Field Notes
San Joaquin County
February 2021

University of California
Agriculture and Natural Resources

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Meet the New Advisor

My name is José Luiz Dias and I have recently joined the UC Cooperative Extension team as the Agronomy and Weed Management Advisor serving Merced, Stanislaus, and San Joaquin counties. The primary crops I will be working with include corn, alfalfa, cotton, dry beans, and small grains.

Background

I am originally from Brazil, and I got my bachelor's degree in Agronomy. In 2011, I had an opportunity to come to the U.S. to do an internship at the Range Cattle Research and Education Center – University of Florida (RCREC-UF), to work with weed science in pasture and rangelands systems. During my time at the RCREC, I was exposed to several different weed science-related projects, which really sparked in me the passion to work with weeds. In 2013, I obtained my master's degree in Crop Protection-weed science, where I worked with sugarcane herbicide tolerance to soil-applied residual herbicides. I continued my education earning a Ph.D. in 2019 from the University of Florida in agronomy-weed science.

During my Ph.D. I studied how to implement integrated management practices to control giant smutgrass (*Sporobolus indicus* (L.) var. *pyramidalis*) populations in bahiagrass (*Paspalum notatum*) pastures in Florida. We investigated the efficacy of integrating prescribed burning, grazing management, and hexazinone applications for giant smutgrass control; the effectiveness of integrating physical control methods such as mowing with chemical control measures (glyphosate and hexazinone) applied with a weed wiper; and the effects of application time, hexazinone rate, and rainfall (time and intensity after application) on hexazinone effectiveness. After graduation, I was a post-doc at the University of Wisconsin – Madison for about one year. During my time in Wisconsin, I had the opportunity to work with agronomy and weed science applied research in different cropping systems such as alfalfa, silage corn and cool season grass-clover mixed swards.

Working with UC Cooperative Extension

As a UCCE advisor, I plan to work closely with the growers, consultants, and industry personnel to develop applied research and extension activities in the Northern SJV. Since I have a weed science background, I am very interested in developing applied tools and management practices to deal with present and likely-future weed management issues. Weed biology, ecology, integrated weed management strategies and herbicide resistance (HR) are some of the main weed science topics where I am interested in developing educational and research projects. Additional weed science topics that I am interested in include herbicide efficacy, crop safety, herbicide environmental fate, precision agriculture, and remote sensing. Furthermore, I am also planning to address other agronomic needs such as variety performance trials, nutrient and soil fertility management, soil salinity, water use-efficiency and integrated pest management.

Do you think you have herbicide resistant weed populations in your field?
Are you struggling with weed management and believe you might be dealing with herbicide resistant weeds on your farm? If so, please feel free to contact me! I would really enjoy scheduling a time to meet at your farm to talk about the issue and collect some seeds.

Possible collaborator for a 2021 safflower herbicide safety trial.
Are you planning to plant safflower in 2021? If you would like to know more details about this project and/or know someone that might be interested in collaborating with us, please contact me. The UCCE Merced mainline is 209-385-7403.

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Helping me to help you

An extension program can only be effective and deliver meaningful results if we work together with industry and growers. Please help me help you by sharing what you think are the most significant problems facing field crops in Merced, Stanislaus, and San Joaquin counties.

Feel free to call me at the Merced County office (209) 385-7403, or email me at jdias@ucanr.edu. I would really enjoy scheduling a time to meet at your farm to talk about issues that are impacting your production system, as well as your thoughts on possible future crop production and research challenges.

Thank you very much, and happy 2021!

José Luiz Carvalho de Souza Dias, Agronomy and Weed Management Advisor, Merced, Stanislaus, and San Joaquin counties

Herbicide Trial in Delta Drill-Seeded Rice

Weeds are important pests of California rice systems, and weed management can account for roughly 17 percent of total operating costs (Espino et al., 2016). Integrated weed management uses cultural and chemical practices where herbicides are important tools. Certain conditions in California rice production systems, however, increase the likelihood of developing herbicide resistance. Herbicide resistance is the ability of certain weed biotypes to survive certain herbicide treatments when the weed species is usually killed by that herbicide (Al-Khatib et al., 2019). Such conditions include, but are not limited to, lack of crop rotation, the efficacy of certain herbicides on certain weeds causing them to get frequently used, and not having diverse chemistries available.

In 2019 and 2020, trials were conducted to evaluate the efficacy of a new herbicide product called Loyant (florpyrauxifen-benzyl; group 4 herbicide; Corteva Agriscience) in drill-seeded rice in the Delta region. Loyant is registered in rice growing states in the southern US but would be a new chemistry in California. Corteva Agriscience expects to have CA registration in 2021. The objective of the trials, by assessing different rates and treatment combinations, was to understand the efficacy and crop tolerance of Loyant for weed control in drill-seeded rice in California. This article will describe select results of the 2020 trial. Treatments are listed in Table 1. Complete information from both years is available from my website (https://ucanr.edu/sites/deltacrops/Rice/).

