CALIFORNIA OLIVE COMMITTEE
2565 Alluvial Ave • Suite 182
Clovis, CA 93611
PHONE 559/456-9096 FAX 559/456-9099

AGENDA
Full Committee Meeting
Double Tree • Sonoma Room
Wednesday, June 13, 2018
11:30 a.m.
Conference Call Line: 1-877-366-0711 Passcode: 93458269#

I. Call to Order

a. Roll call
b. Approval of 12-13-17 Full Committee minutes (action item)
c. Chairman's comments

II. Marketing Subcommittee

a. Update on 2018 Marketing Activities

III. Inspection Subcommittee

a. Incoming & Outgoing 2018-2019 Inspection Charts (action items)
b. 2017 Import Inspection Report & Inspection Fees Update

IV. Review of Crop Estimates

a. NASS 2018 Estimate Forecast
b. 2018 Industry Crop Estimates (action item)

V. Executive Subcommittee

a. Sampson & Sampson 2017 Audit Review (action item)
b. 2018-2019 Crop Year Marketing Policy Statement (action item)
c. Compliance Plan (action item)
d. Export Program Update

VI. Research Subcommittee

a. 2017 Final Research Reports
b. Review & Update on 2018 projects

VII. Other Business

VIII. Closed Session

IX. Adjournment

Note: The COC prohibits discriminations in its programs on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or familial status. The COC is an Equal Employment Opportunity Organization. Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact Liza Ramon at 559-456-9096.

CALIFORNIA OLIVE COMMITTEE

June 1, 2017 – May 31, 2019

PRODUCERS

DISTRICT #1 (Counties of Alpine, Tuolumne, Stanislaus, Santa Clara, Santa Cruz all counties north thereof)

Members	Alternates
Pablo Nerey	Carolina Burreson
Ed Curiel	Michael Silveira
Edward Garcia	Chris Henderson

DISTRICT #2 (Counties of Mono, Mariposa, Merced, San Benito, Monterey, and all counties south thereof)

Members	Alternates
Mark Hendrixson	Julia Inestroza
Mark Heuer	Bert Quezada
Rick Benson	Joan Whelan-Vanderhorst
Pat V. Ricchiuti	Galen Pfeiffer
Vito DeLeonardis	John Patterson

HANDLERS

Members	Alternates
Colleen Sparda	Sergio Mendez
Tim T. Carter	Vacant
Jacob Peters	Vacant
Julia Tinsley	Phil Quigley
Janet Edwards	John Pieretti
Felix Musco	Benjamin Hall
Bill McFarland	Tracy Wood
Dennis Burreson	Scott Hamilton

CALIFORNIA OLIVE COMMITTEE

Full Committee Meeting Minutes
Wednesday, December 13, 2017
Double Tree Hotel – Modesto, CA

I. CALL TO ORDER

A meeting of the Full Committee was called to order by Mike SILVEIRA at 10:01 a.m., and the following members were present:

Members	Affiliation:
Mike SILVEIRA	GROWER
Doug REIFSTECK*	BELL CARTER
Rick BENSON*	GROWER
Carolina BURRESON	GROWER
Edward GARCIA*	GROWER
Dennis BURRESON*	MUSCO
Phil QUIGLEY*	BELL CARTER
Bill MCFARLAND*	MUSCO
Tracy WOOD*	MUSCO
Bert QUEZADA	GROWER
Chris HENDERSON*	GROWER
Mark HENDRIXSON*	GROWER
Pat V. RICCHIUTI*	GROWER
Mark HEUER*	GROWER
Sergio MENDEZ	BELL CARTER
Cody MCCOY*	BELL CARTER
Colleen SPARDA*	BELL CARTER
Ben HALL*	MUSCO
John PIERETTI*	MUSCO
Galen PFEIFFER	GROWER
Vito DELEONARDIS*	GROWER

OTHERS PRESENT:	
Alexander OTT	COC
Todd SANDERS	COC
Liza RAMON	COC
Elizabeth CARRANZA	COC
Debra KEENAN	RESEARCH 2000
Shelly PHILLIPS	CDFA
Shelly KESSEN	FLEISHMAN HILLARD

*Denotes voting members for the Committee

With the appropriate number of members in attendance and the seating of an alternate member, a quorum was established.

MOVED BY Bill MCFARLAND, duly seconded by Ben HALL, and unanimously carried THAT the minutes for November 30, 2017 for the Full Committee Meeting be approved. (Motion 12.13.17 #1)

II. MARKETING SUBCOMMITTEE

Each year, the Marketing Subcommittee approves a marketing plan with a contracted agency. Last year, the Committee contracted with Fleishman-Hillard (FH) to implement a marketing program and requested FH to propose a plan for 2018. FH developed a plan with a budget of $750,000 for the 2017 fiscal year. This year, FH is planning a marketing budget of $770,000.

Additionally, the Committee needs to approve travel for staff, and growers to various marketing events, association fees, partnerships and international program research. These items total of $58,500 making the total marketing budget $828,500.

1) Education and Partnerships - $58,500
    a. Alliance for Food and Farming
    b. CA Grown
    c. Partnerships
    d. Travel
    e. Olive Day
    f. Crisis Communication

Lastly, Fleishman-Hillard has two additional items that may be considered for the 2018 Marketing Program. These items include:

* NYC activation (IACP and media blitz)	$ 85,000
* Influencer activation (CA blossom and harvest tour)	$115,000
TOTAL	$200,000

MOVED BY Mark HEUER, duly seconded by Mark HENDRIXSON, and unanimously carried THAT the Committee adopt the Marketing Budget of $828,500. (Motion 12.13.17 #7)

MOVED BY Rick BENSON, duly seconded by Bill MCFARLAND, and unanimously carried THAT the Committee approve the NYC activation of $85,000. (Motion 12.13.17 #8)

MOVED BY Dennis BURRESON, duly seconded by Edward GARCIA, and unanimously carried THAT the Committee approve the Harvest Tour of $60,000. (Motion 12.13.17 #9)

MOVED BY Rick BENSON, duly seconded by Mark HENDRIXSON, and unanimously carried THAT the Committee to delegate authority from the Committee to the Executive Director with oversight by the Chairman, for Inter-Item transfer fund. (Motion 12.13.17 #10)

III. INSPECTION SUBCOMMITTEE

With the systems in place, the industry is seeing success in both the reporting and optical sizing. Adjustments and maintenance will be needed for the program to maintain the integrity of the system and to ensure the technology keeps up with software and other items.

For the 2018 FY, the following items are expenditures for the Inspection program.

1. Travel - $5,000
2. OERS Maintenance - $42,000
3. Optical Sizer (misc. as needed) - $30,000

Staff has put together a history of previous Inspection Committee Budgets.

FISCAL YEAR	*2018 (Proposed)*	*2017*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*
INSPECT	$77,000	$98,000	$102,000	$132,000	$0	$105,000	$50,000	$75,000	$50,000
%Differ	-27.2%	-3.9%	-29.4%	100.0%	-100.0%	110.0%	-50.0%	50.0%	-

MOVED BY Mark HEUER, duly seconded by Rick BENSON, and unanimously carried THAT the Committee adopt the Inspection Budget for the 2018 FY. (Motion 12.13.17 #2)

MOVED BY Cody MCCOY, duly seconded by Ben HALL, and unanimously carried THAT the Committee to delegate authority from the Committee to the Executive Director with oversight by the Chairman, for Inter-Item transfer fund. (Motion 12.13.17 #3)

IV. EXECUTIVE SUBCOMMITTEE

The following is the General Administration Budget for the California Olive Committee. Exports are separated.

Staff has put together a history of previous Executive Committee Budgets.

FISCAL YEAR	2018 (Proposed)	2017	2016	2015	2014	2013	2012	2011	2010
ADMIN	$401,200	$392,100[1]	$399,800	$393,500[2]	$333,800	$333,500	$415,900[3]	$324,923	$359,549
%Change	2.3%	-1.9%	1.6%	17.9%	.09%	-19.8%	28.0%*	-9.6%	24.6%
EXPORTS	$191,000	$121,000	$85,000	$72,000	$0	$0	$0	$0	$0
%Change	57.8%	42.3%	18.1%	100%	-	-	-	-	-
MAP/EMP	$250,000	$236,000							
%Change	5.9%								

[1] $121,000 of the total budget is dedicated to the export category, and the remaining $392,100 is for general administrative costs. General admin. decreased from $399,800 in 2016 FY to $392,100 this year, whereas exports increased from $85,000 to $121,000.
[2] The Committee approved dollars for crisis communication and legal activities coupled with $72,000 for industry studies. These studies were for additional research on specific items. Legal and crisis communication will be rolled over to next year for a reserve to be created going forward.
[3] The original approved Executive Sub-Committee budget for 2012 was $335,900. However, in order to begin electronic reporting, USDA required the Committee to approve $80,000 not used in research for the 2012 FY and reallocate to the Executive Sub-Committee, otherwise the project would have to be placed on hold. The mid-year correction increased the Executive Sub-Committee budget by $80,000 to total $415,900.

MOVED BY Mark HENDRIXSON, duly seconded by Vito DELEONARDIS, and unanimously carried THAT the Committee adopt the General Administration 2018 FY Budget. (Motion 12.13.17 #4)

MOVED BY Mark HEUER duly seconded by Bill MCFARLAND, and unanimously carried THAT the Committee to delegate authority from the Committee to the Executive Director with oversight by the Chairman, for Inner-item transfer fund. (Motion 12.13.17 #5)

MOVED BY Mark HENDRIXSON, duly seconded by Rick BENSON, and unanimously carried THAT the Committee to approve the use of legal counsel should one be needed with approval from the USDA. (Motion 12.13.17 #6)

V. RESEARCH SUBCOMMITTEE

Each year the Research Subcommittee approves various research projects funded by the Committee. The Subcommittee must which proposed projects to recommend to the Committee for funding. A budget of $312,777 is purposed based on the submitted projects.

2018 RESEARCH PROPOSALS FOR THE CALIFORNIA OLIVE COMMITTEE

TOPIC	LEADERS	AMOUNT
A new fruit removal head for an olive harvesting system	Reza Ehsani	$45,741
Canopy management, tree hedging and topping to optimize yield	Rich Rosecrance	$31,075
Managing Alternate Bearing in Olive with PGRs and Pruning	Carol Lovatt Elizabeth Fichtner	$20,698
Evaluation of Several Promising Additives for Reducing Acrylamide in Black Ripe Table Olives	Selina Wang	$53,280
Differentiation of olive cultivars using DNA and NMR-based fingerprinting methods	Selina Wang	$67,433
Southern San Joaquin Valley Olive Fruit Fly Monitoring Project	Jim Stewart	$6,400
Sacramento Valley Olive Fruit Monitoring Project	Ernie Simpson	$6,500
Epidemiology and management of olive knot caused by *Pseudomonas savastanoi* pv.*savastanoi*	J. E. Adaskaveg	$16,650
Contingency Fund		$50,000
Total		$297,777
*Sensory Research (research and key message development)		$65,000
*Management of foliar diseases of olive (Contingency Fund)	J. E. Adaskaveg	$15,000*

MOVED BY Mark HENDRIXSON, duly seconded by Chris HENDERSON, and unanimously carried THAT the Committee approve the$297,777 Research Budget for 2018 FY. (Motion 12.13.17#11)

MOVEDY BY Mark HEUER, duly seconded by John PIERETTI, and unanimously carried THAT the Committee approve the $15,000 Peacock research. (12.13.17 #12)

MOVED BY Rick BENSON, duly seconded by Pat RICCHIUTI, and unanimously carried THAT the Committee approve the $25,000 out of contingency for additional projects as needed. (12.13.17 #13)

MOVED BY Cody MCCOY, duly seconded by Doug REIFSTECK, and unanimously carried THAT the Committee delegate authority to the Subcommittee for contingency fund. (12.13.17 #14)

MOVED BY Pat RICCHIUTI, duly seconded by Vito DELEONARDIS, and unanimously carried THAT the Committee delegate authority for inter-item transfers, from the Committee to the Executive Director with oversight by the Chairman for the 2018 research budget. (12.13.17 #15)

VI. REVIEW OF FISCAL 2017 BUDGET

The following is the total 2018 FY Budget.

TOTAL 2018 BUDGET

BUDGETS	MARKETING	RESEARCH	INSPECTION	EXECUTIVE	EXPORT	TOTAL
2018	**$973,500**	**$297,777**	**$77,000**	**$401,200**	**$191,000**	**$1,940,477**
% Budget	50.2%	15.3%	4.0%	20.7%	9.8%	100%

HISTORIC BUDGET, TONNAGE, & ASSESSMENT COMPARISON

FISCAL YEAR	2018 (Proposed)	2017	2016	2015	2014	2013	2012	2011	2010
Previous	$1,940,477	$1,752,366	$1,525,415	1,296,731	1,129,682	$1,289,198	$1,197,291	$2,203,909	$929,923
% Difference	2.4% 17.5%	14.9%	15%	12%	-12%	7%	-46%	107%	-39.97%
Tonnage	90,188	63,000	77,977	37,119	90,790	78,179	26,944	167,000	22,150
%Difference	50.7%	-19.2%	110.1%	-59.1%	16.1%	190.2%	-83.9%	6.54%	-54.8%
Assessment Rate		$26.00	$26.00	$26.00	$15.21	$21.16	$31.32	$16.61	$44.72
% Difference		0%	0%	41%	-39%	-52%	89%	-63%	56%

MOVED BY Mark HENDRIXSON, duly seconded by Pat RICCHIUTI, and unanimously carried THAT the Committee adopt the $1,940,477 2018 FY Budget. (Motion 12.13.17 #16)

MOVED BY Mark HEUER, duly seconded by Mark HENDRIXSON, and unanimously carried THAT the assessment rate be set at $24.00 per ton. (Motion 12.13.17 #17)

VIII. ADJOURNMENT

Chairman Mike Silveira adjourned the meeting at 12:11 p.m.

December 14, 2017

Date: December 14, 2017

Liza Ramon, California Olive Committee

SUMMARY OF MOTIONS FOR DECEMBER 13, 2017

Motion 12-13-17 #1 **APPROVED**

MOVED BY Bill MCFARLAND, duly seconded by Ben HALL, and unanimously carried THAT the minutes for November 30, 2017 for the Full Committee Meeting be approved.

Motion 12-13-17 #2 **APPROVED**

MOVED BY Mark HEUER, duly seconded by Rick BENSON, and unanimously carried THAT the Committee adopt the Inspection Budget for the 2018 FY.

Motion 12-13-17 #3 **APPROVED**

MOVED BY Cody MCCOY, duly seconded by Ben HALL, and unanimously carried THAT the Committee to delegate authority from the Committee to the Executive Director with oversight by the Chairman, for Inter-Item transfer fund.

Motion 12-13-17 #4 **APPROVED**

MOVED BY Mark HENDRIXSON, duly seconded by Vito DELEONARDIS, and unanimously carried THAT the Committee adopt the General Administration 2018 FY Budget.

Motion 12-13-17 #5 **APPROVED**

MOVED BY Mark HEUER duly seconded by Bill MCFARLAND, and unanimously carried THAT the Committee to delegate authority from the Committee to the Executive Director with oversight by the Chairman, for Inner-item transfer fund.

Motion 12-13-17 #6 **APPROVED**

MOVED BY Mark HENDRIXSON, duly seconded by Rick BENSON, and unanimously carried THAT the Committee to approve the use of legal counsel should one be needed with approval from the USDA.

Motion 12-13-17 #7 **APPROVED**

MOVED BY Mark HEUER, duly seconded by Mark HENDRIXSON, and unanimously carried THAT the Committee adopt the Marketing Budget of $828,500.

