California Melon Research Board

2026-27 Research Proposals Worksheet

Leader	Project Title	2025-26 Funded	2026-27 REQ/REC	Board Approved JAN 9, 2026
Babu *UCCE - Imperial*	**Evaluating Management Strategies for Whitefly and Aphids in Melon**	14,352	**15,521**	**15,521**
Gilbertson *UC Davis*	**Investigation of the Nature and Threat of a New Mixed Virus Disease of Melons and Other Cucurbits in the Southwestern US: Watermelon Chlorotic Stunt Virus (WmCSV) and Squash Leaf Curl Virus (SLCuV)** *LAST YEAR: Monitoring and Investigating Cucurbit-Infecting Viruses in the Northern and Central Production Areas of California and Impact of Mixed Infections of Aphid-Transmitted Viruses on Melon Plants on Symptoms and Plant Development*	24,000	**31,000**	**31,000**
Mauck *UC Riverside*	**Improving Whitefly Management through Field Validation of Whitefly Resistance in Muskmelon Breeding Lines and Insecticide Resistance Management** *LAST YEAR: Developing a New "Pest Management Strategic Plan" for California Melons*	20,509	**21,264**	**21,264**
Pastrana *UCCE - Imperial*	**Evaluation of Biological Control Strategies for Powdery Mildew on Cantaloupe Melons in the Desert Conditions of the Imperial Valley**	12,042	**11,354**	**11,354**
Stoddard *UCCE - Merced*	Controlling In-Row Weeds with Post Plant Applications of Pre-Emergent Herbicides, Year 2	6,160	0	
Swett *UC Davis*	**Addressing Management and Diagnosis Needs for Emerging, Poorly Understood Fusarium Pathogens Driving Vine Decline of Muskmelons in California and Providing Discovery Pathology and Diagnostic Support for Diseases Affecting the California Melon Industry**	28,071	**49,656**	**49,656**
Wintermantel *USDA- Salinas*	**Improving Whitefly Transmitted Virus Management in Melon through Improved Virus Diagnostics, Monitoring, and Identification of Reservoir Hosts** *LAST YEAR: Development of Detection Methods and Monitoring the Incidence of Newly Emerged Watermelon Chlorotic Stunt Virus and Other Whitefly-Transmitted Viruses in Melon and Identification of Reservoir Hosts*	21,681	**22,370**	**22,370**
CPS	**Pledge to the Center for Produce Safety (CPS)**	10,000	**10,000**	**10,000**
CSCC	**Annual Renewal for Membership in the California Specialty Crops Council (CSCC)**	6,000	**6,000**	**6,000**
TOTALS		$ 142,815	**$ 167,165**	**$ 167,165**

BABU

Project Title: Evaluating Management Strategies for Whitefly and Aphids in Melon

Principal Investigator

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Project Objectives

Objective 1. Conduct an organic insecticide efficacy trial in spring 2026 to provide organic melon growers with information on whitefly efficacy of currently available products and new biological materials.

Objective 2. Test the efficacy and residual effect of soil-applied insecticides for managing whitefly and aphid infestation in melon.

Short progress report: Summary

The proposal aimed to conduct four insecticide efficacy trials against whitefly and aphid management in melons.

Our first objective was to conduct an organic insecticide efficacy trial in spring 2026 to provide organic melon growers with information on whitefly efficacy of currently available products and new biological materials. Accordingly, an insecticide efficacy trial was conducted at the Desert Research and Extension Center in Holtville, CA during spring 2026. Plots were planted with cantaloupe 'Desert Express' on 21 Apr. This trial included seven treatments: six OMRI-listed insecticide treatments and an untreated control. The insecticide treatments included Debug Tres, Debug Turbo, PFR-97, PyGanic 5EC, Ecowork 70EC, and M-Pede. Among the treatments tested, M-Pede significantly reduced adult whitefly pressure throughout the observation period compared with the control. Additionally, PyGanic, Debug Turbo, and Ecowork also reduced adult counts at 3 days after treatment 1 (DAT1) and 3 DAT2, but not at 7 DAT2. For nymphs, all the insecticide treatments significantly reduced nymph counts in melon leaves compared with the untreated control. However, in general, M-Pede, Ecowork, and Debug Turbo resulted in noticeable differences in the treated plots. Although we intended to collect information on the efficacy of treatments against aphids during this trial, aphid pressure was extremely low in the plots, and no observations were made.

Additionally, during spring 2026, a second trial was conducted at the same location in Honeydew melon ‘Flavor Journey '. We tested the efficacy of a new experimental insecticide formulation, NAI-3827, alongside industry standards and untreated control. NAI-3827 provided good control of both adult whitefly and nymphs, and the efficacy was overall comparable to industry standard Sefina Inscalis and the insecticide mixture Courier 3.6SC + Assail 70WP

The data from the above two trials will be made available to stakeholders before the 2027 spring melon season through various Extension channels, including two journal articles in Arthropod Management Test and articles in Ag Briefs, the extension publication of UCCE Imperial County.