Crop injury

We made crop injury observations and weed counts on 7-day intervals for about two months following treatment. We observed tip burning in several of the treatments, but the symptoms were no longer apparent by 21 days after treatment (DAT). We observed leaf curling in the Loyant treatments until about 56 DAT. Corteva Agriscience has observed this symptom with Loyant in other trials where environmental stressors impact crop health, such as extreme cold or heat, drought, or poor fertility. We observed this symptom on the side of the plots closest to the field edge. We observed no stunting, stand reduction, or differences in heading with any treatments.

Table 1. Herbicide treatments in the 2020 trial. The rice (variety M.206) was drilled on April 13th. Treatments were applied on May 8th, when the rice was approximately at the 3rd leaf stage. The permanent flood was established within a few days after treatment.

Materials	Rate (unit of product/ acre)	Herbicide Program denoted as
Loyant, Prowl H2O, MSO	1.37 pints, 5.5 pints, 0.5 pints	Loyant
Loyant, Clincher, Prowl H2O, MSO	1.37 pints, 15 fluid ounces, 5.5 pints, 0.5 pints	Loyant/ Clincher
Loyant, Granite SC, Prowl H2O, MSO	1.37 pints, 2.8 fluid ounces, 5.5 pints, 0.5 pints	Loyant/ Granite
Loyant, RebelEX CA, Prowl H2O,	1.37 pints, 20 fluid ounces, 5.5 pints, 0.5 pints	Loyant/ RebelEX
Regiment, Sandea, Prowl H2O, SuperWham, MSO,	0.2 ounces, 0.8 ounces, 5.5 pints, 6 quarts, 16 fluid ounces, 2 gallons/100 gal	Grower standard
Prowl H2O	5.5 pints	Prowl
Loyant, Prowl H2O, SuperWham,	1.37 pints, 5.5 pints, 6 quarts, 16 fluid ounces	Loyant/ SuperWham

Weed control

Overall weed pressure was relatively low, with about one weed per square foot in an untreated strip next to the trial. The prominent weeds in the field were *Echinochloa* species (i.e. watergrass, barnyardgrass; Figure 1). We did not have a completely untreated control but instead considered the pre-emergent only treatment (i.e. Prowl) the control. There was a trend for the Prowl treatment to have the highest weed counts. The treatments that had the best weed control were the grower standard and Loyant/ SuperWham herbicde programs (Table 2 on next page).

Figure 1. Predominant weeds in the trial were watergrass and barnyardgrass.

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Table 2. Weed counts on 7-day intervals from 14 DAT to 42 DAT. Data represent total number of weeds in the 400-ft2 plot and are the means across four replicates.

Herbicide Program	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT
Loyant	3	5	2ab	3 ab	4 c
Loyant/Clincher	2	3	1ab	3 ab	5 bc
Loyant/Granite	4	3	1 b	9 ab	15 ab
Loyant/RebelEX	2	3	1ab	4 ab	9 abc
Grower standard	1	1	1 b	2 b	4 c
Prowl	3	0	8a	15 a	21 a
Loyant/SuperWham	1	2	1 b	2 b	3 c
Average	2	2	2	5	9
Coefficient of Variation (%)	113	74	154	119	95
Significance of treatment effect (P value)	0.1757	0.2314	0.0191	0.0085	0.0011

Yield

We found no differences in yield, but there was a trend for the grower standard and the Loyant/SuperWham herbicide programs to have slightly higher yields (Table 3). Measured yields were uncharacteristically high for the region. Our explanation of the data is that we hand-harvested in the early morning hours when there was a heavy dew, and this likely inflated the weights. There was, however, low variability across the plots, which suggests that our results are a robust comparison of the treatments.

Table 3. Yield adjusted to 14 percent moisture. The trial was hand-harvested on Sept. 29, measuring one 10.8-ft2 (1-m2) quadrat per plot.

Herbicide Program (Treatment)	Yield (lbs/ac)
Loyant	12575
Loyant/Clincher	12431
Loyant/Granite	13064
Loyant/RebelEX	12210
Grower standard	13438
Prowl	12335
Loyant/SuperWham	13534
Average	12798
Coefficient of Variation (%)	8
Significance of treatment effect (P value)	0.3755

Conclusions

The purpose of the trial was to learn the efficacy and crop tolerance of Loyant (florpyrauxifen-benzyl) for weed control in California drill-seeded rice. We observed Loyant to have good activity on watergrass and barnyardgrass, which were the predominant weeds in the trial. We observed Loyant treatments to have similarly low weed counts compared to the grower standard, and a Loyant/SuperWham herbicide program appears to provide comparable weed control to the grower standard under this composition of weeds. Tank mixes may be needed when a broader array of weeds are present. The results demonstrate that Loyant could be used in drill-seeded rice herbicide programs, providing a different chemistry for herbicide resistance management.