Motion 12-13-17 #8 **APPROVED**

MOVED BY Rick BENSON, duly seconded by Bill MCFARLAND, and unanimously carried THAT the Committee approve the NYC activation of $85,000.

Motion 12-14-16 #9 **APPROVED**

MOVED BY Dennis BURRESON, duly seconded by Edward GARCIA, and unanimously carried THAT the Committee approve the Harvest Tour of $60,000.

Motion 12-13-17 #10 **APPROVED**

MOVED BY Rick BENSON, duly seconded by Mark HENDRIXSON, and unanimously carried THAT the Committee to delegate authority from the Committee to the Executive Director with oversight by the Chairman, for Inter-Item transfer fund.

SUMMARY OF MOTIONS FOR DECEMBER 13, 2017

Motion 12-13-17 #11 **APPROVED**

MOVED BY Mark HENDRIXSON, duly seconded by Chris HENDERSON, and unanimously carried THAT the Committee approve the $297,777 Research Budget for 2018 FY.

Motion 12-13-17 #12 **APPROVED**

MOVEDY BY Mark HEUER, duly seconded by John PIERETTI, and unanimously carried THAT the Committee approve the $15,000 Peacock research.

Motion 12-13-17 #13 **APPROVED**

MOVED BY Rick BENSON, duly seconded by Pat RICCHIUTI, and unanimously carried THAT the Committee approve the $25,000 out of contingency for additional projects as needed.

Motion 12-13-17 #14 **APPROVED**

MOVED BY Cody MCCOY, duly seconded by Doug REIFSTECK, and unanimously carried THAT the Committee delegate authority to the Subcommittee for contingency fund.

Motion 12-13-17 #15 **APPROVED**

MOVED BY Pat RICCHIUTI, duly seconded by Vito DELEONARDIS, and unanimously carried THAT the Committee delegate authority for inter-item transfers, from the Committee to the Executive Director with oversight by the Chairman for the 2018 research budget.

Motion 12-13-17 #16 **APPROVED**

MOVED BY Mark HENDRIXSON, duly seconded by Pat RICCHIUTI, and unanimously carried THAT the Committee adopt the $1,940,477 2018 FY Budget.

Motion 12-13-17 #17 **APPROVED**

MOVED BY Mark HEUER, duly seconded by Mark HENDRIXSON, and unanimously carried THAT the assessment rate be set at $24.00 per ton.

*****INFORMATION*****

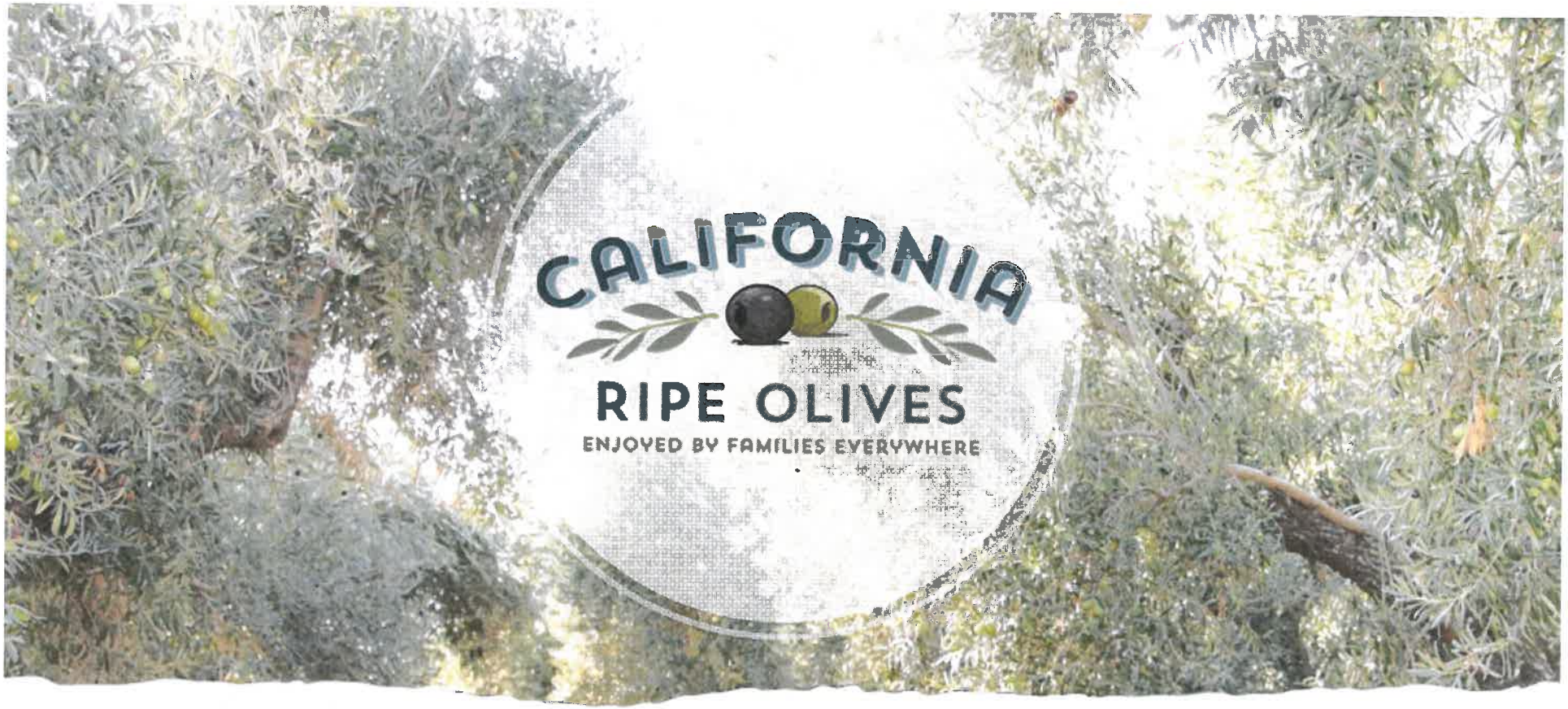
FROM: FULL COMMITTEE

SUBJECT: MARKETING UPDATE

BACKGROUND: In November of 2017, the Subcommittee approved the 2018 marketing plan presented by Fleishman Hillard. The plan featured various activities including:

- Media Partner
- Media Engagement
- Asset Development
- Social Media
- Website
- Retail
- Industry Communication
- NYC Activation
- Influencer Activation

Fleishman Hillard will present a brief progress summary on the 2018 COC marketing activities. The presentation is also available in the meeting packet.



CALIFORNIA RIPE OLIVES:

2018 CRISIS PLAN UPDATE

June 13, 2018

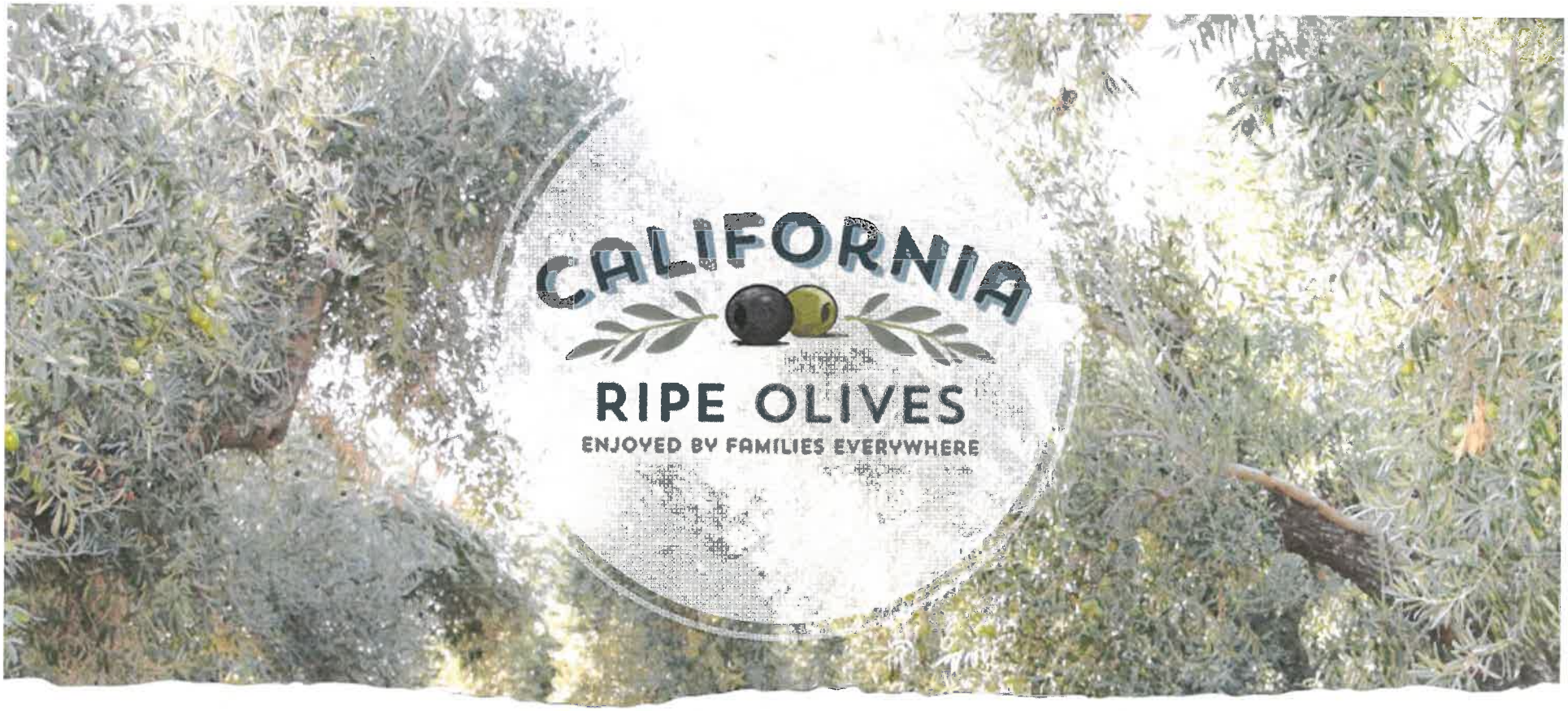
DISCUSSION:
VULNERABILITIES ASSESSMENT

Today's Action:

- Confirm existing vulnerabilities are/are not still a concern
- Add any new threats to the list
- Identify sources of expertise for each

Vulnerabilities identified (January 2013)

- General food safety and product recalls
  - ➢ Botulism
  - ➢ Sharp, foreign objects
- Acrylamide
- Bisphenol A or BPA
- Styrene
- Labor
- Water/water conservation



CALIFORNIA RIPE OLIVES:

2018 MID-YEAR PROGRAM HIGHLIGHTS

Presented By: FleishmanHillard | June 13, 2018

2018 MID-YEAR HIGHLIGHTS

CALIFORNIA RIPE OLIVES

2018 RECIPE FOR CONTINUED SUCCESS

Growers as the heart & soul...

2018 RECIPE FOR CONTINUED SUCCESS

Growers as the heart & soul...

Best-of-the-best national media partner...

2018 RECIPE FOR CONTINUED SUCCESS

Growers as the heart & soul...

Best-of-the-best national media partner...

High-profile media outreach and influencer engagement...

2018 RECIPE FOR CONTINUED SUCCESS

Growers as the heart & soul...

Best-of-the-best national media partner...

High-profile media outreach and influencer engagement...

Tasty global content...

2018 RECIPE FOR CONTINUED SUCCESS

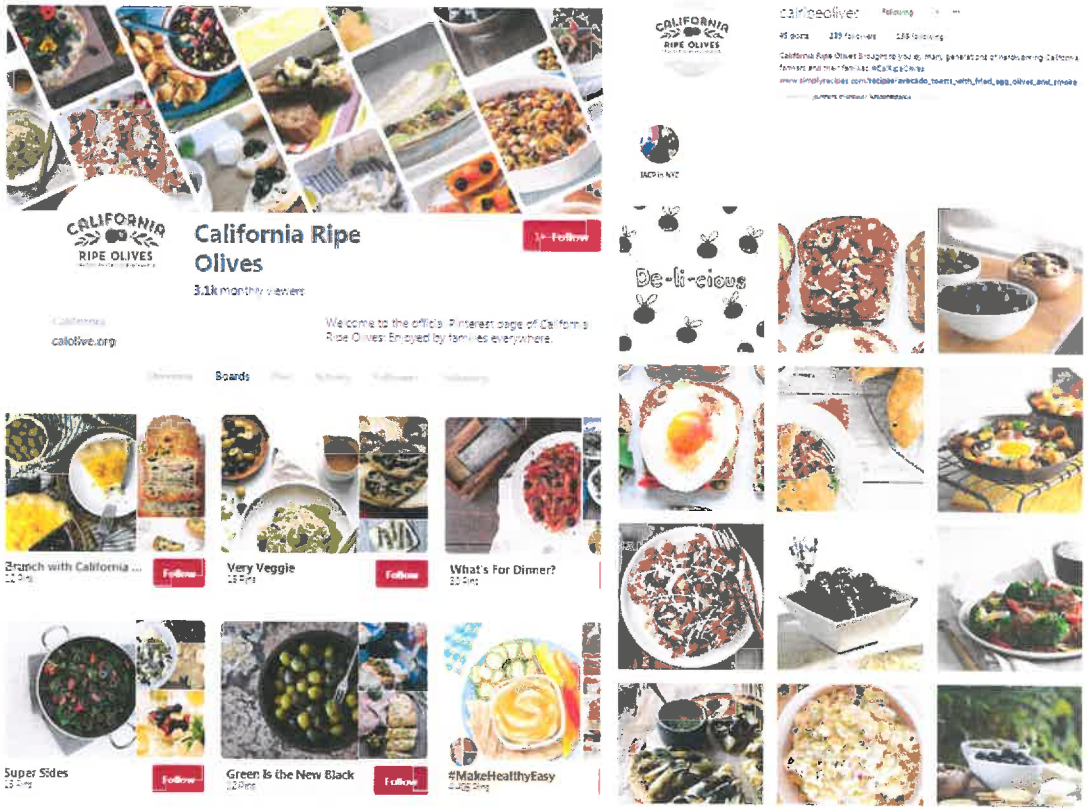
Growers as the heart & soul…

Best-of-the-best national media partner…

High-profile media outreach and influencer engagement…

Tasty global content…

Social expansion…



2018 RECIPE FOR CONTINUED SUCCESS

Growers as the heart & soul...

Best-of-the-best national media partner...

High-profile media outreach and influencer engagement...

Tasty global content...

Social expansion...

Retail advertising integration...

CALIFORNIA RIPE OLIVE GROWERS AT THE HEART OF IT ALL...