Upcoming trials

The second objective is to test the efficacy and residual effect of soil-applied insecticides for managing whitefly and aphid infestations in melon. A trial testing the efficacy and residual effect of various soil-applied insecticides is scheduled to be planted around mid-September. Additionally, we will conduct a second round of trial testing of NAI-3827 under fall-growing conditions. For these trials, the land preparation is underway at the Desert Research and Extension Center. We expect to begin these trials around mid-September and complete them by late November 2026.

GILBERTSON

Interim Report to the California Melon Research Board-Gilbertson-2026

Project title: **Investigation of the nature and threat of a new mixed virus disease of melons and other cucurbits in the Southwestern US: watermelon chlorotic stunt virus (WmCSV) and squash leaf curl virus (SLCuV)**

Principal Investigator (PI): **Robert L. Gilbertson**, Distinguished Professor, Department of Plant Pathology, UC Davis

Co-PIs: **Tom Turini**, Farm Advisor, University of California Cooperative Extension, Farm Advisor, Fresno County and **William Wintermantel**, Virologist, USDA-ARS, Salinas

Cooperators: **Margaret Cespedes,** Assistant Specialist and **Tomas Melgarejo**, Assistant Project Scientists, Department of Plant Pathology, UC Davis.

The overall objective of this project is to provide rapid and precise identification of viruses affecting production of melon, watermelon and other cucurbits in California and to help develop effective management strategies. Thus, we have been focused on the recently introduced watermelon chlorotic stunt virus (WmCSV) in the desert southwest> However, we have also been addressing the first detection of the new seed-transmitted watermelon crinkle leaf associated virus (WCLaV) in Fresno County (see new objective 5).

1. Monitoring for mosaic and yellows symptoms in melons in California with emphasis on Central (Fresno) and Southern (Riverside and Imperial) areas for the new whitefly transmitted WmCSV and SLCuV mixed infection

Thus far in the 2026 growing season, we have detected multiple viruses affecting melons and other cucurbits in various growing regions in California. In April-June, melon plants from fields in the Imperial Valley showed stunting and severe leaf distortion and yellowing. Samples of these plants provided by Farm Advisor Ana Maria Pastana were infected by WmCSV and a crinivirus, later determined to be cucurbit chlorotic yellows virus (CCYV) by co-PI Bill Winermantel. SLCuV was not detected in these samples. This showed that WmCLV overwintered in the Imperial Valley. In early May, we received samples of watermelon plants with leaf curling and mosaic from a field in Fresno County from co-PI Tom Turini. These tested negative for mosaic viruses and beet curly top virus (BCTV) but did test positive for the new viruses WLCaV-1 and -2 (new objective 5). In early July, we received squash samples with curly top disease (CTD) symptoms in a field in Fresno County, and BCTV infection was confirmed in these plants. In Yolo County, a volunteer cucurbit plant with mosaic symptoms was shown to be infected with a potyvirus and cucumber mosaic virus (CMV). In late August, melon plants in fields in Merced and Fresno started showing mosaic symptoms. The fields in Merced had high disease incidences and the symptoms were very severe, especially in honeydew melon, including fruits with internal necrosis. These symptoms were associated with a mixed infection of zucchini yellow mosaic virus (ZYMV) and CMV. Fields in Fresno were less severely affected and watermelon mosaic virus (WMV) and CMV were detected. Samples from additional affected fields in Fresno County will be received soon. These outbreaks on mosaic symptoms seem to be associated with increased late season aphid activity.

2. Determine the sequences of the DNA-A and DNA-B components of the isolate of SLCuV detected in a mixed infection with WmCSV in melon in Imperial Valley in 2026

We have cloned the full-length DNA-A and DNA-B components of this isolate of SLCuV and determined the complete sequence of each component. The sequences of both components are >97% identical to those of previously sequenced isolates from the southwest desert, indicating this is a new isolate of SLCuV and has no unusual features.

3. Generate Agrobacterium-mediated delivery systems to investigate the disease biology of the new WmCSV and SLCuV association in Southern California

We have now generated multimeric clones of the DNA-A and DNA-B components of a California isolate of WmCSV. These were individually cloned into a binary vector and these plasmids transformed into *Agrobacterium tumefaciens*. *Nicotiana benthamiana* plants agroinoculated with the DNA-A and DNA-B of WmCSV developed symptoms of leaf curling and crumpling whereas watermelons developed symptoms of WmCS disease. Co-PI Bill Wintermantel showed the virus from the cloned WmCSV A and B components is whitefly transmissible. Thus, this WmCSV agroinoculation system can now be used for screening watermelon germplasm for response to the virus and other experiments. We are in the process of generating the multimeric clones of SLCuV.