The aforementioned information on products and practices is for educational purposes only and does not constitute an endorsement or recommendation by the University of California.

Michelle Leinfelder-Miles, Delta Farm Advisor

Warm-season Legume Cover Cropping in the Delta

In 2020, we completed a three-year on-farm trial in the Delta to evaluate warm-season legume cover cropping between winter small grain forage crops. Cover cropping is a management practice identified in the Healthy Soils Program of the California Department of Food and Agriculture as having the potential to improve soil health, sequester carbon, and reduce greenhouse gas emissions. Our objectives were to evaluate summer cover cropping for its potential to improve soil tilth at a time of year when the soil would usually be fallowed and dry with no soil cover, and to better understand the agronomic practices that might make summer cover cropping more feasible for Delta farmers. This article summarizes select results from the trial. A detailed report is available on the Delta Crops website (https://ucanr.edu/sites/deltacrops/files/344794.pdf).

The trial took place over 4.5 acres of a commercial field, and we compared a cowpea (cultivar 'Red Ripper') cover crop treatment (CC) to fallow soil (No CC). The cultural practices varied across years (Table 1 on the next page). Irrigation was only applied to the cover crop plots. In 2020, we estimated that five inches of irrigation was applied to the cover crop, using surface water with moderately low salinity (seasonal EC_w of 0.5 dS/m).

We soil sampled twice per year. The first sampling occurred following triticale harvest but prior to tillage and cover crop planting. The second occurred at the end of the cover crop season immediately prior to cover crop termination. Soil was samples from 0-6, 6-12, 12-24, and 24-36 inch

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Table 1. Agronomic practices during the three-year study.

Year	Pre-Season Sampling Date	Cover Crop Planting Date	End-of-Season Sampling Date	Cowpea Seeding Rate (lb/ac)	Irrigation Method
2018	July 2nd	July 30th	October 23rd	51	Furrow/Flood
2019	June 6th	July 15th	September 13th	56	Sprinklers
2020	May 14th	May 29th	July 29th	50	Sprinklers

depths. We evaluated bulk density, salinity (electrical conductivity, EC_e), pH, total nitrogen (N), and total carbon (C). Additionally, in-situ water infiltration was measured at the conclusion of the project (i.e. prior to 2020 cover crop termination). We hand-harvested cover crop biomass, separated it into cultivated cowpeas, volunteer small grains, and weeds and analyzed each component for total C and N. We hand-harvested triticale forage in 2019 and 2020.

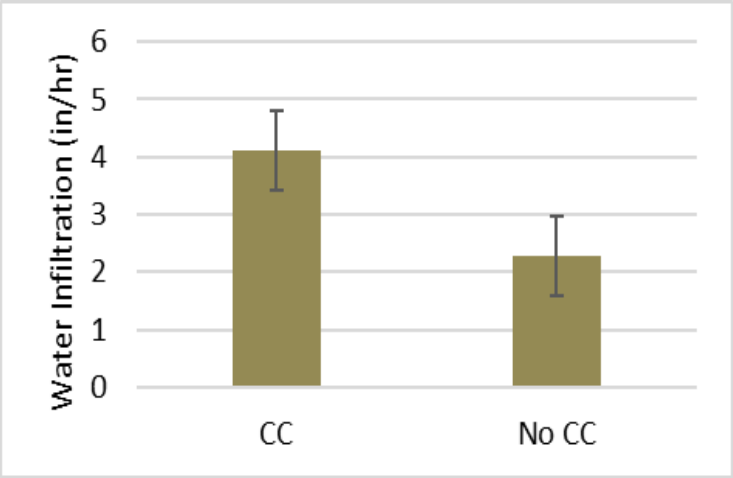

Figure 1A. Three years of cover cropping improved water infiltration (P=0.0198) compared to the standard dry fallow. The error bars represent the standard errors.

Soil properties

After three years of cover cropping, we did not observe improvements in total N or bulk density from cover cropping, and our statistical analysis indicated that total C was impacted by plot location. This indicates that an inherent soil characteristic, like texture, was having more of an impact on total C than the cover crop treatment. We observed better water infiltration in the CC plots (Figure 1A and 1B). Cover crop roots likely contributed to better soil structure and water conductance. We also observed lower salinity and higher (i.e. less acidic) pH in the CC plots. Root zone salinity (0-36 in) averaged 1.4 dS/m in the CC plots and 2.2 dS/m in the No CC plots. Root zone pH averaged 5.7 in the CC plots and 5.5 in the No CC
plots. These results suggest that cover cropping can improve certain soil characteristics, particularly those relat ed to soil-water status, on a relatively short timeframe. Changes in nutrients and C storage, however, are less likely to be observed following short-term changes in management.

