (such as leafroll, vitiviruses, or in some regions, red blotch) based upon testing, but *no actions are taken to control the spread of vectors and viruses to healthy vines or other vineyards*.	**Take 0 points** and go to Standard **6.31** (Standard **6.30.1** is **N/A**)
C. The vineyard has a partial (less than 25%) or unknown percentage of transmissible virus infections (such as leafroll, vitiviruses, or in some regions, red blotch) ***OR*** appears not to be infected with transmissible viruses at the present time.	go to Standard **6.30.1**

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To estimate the grapevine virus status for transmissible viruses, which will inform the activities of the vineyard manager and his/her management team and the overall vineyard economics.

Verification: Visual inspection of written lab results for transmissible viruses, emails shared among management discussing virus presence, labor records/invoices for vector spread mitigation practices, and/or photos taken during rogueing/removal of infected vines.

Resources/References:

Almeida, RPP, Daane, KM, Bell, VA, Blaisdell, GK, Cooper, ML, Herrbach, E, and Pietersen, G. Ecology and management of grapevine leafroll disease. 2013. *Frontiers in Microbiology*. frontiersin.org/articles/10.3389/fmicb.2013.00094/full

Bettiga, LA. *Grape Pest Management*, 2nd Ed. 2013. University of California Division of Agriculture and Natural Resources Publication 3343.

Bolton, SL. *What Every Winegrower Should Know: Viruses*. 2020. Lodi Winegrape Commission.

Fuchs, M. "Viruses." Presentation at Lodi Mealybug & Virus Outreach Meeting. 2019. youtube.com/watch?v=tqxuvej2WAY

Pietersen, G. "Grapevine leafroll disease." Presentation at Lodi Mealybug & Virus Outreach Meeting. 2019. youtube.com/watch?v=7yKLfJwx2lw

6.30.1 Virus Management – Partially Infected, Unknown Virus Status, or Healthy Vineyard

***NEW* Standard**

Select all that apply:

6.30.1.1 Virus Management: Scouting The vineyard is scouted during the late summer/fall for symptoms of leafroll virus and red blotch virus such as reduced yield, leaf discoloration, and poor ripening.	**YES = 1** **NO = 0**
6.30.1.2 Virus Management: Testing ***At least once in the past three years***, the vineyard has been tested for the presence of economically important viruses of concern, including both leafroll and red blotch ***AND*** samples collected from healthy-appearing vines were included in the testing.	**YES = 1** **NO = 0**
6.30.1.3 Virus Management: Rogueing Vines Infected with Leafroll When vines test positive for leafroll virus, they are removed from the vineyard in well-irrigated soil as soon as is economically feasible ***AND*** vectors are controlled to mitigate the spread of virus to other vineyards until the vines can be removed.	**YES = 1** **NO = 0**
6.30.1.4 Virus Management: Rogueing Vines Infected with Red Blotch When vines test positive for red blotch virus and a vector is assumed present in the region, they are removed from the vineyard as soon as is economically feasible.	**YES = 1** **NO = 0**

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To mitigate the spread of transmissible viruses to maintain economic viability of the vineyard.

Verification: Visual inspection of virus scouting records, written lab results, emails shared among management discussing virus presence, labor records/invoices for vector spread mitigation practices, photos taken during rogueing/removal of infected vines, and/or invoices of purchases of replacement vines from a nursery.

Resources/References (continued on the following page):

Almeida, RPP, Daane, KM, Bell, VA, Blaisdell, GK, Cooper, ML, Herrbach, E, and Pietersen, G. Ecology and management of grapevine leafroll disease. 2013. *Frontiers in Microbiology*. frontiersin.org/articles/10.3389/fmicb.2013.00094/full

Bettiga, LA. *Grape Pest Management*, 2nd Ed. 2013. University of California Division of Agriculture and Natural Resources Publication 3343.

Bolton, SL. *What Every Winegrower Should Know: Viruses*. 2020. Lodi Winegrape Commission.