4. Complete the investigation of mixed infections of mechanically transmissible aphid-vectored viruses on disease symptoms in melon leaves and fruits

The agroinoculation system we generated for cucurbit aphid-borne yellows virus (CABYV) has proven to be inefficient for infecting melons, but agroinoculated squash plants become infected and develop typical yellowing symptoms. To determine if the virus derived from the clone is aphid-transmissible, we provided infected symptomatic squash plants to co-PI Bill Wintermantel. The infected plants were exposed to melon aphids, and these were allowed to feed on healthy melon plants. Some of these plants developed yellowing symptoms and the presence of CABYV in these plants was confirmed. Thus, we will use aphid transmission in future mixed infection experiments with CABYV and CMV and ZYMV/WMV. We also showed that late season outbreaks of severe mosaic and leaf curling and internal fruit discoloration in honeydew and cantaloupes fields in Merced were associated with a mixed infection of CMV and ZYMV, possibly implicating these viruses in this disease situation.

5. First detection of WLCaV in California. In early June, co-PI Tom Turini sent us leaf samples from watermelon plants showing strong leaf curling and mosaic symptoms, which looked similar to symptoms reported for this new seed-transmitted virus. These leaves tested negative for known mosaic viruses and BCTV. We then conducted RT-PCR tests for the WLCaV-1 and -2 primer pairs. Strong DNA bands of the expected-size were obtained, especially for WLCaV-2, and DNA sequencing confirmed these bands were from these new seed-transmitted viruses. We reported the finding to CDFA and they independently confirmed infection of WLCaV-2 from samples from the same plant. This is the first report of this virus occurring in the state of California.

MAUCK

FY 2026 Interim Progress Report

Project Information

Project Title: Improving whitefly management through field validation of whitefly resistance in muskmelon breeding lines and insecticide resistance management

Principal Investigator: Dr. Kerry Mauck, Assistant Professor of Entomology, Department of Entomology, University of California, Riverside

Cooperating Personnel:
Benjamin van Raalte, Ph.D. Candidate, Department of Entomology, University of California, Riverside

Dr. William M. Wintermantel, Research Plant Pathologist, USDA-ARS, Salinas, CA

Dr. Jim McCreight, USDA-ARS (retired)

Project Objectives

1. Validate the genetic regions associated with sweetpotato whitefly (*Bemisia tabaci* MEAM1) resistance traits in a field setting using melon lines derived from a cross of PI 122847 and 'Top Mark'.

2. Screen sweetpotato whitefly populations from the Low Desert and the Central Valley for insecticide resistance to: acetamiprid (Assail), dinotefuran (Venom), cyantraniliprole (Exirel), and afidopyropen (Sefina).

Work Completed

Objective 1. Field validation of whitefly resistance traits
We identified 18 F2 families with different genetic combinations at the two newly discovered resistance sites on chromosome 5 and chromosome 11. These families, along with the parents ('Top Mark' and PI 122847) and the 'Top Mark' x PI 122847 F1 progeny, have been prepared for field screening. The experimental design was finalized for completion at the Coachella Valley Agricultural Research Station in Thermal, CA. We selected this location because it has good whitefly pressure under desert ag conditions but is closer to UCR than the Desert Research and Extension Center and operated by UCR Ag Ops personnel. This makes frequent sampling feasible. The field is shown in Fig. 1. Every third row is planted with a standard cultivar ('Gold Express') which was seeded in advance of transplanting the experimental genotypes to generate uniform whitefly pressure throughout the field. The experimental genotypes include 18 F2 families, parental lines, and F1 progeny. There are a total of 81 completely replicated blocks, each with 8 plots. Each plot contains two plants of the same genotype. The total plots is 648. Transplanting occurred on August 31, 2026.

Figure 1. Top left: 1,296 plants of the experimental lines secured for transport. Plants were grown in a greenhouse and hardened off with outdoor exposure before transplanting to the field site. Remaining images: plot layouts and transplanting on August 31, 2026 at the CVARS facility in Thermal, CA.

We also established standard sampling protocols to track the presence and density of whitefly adults and nymphs on the experimental lines. We constructed small bug vacuums and designed a quick-change mesh bag collection system to facilitate rapid sampling of adults (Fig. 2). Sampling will occur weekly for 3-4 weeks after transplanting. We will also collect tissue to monitor for virus infection.

Figure 2. Whitefly sampling device. Mesh bags are fitted over 2.5inch diameter jars with the bottoms removed, which are then affixed to the tube of a battery powered industrial hand vacuum. After sampling from foliage for a set period of time, the cap is placed over the jar lid to contain the insects for later counting.