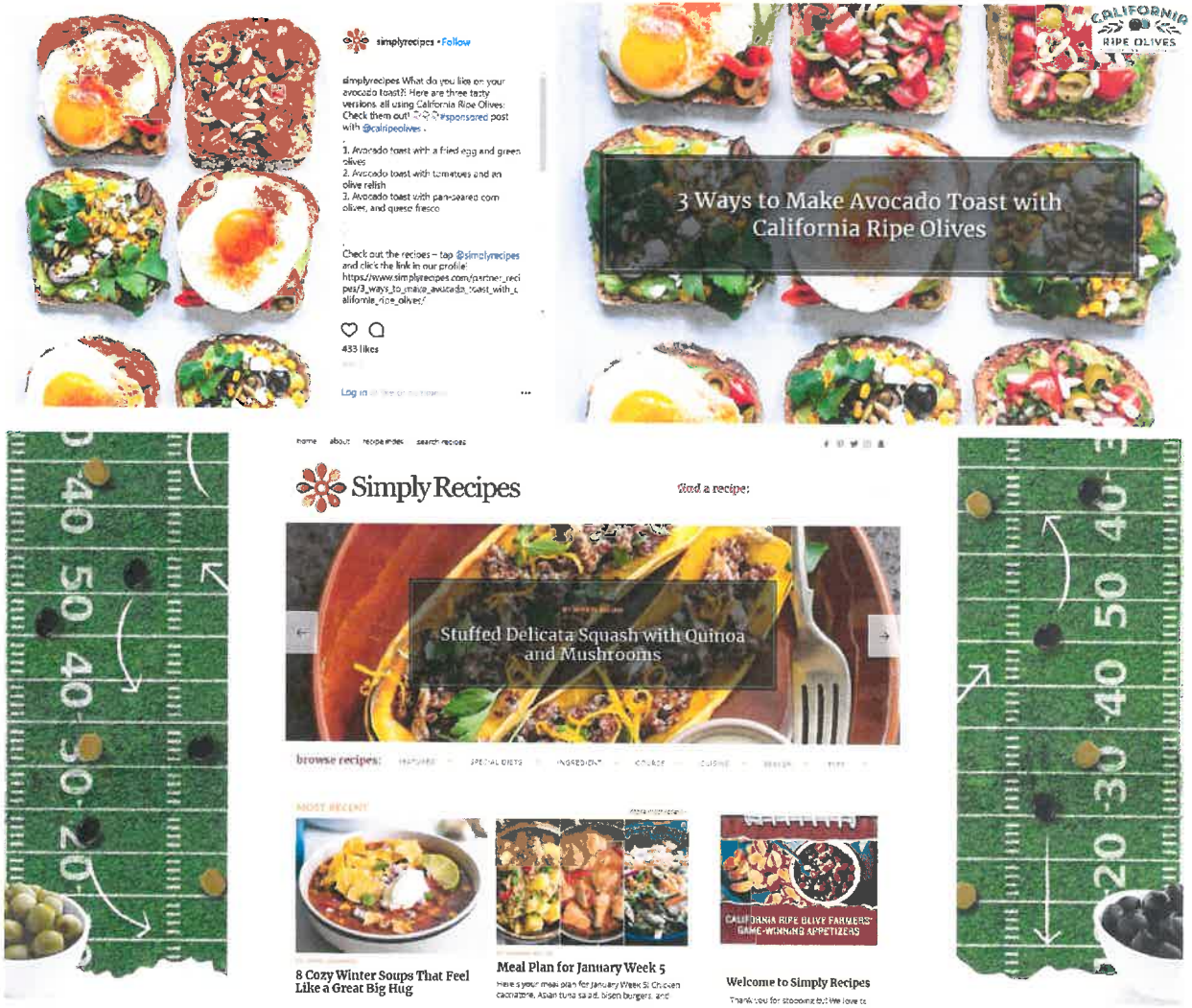
SIMPLY RECIPES = SIMPLY AMAZING

Super Bowl site takeover

- Custom homepage skin
- 5 game day banner assets
- 6.3 million impressions!

New content

- 3 ways to make Avocado Toast with California Ripe Olives
- 1 hub post + 3 supporting individual recipe posts



MAXIMIZING THE PARTNERSHIP & AMPLIFYING THE CALIFORNIA RIPE OLIVE STORY

In February, we took Elise Bauer + Jorge Inestroza on the road to NYC!

Extensive integration with the International Association of Culinary Professionals (IACP) annual conference in New York City

- Influencer retreat day sponsorship
- Expo table at Saturday lunch
- 1-hour cooking demonstration
- New York City chef showcase sponsorship

Editor meetings at top national publications

Nationally syndicated broadcast segment highlighting California Ripe Olives

SAVEUR

First for women

Good Housekeeping

OPRAH.com

REAL SIMPLE

FamilyCircle

TWO PEAS & THEIR POD

foodiecrush

Feel Good FOODIE

Gabby

Ella

HeatherChristo

FEEDING A GLOBAL TASTE FOR CALIFORNIA RIPE OLIVES...

SHARING CRAVE-WORTHY CONTENT ON SOCIAL

View Insights Promote

Liked by **thesuburbansoapbox, cookincanuck** and **57 others**
calripeolives Want to spice up brunch this weekend? Our "California Mary" is just what you need! #CalRipeOlives {link in bio}

View Insights Promote

Liked by **realfoodbydad, cookincanuck** and **65 others**
calripeolives Start spreading the news! We're visiting the city that never sleeps for @lacppix, follow all of our delicious adventures on our story. #CalRipeOlives

View Insights Promote

Liked by **thesuburbansoapbox, cookincanuck** and **50 others**
calripeolives It's #ToastTuesday! We are loving this recipe from @simplyrecipes. Avocado, a fried egg, peppers and California Ripe Olives make for the perfect way to start the day! {Link in Bio}

View Insights Promote

Liked by **thesuburbansoapbox, lifearoundmytable** and **39 others**
calripeolives Looks like the Easter Bunny has great taste Happy Easter, from all of us to you! #CalRipeOlives

View Insights Promote

Liked by **thesuburbansoapbox, cookincanuck** and **51 others**
calripeolives Another of our favorite #MeatlessMonday recipes coming at you! This roasted fennel and garlic socca flatbread from @snixykitchen is absolutely delicious and sure to make your Monday better. #CalRipeOlives {LinkInBio}

3.1k monthly views on Pinterest!
Social channels serving as a top 3 driver to website
90+ entries in first Instagram giveaway

Meet the Growers
17 Pins
Follow

Olives + Pizza = <3
13 Pins
Follow

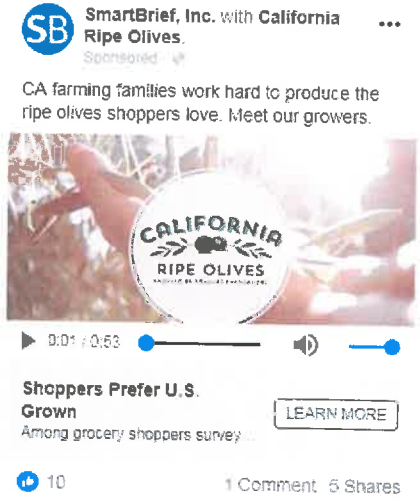
Green is the New Black
12 Pins
Follow

Tasty Tapenades
14 Pins
Follow

CALIFORNIA RIPE OLIVES RETAIL ADVERTISING UNDERWAY

Integrating grower content and messaging into year-long advertising plan

33 total ad insertions including in-book print advertisements, e-newsletters, website ads, dynamic web content and social media ads



Phil Lempert SUPERMARKET GURU · Winsight Grocery Business · The Shelby Report · Progressive Grocer · SN Supermarket News · FMI The Voice of Food Retail · SmartBrief

NEXT UP!

Simply Recipes &
California Ripe Olives Instagram recipe photo contest

California Ripe Olives mini-documentary development

- Distributed this fall via PBS stations with access to 5+ million viewers

California Ripe Olives grower video

California Ripe Olives harvest tour

Continued traditional media outreach, social media engagement and retail advertising

THANK YOU!

TO BE CONTINUED...

*******ACTION REQUIRED*******

FROM: INSPECTION SUBCOMMITTEE

SUBJECT: 2018-2019 INCOMING & OUTGOING INSPECTION REQUIREMENTS

RECOMMENDATION: THAT the Committee adopt the 2018-2019 Incoming & Outgoing Inspection Requirements.

BACKGROUND: Each year, the industry approves the Incoming and Outgoing Inspection Requirements. The following charts are used to ensure that the industry meets an acceptable U.S. standard and Marketing Order size regulations, in addition to the acceptable count ranges and mid-points. The following chart is for the 2018-2019 season.

FISCAL IMPACT: None

CALIFORNIA OLIVE COMMITTEE
INCOMING INSPECTION REQUIREMENTS
2018-2019

U.S.Standards & Marketing Order Sizes		Acceptable Count Ranges and Mid-Points (Per Pound)							
		Variety Group 1				Variety Group 2			
		Sevillano		Ascolano**		Obliza		Mission/Manzanillo*	
Size Designation	Avg Count Range Per Pound	Acceptable Count Range	Mid Point	Acceptable Count Range	Mid Point	Acceptable Count Range	Mid Point	Acceptable Count Range	Mid Point
Undersize	226-up	Undersize 106 - UP		Undersize 181- Up		Undersize 181- Up		Undersize 206 - Up	
Sub-Petite	181-225							181-205	193
Petite	141-180			158-174	166	158-174	166	158-174	166
Small	128-140			132-138 Ltd	135	136-140 Ltd	138	132-138	135
Medium	106-127			110-122	116	110-122	116	110-122	116
Large	91-105	91-105	98	91-105	98	95-101	98	91-105	98
Extra-Large Sev "L"	76-90	82-90 Ltd	86	--	--	--	--	--	--
Extra-Large	65-90	--	--	67-85	72-80	65-88	72-80	65-88	72-80
Extra-Large Sev "C"	65-75	67-73	70	--	--	--	--	--	--
Jumbo	47-60	47-60	47-60	47-60	47-60	47-60	47-60	47-60	47-60
Colossal	33-46	33-46	33-46	33-46	33-46	33-46	33-46	33-46	33-46
Super Colossal	32 or less	32 or less	32 or less	32 or less	32 or less	32 or less	32 or less	32 or less	32 or less

* Manzanillo includes Haas

** Ascolano includes St. Agostino and Barouni

Undersize

Limited Sizes

CALIFORNIA OLIVE COMMITTEE
OUTGOING INSPECTION REQUIREMENTS
2018-2019

SIZE REQUIREMENTS AND PERCENTAGE TOLERANCES

Size Designation	SEVILLANO		ASCOLANO*		OBLIZA		MISSION/ MANZANILLO**	
Undersize	Undersize		Undersize		Undersize		Undersize	
Sub-Petite							L 35% less than 1/205	
Petite			L 35% less than 1/ 180		L 35% less than 1/ 180 lb.			
Small							C 128-140	
Medium					C 106-127		106-127	
Large	LL 35% less than 1/ 105		C 91-105		91-105		91-105	
Extra Large			65-90	All sizes 5 % less than 1/ 105 lb.	65-90	All sizes 5 % less than 1/ 127 lb.	65-90	All Sizes 5 % less than 1/ 140 lb.
Extra Large	C 65-75							
Jumbo	47-60	All sizes 5% less than 1/ 75 lb	47-60		47-60		47-60	
Colossal	33-46		33-46		33-46		33-46	
Super Colossal	C 32 or less		C 32 or less		C 32 or less		C 32 or less	
	Tolerance (by count) 35% under 1/ 75 but not more than 10% under 1/ 86		Tolerance (by count) 35% under 1/ 105 but not more than 10% under 1/ 113		Tolerance (by count) 35% under 1/ 127 but not more than 7% under 1/ 138		Tolerance (by count) 35% under 1/ 140 but not more than 7% under 1/ 166	

* Ascolano includes St. Agostino and Barouni

** Includes Haas variety

L **LIMITED USE SIZE** and **PERCENTAGE TOLERANCES**

C

Tolerances apply to MINIMUM WHOLE OR PITTED CANNING SIZE:
Sevillano- Extra Large "C"; Ascolano- Large; Obliza- Medium; Mission/Manzanillo- Small

*****INFORMATION*****

FROM: INSPECTION SUBCOMMITTEE

SUBJECT: 2018 IMPORT INSPECTION REPORT & FEES

BACKGROUND: Each year the United States Department of Agriculture (USDA) provides the industry with an update on import inspection and inspection fees. A representative with the USDA will be present to provide information on the 2018-2019 import inspection and inspection fees. Additionally, a report on imported olives will also be provided.

Import Olives Entry Count by Country, Port, & Office Report

Report Date: 7/01/2017 to 5/22/2018

Report Data Source: USDA Specialty Crops Inspection Imports Database

Entry Count By Country	
Argentina	2
Egypt	312
Greece	21
Italy	38
Mexico	1
Morocco	779
Poland	2
Portugal	188
Solomon Islands	2
Spain	2241
Turkey	1
	3587

Entry Count By Office	
College Park	264
Covina	562
Hunt Valley	233
North Brunswick	1078
Oshkosh	119
Puerto Rico	4
South Bend	261
Stockton	80
Weslaco	636
Winter Haven	253
Yakima	97
	3587

Entry Count By Port	
Baltimore, MD	145
Boston, MA	4
Charleston, SC	102
Chicago, IL	234
Detroit, MI	18
Houston-Galveston, TX	630
Indianapolis, IN	121
Jacksonville,FL	11
Kansas City, MO	7
Long Beach, CA	2
Los Angeles, CA	560
Miami, FL	6
New York City, NY	20
Newark, NJ	1133
Norfolk, VA	15
Oakland, CA	36
Port Everglades, FL	60
Portland. OR	1
San Francisco, CA	44
San Juan, Puerto Rico	4
Savannah, GA	332
Seattle, WA	96
Tampa, FL	6
	3587

Imported Olive Meeting & Failing Lots Report

Report Date: 7/1/2017 to 5/22/2018

Report Data Source: USDA Specialty Crops Inspection Imports Database

Month	Year	Meeting Lot Count	Meeting Pounds	Failing Lot Count	Failing Pounds
1	2018	419	7952258	1	41682
2	2018	302	5920265		
3	2018	294	5190050		
4	2018	252	5139894	1	25410
5	2018	99	2208191	1	42525
6	2018	0	0		
7	2017	308	6699606		
8	2017	427	9312600		
9	2017	320	9352327		
10	2017	388	7511063		
11	2017	366	6487495	1	6311
12	2017	406	7948834	2	42160
		3,581	73,722,583	6	48,471

Total Lot Count:	3,587

Total Weight (lbs):	73,771,054

Percentage Failing (lbs):	0.07%

Imported Olives Failing Defect Count by Country - Cumulative

Report dates: 1/01/2004 to Present

Report Data Source: USDA Specialty Crops Inspection Imports Database

Country	Defect	Defect Count
Country	FailingReason	ReasonCount
Argentina	Color	1
Argentina	Defects	2
Argentina	Flavor	3
Argentina	Foreign Material	2
Argentina	Other	5
Brazil	Flavor	1
Egypt	Broken	1
Egypt	Color	1
Egypt	Flavor	8
Egypt	High Salometer	1
Egypt	Other	3
Egypt	Pits	1
Greece	Flavor	2
Greece	High Salometer	5
Italy	Character	3
Italy	Color	2
Italy	Defects	1
Italy	Flavor	11
Italy	High Salometer	6
Italy	Size	1
Lebanon	High Salometer	1
Morocco	Broken	2
Morocco	Defects	2
Morocco	Flavor	34
Morocco	Foreign Material	6
Morocco	High Salometer	1

Morocco	Other	1
Pakistan	Character	4
Pakistan	Size	4
Portugal	Broken	2
Portugal	Character	2
Portugal	Color	2
Portugal	Defects	1
Portugal	Flavor	1
Portugal	High Salometer	3
Portugal	Other	1
Portugal	Size	2
South Africa	Flavor	1
Spain	Broken	27
Spain	Character	1
Spain	Damage	1
Spain	Defects	12
Spain	Flavor	78
Spain	Foreign Material	20
Spain	High Salometer	24
Spain	Insect	1
Spain	Low Salometer	3
Spain	Other	25
Spain	Pits	2
Spain	Size	1
Tunisia	Character	1
Tunisia	Size	1
Turkey	Broken	1
Turkey	Character	3
Turkey	Defects	3
Turkey	Flavor	12
Turkey	High Salometer	2
Turkey	Low Salometer	1
Turkey	Other	4

Turkey	Size	1
Turkey	Undeveloped	1

*****INFORMATION*****

FROM: FULL COMMITTEE

SUBJECT: 2018 NASS ESTIMATE FORECAST

BACKGROUND: Every year, the National Agricultural Statistical Service (NASS) provides the industry with a forecast of the table olive crop for the upcoming season. This forecast assists the industry in preparation for the season and in budget planning for the next year. A representative from NASS is present to discuss and answer any questions regarding the 2018 crop forecast.

