VIT TIPS

San Joaquin Valley Viticulture Newsletter

UC CE University of California Agriculture and Natural Resources Cooperative Extension

Spring 2017

Evaluation of Sprayable Pheromone for Vine Mealybug in Grapes

David Haviland, UCCE Kern County

Managing vine mealybug can be a difficult task for California grape growers. The high reproductive potential of this pest, coupled with short generation times and an affinity for feeding in the clusters makes the need for management essential. For several years mating disruption has been available in the form of passive dispensers that are hung on the vine, but adoption by the grape industry has been limited. However, a new flowable mating disruption system, where pheromone is mixed with water and applied to the foliage, provides new opportunities for growers.

The new mating disruption system is called Checkmate VMB-F and is produced by Suterra. Scientists have determined a way to microencapsulate vine mealybug pheromone into tiny micro-bubbles that can be mixed with water and sprayed to the foliage. Once on the leaves, pheromone passively dissipates out of the capsules into the vineyard. This results in thousands of tiny point-sources of pheromone that make it difficult for male vine mealybugs to find the real females. Delays or inhibition of mating result in less mealybug offspring.

Research Trials, 2016

Trials including Checkmate VMB-F were conducted in four table grape vineyards in Kern County during 2016. Each trial compared mealybug densities in ten acres using a standard chemical control program using Lorsban, Applaud, Admire and Movento to another ten acres using the same standard chemical control program plus mating disruption. In the mating disruption plots, pheromone was applied four to five times at monthly intervals beginning in late May through early September. Applications were made to every other row by the cooperating growers at a rate of 5 g. a.i./acre using 50 GPA of water for each application.

Pheromone trap data show that monthly applications of pheromone greatly inhibited the ability of male vine mealybugs to find pheromone traps. At the Bakersfield sites, the total male captures in mating…

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Pictured: An adult vine mealybug (Photo by UCANR)

Upcoming Events and Announcements

Hands-on Virus Diseases Identification and Management in the Vineyard Workshop

May 16, 2017

9:00am—1:00pm

UC Cooperative Extension Kern County

1031 South Mount Vernon Avenue,

Bakersfield, CA
No cost to attend

To register, please visit
http://ucanr.edu/grapevirus
or contact Ashraf El-kereamy (661-868-6226) for more information

Virus and Virus Vector Workshop

May 17, 2017

10:00am—2:00pm

Kearney Agricultural Research and Extension Center

9240 South Riverbend Avenue

Parlier, CA
No cost to attend

To register, please visit
http://ucanr.edu/sites/FPSevent/Virus_and_Vector_Work_Group_Fresno_County/
or contact George Zhuang (559-241-7506 or gzhuang@ucanr.edu) for more information

UC Davis Department of Viticulture and Enology presents:

Wine Flavor 101D: Varietal Focus

June 6, 2017

Located at the UC Davis Conference Center. Agenda and more information will be available at http://wineserver.ucdavis.edu

San Joaquin Valley Winegrowers Association & UC Cooperative Extension with CSWA support present:

The Annual Viticultural Research Roadshow

June 7, 2017

1:00pm—5:00pm

At the FEOC Nielsen Conference Center
3110 W. Nielsen (West of Marks)
Fresno, CA

To register for the Roadshow and for more information, please visit idrinkwine.net

Special Meeting for Grape Growers and Winery Operators in Mariposa, CA

June 8, 2017

For more information, please contact lmjordan@ucanr.edu

Save the Date for

Kearney Grape Day

August 8, 2017

Kearney Agricultural Research and Extension Center

9240 South Riverbend Avenue

Parlier, CA

Agenda and registration will be available soon.

Lindsay Jordan, Advisor for Madera, Merced, & Mariposa counties, is leaving UCCE in June

To all the readers of *Vit Tips*,

It has been an honor working for University of California Cooperative Extension, but it is with a heavy heart I must announce that I will be leaving UCCE. My last day will be on June 9, 2017. While I will no longer be acting as the editor of this newsletter, I know my colleagues and everyone at UCCE will continue to be a valuable source of science-based information to answer your questions and help keep viticulture in the Valley thriving. During my time here, I hope you have benefitted from the extension efforts of our UCCE viticulture advisor team in the San Joaquin Valley, including the creation of this newsletter.