Cover crop stand

Cover crop composition varied over the course of the study and was likely impacted by cultural practices, like planting and irrigation methods. While cowpea was the only seed planted, the stand was a mix of cowpea, volunteer wheat/triticale, and weeds. We observed that the 2020 practices and timing of operations resulted in the least amount of weed growth (Figure 2 on next page) and seed heading.

Figure 1B. The photo illustrates how there were visible differences between treatments, even after triticale forage harvest and uniform tillage operations. No CC soil was a fine powder (bottom of the photo); whereas, CC soil was observed to have better aggregation. The grower observed differences in subsequently-planted small grains, with seedlings in the CC plots emerging about five days earlier than seedlings in the No CC plots.

Triticale forage yield

Despite certain soil health benefits, cover cropping did not improve triticale forage yield. The No CC treatment yielded higher than the CC treatment across both years (Figure 3 on the next page). The CC plots yielded below the two-year field average of 5.5 tons per acre, and the No CC treatment yielded above the field average yield. Given the improved soil-water, pH, and salinity conditions in the CC treatment, the yield result is difficult to explain, but machine harvesting over a larger area might lessen the difference between treatments.

Summary

In our three-year study, cover cropping had no effect on total N, bulk density, and total C, but water infiltration, salinity, and pH were improved. Triticale forage (i.e. cash crop) yield did not improve as a result of cover cropping, however. Cowpea stand establishment and volunteer grain and weed competition were the biggest challenges to

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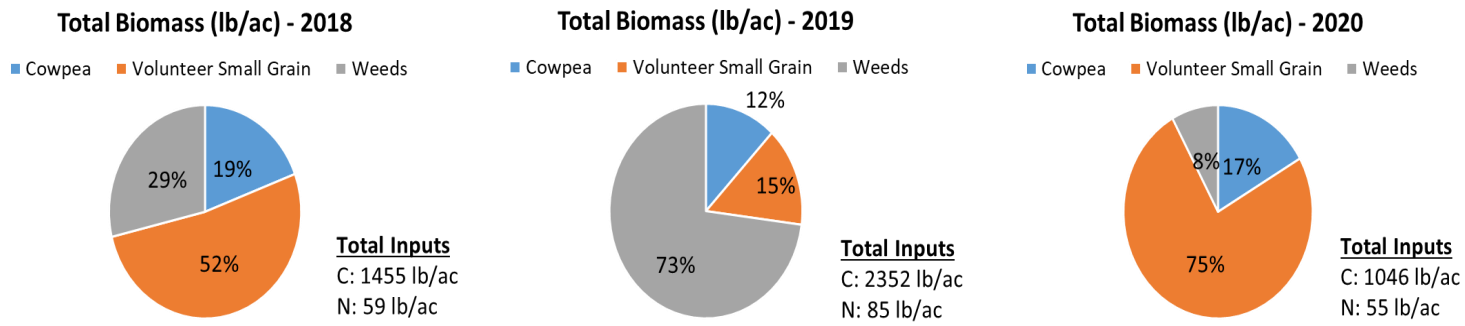

Figure 2. Proportion of cowpeas, small grains, and weeds in total cove crop biomass, and total C and N inputs from the cover crop.

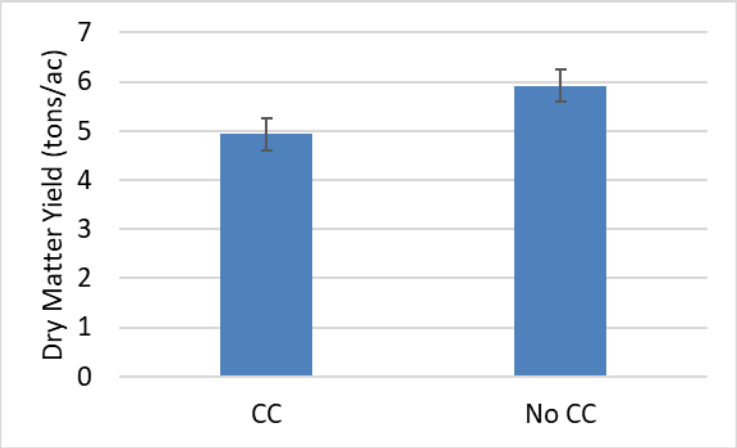

Figure 3. Triticale forage yield as tons of dry matter per acre. The No CC treatments yielded higher than the CC treatments across both years (2019-2020) (P=0.0059).

growing a summer cover crop at this site, but earlier planting and termination reduced the weed pressure. Despite these challenges, the grower observed better soil aggregation in areas of the field where the cover crop had grown. Overall, the potential benefits of cover-cropping may not be realized in the first few cover crop cycles, which could hinder long-term adoption. Results may also depend on the cover crop biomass obtained and other site-specific factors. While scientific studies have demonstrated soil health and cash crop yield improvements with cover cropping, more long-term studies are needed in California to demonstrate how these benefits can be realized.