*****ACTION REQUIRED*****

FROM: FULL COMMITTEE

SUBJECT: 2018 INDUSTRY CROP ESTIMATES

RECOMMENDATION: THAT the Committee adopt a 2018 forecast.

BACKGROUND: Each year, the industry creates an internal crop forecast for the California Olive industry. The Committee will discuss and develop a 2018 crop estimate.

FISCAL IMPACT: None

*******ACTION REQUIRED*******

FROM: EXECUTIVE SUBCOMMITTEE

SUBJECT: SAMPSON & SAMPSON

RECOMMENDATION: THAT the Committee approves the 2017 FY audit.

BACKGROUND: A representative from Sampson & Sampson has completed the California Olive Committee's 2017 fiscal audit. The representative will present any findings to the Committee.

FISCAL IMPACT: None

*** * * ACTION REQUIRED * * ***

FROM: EXECUTIVE SUBCOMMITTEE

SUBJECT: 2018-2019 MARKETING POLICY STATEMENT

RECOMMENDATION: THAT the Full Committee approve the 2018-2019 amended Marketing Policy Statement.

BACKGROUND: Each year, the California Olive Committee (COC) must approve a Marketing Policy Statement. The Marketing Policy Statement (MPS) is an annual analysis of the industry that is used by the U.S. Department of Agriculture (USDA) to determine the effectiveness of the federal Olive Order 932 and its relationship to the requirement established by the Agricultural Marketing Agreement Act.

FISCAL IMPACT FOR 2018/2019: None

CALIFORNIA OLIVE COMMITTEE
MARKETING POLICY STATEMENT
2018-2019 CROP YEAR

The Committee is required to annually consider specific areas that directly affect the successful operation of the Marketing Order. This annual analysis of the industry is also used by the U.S. Department of Agriculture to determine the effectiveness of the Order in relationship to the requirement established by the Agricultural Marketing Agreement Act.

PROGRAM INVOLVED: Marketing Order No. 932 established in 1965 and amended in 1968, 1971, 1982, 1984, 1989, 1997, 2000 and 2005 regulating handlers of olives grown in California.

PROGRAM PURPOSES: Pursuant to the Act and continuing regulations, the purposes of the Order are: Orderly marketing between producers and handlers; assurance of product quality; improvement of grower returns and expansion of the market for California olives.

NEED FOR ACTION: The California Olive Committee (COC) continues to conduct research, marketing, inspection and compliance programs. The industry is facing many challenges from labor and water shortages, cost increases to acreage reduction, low growers returns, highly competitive imports and market changes. To meet these challenges the Committee has joined with the other Ripe Olive industry organizations to find solutions and create a workable plan to expand the viability of the California Ripe Olive industry. The industry is banning together more than ever before exploring new technologies, enhancing capabilities, leveraging marketing efforts and research to enhance quality.

JUSTIFICATION: Justification for such programming is contained in the Agricultural Marketing Agreement Act of 1937 as amended (7 U.S. C. 601-674) and through Marketing Order No. 932 as amended - Olives Grown in California.

AGENCY: U.S. Department of Agriculture, Fruit and Vegetable Programs, Agricultural Marketing Service.

CONTACT: Michelle P. Sharrow, Chief of the Marketing Order Administration Branch, Fruit and Vegetable Programs, Agricultural Marketing Service. Telephone: 202-720-9914.

ANALYSIS OF ECONOMIC IMPACT

ACREAGE AND PRODUCTION TRENDS: California produces approximately 95% of the olives grown in the United States. Olive growing areas are scattered throughout California with most of the commercial production coming from Tulare, Tehama, Glenn, Madera, and Fresno counties. For the first time the industry has plantings in Imperial Valley.

Olive production has fluctuated from an unprecedented low of 16,968 tons in the 2006-07 crop year to a high of 164,984 tons in the 2010-11 crop year. The yield per bearing acre has varied from 0.59 tons in 2006 to a high of 5.83 tons in 2010-11. A total of 17,040 bearing acres will be used for this analysis. Actual production since 1997 is listed in Table A.

Factors to consider in evaluating the potential 2018-19 crop year tonnage are:

1. Alternate bearing crop.

2. Bloom is looking normal.

USES FOR OLIVES GROWN IN CALIFORNIA: The primary use of California olives is for canned ripe olives which are eaten out-of-hand as a snack, in hors d'oeuvres, or as an ingredient in various entrees, side dishes and cocktails. They add texture, color and flavoring to any dish. A new growing trend is foodie crafts with olives being a natural fit.

RECEIPTS BY REGULATED HANDLERS: Historically 85-95% of the reported California olive crop has been delivered to regulated handlers. A portion of the total tonnage delivered to regulated handlers will be diverted to non-regulated uses in addition to the tonnage delivered to non-regulated handlers and oil processors.

EXPORTS: The canned olive market is historically a domestic market with only approximately 3 to 5% exported, primarily to Canada, Mexico, and Japan. Industry is exploring further exports to China, Southeast Asia, and South Korea.

PORTION OF COMMODITY AFFECTED: The portion of the California olive crop that is affected by the proposed actions those olives used in the production of canned ripe olives canning and limited sizes, which will be approximately 90% of total production.

IMPACT ON SUPPLY/DEMAND UTILIZATION: The Committee continues to utilize three areas marketing, research, and inspection programs to create a positive impact for the industry concerning supply and demand. Marketing efforts include an extensive database of industry assets, including recipes, photographs, grower videos and much more, that have been used to promote Ca olives through retail trade advertisements, digital and social media, and influencers. The story of our grower families has been a driving force in our marketing efforts. Research efforts have focused on cultural practices, pest and disease, and utilization of the latest technology to develop low cost solutions for producing olives in California. Lastly, inspection capabilities have been enhanced through an electronic reporting system to decrease waste, provide efficiency, reduce burden on canner staff and provide growers with more resources. The reporting system has been well received by growers. Growers are now able to make better management decisions in the field due to the real time data, as a result has provided back hire returns. The Committee has been making major strides over the past few years with efforts to assist growers in lowering production cost, while increasing the quality, supply, and demand of the product.

IMPACT ON SMALL BUSINESS: The Committee is required to assess the impact of its proposed regulations on small business units. The definition of a small grower unit is $750,000 in gross income. With approximately 900 growers producing less than 1,000 tons, and approximately 2% of growers producing more than 1,000 tons, a majority of all growers would be considered small olive producers.

A grower would have to produce approximately 1,000 tons of olives to be above the $750,000 gross income, required to meet the small grower definition.

The Committee's record keeping and reporting regulations do not affect growers directly since all regulations are enforced on the handlers.

The Committee's regulation on the use of limited fruit affects all growers equally. By permitting handlers to use "Limited Size" olives, a higher price is paid to growers for that fruit than if the handlers could not use it.

The definition of a small handler unit is "those having annual receipts of less than $6.5 million". Both handlers have olive sales above that level.

OTHER ECONOMIC EFFECTS:

Growers are benefited by the marketing order through all the core programs such as: research, marketing, inspection, and compliance. The research programs provide the grower with new ways to enhance the production of quality fruit, combat disease, monitor pests, and reduce production costs. Marketing programs provide an outlet to build awareness and educate consumers on the availability and quality of California Ripe Olives. Inspection programs continue to provide growers with third party inspection of fruit, less subjective technologies for sizing fruit, and an electronic reporting system. The electronic reporting system provides growers with real time data, which has provided tremendous value to the grower. Growers are making better management decisions, and due to the real time data feedback are resulting in higher returns. Compliance programs provide growers with grades and standards for domestic and foreign product.

The consumer benefits from the federal marketing order because of the quality regulations in place and an ongoing supply.

Table A each year the estimated bearing and non-bearing acreage of California ripe olives, the production, and yield per acre of California olive trees from 1997 through 2017.

TABLE A
ACREAGE AND YIELD - CALIFORNIA OLIVES
1997-2017

Year	Bearing Acres	Non-Bearing Acres	Total Acreage	Tons Produced	Tons Per Acre
1997	35,311	1,000	36,311	99,663	2.82
1998	35,311	1,000	36,311	85,375	2.42
1999	35,311	1,000	36,311	135,827	3.84
2000	35,311	1,000	36,311	49,331	1.40
2001	36,000	Unknown	36,000	129,977	3.61
2002	36,000	Unknown	36,000	94,446	2.61
2003	36,000	Unknown	36,000	107,997	2.99
2004	31,887	Unknown	31,887	92,245	2.89
2005	31,580	Unknown	31,580	123,589	3.92
2006	28,926	Unknown	28,926	16,968	.59
2007	27,599	Unknown	27,599	114,883	4.17
2008	27,599	Unknown	27,599	51,543	1.87
2009	28,615	Unknown	28,615	23,034	.80
2010	28,322	Unknown	28,322	164,984	5.83
2011	27,000	Unknown	27,000	26,945	.99
2012	25,090	Unknown	25,090	78,179	3.12

2013	22,956	Unknown	22,956	90,792	3.92
2014	19,271	Unknown	19,271	31,120	1.93
2015	19,299	Unknown	19,299	77,594	4.02
2016	18,409	Unknown	18,409	66,575	3.62
2017	**17,040**	**Unknown**	**17,040**	**90,237**	**5.30**

Source: CALIFORNIA OLIVE COMMITTEE

PRICES: Field prices are determined by a number of factors: the estimate of the oncoming crop, the individual handler inventory and sales projections, and negotiations with growers. Grower returns are affected by the olive size-grade, quality of fruit delivered, and cultural and harvest costs. The average parity price (as computed by the USDA) for olives in 2017 was $2,790 per ton. The price received by growers for the 2017 crop was approximately 48% of average parity.

Parity is a computed value based on government statistics and has no relationship to current prices or wholesale values. It is however, used by the USDA to determine if grower prices have reached a level at which regulations on handlers would not be permitted.

Table B reports the total Canning and Limited tons, average canning and limited prices paid to producers, average crop year parity price, and canning size price as a percent of parity.

TABLE B
CALIFORNIA OLIVES - GROWER PRICES

Year	Canning Size		Limited Size		Average	Canning Size
	Tons	Avg Price	Tons	Avg Price	Parity Price	Price-% of Parity
		$		$	$	%
1997	82,150	664	10,235	208	1,430	46
1998	64,161	540	12,830	200	1,420	38
1999	85,639	575	36,475	228	1,443	40
2000	41,260	742	6,571	380	1,468	50
2001	108,143	754	15,296	297	1,583	48
2002	79,113	672	9,893	306	1,603	42
2003	92,239	478	10,467	254	1,650	29
2004	69,737	720	16,126	276	1,692	43
2005	89,958	715	23,794	261	1,799	40
2006	14,667	961	2,176	249	1,864	52
2007	88,072	1,008	19,905	378	2,053	49
2008	43,360	1,109	5,891	381	2,195	51
2009	20,043	1,197	1,068	375	2,060	58
2010	114,930	1,040	36,754	378	2,333	45
2011	23,147	1,165	2,082	370	2,410	48
2012	68,044	1,150	6,062	333	2,578	45
2013	75,305	1,150	10,363	385	2,596	44
2014	29,078	1,207	5,648	419	2,840	43
2015	56,478	1,320	14,395	640	2,810	47
2016	50,675	1,354	10,920	751	2,673	51
2017	**66,244**	**1,345**	**17,184**	**784**	**2,790**	**48**

Average Price - Independent canner price not including standard bonus, extra bonus or hauling allowance.
Prices based on data compiled by Olive Growers Council.

TRADE DEMANDS: The market for California produced ripe olives in the United States is concentrated in retail and food service areas. Some ripe olives are used as ingredients in manufactured frozen or canned foods, but these usually come from fruit exempt from the Marketing Order requirements. Please note Table D represents olives processed and sold in the United States.

IMPORTS: Beginning in the 1981-82 crop year, supplies of California grown ripe olives were insufficient to consistently meet the demands of the market place. Processors in Spain & Morocco export canned California-style ripe olives into the U.S. Most of the imported product is sold to pizza chains and large foodservice distributors. Lower priced imports have replaced California olives for those customers whom are most sensitive to price. Unprocessed olives have been brought into California from Mexico, Spain, and Argentina for processing as canned ripe olives.

The effect of imports on California sales has resulted in a reduction in wholesale prices of specific items, lower grower returns and handler profits as canners lower selected prices to maintain volume. The threat of imports is in their lower cost, lower quality, governmental support, and an almost unlimited supply. If they continue to displace California product, growers' returns will continue to decline.

Effective with the start of the 2000-01 crop year, to date, the Committee has received monthly reports of imported sales by foreign countries, as well as imported bulk olives, which are mostly processed as California black ripe style. The report of canned ripe olives imports from foreign countries is obtained from the U.S. Customs Service. Table C shows imports expressed in U.S. tons for 2007-08 to date.

TABLE C
U.S. CUSTOMS IMPORT DATA
IN ***GROWER TONS***

CROP YEAR	WHOLE/PITTED FS & RETAIL	SLICED	WEDGED/ CHOPPED	TOTAL CANNED	BULK Aug 1-July 31	TOTAL IMPORTS
2007-08	8,053	61,601	4,163	73,817	9,265	83,082
2008-09	7,625	50,259	2,093	59,977	15,742	75,719
2009-10	9,775	56,696	4,341	70,812	27,494	98,306
2010-11	8,928	57,458	3,945	70,331	29,212	99,543
2011-12	8,439	60,209	4,475	73,123	4,641	77,764
2012-13	8,898	58,345	3,757	71,000	15,629	86,629
2013-14	10,277	63,923	3,961	78,161	12,878	91,039
2014-15	10,262	58,157	2,608	71,027	21,033	92,060
2015-16	11,142	64,611	2,958	78,711	8,185	86,896
2016-17	**11,384**	**52,074**	**2,163**	**65,621**	**13,813**	**79,434**

CURRENT SUPPLIES: Table D shows the canned inventory as of April 30, 2018 (but will be updated in July 2018) of consumer and food service size containers of whole, pitted, sliced, chopped,

wedged and broken pitted style olives, and certain key style and pack combinations. The projected sales for June and July are based on the average sales.

The estimated inventory as of July 31, 2018, and the month's supply of carryover are based on the estimated total sales for this year. The two handlers have unprocessed olives in storage. The estimated inventory should not be viewed in the total but as individual components for which trade demand varies dramatically.