It has been a privilege to meet and learn from the growers within Madera, Merced, and Mariposa counties and across the entire state of California. It has also been an honor to work with my fellow advisors, specialists, and faculty from UC ANR and beyond on the incredible viticulture research that they are conducting. I will be moving into the private sector of the grape and wine industry and truly hope to see many you in the future. I commonly use the phrase "don't be a stranger" and I truly mean it. I am so thankful for the experiences I have had and the people I have met in this position.

Thank you for giving me the chance to serve the viticulture community of the San Joaquin Valley and California.

Cheers,

Lindsay Jordan

Effects of Excessive Nitrogen in Table Grapes

Ashraf El-kereamy, UCCE Kern County

Nitrogen is one of the essential elements required for vine growth and development. Vine roots take up nitrogen in the form of nitrate or ammonium which is then assimilated into amino acids in the roots and shoots. Amino acids are the building blocks of proteins and enzymes involved in vine growth and development. Varieties vary in their nitrogen requirement based on their capability to assimilate and use the available nitrogen.

Despite the vital role of nitrogen in vine growth and fruit development, excess nitrogen may decrease vine productivity and negatively affect fruit quality. For example, excess nitrogen may stimulate excessive vegetative growth, resulting in a shaded canopy. Excessive canopy shade negatively affects flower bud initiation, resulting in lower bud fruitfulness the following season. The shaded canopy may also suffer from a high percentage of necrotic buds that will not grow the following spring, and thereby reduce vine productivity.

Further, a vigorous canopy may compete with fruit for sugars, negatively affecting fruit sugar accumulation and red color development. Blocking too much sunlight from the berries also inhibits anthocyanin and phenolic accumulation in red color varieties. Under these undesirable conditions, normal leaf removal around clusters may increase the risk of sunburn due to high nitrogen and low phenol level in the berries.

The microclimate of shaded canopies is typically more humid than a less shaded canopy and consequently the risk of fungal disease incidence is increased with shading. Excessively leafy canopies also reduce spray coverage and efficiency.

It is important to note that excess nitrogen has different effects on the vine, depending on the phenological stage. Excessive nitrogen at bloom could result in early bunch stem necrosis, especially in cool, wet weather, or excessive shattering resulting in inadequate berry set and almost empty loose clusters. Similar effects are associated with shaded clusters.

Confirmation of excessive nitrogen can be made through bloom petiole analysis, soil and water nitrate levels, and observations in the vineyard. Vineyards that suffer from excessive nitrogen have a higher percentage of flat canes by end of the season. Early in the spring, look at the bud break percentage and fruitfulness. During the season, excessive nitrogen could cause excessive shatter at bloom, lower anthocyanin accumulation and coloration at ripening.

Pictured: An example of a flat cane in a table grape vineyard, which can be a symptom of excessive nitrogen.
(Photo by Ashraf El-kereamy)

...Pheromone continued from Page 1

...disruption plots were 172 per trap from August through mid-November compared to 1966 per trap without mating disruption. This is a reduction in captures of 91.2%. Similar results were seen at the two Arvin sites, where captures over the same period of time were reduced by 90.8%. These reductions are increased to 93.1% at the Bakersfield sites and 92.2% at the Arvin sites if traps on the edges of the vineyards are excluded.

Efforts to evaluate the impact of reduced male captures are still underway. Evaluations of mealybug density under the bark in June and of mealybugs in clusters at the start of harvest (late Jun to Aug) did not reveal any differences among plots. However, this is not a surprise due to the limited amount of time available for mating disruption to have worked, coupled with the effects of insecticide programs used in the table grape vineyards. Most of the mating disruption in this trial occurred after harvest and impacts of that disruption will be evaluated during the upcoming 2017 season.