Objective 2. Insecticide resistance screening

We established a serial dilution leaf-disc assay system for resistance testing and evaluated it with our laboratory colony. Melon leaf discs are dipped in insecticide solutions for five seconds, dried, and inverted on agar. Assays are ongoing for testing with field populations. For each population, we are testing five to seven concentrations of acetamiprid, dinotefuran, cyantraniliprole, and afidopyropen, measuring the mortality of 20 female whiteflies per disc after 24 and 72 hours across five replicates.

Field whitefly populations were collected from agricultural fields in California during the 2026 growing season. Sampling locations are shown on the map in Fig. 3. Sampling occurred between July 29-31, 2026.

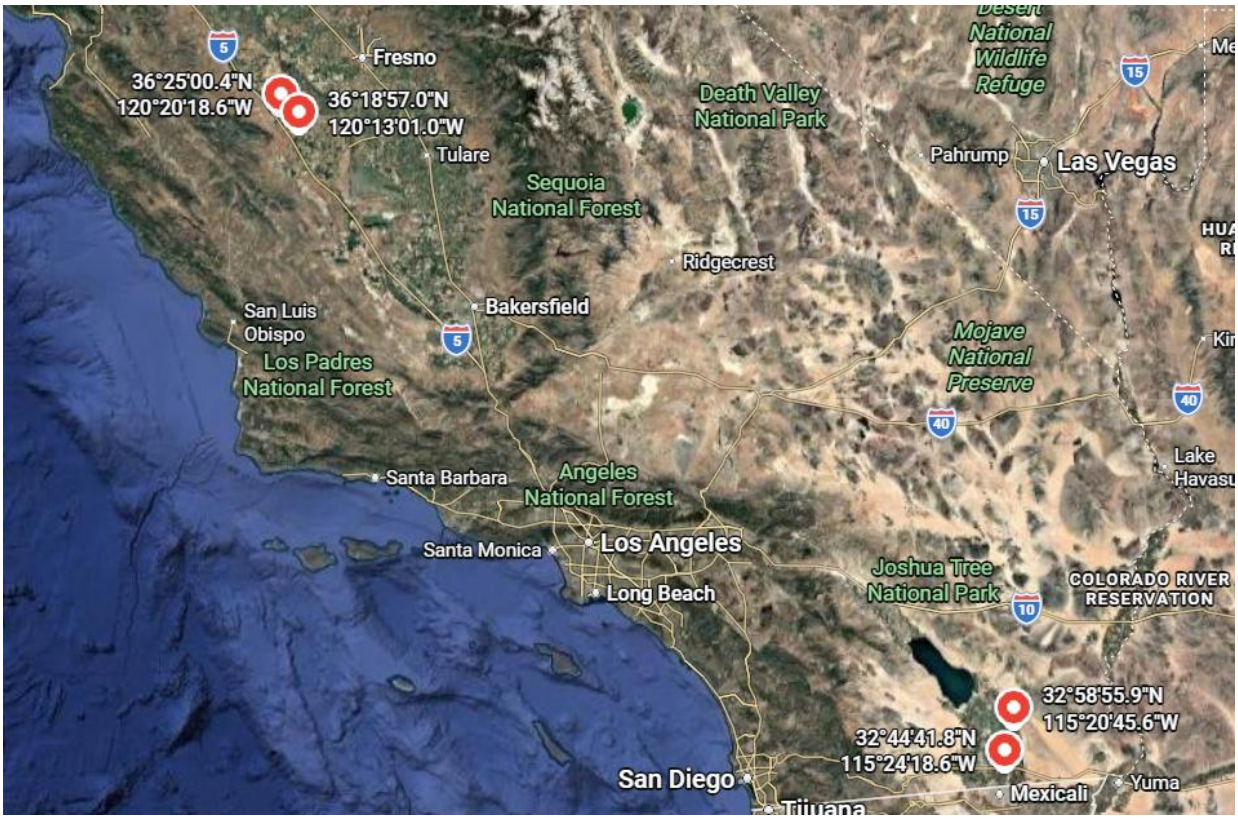

Figure 3. Sampling locations for whitefly populations in the Central Valley and Imperial Valley.

Where possible, we collected 500+ whiteflies per location to establish colonies on cowpea. Collected whiteflies were immediately transferred to clean cowpea plants maintained in a climate-controlled vehicle, then transported back to UCR for establishment in the greenhouse under controlled conditions (~27 °C, 30% relative humidity, and 16h:8h light:dark cycle). Colony establishment numbers are shown in the table below.