Table D
Processed Ripe Olives in Cans (Converted into 24/300 Case Basis)

ITEM	10 Month Sales thru 04/30/2018	Estimated Sales June & July 2018	Estimated Total Sales 2018-2019	Inventory 4/30/2018	Estimated Inventory 7/31/18	# Months Supply as of 8/1/18
TOTAL	8,610,785	1,722,157	**10,332,942**	7,476,702	9,968,937	12
MARKETS						
CONSUMER FOOD	6,499,514	1,299,903	**7,799,417**	5,825,001	7,766,667	12
SERVICE	2,111,271	422,254	**2,533,525**	1,651,701	2,202,267	10
STYLES						
WHOLE	6,260	1,252	**7,512**	16,898	22,532	36
PITTED	5,278,390	1,055,678	**6,334,068**	5,110,533	6,814,044	13
WEDGED	25,657	5,131	**30,788**	37,349	49,799	19
SLICED	3,106,938	621,388	**3,728,326**	2,171,143	2,894,857	9
CHOPPED	175,142	35,028	**210,170**	120,931	161,242	9
BROKEN PITT	18,398	3,680	**22,078**	19,848	26,463	14
KEY ITEMS						
24/300 Pitted	5,025,920	1,005,184	**6,031,104**	4,811,452	6,415,270	13
6/10 Pitted	239,906	47,981	**287,887**	282,595	376,792	16
6/10 Sliced	1,809,342	361,868	**2,171,210**	1,278,923	1,705,232	9
24/300 Whole	4,774	955	**5,729**	13,217	17,624	37
6/10 Whole	1,486	298	**1,784**	3,681	4,908	33
6/10 Wedged	24,509	4,902	**29,411**	35,146	46,861	19
2.25 Sliced	484,302	96,860	**581,162**	262,634	350,180	7
4.5 Chopped	134,160	26,832	**160,992**	58,919	78,560	6

PRODUCTION, ESTIMATED CROP SIZE AND QUALITY: Crop estimate questionnaires will be mailed to olive producers in accordance with procedures established by the National Agricultural Statistic Service and the California Olive Committee. Growers will be contacted by phone for their estimate. Since the computation of this survey will not be available when the Committee meets on June 13, 2018, the results of the grower survey will be submitted as an amendment to this Marketing Policy Statement when that survey is available. There are only two large regulated handlers for the industry, and confidentiality can still be breached by taking a handler survey at this time. The crop estimate listed on the next page is a survey of handler and producer members attending the June meeting:

VARIETY	California Olive Committee SURVEY June 13,2018 Tons	GROWER SURVEY (NASS) August 12, 2018 Tons
Sevillano Manzanillo Other	**XXX**	**XXX**
	(all varieties combined)	
TOTAL		

SUMMARY: The marketing order specifies the minimum grade and size requirements for olives that may be used in the production of canned ripe olives. The use of limited size olives will be allowed for "limited use" styles of canned ripe olives because the Committee voted unanimously on June 13, 1996 to recommend that canning smaller olives of the "limited use" size be permitted on a continuing basis. This regulation is the same that has been recommended in all but two years (1971-72 and 1980-81) since the establishment of the Marketing Order. This will permit the maximum utilization of the California olive supply for retail and food service use based on historic practices. The fresh olive Limited size mid-points will be same as those used for the 2017-2018 crop.

Amended: XX

*** * * ACTION REQUIRED * * ***

FROM: EXECUTIVE COMMITTEE

SUBJECT: 2018-2019 ANNUAL COMPLIANCE PLAN & E-COMPLIANCE PLAN

RECOMMENDATION: THAT the Committee approve the 2018-2019 Annual Compliance Plan and E-Compliance Plan.

BACKGROUND: Every year the California Olive Committee must approve the Annual Compliance Plan (ACP). The ACP describes compliance strategies, resources, and activities for the current year. USDA requires that this program be established in order for the industry to comply with the Order and regulations. Additionally, the ACP must be in place to provide the COC the procedures needed in the event that violations are brought forth to the Committee.

Additionally, in 2010, USDA required the Committee to file an E-Compliance Plan. This compliance plan is a USDA template which staff completes on behalf of the Committee. By 2011, USDA requested the Committee to approve both the completed E-Compliance Plan and ACP Plan. Although both plans are similar and duplicative, USDA has stated that both plans must receive approval from the Committee.

FISCAL IMPACT FOR 2018/2019: None

ANNUAL COMPLIANCE PLAN
FOR THE
CALIFORNIA OLIVE COMMITTEE

(Marketing Order 932 - Olives Grown in California)

I. THE PURPOSE OF THE ANNUAL PLAN

This compliance action plan describes compliance strategies, resources, and activities for the current year. It is formulated to assist the California Olive Committee (COC) and its staff, as well as the Agricultural Marketing Service, in assuring that all olive handlers are complying with the marketing order (order) and regulations. It is also designed to assure that the COC and its employees are following prescribed procedures, an essential prerequisite when violations are brought forward for criminal and civil prosecution. Following these procedures assures that all handlers are treated equitably.

II. BACKGROUND OF MARKETING ORDER 932 (REGULATING OLIVES GROWN IN CALIFORNIA)

The COC was established in 1965 and is composed of 8 handler members and 8 producer members. The order, as contained in the Code of Federal Regulations, 7 CFR Part 932, regulates the handling of olives grown in California. The order authorizes the establishment of minimum grade and size regulations with mandatory incoming and outgoing inspections. The order authorizes production and marketing research, and paid promotion activities. The order also permits fruit of certain sizes too small to be of good value as whole or pitted olives to be utilized in chopped, segmented (wedged), and sliced form. Finally, the order authorizes the collection of assessments to fund the approved program activities. No regulations or restrictions are imposed upon producers by the order. All provisions apply to the handling of olives, and only handlers are assessed and billed for the COC's expenses.

III. INDUSTRY BACKGROUND

Agricultural industries differ considerably. The production and handling of the many various specialty crops provide a unique perspective of California agriculture. Consider the following features of this state's and the nation's olive industry:

1. Virtually every olive grown commercially in the United States is grown in California.
2. Olive trees have an alternate-bearing characteristic, yielding large crops one year and smaller crops the next year. A record crop was harvested in the 2010 season with 164,984 tons delivered. The smallest crop harvested in recent years was in the 2006 season, with 16,968 tons delivered. Handlers try to hold higher inventories in years with larger crops to provide fruit for sales in years with smaller crops. Similarly, the COC plans program activities, budgets expenses, and recommends assessment rates based upon this crop characteristic.
3. The COC has established both a crop year and a fiscal year. The crop year begins August 1 while the fiscal year begins January 1. Actual crop harvest begins in September and usually continues through mid-November.
4. Several styles of olives are exempt from regulations: Greek, Sicilian, fresh shipments to market, and olive oil. Exemptions may be obtained from the COC for fruit that is used in new product market tests.

5. Assessments are based upon handler receipts of canning and limited size fruit. The budget and assessment rate are recommended after the fruit is received so that the total assessable receipts are known.
6. Delinquent assessments are subject to an interest charge and a 5% penalty late charge. The interest rate is calculated at 2% above the current commercial prime rate.
7. Handlers are required to report all olive receipts, sales, use, packout, and inventory of olives grown in California to the COC.
8. Records of olives acquired, held, and disposed of shall be retained by each handler for two years beyond the crop year in which the transaction occurred.
9. Olives are covered under the Agricultural Marketing Agreement Act of 1937, Section 608e; therefore, regulation of imported fruit is mandatory. Any grade and size regulation pertaining to the domestic crop also applies to imports of similar styles of olives.
10. Olives are subject to both incoming (when delivered by the grower to the handler) and outgoing (after processing) inspection. The incoming inspection is to establish weights, size-grades, and quality of olives received in natural condition. Outgoing inspection is for processed grade and size regulations. All inspections are based upon the U.S. Standards for Grades of Canned Ripe Olives (7 CFR part 52) and additional size tables adopted by the COC.
11. Receipts of "tree-ripened" fruit require that the handler notify the COC and the inspection service. Such fruit must be kept separate from other fruit received and in storage.
12. At the beginning of the current crop year and fiscal year there are two major handlers in the industry.

IV. REPORTS

The order requires that each handler report receipts of fruit, sales, utilization, packaged and bulk inventory, and packouts. The following forms are used by handlers to comply with this requirement.

A. The *Weight and Grade Report* (Form COC-3A/3C) is required as part of the incoming regulations. The report should contain at least the following information:

i. lot number
ii. date received/time received
iii. variety
iv. number and type of containers
v. name of handler
vi. name of producer
vii. county of production
viii. weight certificate number
ix. net weight
x. method of size-grade determination (lot or sample)
xi. weight of sample if size graded by sample, and
xii. the quantity of olives of each size designation.

The information from this report provides the basis for determination of canning, limited, undersize and cull olives; and also provides the basis for the handler payment to the producer. The inspection service shall certify this form.

B. The *Report of Olives Received* (Form COC-19) is a weekly report showing by size designation and culls:

i. the respective quantity of each variety received
ii. seasonal total receipts of each variety to date.

C. The *Report of Limited, Undersize and Cull Olives* (Form COC- 5) is a report filed with the COC upon disposition of limited, undersize and cull olives. The report should contain the following information:

i. name of handler
ii. name of consignee
iii. number of containers
iv. type of containers
v. variety
vi. net weight of limited, undersize and culls disposed of
vii. style (whole or pitted)
viii. outlet
ix. handler or inspection service comments

This permits the COC to verify that the cull and undersize fruit has not been used in the production of canned ripe olives. The disposition of such fruit is done under the inspection of Shipping Point Inspection (SPI). All required disposition of non-canning olives shall be completed not later than September 30 of the crop year following the one in which the obligation is incurred or such later date that a handler may specify in a notice filed with the COC at least 15 days prior to September 15 of such subsequent crop year. Such notice shall show that a handler has sufficient quantity of olives held in storage to meet his obligation.

D. The *Pack and Certification Report* (Form COC-4) is a report from the handler of daily pack, certified by the inspection service, which contains the following information:

i. name and address of handler
ii. date
iii. place of inspection
iv. variety
v. style of pack
vi. fruit size
vii. number of cans per case
viii. can size
ix. can code
x. total number of cases of packaged olives
xi. remarks (inspection grade/failed lots)

E. Reports are required monthly that show the quantity of packaged olives of the ripe and green ripe types <u>*sold*</u> during the month. Such reports include the following information, as applicable:

i. With respect to the whole, pitted, and broken pitted styles: each style is reported separately in terms of the quantity of each size of olives. Such quantity is reported in terms of the total amount packaged in each of the container sizes listed on the form. The Form COC-29a is used for this type of report. Monthly sales of green ripe olives are listed on the form.
ii. Limited use styles - halved, sliced, segmented (wedged) and chopped - are reported in terms of the quantity of each style packaged in each of the container sizes listed on the form. The Form COC-29b is used for this report.

F. *Packaged Olive Inventory Reports* are monthly reports showing the total quantity of packaged olives of the ripe and green ripe types held in *inventory* storage at all locations on the last day of the preceding month. Such reports shall contain the following information:

i. With respect to whole, pitted, and broken pitted styles of packaged olives, each style is reported separately in terms of the packaged quantity of each size designated on the form. Such quantity shall be reported in terms of the total amount packaged in each of the container sizes listed on the form. Green ripe olive inventories are listed on the form. The Form COC-27a is utilized for this report.

ii. Halved, sliced, segmented (wedged), and chopped styles of packaged olives of the ripe and green ripe type are reported in terms of the quantity of each style packaged in each of the container sizes listed. The Form COC-27b is utilized for this report.

G. *Natural Condition Olive Bulk Inventory Reports* are monthly reports showing the total quantity of natural condition olives held in *bulk storage* at all locations on the last day of the preceding month. Such reports shall contain the following information if applicable:

i. The total tonnage of natural condition olives held in storage which are of any size that may be used in the production of packaged olives of the whole or pitted styles shall be reported in terms of the total quantity of each size designated. This report is filed on Form COC-27c.

ii. The total tonnage of natural condition olives held in storage by the handler which are of sizes that may be used in the production of packaged olives of the halved, sliced, segmented (wedged), or chopped style shall also be reported on Form COC-27c.

H. *Packout Reports* are monthly reports showing the total production of packaged olives of the ripe and green ripe types. Such reports shall include the following information, as applicable:

i. With respect to the whole, pitted, and broken pitted styles of packaged olives, each style shall be reported separately in terms of the total quantity of each size designated on the form. Such quantities shall be reported in terms of the total amount packaged in each of the container sizes listed on the form. Green ripe olives shall be listed on the form. This report is filed on Form COC-28a.

ii. Halved, sliced, segmented (wedged), and chopped styles of packaged olive shall be reported in terms of the quantity of each style packaged in each of the container sizes listed on the form. This report is filed on Form COC-28b.

iii. Monthly reports come to the COC office via email (scanned/signed pdf.), fax and mail from the handlers. They are date stamped, logged in Monthly Report Register, for record. The reports are then added into the computer for a continuing report the COC office keeps, and works in conjunction with CASS to make available through the CASS website for public review (as our industry currently has 2 handlers). Once the CASS report is up on site and "live" then the COC office blast emails the CASS reports to the entire industry.

I. The *Report of Interhandler Transfers* (Form COC-6) is filed within ten days of such transfer. The transferring handler reports natural condition shipments to the COC with at least the following information:

i. name and address of the transferring and receiving handlers
ii. date of the transfer
iii condition of fruit, either natural condition or processed

iv. weight, number, and size of each type of container

v. variety

vi. transfer of obligation of Limited, Undersize or Culls.

Packaged olives cannot be transferred via an interhandler transfer. Such transfers are considered sales and are reported on Form COC-30.

J. The *Interhandler Sale or Purchase of Canned Ripe Olives* (Form COC-30) is used to report sales or purchases of processed canned ripe olives between regulated handlers. The form contains the following information:

i. name and address of originating handler (seller)
ii. name and address of receiving handler (buyer)
iii. details of the transaction: type, size, style, can size, number of cases
iv. signatures of originating and receiving handlers

K. The *Report of Assessable Tonnage* (Form COC-13) is an annual report of assessable tonnage received by variety and an estimate of tonnage expected to be diverted to exempt use.

L. The *Report of Final Assessment Payment* (Form COC-17) is an annual form verifying the amount of assessable tonnage of fruit handled and the actual and/or estimated exemptions. It also indicates previous payments to satisfy assessments levied.

M. The *Authorization of Grower to Combine Lots* (Form COC-23) is used by the handler to indicate when lots have been combined by the permission of the grower. This is a seldom-used form. The report contains the following information:

i. name and address of handler
ii. date of authorization
iii. variety (separate form required for each variety)
iv. weight & grade certificate numbers included in combination
v. signature of producer or agent
vi. county
vii. number of containers
viii. net weight

N. The *Report of Special Shipments* (Form COC-155) is used by handlers to request permission to package and market experimental shipments of olives in order to conduct marketing research and development projects. Each application must provide at least the following information:

i. quantity of olives to be utilized (no more than 5% of crop year acquisitions)
ii. specific market outlet
iii. flavorings or other added ingredients
iv. style
v. type of olives (black or green)
vi. container size
vii. variety
viii. sizes
ix. date when product to be packaged
x. name and address of handler
xi. place of inspection
xii. certification that all marketing order requirements met

xiii. certification that product will be kept separate
xiv. purpose and nature of request
xv. estimate of time needed to complete the test.

The reporting requirements as they currently exist provide cross-checks and safeguards against violations within the industry. The fact that the growers and the handlers, as an industry, support the order assists in that regard.

V. RESOURCES

Both incoming and outgoing inspection are required under the order. Because incoming inspection is provided by SPI, and outgoing inspection by USDA Processed Products Branch (PPB), a high level of integrity in total receipts and output per handler is maintained. Cross-checks by COC's staff utilizing incoming and outgoing inspection certificates, pack, storage, disposition, exempt, inventory, and sales reports can account for virtually all fruit handled by each of the two regulated handlers in the industry.

Inspectors representing the PPB remain at the processing plant while handling and processing are underway. Inspectors with SPI remain on the premises while fruit is received, weighed, and size-graded. Receiving may be at the processing plant itself or may be at one or more of the handler's receiving stations. Each station may have more than one SPI inspector, depending on the amount of fruit received. SPI oversees the lot sampling, with the assistance of handler employees. Inspectors for the PPB are authorized to act in the stead of the SPI inspectors, if necessary. It should be noted that industry has begun moving forward.