However, evidence does exist that mating disruption reduced mealybug densities on the vine. The grower cooperator of the Bakersfield sites reported that he did not see reductions in mealybug density at the start of harvest of his Scarlet Royals (when we did our evaluations), but that they did see reduced damage in the mating disruption plots by the time they got to their third pick in September (that we did not evaluate).

Additionally, during 2016 we conducted studies to evaluate the longevity of a single application of pheromone. Single applications were made to three different vineyards on 31 May, 2 July or 1 August. In all cases reductions in male captures occurred for periods of time greater than 100 days (data for the 2 July date are shown). We know that one application of microencapsulated pheromone does not disrupt mating for 100-day periods. The manufacturer reports that pheromone is released for approximately 30 days. This means that long-term reductions have to be due to reduced populations on the vine.

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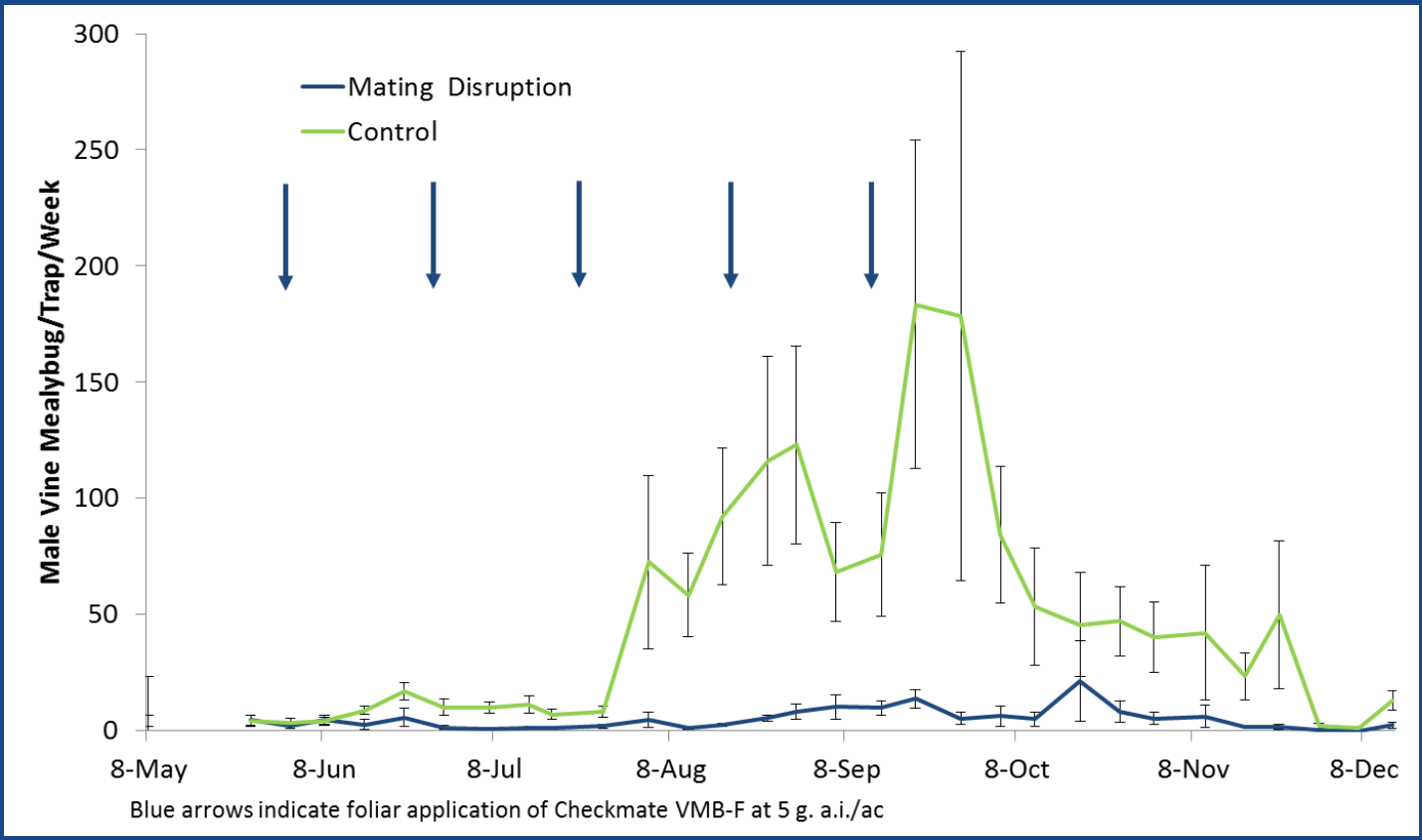
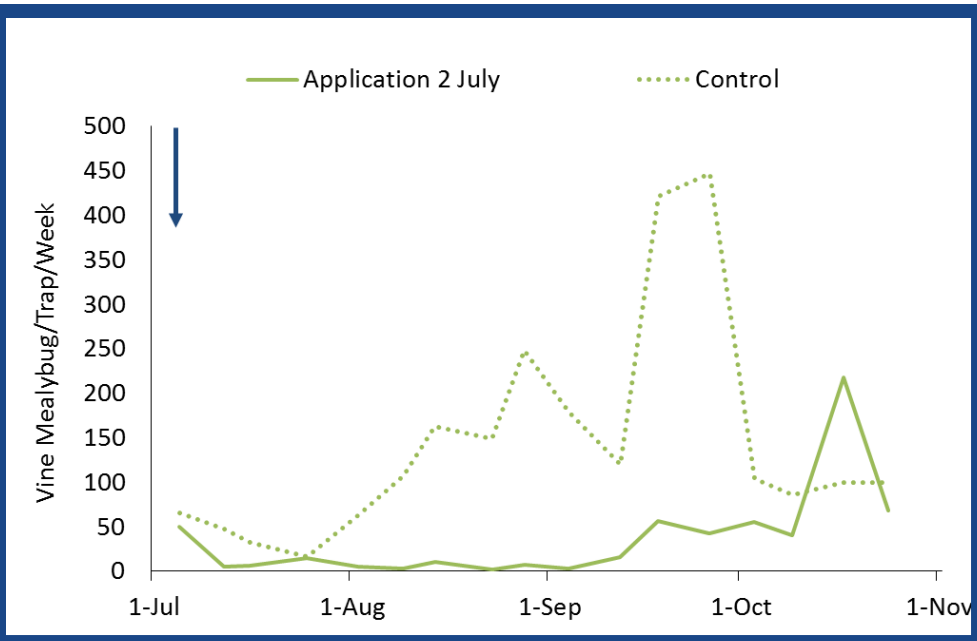