Line Name	Colony ID	Collection date	Collection County	Crop Species	Collection Location	Whiteflies at initiation
Coalinga	1	2026-07-29	Fresno	Watermelon	36.315822, -120.216933	700
Coalinga	2	2026-07-29	Fresno	Watermelon	36.315822, -120.216933	500
Laguna	1	2026-07-29	Fresno	Muskmelon	36.416772, -120.338486	500
Laguna	2	2026-07-29	Fresno	Muskmelon	36.416772, -120.338486	500
Bank	1	2026-07-31	Imperial	Alfalfa	32.744944, - 115.405167	200
Bank	2	2026-07-31	Imperial	Alfalfa	32.744944, - 115.405167	200
Silliman	1	2026-07-31	Imperial	Cotton	32.982189, -115.346000	450
Silliman	2	2026-07-31	Imperial	Cotton	32.982189, -115.346000	200

We are currently rearing each colony for 2-3 generations to build population numbers sufficient for assays. Additional collections may be needed from the Imperial Valley populations, and we will include a population from CVARS. We also set up PCR diagnostics to confirm the whitefly species and screen for the presence of secondary endosymbionts, which are known to impact insecticide resistance patterns. In parallel, we continued to maintain our susceptible laboratory whitefly colony, which has been reared in captivity for over 50 generations without insecticide exposure, to serve as the control baseline.

Preliminary Results

Objective 1. Field validation of resistance traits

The field trial is ongoing at the Coachella Valley Agricultural Research Station Fig. 1. The field was prepared in early August and every third row planted with ‘Gold Express’. The 18 F2 families, parental lines, and F1 progeny were transplanted into remaining rows on August 31, 2026. A light treatment with kaolin clay was applied to ensure plants can adapt to the new environment and full sun. We will conduct whitefly counts through vacuum sampling every 7-10 days for 3-4 weeks.

Objective 2. Insecticide resistance bioassays

Prior to collections, we completed baseline bioassays using the susceptible laboratory colony to calibrate the concentration ranges for the serial dilution assays (Fig. 4). We are continuing to optimize the protocol to ensure low mortality in controls before proceeding with field population testing (e.g., testing different cucurbit hosts as leaf discs for exposures). Field colonies were successfully established on cowpea host plants for short-term rearing. Whitefly specimens were taken from each colony and DNA extracted to perform PCR and sequencing to confirm species identity. When populations are high enough and we are satisfied with the mortality rates for controls (0 active ingredient replicates) with the laboratory lines, we will proceed with completing all assays.

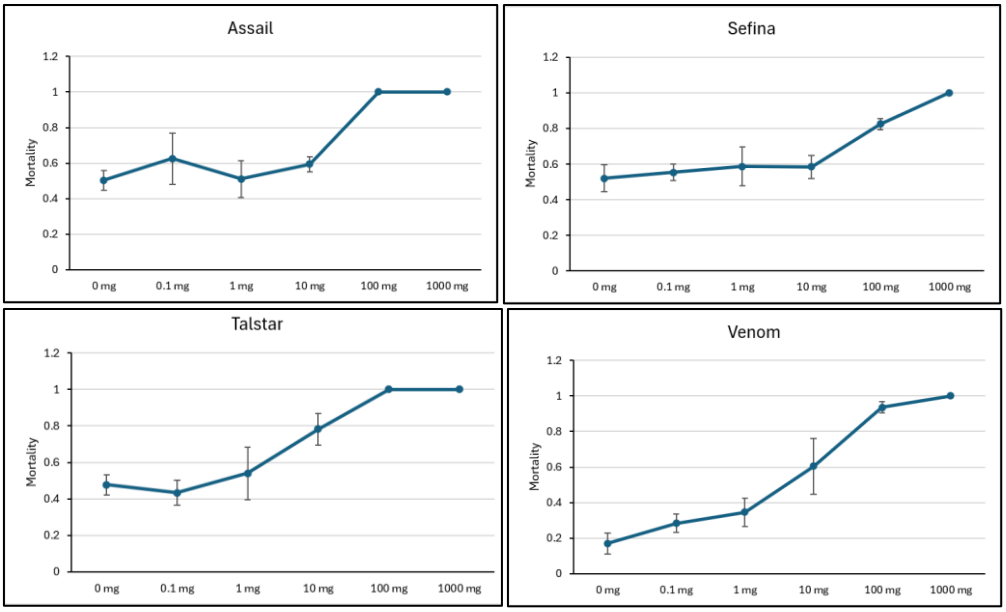

Figure 4. Mortality curves from insecticide exposure experiments performed with different whitefly colonies. 5-10 replicates were run for each insecticide concentration (as milligrams of active ingredient per liter of solution). Assays with Assail, Sefina, and Talstar were run with squash as the leaf disc. Assays with Venom were run with melon as the leaf disc. Based on these results, melon appears to be better than squash as the leaf disc to use for exposure.