Fuchs, M. "Viruses." Presentation at Lodi Mealybug & Virus Outreach Meeting. 2019. youtube.com/watch?v=tqxuvej2WAY

Pietersen, G. "Grapevine leafroll disease." Presentation at Lodi Mealybug & Virus Outreach Meeting. 2019. youtube.com/watch?v=7yKLfJwx2lw

6.31 Replants

***NEW* Standard**

A. Any new vines planted or grafted to the vineyard ***during this certification year*** were/will be CDFA-certified (or similar) virus tested or otherwise tested for economically important viruses (both rootstock and scion) before planting/grafting ***AND*** they were/will be inspected upon arrival for pests, disease, and quality.	**3**
B. Any new vines planted or grafted to the vineyard ***during this certification year*** were/will be CDFA-certified (or similar) virus tested or otherwise tested for economically important viruses (both rootstock and scion) before planting/grafting ***OR*** they were/will be inspected upon arrival for pests, disease, and quality.	**1**
C. Any new vines planted or grafted to the vineyard ***during this certification year*** *were not/will not be CDFA-certified (or similar) or otherwise tested for economically important viruses nor were they/will they be inspected for pests, disease, or quality.*	**0**
D. No new vines were/will be planted or grafted to the vineyard ***during this certification year.***	**N/A**

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To mitigate the introduction of pests and diseases to maintain economic viability of the vineyard.

Verification: Visual inspection of written CDFA (or similar) certification documentation from the nursery (rootstock and scion), written lab tests (rootstock and scion) for economically important viruses, labor records and/or written protocol for inspection upon arrival of replants.

Resources/References:

Bolton, SL. "Nursery Ordering 101" in *What Every Winegrower Should Know: Viruses*. 2020. Lodi Winegrape Commission.

Stamp, J. "Planting Material." Presentation at Lodi Mealybug & Virus Outreach Meeting. 2019. youtube.com/watch?v=0gMd_tMObL4

Pietersen, G. "Grapevine leafroll disease." Presentation at Lodi Mealybug & Virus Outreach Meeting. 2019. youtube.com/watch?v=7yKLfJwx2lw

6.32 Neighborhood Pest and Disease Communication

***NEW* Standard**

The farming operation communicates with neighboring growers to the best of their ability about any transmissible pest and disease issues that may affect them - including powdery mildew resistance, vine mealybugs, and viruses ***OR*** if isolated, the farming operation communicates with other growers in their region about transmissible pest and disease issues.	**YES = 1**
	NO = 0

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To enhance efficiency and effectiveness of any pest and disease management programs.

Verification: Visual inspection of written communication records such as emails, texts, phone call logs, and/or pictures of neighborhood communication events.

Resources/References:

Almeida, RPP, Daane, KM, Bell, VA, Blaisdell, GK,Cooper, ML, Herrbach, E, and Pietersen, G. Ecology and management of grapevine leafroll disease. 2013. *Frontiers in Microbiology*. frontiersin.org/articles/10.3389/fmicb.2013.00094/full

Bettiga, LA. *Grape Pest Management*, 2nd Ed. 2013. University of California Division of Agriculture and Natural Resources Publication 3343.

Bolton, SL. *What Every Winegrower Should Know: Viruses*. 2020. Lodi Winegrape Commission.

Daane, KM. "Managing Vine Mealybugs in Grapes." Presentation at Lodi Mealybug & Virus Outreach Meeting. 2019. youtube.com/watch?v=d4-1I84QB8I&t=2s

Mahafee, W. "Here comes the mildew again: the challenges of managing powdery mildew in the era of fungicide resistance." Lodi Winegrape Commission Coffee Shop Blog. March 22, 2018. lodigrowers.com/here-comes-the-mildew-again-the-challenges-of-managing-powdery-mildew-in-the-era-of-fungicide-resistance/

Ohmart, CP, Storm, CP, and Matthiasson, SK (Eds.). *Lodi Winegrower's Workbook*, 2nd Ed. Lodi Winegrape Commission. 2008.

Pietersen, G. "Grapevine leafroll disease." Presentation at Lodi Mealybug & Virus Outreach Meeting. 2019. youtube.com/watch?v=7yKLfJwx2lw

6.33 Pesticide Risk Threshold

***NEW* Standard**

The farming operation meets the requirements of the pesticide risk threshold for LODI RULES certification.	**YES = 1**
	NO = 0

Companion Information

Scope: Individual vineyard management units submitted for **LODI RULES** certification.

Purpose: To formally include the pesticide risk threshold component of the **LODI RULES** certification program in the Standards.

Verification: Submission of pesticide application records with calculation of pesticide risk using the provided scoring system.

Resource: lodigrowers.com/standards