Pictured: The number of male vine mealybugs trapped when using multiple applications of Checkmate VMB-F compared to the experimental control.
(Figure by David Haviland, UCCE)



Pictured: The number of trapped male vine mealybugs when using one application of Checkmate VMB-F compared to the experimental control.
(Figure by David Haviland, UCCE)

...Pheromone continued from page 4
In other words, reductions in trapped males for one or two months after application were due to the inability of males to find traps, whereas reductions in males thereafter were because mating disruption reduced the overall mealybug population.

Use patterns and fit within an IPM program
The flowable formulation of mating disruption has several advantages in an integrated pest management program for vine mealybug. Applications can be made with existing equipment used by all grape growers. The active ingredient is exempt from tolerances such that there are no pre-harvest intervals, residues, or international maximum residue limits (MRLS) for exported fruit. Applications can be made as part of a tank mix with other insecticides or fungicides that do not contain products that are oil-based, emulsifiable concentrates (EC) or include organosilicone surfactants.

Mating disruption has no known impacts on natural enemies of vine mealybug or other grape pests. It is also priced at a level that allows flexibility. For example, each application of CheckMate VMB-F costs about 20% of the cost of the older dispenser-based system (CheckMate VMB-XL), such that growers can choose how many applications they want to make depending on pest density, harvest date and tolerance for damage. The only key disadvantage of the flowable formulation is that it is not OMRI-approved for organic production due to the microencapsulation process. Organic growers using mating disruption need to maintain the use of Checkmate VMB-XL at a rate of 250 dispensers per acre.