Acknowledgments

This project was supported by the California Climate Investments program. We thank Dawit Zeleke, Morgan Johnson, and Jerred Dixon of Conservation Farms and Ranches for hosting the trial. We thank Tom Johnson of Kamprath Seed and Margaret Smither-Kopperl and Va lerie Bullard of the NRCS PMC for information and advice on cover cropping.

Michelle Leinfelder-Miles, Delta Farm Advisor
Brenna Aegerter, Vegetable Crops Farm Advisor

Verticillium Wilt vs. Freeze Damage of Super High Density Oil Olive

Over the last three years, we have received several calls from olive growers in San Joaquin County reporting issues of olive trees with declining symptoms, including branch wilt and dieback. In some cases, we suspected autumn frost to be the major cause of decline. In other situations, we confirmed trees were affected by Verticillium wilt. Nevertheless, diagnosis has been challenging overall due to the strong overlap of Verticillium wilt symptoms with those of frost injury. Recently, we conducted a survey of olive orchards with trees showing decline to get a closer look at the various symptoms. This article provides field observations and detailed symptom descriptions to help growers improve field diagnosis of Verticillium wilt vs. freeze damage in olive trees.

What is Verticillium wilt of olive?

Caused by the soilborne fungus *Verticillium dahliae* Kleb, Verticillium wilt of olive is considered one of the most important diseases of olive trees worldwide. The disease may kill trees and is difficult to control. The fungus is found throughout California's Central Valley, affecting numerous species of woody and herbaceous plants in all soil types. In general, *V. dahliae* is categorized into two pathotypes, namely the defoliating and non-defoliating pathotypes which are different in their virulence.

Symptoms and disease development

On trees affected by isolates that belong to the non-defoliating pathotype, leaves first become chlorotic (leaf yellowing), and then turn light-brown while remaining attached to branches. Symptoms usually begin in spring and slowly worsen in the early summer. Ultimately, a rapid dieback and wilting of twigs and branches takes place, especially in young trees. The bark of affected shoots may become reddish-brown. *Verticillium dahliae* invades and colonizes the plant's vascular system, and then infected xylem tissue becomes clogged due to fungal materials (conidial spores produced by the pathogen are translocated from the roots to branches) and host reaction substances, leading to dark vascular discolorations also referred to as streaking.

The defoliating Verticillium is characterized by early drop of

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asymptomatic green leaves from individual twigs and branches, eventually leading to complete defoliation. In this case, trees will most likely die. Symptoms typically develop from late fall through late spring and early summer.

Verticillium dahliae is characterized by the ability to produce long-lasting resting structures called microsclerotia, free in soil or within plant debris. As thick-walled fungal structures, these microsclerotia form the primary inoculum of the disease and can endure harsh environmental conditions and long dormancy periods while waiting for favorable conditions and/or the presence of root exudates from the olive tree host to initiate germination. Germination then leads to the formation of infective hyphae, which penetrate the roots and grow within xylem vessels producing mycelium and spores. The fungus spreads to the aerial part of the plant, plugging the water-conducting system (xylem) along the way, resulting in symptom expression.

Last year we diagnosed several super high density orchards in San Joaquin County affected by Verticillium wilt. The disease was observed in young (~ 6-year-old) trees of the three cultivars (Arbequina, Arbosana and Koroneiki). Most of these orchards were planted after solanaceous crops (i.e. tomato).

Field diagnosis

Knowing the field site and orchard history, keeping records of cultural practices including any chemical applications, and observing the disease pattern in the orchard are critical to provide an accurate diagnosis and implement best management strategies. When it comes to Verticillium wilt diagnosis, it is important to know the previous cropping history that may include susceptible hosts (e.g. cotton, tomatoes, potatoes, melons, etc.) and recent environmental conditions that can favor disease development. Verticillium wilt is usually favored by cool soil temperatures in the spring.

To diagnose affected trees in the field, look for symptoms of foliar chlorosis and wilting. Advanced stages of symptom development include shoot wilting and dieback, and foliar necrosis, which might be confused with desiccation associated with freeze damage. However, with Verticillium wilt, obstructed vessels become darkly pigmented, and the inner vascular tissues show dark streaking following longitudinal cuts into the xylem tissue using a knife. In transversal cuts, infected branches may reveal spotty rings of discoloration, visible mainly in the outer xylem tissue (Fig. 1). Previous olive literature on Verticillium wilt management has suggested, "Darkening/black streaking of xylem tissue does not occur in olive wood as it does in other tree crops". This information is no longer supported based on our recent field observations, isolation work, and diagnosis efforts (Fig. 1).