PASTRANA

SUMMARY OF FINDINGS CONCERNING FUNGICIDE EFFICACY TRIALS FOR MELON POWDERY MILDEW IN THE LOW DESERT REGION – SPRING 2026

Prepared by: Ana M. Pastrana, Plant Pathology Advisor, UC ANR
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Date: July 2026
Location: UCCE Imperial / Desert Research and Extension Center

BACKGROUND AND INTRODUCTION

Powdery mildew (*Podosphaera xanthii*) is a prevalent and economically damaging disease affecting cucurbits, including cantaloupe melons (*Cucumis melo*), across major growing regions around the world. This disease annually impacts cantaloupe production in desert areas such as the Imperial, Coachella, and Yuma valleys, where environmental conditions of low relative humidity and high temperatures in late spring and early summer exacerbate its severity. Infected leaves desiccate rapidly, reducing photosynthesis, causing sunscald on exposed fruit, diminishing sugar content, and lowering overall fruit quality. These factors shorten harvest windows and reduce marketable yields, posing significant challenges to growers.

This research seeks to evaluate organic and conventional fungicides to managing powdery mildew in cantaloupes, tailored to the unique growing conditions of Imperial Valley.

EXPERIMENTAL DESIGN

- Randomized complete block design with four replicates per treatment
- Plot Size: 10 × 25 ft = 250 ft^2 = 0.00574 acres
- Replications: 4 replicates per treatment
- Total area per treatment: 4 × 0.00574/plot = 0.02296 acres/application
- Application Volume: 50 gallons/acre = 4.35 liters per treatment → 5 liters per treatment used at each application.

CULTURAL PRACTICES AND AGRONOMIC INPUTS

March 9th, 2026

- **Pre-plant Fertilization**: 11-52-0 fertilizer applied at a rate of 400 lbs/acre.

March 17th, 2026

- **Bed shape**

March 26th, 2026

- **Seeding**
    - Varieties: 'Lambkin Piel de Sapo' (susceptible, main plot) and extra beds of a susceptible 'Hami' variety.
    - Configuration: Seventeen 60-inch raised beds, seeded 12 inches apart in a single row per bed.

April 2nd, 2026

- Sprinkler installation and initial **irrigation**

Figure 1. Picture of the melon plot taken on April 9th, 2026, a week after the first irrigation.

April 14th, 2026

- Pre-emergence **herbicide** application. Arrow 2EC at 8 oz/ac.

April 16th, 2026

- **Cultivation** and weed control.

April 17th, 2026

- **Fertilization**: urea applied at a rate of 200 lbs/acre.

April 20th, 2026

- Manual hoeing and **weeding**

April 21st, 2026

- **Insecticide** application, Assail at 2.5 oz/ac

May 13th, 2026

- **First fungicide** application

May 15th, 2026

- **Fertilization**: UAN32 applied at a rate of 30 gallons/acre

May 20th, 2026

- **Second fungicide** application

May 21st, 2026

- **Insecticide** application, Exirel at 15 oz/ac

June 1st, 2026

- **Third fungicide** application (applied more than 7 days after the second fungicide application due to high winds in the area)

June 3rd, 2026

- **Insecticide** application, Exirel at 15 oz/ac
- **Herbicide** application, Arrow 2EC at 8 oz/ac

June 17th, 2026

- **Trial termination:** The trial experienced severe virus pressure beginning early in the season. By early June 2026, the crop exhibited widespread, advanced viral yellowing symptoms, resulting in severe stunting and leaf chlorosis across all plots (Figures 2 and 3).

Figure 2. Picture of the melon plot taken on June 2nd, 2026, two months after the first irrigation.

Figure 3. Photographs showing two average plants at the end of the trial (June 10th, 2026).

ARTIFICIAL INOCULATION

From May 6 to June 2, 2026, a buffer row was artificially inoculated weekly either with symptomatic powdery mildew leaves placed on Hami melon buffer plants or with washed conidial suspensions in deionized water applied to promote disease establishment. Hami melons were less affected by viral symptoms and had better foliage.

LIST OF TREATMENTS EVALUATED

Treatment	Product Name	Active Ingredient	Rate	Company
1	**LALSTOP 46**	*Clonostachys rosea* strain J1446 + LALSTIM OSMO	3.2 oz/ac + 2 lbs/ac	Lallemand
2	**Ecoswing**	Extract of *Swinglea glutinosa* + DyneAmic	32 fl oz/ac + 6.4 fl oz/ac	Gowan
3	**Zorda**	*Bacillus amyloliquefaciens* strain PTA-4838	2 lb/ac	Valent
4	**Regalia**	*Reynoutria sachalinensis* extract	4 quarts/ac	ProFarm
5	**Gargoil**	Botanical-based product	1% volume	SanAgrow
6	**Plasma-Activated Water**	Experimental	50% volume	Stanford University
7	**AgroRocker**	Botanical extracts + NuFilm	1 L/ha + 100 ml/ha	Agrobotanix
8	**Excalia**	Inpyrfluxam (chemical fungicide) + DyneAmic	4 oz/acre + 6.4 fl oz/ac	Valent
9	**Untreated Control**	Water	—	—