Studies in 2016 suggest that grape growers can use CheckMate VMB-F at the low end of the label rate (5 g. a.i./acre). Suterra recommends making applications every 30 days, though our data suggest that stretching that interval to 45 days is unlikely to compromise efficacy. Replicated field trials in 2017 are already underway to formally evaluate 30 vs. 45-day intervals. The window of timing when applications can be made in the Central Valley starts in late May. This timing can be confirmed by placing pheromone traps in the vineyard to monitor for male emergence. The end of the window for applications is at the beginning of October, approximately 30 to 40 days before male populations decline for the winter. Applications should be made in a water volume that avoids runoff so that all of the pheromone can remain in the vine canopy. Application costs can be minimized by applying pheromone as part of a tank mix. If pheromone is being sprayed by itself, growers can save money by making applications to both sides of every other row.

Acknowledgments
Research presented in this article was funded by table grape growers through the Consolidated Central Valley Table Grape Pest and Disease Control District with in-kind donations of traps and product by Suterra.

Resident Vegetation vs. Weeds: When Weeds are in Your Vineyard Cover Crop

Lindsay Jordan, Madera, Merced, & Mariposa Counties

Capitalizing on a wet winter, many cover crops established very well in San Joaquin Valley vineyards this year — it has not been uncommon to see stands of barley, mustard, and other species grow taller than 3 feet in vineyard interrows. A robust cover crop planting can offer many benefits to your vineyard site. Winter cereals can break up compaction with their fibrous root systems and legumes can fix nitrogen and contribute to vine nutrition. All cover crop plant species can be used to protect the soil surface from erosion and crusting, improve water infiltration, and provide structure-building organic matter to the soil when mowed or cultivated.

However, it has not only been intentionally seeded cover crops that took advantage of the available water. After a wet winter and warm spring temperatures, there has also been intense weed pressure in many fields. A cover crop can be managed to outcompete and shade-out early season weed pressure in vineyard interrows. In one recently mowed field, a vigorous barley cover crop successfully kept other competing weed species from establishing (Fig. 1). But sometimes, weeds can make an appearance within seeded cover crop stands, and other times, growers have allowed weeds, or more politely termed "resident vegetation," to emerge. In one vineyard (Fig. 2), some rows were seeded with barley this winter (bottom), while others were seeded in the previous year and allowed to naturally reseed and emerge this season (top). The biggest difference between the two cover crop stands was the presence of weeds. In the self-reseeded stand, at least 25-50% of the rows were actually covered by species other than the barley, most predominately filarees (*Erodium* spp.) and cheeseweed (*Malva parviflora*).

After a wet winter, there were many vineyard floor covers of resident vegetation, comprised mostly of winter annuals that covered vineyard interrows uniformly, behaving much like a seeded cover crop mix. In both cases of resident vegetation cover or a resident vegetation/cover crop mix, traditionally "weedy" species contributed to the role of vineyard floor cover. If mowed and/or incorporated, those weeds will contribute organic matter to the soil and help build soil structure just like that of a seeded cover crop species or mix. Resident vegetation offers some of the same soil building benefits, but at a significant cost savings compared to a seeded cover crop.

As a farm advisor, I was asked the question several times this season – does it matter if the vineyard floor cover is resident vegetation versus a seeded cover crop?