Ultimately, accurate diagnosis will require confirmation by a plant disease diagnostic laboratory following isolation and detection of the pathogen on the affected plant tissue. To obtain best results for diagnosis of Verticillium wilt, collect symptomatic tissues and keep the sample

Fig. 1. Verticillium wilt symptoms in olive trees: darkening or black streaking of xylem tissue resulting in defoliation or rapid shoot death with brown leaves attache

moist and cool until shipped to a diagnostic laboratory. Diagnostic labs can also evaluate your soil samples for the presence of microsclerotia.

Disease prevention and management

There is no effective treatment for Verticillium wilt. The most effective management strategies to protect trees are those taken before planting. Previous cultivation of *V. dahliae*-susceptible crops (e.g. cotton, tomatoes, potatoes, melons, etc.) in soils where olive orchards are being established has been identified as one of the major causes of disease development. The Verticillium wilt pathogen is usually present in these soils.

- A soil test to check for the presence of microsclerotia before planting is an essential way to identify disease risk. Previous research has indicated that any level above 1.0 microsclerotia per gram of soil is considered risky for olives.
- Before planting: soil solarization, soil fumigation, flooding the fields during summer, growing several seasons of grass cover crops (e.g. barley or sudangrass) or a combination of these treatments, are practices that may help reduce inoculum levels in the soil.

Freeze Damage Considerations

Super high-density oil olive plantings have increased in San Joaquin County from 3500 bearing acres in 2017 to nearly 5500 bearing acres in 2019 (San Joaquin County Agricultural Commissioner). During fall, winter, and spring, several newly-planted orchards – mainly in Thornton, Lodi, and Roberts Island areas – were at risk of injury caused by cold weather. Damage can occur at temperatures below 29ºF depending on the age of the tree, whether the tree has had a chance to harden, the specific temperature at ground level around the tree, and the duration of the cold snap.

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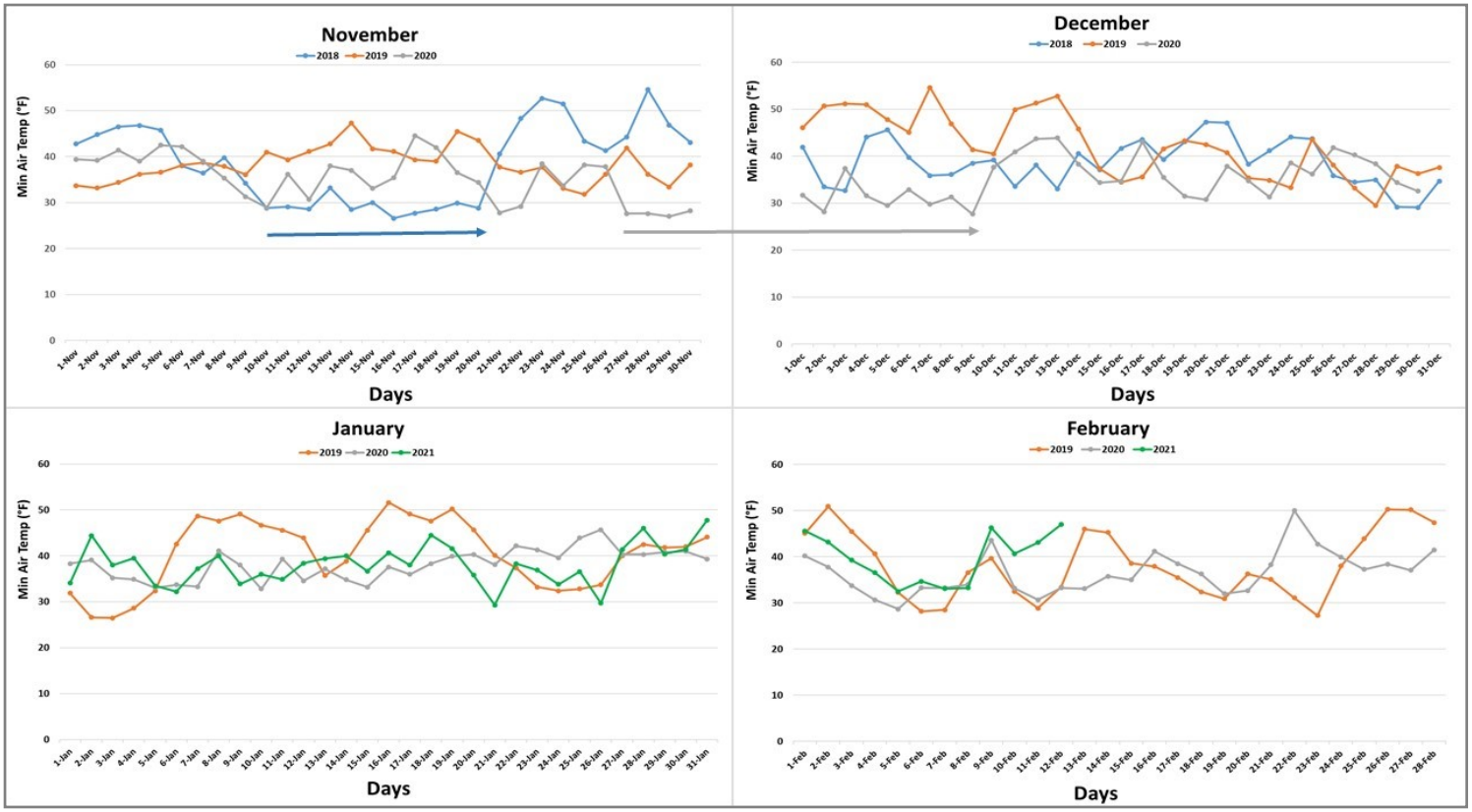