The COC staff is represented by the Executive Director, Program Supervisor and a Programs Coordinator. A portion of each staff members' time is compliance related. Estimated time:

Executive Director	20%
Program Supervisor	50%
Programs Coordinator	30%

VI. COMPLIANCE ACTIVITIES

Compliance activities that specifically address potential violations of these provisions are as follows:

1. Provide information to handlers annually to remind them of their regulatory responsibilities;
2. Identify and visit handlers to discuss regulatory requirements (i.e., record keeping, reporting, assessments, grade, size, pack and container);
3. Receive, investigate, document, and report to AMS complaints of violations of order provisions;
4. Check handler reports as to completeness, accuracy, and timeliness;
5. Monitor handler payments of assessments and late payments;
6. Reconcile handler reports with incoming inspection certificates;
7. Monitor disposition of obligation fruit using handler reports and verify, on a spot-check basis, with third-party records obtained from end users;
8. Periodically visit handlers, announced and unannounced, during the season to observe handling operations and monitor compliance with order provisions.

PART II

DETAILS OF THE COMPLIANCE ACTIVITIES

1. Provide information to handlers annually to remind them of their regulatory responsibilities.

ACTIONS:		FREQUENCY:
1.1	Send out Annual Compliance Plan, Annual Marketing Order Policy Statement to all handlers, Committee members, and to other interested parties via Email, Fax, or Postal Mail. Packet should contain information relating to reporting, regulatory requirements, etc.	In late June or early July, in preparation for the Annual Crop Meeting.
1.2	Send out via Email or Fax to Handlers and Receiving Stations the upcoming crop-year's receiving guidelines.	In August at the start of the crop year.
1.3	A copy of the meeting packet that is mailed out to the committee members in preparation of upcoming annual crop meeting- containing the Annual Compliance Plan, Annual Marketing Order Policy	Whenever a rule change occurs, or a new member or alternate member is appointed to the Committee.
1.4	A copy of the meeting packet that is mailed out to the committee members in preparation of upcoming annual crop meeting- containing the Annual Compliance Plan, Annual Marketing Order Policy Statement, Antitrust Guidelines, COC Bylaws, updated Incoming and Outgoing Inspection Charts, and other pertinent current information is added to the Chronological Monthly Files, to be kept as permanent record.	As needed

2. Identify and visit handlers to discuss regulatory requirements (i.e. record keeping, reporting, assessments, grade, size, pack and container.)

ACTIONS:	FREQUENCY:

2.1	Discuss the regulatory and reporting requirements with handlers.	As necessary during the season, such as when a report is not received, or is not properly completed. As necessary during season, such as when a handler is not meeting grade, size, pack, or other requirements.
2.2	Visit handlers to clarify questions on grade, size, pack, etc. COC staff should document contact with handlers and record observations from each visit, phone call, or email.	
2.3	The Committee identifies new handlers via the Olive Growers Council. The California Olive Committee then sets up a meeting with the new handler, the inspection service, and MOAB to inform them of their responsibilities as a handler under Marketing Order 932. All correspondence with the new handler, including faxes, emails, call reports, etc., is documented and placed in their handler file.	

3. Receive, investigate, document, and report to AMS complaints of violations of Marketing Order provisions. (Rules 932.139, 932.149, 150, 151 & 152)

ACTIONS:		FREQUENCY:
3.1	When a complaint is received (e.g., complaint from industry grower or handler, notice from Inspection Service, etc.) assess the merit of the complaint and action, if any, needed to be taken.	Immediately upon receipt of the complaint.
3.2	Investigate the complaint by visiting the handler, reviewing handler documents, contacting third parties, etc., as needed to resolve the complaint.	After assessing the merit of complaint, above.
3.3	Document all complaints of Marketing Order alleged violations, including Committee follow-up actions, if any, and report to the Department.	Immediately after following up and investigating the complaint.

4. Check handler reports as to completeness, accuracy and timeliness. (Rule 932.161)

ACTIONS:		FREQUENCY:
4.1	Report of Olives Received (Form COC-19)	
	a. Record receipt of, review form for completeness, check accuracy of figures.	Weekly, during receiving season.
	b. Verify handler totals compiled at COC with final report from handler. Cross-check against total receipts recorded from Forms COC-3A/3C.	Annually.
4.2	Disposition and Obligation (Form COC-5)	
	a. Obligation for Limited, Undersize and Culls established when final receipts recorded from each handler.	Annually.
	b. Disposition recorded from each COC-5 in each category for each variety.	Monthly or As necessary.
	c. Remaining Obligation calculated and Form COC-8 sent to handler for verification.	Monthly or As necessary.
	d. Any discrepancies discussed with handler.	As necessary.
	e. Compare remaining obligation with handler's storage tons to ensure sufficient fruit available to meet obligation.	At end of crop year.
	f. When obligation fulfilled for each crop year, handlers notified in writing.	As necessary.
4.3	Pack and Certification Report (COC-4)	
	a. Reports scanned for any failed lots. Recorded in ledger.	Upon receipt.
	b. Disposal of failed lots recorded as they occur.	Upon receipt.

	c. Handler records checked or physical inventory taken of outstanding failed lots.	As necessary.
4.4	Sales, Inventory, Pack Reports (COC-27a, 27b, 28a, 28b, 29a, 29b)	
	a. Record receipt of, review forms for completeness, check accuracy of figures. Contact handler if form is incomplete or late.	Monthly.
	b. Audit handler's sales invoices, inventory controls, etc.	Periodically or as needed following a complaint.
4.5	Natural Condition Olive Bulk Inventory Reports (COC-27c)	Monthly.
	a. Record receipt of, review forms for completeness, check accuracy of figures.	
	b. Audit handler storage facilities at cannery.	Periodically or as needed following complaint.
4.6	Interhandler Transfers (COC-6)	
	a. Record any obligation transfers from transferring handler to receiving handler. Report on COC-8 to handler.	As reported.
4.7	Interhandler Sale or Purchase (COC-30)	
	a. Verify both originating and receiving handler signatures.	As reported.
	b. Investigate how this sale has been reported by each handler on their monthly sales reports to eliminate any double reporting.	
4.8	Combination of Lots (COC-23)	
	a. Verify weight & grade certificate numbers and net weights. (Note: This form is seldom used)	As necessary.

4.9 Report of Special Purpose Shipments (COC-155)

a. Communicate to handlers that a request for experimental shipments must be received by COC at least 10 days prior to shipments.	Annually.
b. Notify the inspection service that COC has approved a special purpose shipment.	At time of approval.
c. Verify that it will be kept separate by a means satisfactory to inspection service.	At time of pack.
d. Follow up disposition of experimental shipment with handler.	According to time frame reported on COC-155.

4.10 Upon receipt, each report is date-stamped and initialed to show timeliness of report. The weekly and monthly reports are recorded on a register and kept in folder. The Register includes the date received, who reviewed report and the accuracy of the report. Should there be a discrepancy, the handler is notified, documented, handler employee signed, and date stamped with the corrected/revised corresponding report and updated/included in file. Files are set up for each type of report and all records are continually updated, kept for permanent record in secured file cabinets.

5. Monitor handler payments of assessments and late payments. (Rule 932.139 & 221)

ACTIONS:	FREQUENCY:
5.1 Compare handler receipts as reported on Form COC-19 to receipts reported on Form COC-13 "Statement of Assessable Tonnage."	Annually after crop completely harvested.
5.2 Calculate handler's assessment due. Notify handler of amount due and payment schedule via Postal mail, Email, or Fax. Send handler copy of Federal Register notice of budget and assessment approval upon receipt from CAMFO.	Annually. (January)

5.3	Send assessment bills to each handler via Postal Mail, Email or Fax, followed by phone call to confirm it was received.	Monthly Payments
5.4	Calculate, and apply, on a consistent basis, late payment and interest charges to all delinquent accounts. Mail assessment penalty notices (Form COC-16) via Registered Mail.	If payment not received by postmarked due date.
5.5	Notify AMS when delinquent notifications are sent.	As necessary.
5.6	Report status of all delinquent accounts to AMS per Compliance Manual instructions.	As necessary.
5.7	Delinquent assessments will be collected in accordance with procedures detailed in the AMS Compliance Manual (Page 20)	As necessary.
5.8	Both handlers are notified via email and fax, followed up fax journal copy attached for record to each handler, files are set up with each handler's schedule and invoice amounts. Upon receipt each check is date-stamped, Master Assessment Register is updated, recorded, and then check is deposited.	As necessary.

6. Reconcile handler reports (COC-19) with incoming inspection certificates (COC-3A/3C).

ACTIONS:		FREQUENCY:
6.1	Compare handler receipts as reported on Form COC-19 with receipts as recorded from the COC-3A/3C Weight & Grade Certificates.	Annually.
6.2	Weight & Grade Certificates include trash (leaves, stems, etc.) weight. COC-19 reports do not. A discrepancy of 1-5% is acceptable depending on crop size and conditions. Discrepancies above 5% will be investigated.	As necessary.
6.3	Work with handler to resolve any discrepancies, by verifying certificate I.D. numbers, identifying revised, replaced, duplicate or voided certificates, checking individual batch or certificate totals by variety and net weight, if necessary.	As necessary.

6.4	Each receiving station sends the COC-3s in bulk, where COC staff puts them into batches, adding the total weight, using the calculator tape (twice) to verify the figures. A second person enters all pertinent data into a producing county report to verify and compare against the cumulative report (of first of each handler's CO-19 report,-and to later determine assessments) then, the harvest of the crop year, against the cumulative report of the COC-19. All hard copies are stored in files/boxes for permanent record.	As necessary.

7. Reconcile handler reports to outgoing inspection certificates.

ACTIONS:		FREQUENCY:
7.1	Reconcile COC-4 (Pack & Certification Report) with monthly forms COC-28(a) and COC-28(b).	Quarterly.
7.2	Track disposition of failed lots as recorded on COC-4.	On-going. Failed lots are opened and repacked or disposed of according to handlers' own schedule.
7.3	Investigate those lots which cannot be accounted for in conjunction with PPB and the handler.	As necessary.
7.4	The COC-4's get date stamped and reviewed to ensure that all reports have passed, and if so, then collected monthly, by date and number sequence, and boxed for permanent record up to completing each crop year (August 1st through July 31 next year), especially for such cases as in the event of periodic auditing that is required. If any COC-4's have "failed lots" then the COC office is required to contact the handler to investigate what was the outcome of that "accounted for" fruit. The documentation is kept in a log binder for permanent record.	As necessary.

8. Monitor disposition of obligation fruit using handler reports and verify, on a spot-check basis, to third party records obtained from end users.

ACTIONS:		FREQUENCY:
8.1	See 4.2	See 4.2
8.2	Conduct spot check audits to verify COC-8 balances of remaining obligation with handlers' actual inventory.	Periodically.

8.3	Spot check audit reports are completed and kept in secured file cabinets, along with all contact documentations, which are periodically updated.	As necessary.

9. Periodically visit handlers, announced and unannounced, during the season to observe handling operations and monitor compliance with Marketing Order provisions.

ACTIONS:		FREQUENCY:
9.1	Visit canneries (announced and unannounced) during regular working hours, and verify handlers are having their products inspected. Observe handling of incoming fruit, size certification, disposition of obligation fruit, inventory controls, etc.	Visit all handlers' main plant and receiving stations at least once during receiving season and at least once during remainder of crop year.
9.2	Verify handler sales records for a randomly selected period (e.g. month) for randomly selected items, with sales invoices, printouts and other handler records.	Annually or as necessary.
9.3	Contact handler on any discrepancies observed during the visit, or when verifying handler records as described above.	Immediately.
9.4	Document and log all visits.	As necessary.

Revised
Lramon 07/16

USDA Agricultural Marketing Service

For your convenience, you may copy and paste into this document.

2018-2019

e-Compliance Plan

California Olive Committee

Full name of Marketing Order Program

932

Marketing Order No.

1. Sending information to handlers annually reminding them of their regulatory, reporting, and record keeping responsibilities.

a. List the types of documents that will be sent to handlers reminding them of their regulatory and reporting requirements during the crop year.

Annual Compliance Plan
Crop year receiving guidelines
Federal Marketing Order 932
Marketing Policy Statement

(e.g., marketing order, current regulations, specific handler reports.)

b. Regulatory requirements will be sent on or around: Mid August

(e.g., September 1, August 1, etc.)

c. Describe what methods will be used to send regulatory requirements and amendments to handlers and what form of documentation will be used to confirm whether the requirements have been sent to all handlers.

Email and regular mail. E-mail verification, mail logs and certified mail (when necessary) will be utilized to provide traceable documentation.

(e.g., methods: regular mail, e-mail, facsimile, hand-delivered; and confirmation: a mailing log, certified return receipts, e-mail return receipts, facsimile transmission logs.)

d. Amendments will be sent to handlers: as implemented

(e.g., as implemented, in the beginning of the crop/calendar year.)

2. Identify and visit handlers to discuss regulatory requirements (e.g., record keeping, reporting, assessments, volume and disposition), observe handling operations, and monitor compliance with marketing order provisions.

a. How does the Marketing Order Program (program) learn of new or potential handlers? When will regulatory and reporting requirements be discussed with new or potential handlers? How will the discussion be documented?

On an as needed basis. A meeting will be held to discuss all regulatory requirements. The handler will also be provided with all the documentation explaining what is required. Discussions will be documented in meeting minutes.

(e.g., a new handler typically calls to say he/she intends to begin operating as a handler, regulatory requirements are discussed with the new handler as soon as the program learns of the handler's intent to operate, and these discussions are documented in the form of a memorandum of discussion.)

b. When will regulatory and reporting requirements be discussed with existing handlers? How will these discussions be documented? (Activity 2.f. specifically refers to hander audits.)

Yearly and on an as needed basis. Handlers will be issued every year a Compliance Agreement, Receiving Guidelines, Marketing Policy Statement and Federal Marketing Order 932. A copy of the packet with cover letter is provided as documentation in COC office files.

(e.g., as needed during the season, such as when a report is not received or is not properly completed and the discussions are documented in the form of memorandum of discussion.)

c. Will a representative of the program periodically visit handlers to observe their operations?

Yes ☑ No ☐ A waiver has been requested and included

d. If yes, what types of activities will be observed during these periodic visits at handlers' operations? How often will these visits take place? How will these visits be documented? Explain below. (Activity 2.f. specifically refers to handler audits.)

The visits will be documented with a handler visit log. Activities that will be conducted include receiving, packing, inspection and reporting.

(e.g., observes where failing products are going; visits handlers weekly; keeps a memorandum of visit)

Program Supervisor will visit 100 % of handlers this crop year.
(e.g., Committee Manager, Compliance Officer.)

e. If less than 1/3 of all handlers will be visited, what percentage of the total volume of production will those handlers that will be visited represent? 0.00 %

f. Will the program conduct handler audits?

Yes ☑ No ☐

g. If yes, how will the audits be documented?

All handlers will be audited and will be documented by filing a handler visit log with audit specified as the activity. The COC also issues a letter of correspondence on any findings.

(e.g., handler audit files are filed by year and then by handler, all handlers will be visited within an audit cycle of four years.)

100.00 % of handlers will be audited this crop year.

Note: If done, the program should ensure all handlers audits will be conducted within a four- year audit cycle.

3. Receive, investigate, document and report to the Marketing Field Office (MFO), complaints of violations of program provisions.

a. Describe how the program receives complaints of marketing order violations. Additionally, explain how the program will investigate, substantiate, and document such allegations and related compliance action.

When a complaint is received (i.e., complaint from industry grower or handler, notice from Inspection Services, etc.) we assess the merit of the complaint and take action, if any, is needed to be taken. After assessing the merit of complaint, the Committee will investigate the complaint by visiting the handler, reviewing handler documents, contacting third parties, etc., as needed to resolve the complaint. Immediately after following up and investigating the complaint and reviewing all documents of Marketing Order alleged violations, the Committee will follow-up with necessary actions, if any, and report of the department.

(e.g., complaints are usually received from other handlers; program investigates complaints by visiting the handler, reviewing handler documents and contacting third parties; all documentation is kept in complaint files by handler including any communications between the program and the handler.)

b. Describe the process of sending a case referral report to the MFO after a complaint has been substantiated.