SUMMARY OF FINDINGS

During the spring 2026 melon season, the trial faced severe virus pressure beginning early in the season. By early June 2026, the crop exhibited widespread and advanced viral yellowing symptoms, causing severe stunting and leaf chlorosis throughout all plots. The trial was concluded on June 10, 2026, when it became evident that the crop could not recover. Viruses detected at high levels across the Imperial Valley in the spring 2026 season included Cucurbit chlorotic yellows virus (CCYV) and Watermelon chlorotic stunt virus (WmCSV) as the primary causal agents, with cucurbit yellow stunting disorder virus (CYSDV) detected at lower levels. These viruses, transmitted by whitefly, caused widespread and severe crop losses across the Imperial Valley, Yuma, Mexicali, and surrounding melon-producing regions during this season.

It is worth noting that the Hami melon edge rows showed comparatively less virus damage than the main Lambkin Piel de Sapo plots in the early stages of the season,

allowing the inoculation strategy to be focused on these plants. However, virus disease severity became so extensive that insufficient healthy green foliage remained to support powdery mildew development and treatment evaluation.

FUTURE PLANS

The trial could be repeated during the spring 2026 melon season, provided sufficient funding is secured. To reduce the likelihood that viral pressure will affect the crop and compromise disease evaluations, several modifications to the experimental design are being considered. These include implementing a more aggressive insecticide program beginning at the seedling stage, using a virus-resistant variety, and/or using insect-proof screening (mesh covers) to minimize vector entry and virus transmission. Another option will be to conduct the trial at the Coachella Research Station.

SWETT

CALIFORNIA MELON RESEARCH BOARD-Interim report
September 1, 2026, Authors: C. Swett and K. Zimmerman

Project title: Addressing management and diagnosis needs for emerging, poorly understood *Fusarium* pathogens driving vine decline of muskmelons and providing discovery pathology and diagnostic support for diseases affecting the California melon industry

STATUS, PITFALLS, REMIDIES & NEXT STEPS: BY OBJECTIVE

Objective 1. Improving diagnostic and management resources for Fusarium crown and foot rot

1.1 Characterizing new FSSC species associated with crown rot

Status: An experimental plan for the *F. cucurbiticola* trial (Objective 1.1.1) has been developed, and plants have been seeded in the greenhouse. Isolates to be used in this trial have all been confirmed as *F. cucurbiticola* with sequencing. The inoculation is set for mid-September, and the trial should be complete by the end of December. Multi-gene phylogenetic analysis (Objective 1.1.2) and manuscript development (Objective 1.1.3) are also currently underway. Pitfalls and Remedies: None.
Next Steps: We will inoculate muskmelon plants with *F. cucurbiticola* isolates in the greenhouse trial. When this trial is complete, crown and foot rot virulence data can be analyzed alongside other completed pathogenicity trials to develop the manuscript. Completed multi-gene phylogenetic analysis with collaborator Dave Geiser will also aid in manuscript development.

1.2. Facilitating development of crop rotation-based management and effective diagnostic tools for Fusarium crown and foot rot.

Status: *F. falciforme* greenhouse trials in muskmelon are currently underway (90 days post-inoculation as of 8/18/26) and should be completed by the end of September. This includes the pathotyping trial with isolates from multiple hosts (Objective 1.2.1) and the cultivar trial looking at one isolate's pathogenicity in Morgan (standard cultivar) and Honey Rock (potentially more resistant). A preliminary three-gene tree has been completed including many isolates, with the finalized version to be finished by the end of the year (Objective 1.2.3). *Nit* mutant generation is complete and somatic compatibility pairing to identify clonal groups is almost complete (Objective 1.2.3). A preliminary global phylogram has been completed, and it will be finalized once the blast search for other isolates published under alternative names like *F. solani* is also finished, by the end of this year (Objective 1.2.4). Pitfalls and Remedies: None.
Next Steps: We will be monitoring muskmelon plants in *F. falciforme* greenhouse trials for lesion development. When significant lesions have formed with the positive control isolate, we will take down the trial and analyze virulence data to determine pathotypes and whether there are more resistant muskmelon cultivars. Three-gene trees and phylograms will be finalized, and somatic compatibility pairings and blast searches will be finished.

Objective 2. Discovery pathology for melon and allied cucurbit crops to facilitate research into diagnosis and management of all microbial diseases

Status: So far, over a dozen isolates have been saved to our culture collection from diagnostic samples this year, including isolates from pathogens of high interest like *F. oxysporum* f. sp. *melonis* and *F. falciforme*. Pitfalls and Remedies: None.
Next Steps: We will continue to save isolates of interest to the lab's culture collection as well as maintain the collection of over 2,000 isolates including hundreds of cucurbit-associated isolates.