Fig. 2. Minimum air temperatures data (°F) collected from the CIMIS station located near Roberts Island area.

Over the past three years, during late winter and early spring, we visited several young olive orchards showing symptoms of damage caused by sudden drops in temperature. We usually try to differentiate between injury during the growing season, which is referred to as frost injury, and the freeze damage that occurs in late fall or winter. The term frost injury is restricted to damage due to freezing temperatures during the growing season while the tree is not dormant, as with a late spring frost. This was not the case for the past three years, based on our survey and the minimum air temperatures data collected from two CIMIS stations located near these olive orchards (Fig. 2).

In these orchards, the weather was warm and mild during the preceding October and early November months, and trees continued to grow, while not hardening off, going into the winter. In mid-November 2018, sudden minimum temperatures were low (ranging from 26ºF to 29ºF) in some locations, causing damage to leaves and shoots particularly in young trees. Fortunately, we went through the 2019 winter with little stress to the newly established orchards, with temperatures that were warm enough to protect these trees. At the end of November and in early December 2020, similar to what happened in 2018, temperatures again dropped off at around 27 to 29ºF and were low enough to harm the trees (Fig. 2 and 3). In this case, we are dealing with a late fall or early winter freeze, and symptoms observed were sometimes confused with Vertcillium wilt disease.

What does freeze damage look like?

The initial damage to look for includes tip dieback, lack of luster to the leaves, curling up of leaves as well as some necrotic or chlorotic lesions and leaf drop (Fig. 3A & B). Branches can have bark cracks and splits (Fig. 3C).

Fig. 3. Freeze damage in young olive trees produces bark splitting and discoloration in the wood. Affected branches or trees dehydrate and die back.

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For young trees in late fall, sapwood is more susceptible to cold. Sapwood is the relatively thin layer of living wood, which carries water and nutrients upwards from the roots. If killed by a freeze, damage beneath the bark will appear as brown discoloration all the way to the heartwood (Fig. 3D), and the tree will no longer be able to transport water to its branches. Damage will become noticeable in the spring or in early summer when warm temperatures lead to increased demand for water. In several cases, healthy-looking trees also showed brown wood discoloration beneath the bark tissue (Fig. 4). These symptoms of wood discoloration are different from those caused by Verticillium disease, which in most cases exhibits discolored sapwood in the recent annual rings (vascular discoloration or streaking in the sapwood). With Arbequina and Koroneiki being the most commonly planted olive varieties in recent years, we noticed, based on our preliminary observation, that symptoms are slightly pronounced in the Koroneiki cultivar, which may be due to its vigor.

Fig. 4. Healthy-looking trees showing wood discoloration beneath the bark tissue due to the freeze damage.

It is still too early to tell how detrimental freeze damage is to these olive orchards (tree losses) and if the trees may later recover from this freeze injury. Assessment of tree recovery can be made later in spring to early summer when the weather gets warmer (Fig. 5).

Recommended cultural operations:

- A dry fall could make freeze damage worse. Cutting back some on irrigation in September and no nitrogen applications after June could help slow down growth and may help the trees harden off before a sudden freeze event comes along. To keep orchards slightly warmer, it is advisable to run the irrigation system a few days before an expected cold snap to ensure the soil surface is moist and help the soil store a little more heat from sunny days. This will also ensure trees are hydrated before the freeze occurs.

Fig. 5. Symptoms of pronounced wilt due to the freeze damage appear later in the spring to early summer when the weather gets warmer.

- Make sure trees have sufficient but not excessive moisture in the soil. The important thing is to give trees an opportunity to recover.
- Prevent olive knot infection in orchards where olive knot is present. It is important to spray copper to protect bark cracks/splits caused by freezing, ideally before subsequent rainfall occurs.
- Delay pruning until the spring when hot weather stresses the tree to see where recovery is possible as new shoots begin to develop on the trees. Branches, limbs or trunks damaged by the freeze will wilt and dieback and can be removed.
- The soil profile should be wet to the depth of rooting by the time spring growth begins. If precipitation is insufficient, irrigation may be necessary as a supplement to stimulate root activity.
- Trees severely affected by freeze will have less total growth, which will reduce the nitrogen requirement but will stimulate vigorous regrowth similar to a heavy pruning.
- Make fertilizer decisions based on current soil reports and leaf analysis.