A follow-up will be sent to the MFO as a case referral report immediately after substantiating the violations.

(e.g., follow up action will be sent to the MFO as a case referral report immediately after substantiating the violation.)

4. Check handler reports for completeness, accuracy and timeliness.

a. List all of the reports the program anticipates receiving from handlers and third parties, including from inspection stations/service, this coming crop year. Also, provide when each report is due or typically received.

COC 3 Immediately upon receipt of each lot of natural condition olives for which inspection is required
COC 4 per packout
COC 5 Prior to disposition of noncanning olives
COC 6 one copy to the committee with 10 days following receipts of the olives
COC 13 issued after the crop is received by COC and requested back within 15 days or before December COC meeting. It depends on the nature of crop timing
COC 15 issued monthly as an invoice to collect assessments
COC 17 at the end of November annually
COC 19 weekly during season
COC 23 as needed when a grower combines a lot
COC 27a not later than the 15th day of each month
COC 27b not later than the 15th day of each month
COC 27c not later than the 15th day of each month
COC 28a for each month and not more than 15 days after the end of such month
COC 28b for each month and not more than 15 days after the end of such month
COC 29a for each month and not more than 15 days after the end of such month
COC 29b for each month and not more than 15 days after the end of such month
COC 30 as needed when a handler transfers a lot to another handler
COC 155 at least 10 working days prior to the shipment of such packaged olives to test markets

(e.g., special purpose shipment reports- 9/1, note sheets, - daily.)

b. The program should be able to determine when a report was received and should review reports in a timely manner after receipt. Describe how the program will determine if reports are received when due. Also, describe how the program ensures reports are reviewed in a timely manner. In addition, what actions will the program take with handlers that have missing/late reports?

Monthly reports are due by the 15th of every month with five day grace period allowed. Other reports are received on annual basis or as needed. Reports done through e-mail and fax are dated automatically when sent and received. Reports are date stamped when they are received by COC. If reports are not provided on a time a follow up call is made to ask for submission. If submission is not made, a letter will be issued on non-compliance.

(e.g., date-stamping reports upon receipts, data entry the same day received, electronic dates; after three unsuccessful attempts by phone, visit and letter to obtain a handler report, the program will document the attempts and report the violation to the MFO in the form of a case referral report.)

c. Explain how the program will check its reports that are received from handlers for accuracy.

By reviewing and comparing to counterpart documentation.

(e.g., handler reports are reconciled with incoming and outgoing inspection certificates.)

d. If changes or corrections will be necessary to a report, explain how authorization by the handler to make the necessary changes or corrections will be obtained and documented. If handlers are required to resubmit their handler reports, explain how the handlers will be contacted.

By phone or e-mail.

(e.g., authorization is conducted by a confirmation letter, facsimile, e-mail or phone call from the handler.)

5. Monitor handler payments of assessments.

a. Explain how handler assessments are determined.

Handler reports and COC 19 forms.

(e.g., Assessments were billed by inspection certificates, invoices; assessments were self-reported by handlers sending in handler reports.)

b. Will the program have controls in place over processing deposits (accounts receivables)?

Yes ☑ No ☐

c. Handler assessments will be collected on a monthly basis.
(e.g., weekly, monthly, quarterly.)

d. Copies of invoices, reports and past due notices will be retained in files by: handler.
(e.g., handler, month, quarter.)

e. The first past due notice will be sent to handlers 15 days after the invoice date.
(e.g., 30, 60.)

f. The second past due notice will be sent to handlers 35 days after the invoice date.
(e.g., 30, 60.)

g. Will the program charge a late payment fee and/or interest rate on delinquent accounts?

Yes ☑ No ☐

h. If yes, describe the late payment fee and/or interest rate on delinquent accounts below. You may include the citation in the marketing order as a description.

The marketing program will charge a late payment fee of 5% of unpaid and/or interest rate of prime + 2% on accounts that are 30 days past due.

Note: Please check the marketing order to see if imposition of interest rate and/or late payment fee, penalties are mandatory.

i. Will the program take any further actions in attempting to collect past due assessments from handlers (e.g., phone call or visit) before referring the action to the MFO?

Yes ☑ No ☐ If yes, explain below.

phone calls and e-mails will be utilized to gain payment.

j. At 60 days, delinquent accounts will be referred to the MFO for appropriate action.
(e.g., 65, 90.)

6. Monitor compliance through inspection services, disposition of exempt, special purpose shipments, restricted, substandard, off grade, other failing, and/or residual commodities using handler reports.

a. Will the program monitor any waivers of inspections for handlers?

Yes ☑ No ☐ N/A ☐ If applicable, explain below.

Reviewing the waiver application for that handler and ensuring that the handler is an compliance.

(e.g., reviewing the waiver application for a handler and ensuring that the handler is in compliance.)

b. Will the program monitor an export program under the marketing order?

Yes ☑ No ☐ N/A ☐ If applicable, explain below.

The COC has included an industry studies section in the budget for 2018 which allocates funds for export activities in China, Japan, Southeast Asia, Mexico, and Canada, and will also be utilizing MAP funds to begin an international program in Japan. The COC was also awarded EMP funds that are being used to conduct market assessments in India and China.

(e.g., determining whether there are discrepancies between the amounts reported by the handler, USDA inspectors, and/or shipping reports.)

c. Will the program monitor handlers that conduct special purpose shipments?

Yes ☑ No ☐ N/A ☐ If applicable, explain below.

The handler must file for COC 155 for special purpose shipments.

(e.g., reconciling handler's reports to the receiver's copies of the special purpose shipment reports submitted to the program.)

d. Will the program monitor the disposition of off-grade and/or other failing products?

Yes ☑ No ☐ N/A ☐ If applicable, explain below.

We compare with the COC 5 numbers.

(e.g., using surveillance to ensure failed product is used in only approved outlets.)

e. Will the program contact third parties, which includes inspection services, on a spot-check basis to monitor compliance with marketing order and/or inspection requirements?

Yes ☐ No ☐ N/A ☑ If applicable, explain below.

We currently don't have a third party spot checks.

(e.g., contacting buyers, consignees, brokers, retailers, terminal markets, and road guard stations.)

7. Other Compliance Activities

a. List any additional compliance activities that will be monitored by the program and have not been discussed previously. Also, discuss how these activities will be documented.

N/A

(e.g., reserves, inventories, diversion programs, controlled buys, etc.)

b. List any sections or provisions of the program's marketing order that will not be in effect for the upcoming crop year. Additionally, list any new marketing order activities that are anticipated that will go into effect.

Sections 932.13, 932.22, 932.51, 932.109, 932.151 were amended in 2017 to suspend the incoming inspection size grading requirement for the current crop year through informal rule making action. The effective date should be at the beginning of the 2016 crop year and ripe olive harvest season August 1, 2016. That way, all olives received will be size-graded

(e.g., diversion program will not be in effect for this crop year, export program may be in effect sometime during this crop year.)

8. Financial Audit Policies

a. Name of Certified Public Accountant (CPA) that will conduct audit: Sampson & Sampson ; if not known, put TBD.

b. How many years has the CPA conducted the audit for the program? 18 year(s).
(e.g., 3, 5)

c. Explain the process of your CPA presenting the annual written report findings below.

The CPA provides a letter and in person report to the Committee.

(e.g., CPA will provide a written report in person at the December program meeting; CPA will participate in a video conference at their April meeting; or CPA will provide report to the audit subcommittee who will report to the program at the May meeting.)

d. Will the program have its audits conducted in accordance with Generally Accepted Government Auditing Standards (GAGAS a.k.a. The Yellow Book)? You may visit: http://www.gao.gov/govaud/ybk01.htm for further information.

Yes ☑ No ☐ If no, explain below.

e. Does the program have any audit deficiencies from the prior year audit?

Yes ☐ No ☑ If yes, describe how the program resolved the deficiencies below; if deficiencies have not been resolved, explain how the program intends to do so.

f. Does the program receive any federal grant funds?

Yes ☑ No ☐ If yes, describe the funds below:

The COC has received another $100k in MAP funds for 2018 to continue export activities in Jap

(e.g., MAP, TASC, FSMIP. Please do not include specialty crop block grants from state departments of agriculture.)

9. Internal Control Policies

Please note that the term "staff members" used throughout this plan means employees, as well as individuals, who are employed by an organization that provides administrative services to the program on a contract/agreement basis. Refer to questions 9.a.

a. Will the program segregate duties among its staff members (e.g., will one staff member handle the accounts receivable and another handle accounts payable)?

Yes ☑ No ☐ How many staff members do you have? 2

b. Will the program use an independent contractor or some other type of organization to perform its management and/or administrative services? (For employee dishonesty insurance purposes)

Yes ☑ No ☐ If yes, attach a copy of the current contract.

If yes, what is the name of the independent contractor or organization that the program will be using?

California Apple Commission

c. What are the names and e-mail addresses of the program officers?

Chairperson(s)

Mike Silveira
msilveira@wilburellis.com

(Name(s) and e-mail address(es))

Vice Chairperson(s)

Dennis Burreson - dennisb@olives.com

(Name(s) and e-mail address(es))

Treasurer

Doug Reifsteck - dreifsteck@bellcarter.com

(Name(s) and e-mail address(es))

Secretary

Doug Reifsteck - dreifsteck@bellcarter.com

(Name(s) and e-mail address(es))

Assistant Treasurer (if applicable)

N/A

(Name(s) and e-mail address(es))

Assistant Secretary(s) (if applicable)

N/A

(Name(s) and e-mail address(es))

Other Officer Positions (if applicable)

N/A

(Name(s) and e-mail address(es))

d. Are any of the above officers a manager or staff member of the program?

Yes ☐ No ☑ If yes, identify officer(s) below.

e. Who is the Chairperson of the Audit Subcommittee? If not applicable, state N/A below.

N/A

(e.g., name or N/A.)

f. Is the Audit Subcommittee Chairperson a member or alternate on the program?

Yes ☐ No ☐ N/A ☑ (if there is no Audit Subcommittee)

g. Will the program commingle federal funds with any other funds? If a clearing account is used to split dual payments of assessments, the program may mark "No."

Yes ☐ No ☑

h. Will the program comply with Agricultural Marketing Service (AMS) Directive 2210.2 Investment of Public funds? Upon request, you may receive a copy of the policies from MOAD Compliance and Enforcement Branch.

Yes ☑ No ☐

i. Are all investments of a maturity period of one year or less, risk free, and interest bearing?

Yes ☑ No ☐ If no, explain below.

j. Are all accounts at financial institutions members of Federal Deposit Insurance Corporation (FDIC)?

Yes ☑ No ☐ If no, explain below.

k. Are all funds in separate accounts which are covered by the FDIC limit for each bank (standard coverage up to $250,000) or collateralized for any funds in excess of the FDIC limit?

Yes ☑ No ☐ (If collateralized and the program has a letter, please attach).

l. Has the program changed financial institutions in the past year?

Yes ☐ No ☑ If yes, provide the name(s) of the new institution(s) and date(s) of change.

m. Will the program inform MFO if there is a change in financial institution in the future?

Yes ☑ No ☐

n. The program maintains fidelity bond/employee dishonesty insurance in the amount of $ 5 million (coverage should be at least 1/3 highest liquid asset).

o. If applicable, is the program listed on the independent contractor's/organization's fidelity bond/employee dishonesty insurance?

Yes ☐ No ☐ N/A ☑

p. What is the highest amount of liquid assets that the program will receive this year?

$ 2 million
(e.g., assessments, savings, etc.)

q. Will a duplicate copy of the monthly bank statement be sent directly to an officer of the program or will they have electronic viewing access?

(If the program's annual revenue exceeds $500,000, this activity is *mandatory*.)

Yes ☐ No ☑ If no, provide explanation below.

Due to the fact there are only two handlers, financial information is proprietary; thus, no committee members (including officers) will see the bank statements. Should a member see the statements, the volumes handled by each handler would become obvious. For this reason, bank statements are not sent directly to Committee members or officers nor do they have electronic viewing access. The process the COC has had in place for several years is that the book keeper will reconcile the accounts, attach the bank statements to the reconciliations and forward that information to the Executive Director. Thus, allowing the Committee to verify the reconciliation in the absence of the members.

r. Will the program replace a manager's signature with a facsimile signature or rubber stamp on checks?

Yes ☐ No ☑

s. Will the program have appropriate written policies which have been approved by the program, for credit card use and approval of expenditure?

Yes ☑ No ☐ N/A ☐

t. Will the program have appropriate written policies, which have been approved by the program, for incurring and approving expenses?

Yes ☑ No ☐ N/A ☐

u. When was the program's internal control policy last reviewed and approved: 19/06/2017
(e.g., dd/mm/yyyy)

v. Explain the procedures to hire qualified and experienced personnel.

All applicants for positions with the COC will undergo a formal vetting and interview process with the COC Executive Subcommittee. A formal vote will be conducted by the Executive Subcommittee following interview process in order to select COC personnel deemed qualified and experienced by consent of the Executive Subcommittee.

10. Operational controls

Please note "appropriate management" should be the next higher level of management. For example, if a manager of a program is the same person who is preparing the vendors invoices for payment or is doing the bank reconciliations, then the manager would need to get an officer of the program to approve those transactions. In other instances, appropriate management can be the Manager or the President of the program. Refer to question 10.c., 10.f. and 10.g.

a. Will checks received for payment of assessments be restrictively endorsed "For Deposit Only"?

Yes ☑ No ☐

b. Do all deposit slips omit handler identifiable information?

Yes ☐ No ☑

c. Will vendor invoices be reviewed and approved by appropriate management prior to being paid?

Yes ☑ No ☐

d. Will bank statements be attached to bank reconciliations before being approved by a program officer? (e.g., program Treasurer)

Yes ☐ No ☑

e. Provide the names of those individuals who are authorized users of credit cards. Also, provide the type, number of credit cards and credit limit that have been issued to each of the individuals.

If not applicable, state N/A below.

Elizabeth Carranza, Program Supervisor, 1 Visa, Alexander J. Ott, Executive Director, 1 Visa and Todd W. Sanders, 1 Visa. The credit cards are property of the Committee and are paid by the Committee. Employees must reconcile all receipts in accordance with the bill.

(e.g., John Smith- 1 Visa, 1 Exxon; Mary Jones- 1 Visa, etc.)

f. Will appropriate management review and approve credit card statement(s) before statements are paid?

Yes ☑ No ☐ N/A ☐

g. Will travel expenditures be approved by appropriate management?

Yes ☑ No ☐ N/A ☐

h. All program checks must be signed by two individuals. Who are the two primary signers of the program's checks? Provide their names and titles, and indicate whether they are an employee, officer or contractor of the program below:

Alexander J. Ott, Executive Director _____ Employee ☑ Officer ☐ Contractor/Organization ☐
(e.g., John Smith, Treasurer, etc.)

Doug Reifsteck, Treasurer _____ Employee ☐ Officer ☑ Contractor/Organization ☐
(e.g., Jane Doe, Manager, etc.)

i. If primary check signers listed above are unavailable, provide the names and titles of other authorized check signers, and indicate whether they are an employee with an "(E)," an officer with an "(O)," or a contractor with an "(C)." If not applicable, please state N/A below:

Michael Silveira, (O) Dennis Burreson (O)
(e.g., Doug Jones, Secretary (O) etc.)

j. Does the program use petty cash and/or postage? Yes ☐ No ☑ If no, skip 10.k.-l.

k. Describe how petty cash and/or postage is reconciled and how the reconciliation is documented below.

N/A

l. Describe how petty cash and/or postage is handled and kept secure below.

Postage is tracked through the COC's online account which is connected to an automated postage machine. Every use of postage is recorded digitally and automatically through this system to ensure accurate records are kept.