The risks of allowing resident vegetation to establish must be weighed against the saved expense in time and materials not only for the current season, but for your vineyard floor management in years to come. Consider the following for when a stand of resident vegetation can instead turn into an aggressive weed infestation:

- **Some species of weeds will always be undesirable.**
  There are some species of plants that will never be an innocuous part of a cover crop mix. Species like yellow starthistle (*Centaurea solstitialis*) or stinging and burning nettles can pose a risk to worker safety and any herbicide resistant weeds, like the glyphosate resistant horseweed (*Conyza canadensis*) that appear in San Joaquin Valley vineyards, pose a large risk to future vineyard…

...Weeds continued on Page 7

Pictured: Figure 1. A barley cover crop successfully suppressed weed species (Photo by Lindsay Jordan, UCCE)

Pictured: Figure 2. Rows were either seeded barley this winter (bottom), or seeded with barley in 2014 and allowed to naturally reseed and emerge this season (top) which also allowed for the emergence of resident vegetation species.
(Photos by Lindsay Jordan, UCCE)

...Weeds continued from page 6
production operations. Some weed species should not be tolerated as part of a cover crop mix.

- ***Weed species may spread.***
  Weed species that are intentionally allowed in the vineyard interrows may not stay confined to that area. If they spread to the under-vine rows or other parts of the vineyard, additional weed control may be required that season.

- ***Weeds are contributing to the seed bank.***
  Some weed species may have gone to seed by the time you mow or cultivate your vineyard floor cover. Those seeds are now permanently added to your seed bank and may subsequently affect future years' weed pressure.

- ***Weeds may compete with vines.***
  You cannot select which resident vegetation species will establish in your vineyard. Purchasing cover crop seed allows for a grower to time the vineyard floor management according to the cover crops known lifecycle, so that it complements the cropping production system. There is no guarantee your weed species will not be actively growing and compete with vines for water and/or nutrients during critical times of the growing season.

Ultimately to judge when resident vegetation has morphed into a deleterious weed population, you need to know exactly which resident vegetation species are present and their stage of growth. Proper identification of weed species within a specific field site is critical before letting resident vegetation species mature with (or instead of) a cover crop. Once the risks for your specific weed population at a vineyard site are understood, you can consider whether the use of a resident vegetation cover can be incorporated into your vineyard floor management.

This article was originally published on the UC Weed Blog, http://ucanr.edu/blogs/ucdweedscience/

Wet Spring Fungal Diseases

Allison Ferry-Abee, UCCE Tulare and Kings Counties

After a historically rainy winter and some spring rain, we are already seeing extra disease pressure this year. Phomopsis is showing up in areas where it has not been seen in years, and if rain continues, it is possible to see botrytis on shoots. It will be especially important to protect vines from botrytis during bloom. Here are some guidelines to help you keep disease under control.

Phomopsis

Symptoms and Disease Cycle

Phomopsis cane and leaf spot is caused by the fungus *Phomopsis viticola*. Phomopsis initially appears as tiny dark spots with yellow margins on leaf blades, veins, and shoots. Symptoms will appear 3 to 4 weeks after rain. It develops when shoots are between one and ten inches. Infected leaves will become distorted as they age and never develop to full size. Infections on shoots often crack and can cause a scabby appearance. Moderate to severe infections can reduce cluster counts and cluster weight. Spores are released from previous years' diseased canes after warm spring rains. Moisture is required for infection, and the disease becomes inactive during hot dry weather. In some cases, the disease can become active again after rain in the fall, causing light brown spots on berries and berry shrivel.

Most Susceptible Cultivars for Phomopsis:

Raisin: DOVine, Fiesta, Thompson Seedless
Table: Flame Seedless, Red Globe
Wine: Grenache

Control

Once shoots emerge, if extended rain is predicted, apply a fungicide with systemic activity prior to the rain event. Even if some of the active ingredient is washed off, some will still remain. Make sure to use a spreader/sticker if recommended by the manufacturer. Contact fungicides can also be effective if they are reapplied after rain. Visit the UC IPM website to see current fungicide recommendations. Unless a vineyard has a history of phomopsis, use the lowest application rate on the label.

Botrytis

Symptoms and Disease Cycle

Botrytis, caused by the fungus *Botrytis cinerea*, commonly causes fruit rot in the San Joaquin Valley. However, during wet springs, it can also cause infections in shoots and flower clusters. Infections almost always begin at leaf, stem and bud axils—water pools in the axil for long periods, creating an optimal environment for botrytis. Botrytis most commonly overwinters on infected clusters from the previous season. You can scout for early season botrytis by looking for flagging shoot tips.