Mohamed T. Nouri, UCCE Orchard Systems Advisor, San Joaquin County, Stockton, CA

Florent P. Trouillas, Plant Pathologist, UC Kearney Research and Extension Center

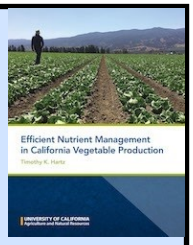
Calendar of Events / Announcements

UCCE Events

Principles of Fruit and Nut Tree Growth, Cropping and Management - VIRTUAL

April 19-23, 2021. Please visit http://fruitandnuteducation.ucdavis.edu/education/principles/ for more information on the program and to register.

UC Davis survey about compost use in tomato production



Tomato growers and consultants, please consider completing a UC Davis survey about compost use in tomato production: https://ucdavis.co1.qualtrics.com/jfe/form/SV_ezDE2JSF95j5YR7.

As an incentive, we have 14 copies of the new book by UC Davis Specialist Tim Hartz on vegetable fertilization to give away to randomly selected people who completed the survey!

Efficient Nutrient Management in California Vegetable Production Available for sale online for $35, but consider completing the survey for a chance to win a free copy!

Announcements From Our Partners

EPA Approves Section 18 Emergency Registration Request for Kasugamycin on Almonds (From the Almond Board of California)

The Environmental Protection Agency (EPA) and California Department of Pesticide Regulation recently accepted a Section 18 petition to allow the use of Kasumin 2L (kasugamycin) to control bacterial blast (Pseudomonas sp) in almonds. The registration allows up to two applications under anticipated cold or freezing conditions on almonds at a use rate of 64 fl. oz. per acre from February 12, 2020 through petal fall. Application after petal fall is prohibited. Kasugamycin may only be used during bloom.

Growers interested in this application are heavily encouraged to reference the Almond Board of California's Honey Bee Best Management Practices **(**https://www.almonds.com/sites/default/files/2020-12/BeeBPMs_12212020.pdf#page=10**)** as well as the Quick Guide for Applicators (https://www.almonds.com/sites/default/files/2020-12/ALM_189395_ALM_AppGuide7x10_F2_12212020.pdf) (in English & Spanish) to ensure pollinator health is maintained. As stated in these practices, growers should only use applications when absolutely necessary and should only make applications in the late afternoon or evening, when bees and pollen are not present.

The approval applies to the counties of Butte, Colusa, Fresno, Glenn, Madera, Merced, San Joaquin, Stanislaus, Sutter, Tehama, Yolo and Yuba. Please contact your local County Ag Commissioner's office for further details if interested in using this product.

FISH FRIENDLY FARMING PROGRAM AN ALTERNATIVE COMPLIANCE PROGRAM FOR IRRIGATED LANDS REGULATORY PROGRAM IN THE DELTA

Learn about a new EASIER way to complete your paperwork and compliance with the Irrigated Lands Regulatory Program (ILRP). The Regional Water Board has approved the **Fish Friendly Farming (FFF)** program as an alternative compliance program for the ILRP. The FFF program already has 200,000 acres enrolled and thousands of farms certified. In the Delta we will complete your farm plan (which counts for all 3 of the ILRP templates) and reduce the time you have to spend on paperwork. If you end up in a Management Plan area and work with the FFF program, you can avoid other typically required meetings. FFF is working closely with the Water Quality Coalitions to benefit growers and the FFF program does not replace the WQ coalitions. Growers also receive a sign to post on their property and positive recognition for their good land stewardship.

Watch our new video: https://youtu.be/2JESbJ8VDAI

Join one of our 30-minute zoom meetings to hear more:
March 11, 2021 12:00pm

Join Zoom Meeting https://us02web.zoom.us/j/83623717946?pwd=STE5amwzay9nZ2JhSVp0L1h3ekkwUT09
Meeting ID: 836 2371 7946 Passcode: 778728 One tap mobile
+16699009128,,83623717946#,,,,*778728# US (San Jose)
+12532158782,,83623717946#,,,,*778728# US (Tacoma)

March 25, 2021 12:00pm

Join Zoom Meeting https://us02web.zoom.us/j/82736756337?pwd=enlSUFQ2OXJ1eUZLWTBPZXRTTVJhUT09
Meeting ID: 827 3675 6337 Passcode: 194610 One tap mobile
+16699009128,,82736756337#,,,,*194610# US (San Jose)
+13462487799,,82736756337#,,,,*194610# US (Houston)

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Notes from the Field

February 2021