Objective 3. Decision support for melon production via diagnostic services

Status: So far, we have provided diagnostic services for 9 melon samples this year, identifying 7 different pathogens (see table below for details). Pitfalls and Remedies: None.
Next Steps: We will continue to conduct diagnoses on melon samples, offering farm calls when needed to enhance diagnosis efforts.

CALIFORNIA MELON RESEARCH BOARD-Interim report
September 1, 2026, Authors: C. Swett and K. Zimmerman

2026 Swett Lab Melon Diagnostic Samples

Crop	Diagnosis	Saved Cultures
Hami	Stem Rot caused by *Pseudomonas viridiflava* and Damping Off / Seedling Crown Rot caused by a combination of *Pythium ultimum* and *F. oxysporum*	No
Cantaloupe & Hami	Fusarium Crown and Foot Rot caused by *Fusarium falciforme*, Root Rot and Vine Decline caused by *Monosporascus cannonballus*, and Charcoal Rot caused by *Macrophomina phaseolina*	Yes, *F. falciforme* and *M. cannonballus*
Cantaloupe & Hami	Fusarium Crown and Foot Rot caused by *Fusarium falciforme*, Root Rot and Vine Decline caused by *Monosporascus cannonballus*, and Charcoal Rot caused by *Macrophomina phaseolina*	Yes, *F. falciforme* and *Plectosphaerella*
Melon	Fusarium Crown and Foot Rot caused by *F. falciforme*	Yes, *F. falciforme*
Melon	Charcoal Rot caused by *Macrophomina phaseolina*	No
Canary	Tentative Fusarium Wilt caused by *F. oxysporum* f. sp. *melonis*, Tentative Fusarium Crown and Foot Rot (FSSC-identified based on morphology; species not identified) and Tentative Root Rot caused by *Phytopythium irregularis*	No
Piel De Sapo	Tentative Fusarium Wilt caused by *F. oxysporum* f. sp. *melonis*	No
Cantaloupe	Tentative Fusarium Wilt caused by *F. oxysporum* f. sp. *melonis*, Fusarium Crown and Foot Rot caused by *F. falciforme*	Yes, *F. falciforme* and *F. oxysporum*
Cantaloupe	Tentative Fusarium Wilt caused by *F. oxysporum* f. sp. *melonis*	Yes, *F. oxysporum*

WINTERMANTEL

CALIFORNIA MELON RESEARCH BOARD
Interim Report 2026

Project Title: Improving whitefly transmitted virus management in melon through improved virus diagnostics, monitoring, and identification of reservoir hosts.

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1. **Monitor incidence and prevalence of watermelon chlorotic stunt virus (WmCSV), squash leaf curl virus (SLCuV), and watermelon crinkle leaf associated viruses 1 and 2 (WCLaV-1 and -2) along with common viruses in melon, watermelon, and other plants in the Yuma, AZ/Imperial/Riverside, CA region to determine virus prevalence and begin to identify plants that serve as virus reservoir hosts.** Samples were collected approximately monthly from desert production regions throughout the spring season to determine the incidence of WmCSV and other whitefly-transmitted viruses in weeds and in the spring melon crop. Results indicated early yellowing was almost exclusively caused by CCYV, followed by higher late spring incidence of WmCSV in co-infections. Very little CYSDV was present in spring. Monitoring is continuing during the fall.
2. **Continue monitoring timing of emergence and prevalence of CCYV, CYSDV, SqVYV, and CABYV in Central Valley melon fields during the summer/fall season and monitor for emergence of WmCSV and/or SqVYV in these regions.** Extensive mosaic virus symptoms on leaves, including fruit deformation and some internal fruit symptoms have been present in early fall in Merced and Fresno Counties associated with potyvirus and cucumber mosaic virus infections (aphid vectors, testing ongoing). Melon yellowing in Kern County associated with whiteflies is being evaluated as well.
3. **Field-validate newly developed multiplex quantitative RT-PCR for detection and quantification of WmCSV along with CYSDV, CCYV, and SqVYV.** The modified detection system has worked fairly well, but required some adjustments. Further laboratory testing is in progress to optimize this new multiplex system designed for the complex of whitefly-transmitted viruses common in the desert region.
4. **Conduct whitefly transmission tests to determine if melon breeding lines and varieties showing resistance when evaluated using Agro-inoculation (by Gilbertson Lab under separate proposal) have resistance to WmCSV when inoculated by whiteflies (this proposal).** Whitefly-transmission tests are awaiting completion of preliminary Agro-inoculation evaluations.
5. **Continue studies to determine if WmCSV infection reduces competitiveness of CCYV and/or enhances prevalence of CYSDV during mixed infections.** Limited studies to date do not support our early hypothesis that WmCSV reduces competitiveness of CCYV. Studies to date suggest CCYV infects plants most efficiently when it is the first virus to infect.