Control

As with phomopsis control, if extended rain is predicted, apply a fungicide with systemic activity prior to the rain event. Contact fungicides can also be effective if they are reapplied after rain. *It is most critical to protect shoots from botrytis during bloom.* For a full list of effective fungicides, see http://www.ipm.ucdavis.edu/PMG/r302100111.html. Always follow label rates, application methods and recommendations when applying fungicides. Rotate modes of action of fungicides to prevent fungal resistance.

Pictured: Phomopsis infection on a cane (left) and botrytis shoot tip infection (right). (Photos by OMAFRA and J.K. Clark)

Effects of Node Position and Cane Length on Yield Components

Matthew Fidelibus, UC Davis Dept. of Viticulture and Enology

Over the past two decades, dry-on-vine (DOV) has become an increasingly important raisin production method. As currently practiced, vines in DOV vineyards are cane-pruned, and canes bearing mature fruit are severed to initiate the drying process, which can take six weeks or longer to complete. Because of the extended drying time, 'Thompson Seedless', which is still California's most important raisin grape, is poorly suited for DOV. Therefore, DOV vineyards are generally planted to newer varieties such as 'DOVine', 'Fiesta', or 'Selma Pete', which ripen earlier than 'Thompson Seedless' and are thus better suited for DOV.

'Thompson Seedless' vines are generally cane pruned because the basal nodes of their canes are less fruitful than nodes near the middle of the cane. The fruitfulness of shoots from specific node positions has not been determined for any of the newer raisin cultivars, but differences in the proportion of clusters produced in the "head of the vine"—on shoots from spurs and the basal nodes of canes—suggest that the fruitfulness of nodes at different positions may vary according to cultivar. Low basal bud fertility is desirable in cane-pruned DOV varieties because canes are generally severed at or above the third or fourth node, so any fruit on shoots emerging from the first several nodes will not DOV.

It is undesirable to have any fresh grapes in the head of the vine at harvest time, as their accidental harvest may elevate raisin moisture content and contribute to spoilage. Some growers with open gable (Y-shaped) trellises have found that fresh "head fruit" can be economically harvested and dried on trays in the row middles, but growers with overhead arbor trellises cannot dry the fruit on the vineyard floor, since the entire vineyard is shaded. Thus, many growers with overhead trellises strip flower clusters, or even shoots, from nodes between the base of the cane and the first foliage catch wire, the outer edge of the machine-harvestable area. The number of nodes that are stripped varies according to the internode length of the canes, and the training system and trellis design in the vineyard. For example, the arms on vines trained to a single head are generally located close to the trunk, near the center of the vine row, so canes from such arms have to span a relatively long distance to reach the first foliage catch wire, whereas, canes from cordons or split heads, which are generally established in closer proximity to the catch wires, may not need to travel far before reaching the wires. That's why, on overhead arbor systems, it is not uncommon for the first five to twelve nodes to be located between the vine and the first trellis wire and thus potentially not contribute to raisin yield.

Thus, growers with overhead arbor trellises commonly leave extra-long canes having 20 or more primary nodes, with or without lateral shoots. L. Peter Christensen showed that nodes five through eight, on 12-node canes, were the most fruitful, and Winkler, in the classic book "General Viticulture" suggested that retaining more than 15 nodes on a 'Thompson Seedless' cane may reduce the proportion of buds that break. However, there is little information on the relationship between node position and fruitfulness on very long canes, perhaps because older trellis systems were generally smaller than those used today, especially compared to modern DOV trellises, and so there was little need for exceptionally long canes.

Growers with open gable trellis systems generally do not have the option to retain particularly long canes because the shoots on such trellises are regularly trimmed during the growing season to enable equipment to pass, and that practice limits the length of most canes. Limited cane length could be one reason why gable trellises tend to be less productive than overhead arbor trellises, though the data needed to support that hypothesis are lacking. However, it should be noted that open gable trellises do not have as much non harvestable fruit in the basal region of canes as overheard arbor trellises do, since the harvesters used on open gable trellises can access more of the potential crop.

Relationships between cane length, node position, and productivity have not been established for the current raisin grape varieties used for DOV, or for the long canes used on modern DOV systems. However, such data would be very helpful in making training and pruning recommendations for growers. Therefore, I recently characterized and compared the emergence and fruitfulness of shoots from different node positions on canes from 'DOVine', 'Fiesta', and 'Selma Pete'...

...Node continued on page 10

...Node continued from Page 9

grapevines to a traditional variety 'Thompson Seedless'.

Shoot emergence from the first few basal nodes was observed to be relatively low for most varieties, and increased with node position up to about position 10, with most of the nodes beyond position ten producing shoots. In general, shorter canes had slightly more uniform bud break, especially from nodes near the tip of the canes. Nodes nearer the base of canes produced the fewest clusters partly due to reduced budbreak, but also due to lower fruitfulness of the shoots that did emerge from those nodes. 'Fiesta' had the most fruitful nodes, followed by 'Selma Pete.' Thompson Seedless and DOVine produced the fewest clusters per node. Cluster weights generally increased with node position, regardless of cane length, but 15-node canes generally had heavier clusters than 20-node canes at most node positions, except for Selma Pete and Thompson Seedless. Berries from clusters on short canes had similar or greater soluble solids than berries from clusters on long canes at a given node position. Regardless of cane length, soluble solids generally decreased with node position in both years. The strong effects of node position on soluble solids and cluster weights are important factors to consider when taking berry samples to determine when to initiate drying, as clusters on shoots from the apical portion of canes are bearing a heavier crop of fruit with potentially lower ripeness, than clusters from shoots arising from the basal part of canes.

Because percent bud break, fruitfulness, and cluster weights all increased with node position, particularly for 'Selma Pete', I hypothesized that distributing the same number of nodes over longer canes might result in a greater proportion of nodes having higher productivity compared to the same number of nodes distributed over shorter canes. Thus a second study was conducted, in which the productivity of 'Selma Pete' grapevines on an open gable trellis having 120 nodes distributed on either eight, 15-node canes, or six, 20-node canes, was compared. Cane length did not significantly affect overall soluble solids in either year of the two years of the study, but in one year, vines having fewer longer canes were more productive than vines having more, shorter canes. Thus, the raisin data suggests that leaving fewer, longer canes was as or more productive than leaving more, shorter canes, but it must be recognized that other factors, such as cane selection, can profoundly affect productivity. For example, canes that grew in full sun tend to have better budbreak and higher fruitfulness than canes which developed in the shade, and the need to retain a large number of canes to meet a desired budcount might require selecting some less desirable canes.

Pictured: Node position and cane length affect yield components of grapes, including budbreak, cluster weight, and soluble solids.
(Photo by Matthew Fidelibus, UC Davis, Dept. of V&E)

Viticulture Resources

- Vit Tips Newsletters (Archived): http://ucanr.edu/sites/viticulture-fresno/newsletters_819/
- UC IPM: http://ipm.ucanr.edu
- Powdery Mildew Risk Assessment Index Weather Stations and information: http://ipm.ucanr.edu/calludt.cgi/GRAPEPMVIEW1
- UC Davis Dept. of Viticulture and Enology: http://wineserver.ucdavis.edu
- UC Weed Research and Information Center: http://wric.ucdavis.edu
- UC Agricultural Cost Studies: https://coststudies.ucdavis.edu/
- Foundation Plant Services: http://fpms.ucdavis.edu
- National Grape Registry: http://ngr.ucdavis.edu
- UC ANR Catalog of Publications: http://anrcatalog.ucanr.edu/

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Contact your local viticulture advisor or UCCE county office to be added to the e-mailing list or if you wish to receive a mailed copy.

Contact Us

Questions? Concerns? Follow up? Please feel free to contact us.

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