11. Confidential Information and Record Keeping

a. Under Section 608d(2) of the Agricultural Marketing Agreement Act of 1937, all information furnished to or acquired by the USDA for marketing order program categorized as trade secrets and financial or commercial information shall be kept confidential by all USDA officers and employees. These individuals may disclose such information only in a suit or administrative hearing brought at the direction, or upon the request, of the USDA. Because marketing order programs are quasi-governmental entities, this regulation applies to marketing order program management. Will the marketing order program staff protect personal, commercial, financial, and employment information from an unauthorized closure? Will the program have appropriate computer controls in place that are adequate for the size of the program (e.g., password protection to log onto network, automatic logging off after 10 minutes, use of password protected files, etc.)?

Yes ☑ No ☐

b. Explain the program's security protocol to protect confidential information below.

Employees must be careful not to jeopardize the confidentiality of information provided under the Agricultural Marketing Agreement Act and the Federal Marketing Order. Some information may be marked confidential; however, there also may be times when such information is not marked. When uncertain as to the confidentiality of a document, employees are to ask their supervisor. All work should be put away at the end of the day and locked up, if appropriate.

Employees should treat as confidential all individual grower production, inspection and acreage information, and individual handler sales, inventory, acreage and inspection information as well as anything that is not common knowledge or has not been published. It is vital to the future of the Committee that employees respect the trust that has been placed in them by carefully handling all such confidential information. Any employee disclosing confidential Federal Marketing Order information may be subject to conviction and a fine of up to $1,000.00 and/or imprisonment for up to one year, and termination of employment (7 U.S.C. Section 608d(2)).

Our employees are expected to devote their best effort and attention to the full-time

c. Personally Identifiable Information (PII) can be used to distinguish or trace an individual's identity. It includes, among other things, the use of names, social security numbers, or financial information associated with an individual. PII is subject to the Privacy Act, and should be held, processed or stored only where facilities and conditions are adequate to prevent unauthorized access. Will the program protect PII from an unauthorized disclosure?

Yes ☑ No ☐

d. Is the program following the retention schedule in the MOAD Operations Manual?

Yes ☑ No ☐

e. Where are the records stored?

Records are filed according to year and content in both digital and hard copy format.

(e.g., stored off-site in filing cabinets which are locked when not in use.)

f. How does the staff dispose of records past retention?

Records older than 7 years (2010) are destroyed and disposed of accordingly.

(e.g., Shredded after 4 years, etc.)

g. If you wish to explain or clarify your answer to any of the previous questions, use the text box below. Begin by identifying the question or item number, for example: Item 2.c. Item 10.k, etc.

Marketing Order Program Representative Certification

Instructions for Marketing Order Program: *Please complete this certification page. Once completed, please e-mail this file as an attachment to your Marketing Field Office Specialist for approval.*

I, Elizabeth Carranza _____, of the
Name and Title

California Olive Committee _____, certify that
Full Name of Marketing Order Program

the foregoing compliance plan was approved by program members on: 4/25/2018
Date

☑ **Required: By checking this box, I certify that the foregoing compliance plan reflects, to the best of my knowledge, the program's compliance strategies, resources and activities for the upcoming season.**

Elizabeth Carranza Digitally signed by Elizabeth Carranza Date: 2018.04.25 11:13:59 -07'00' _____ 4/25/2018
Name Date

My e-mail address is: ECarranza@calolive.org

Only complete below this line if you are *resubmitting* your e-Compliance Plan.

Resubmitted for approval on: _____ by _____
Date Name

Resubmitted for approval on: _____ by _____
Date Name

Resubmitted for approval on: _____ by _____
Date Name

If this e-Compliance plan has been pre-approved and received final approval during the program meeting, please list any modifications that were made during the meeting:

Marketing Specialist Certification

Marketing Field Office

***Instructions for Marketing Field Office Specialist**: Please complete this certification page. If the e-Compliance Plan is not approved, please e-mail it back to the program for revisions. If the e-Compliance plan is recommended for pre-approval/approval, please e-mail it to the Compliance and Enforcement Branch Chief. The e-Compliance Plan will then be assigned to a Compliance and Enforcement Specialist for review.*

I, PETER SOMMERS Digitally signed by PETER SOMMERS Date: 2018.05.03 08:45:24 -07'00' , Marketing Specialist at the
Name

CAMFO
Field Office Location, certify that

I have reviewed the foregoing program's compliance plan on this day: 3May18
Date

Recommend for pre-approval ☑ The program will approve on: _____
Date

Recommend for approval ☐

Returned for revisions ☐

See Comments Below:

Received On: _____
Date

Recommend for approval ☐

Returned for revisions ☐

See Comments Below:

Compliance and Enforcement Specialist Certification

Headquarters

Instructions for Compliance and Enforcement Specialist: *Please complete the following certification. Once completed, please e-mail this file either to the Field Marketing Specialist if returned for revisions (the Field Office will forward to the program for revision) or to the Compliance and Enforcement Branch Chief for final approval.*

I, JOSEPH LLOYD Digitally signed by JOSEPH LLOYD Date: 2018.05.08 11:12:19 -04'00' _____, Compliance and Enforcement
Name

Specialist, certify that I have reviewed the foregoing program's compliance plan on this day:

05/08/2018 _____.
Date

Received on: 05/03/2018 _____
Date

Recommend for pre-approval ☐

Recommend for approval ☐

Returned for revisions ☑

See Comments Below:

7.b. Sections 932.13, 932.22, 932.51, 932.109, 932.151, of the MO "amended", please forward supporting documentation, of the process used to amend the MO??
9.a. Please respond, number of staff
9.u. Please respond, date the internal control plan was updated

Received On: 05/08/2018 _____
Date

Recommend for approval ☑

Returned for revisions ☐

See Comments Below:

Compliance and Enforcement Branch Chief

Headquarters

FINAL APPROVAL

I, _____, Compliance and Enforcement
Name

Branch Chief, certify that I have reviewed the foregoing program's compliance plan on this day: _____. Received on: _____
Date Date

Approved ☐

Rejected for Revision ☐

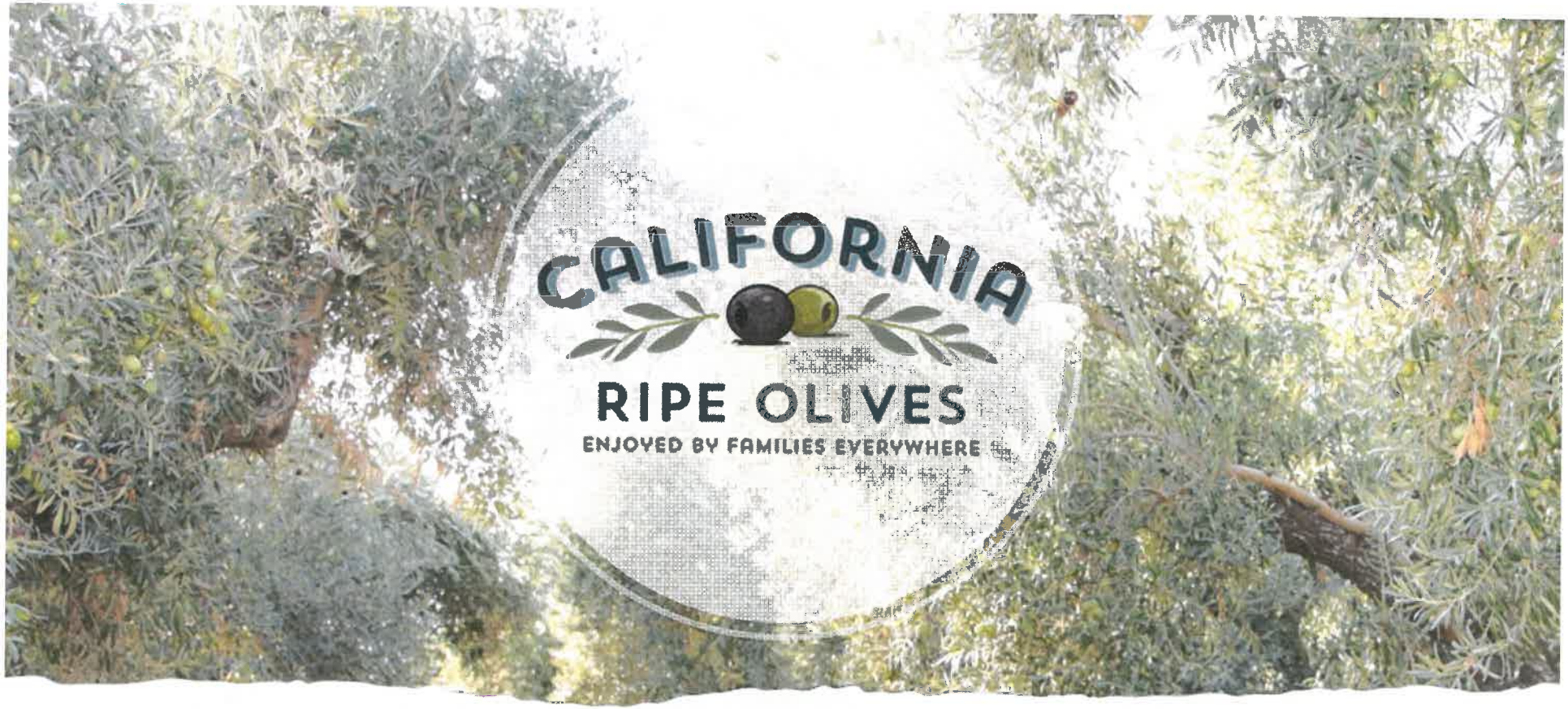
See Comments Below:

Received on: _____
Date

Approved ☐

Rejected for Revisions ☐

See Comments Below:



EXPORT OVERVIEW

JUNE 13, 2018

JAPAN UPDATE 2018

- Using a combination of MAP and industry funding
- Attended Japan Supermarket Tradeshow in February 2018
- Developed COC website in Japanese, along with translated Buyer's Guide
- COC conducted market visit in April 2018
  - Met with key trade contacts and U.S. Embassy ATO personnel

Future Activities:

- Taste of America Fair in October
- Foodservice Wholesaler Exhibition in June
- Bakery & Café Japan Tradeshow in July (U.S. Pavilion)
- Trade Seminar in October
- Advertising & Digital Media
- Retail Promotions
  - Targeting home meal replacements
  - Tapas, salad, etc.

CHINA EMP UPDATE

- Current EMP agreement requirements satisfied with FAS
- Participating in Embassy's July 4th Event
  - Providing samples, recipes, handouts, etc.
- Applied for more funding for remainder of 2018
- Technical Training Seminars
  - Usage
  - Taste Profile

OTHER MARKET UPDATES 2018

Southeast Asia

- COC to attend trade mission from July 5-13
- Targeting
  - Bangkok, Thailand
  - Kuala Lumpur, Malaysia
  - Singapore
  - Manila, Philippines

Canada

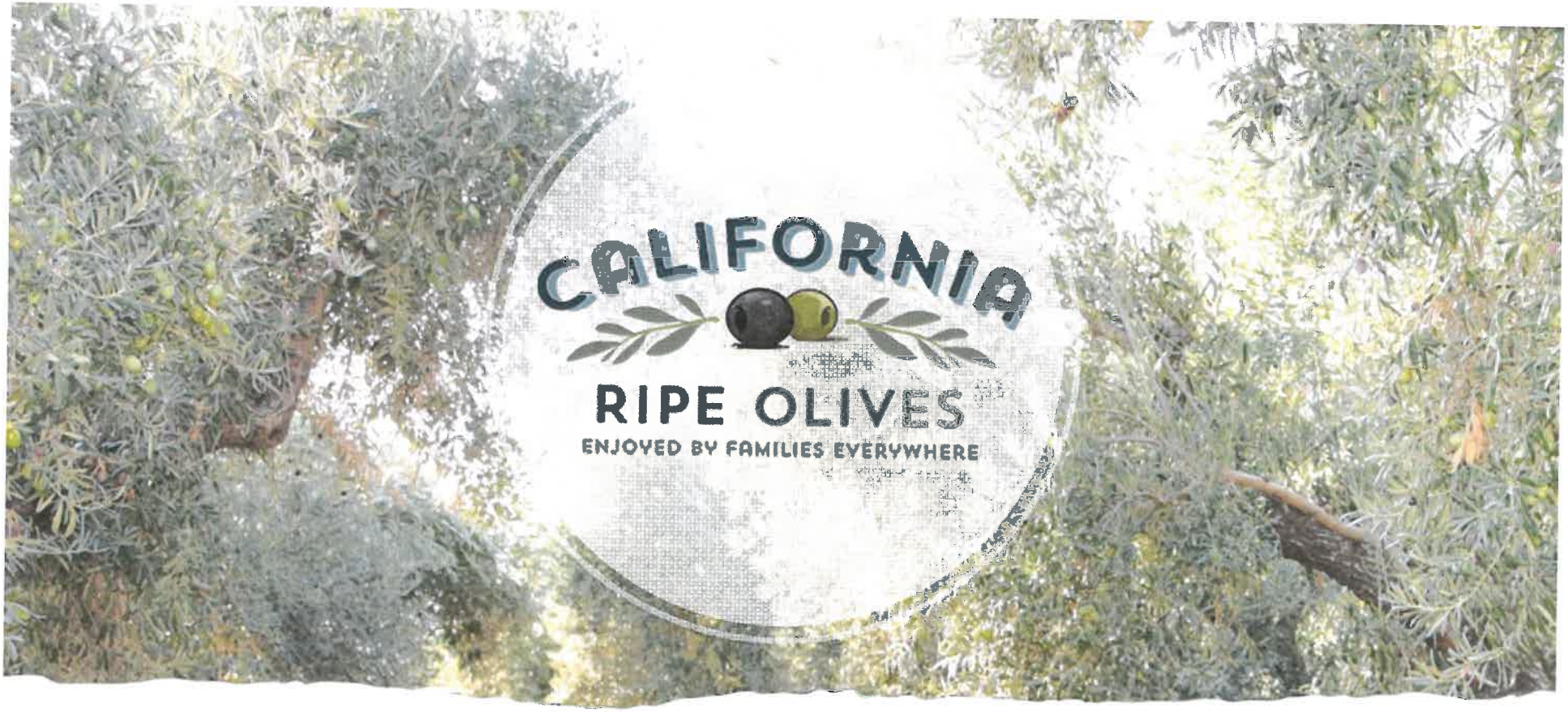
- COC Attended SIAL tradeshow in May
- Store audits
- Will participate in Quebec based GBI, Prenez GOÛT in July
  - Retail promotions

Asia Fruit Logistica 2018

- COC to attend tradeshow as a co-exhibitor with the California Blueberry Commission
  - Booth in the U.S. Pavilion

2019 UNIFIED EXPORT STRATEGY

- **Canada**
  - Trade Representation
  - Tradeshow
  - Retail Promotions
- **Japan**
  - Trade Representation
  - Supermarket Tradeshow and Seminar
  - Foodservice & Retail promotions
  - Trade mission
  - Advertising and Digital Media
- **Mexico**
  - Trade Representation
  - Tradeshow
  - Public Relations
  - Retail Promotions
- **South Korea**
  - Trade Representation
  - Market Research
  - Trade mission
  - Retail Promotions



THANK YOU!

***** INFORMATION *****

FROM: RESEARCH SUBCOMMITTEE

SUBJECT: FINAL 2017 RESEARCH REPORT

BACKGROUND: In 2016 the Research Subcommittee funded various projects. The final research reports, in addition to the no cost extensions, are included in the meeting packet.

Researcher	Project	Amount Funded
Ferguson & Fichtner	Investigating Anti-Oxidant to Decrease the Leaf Abscission with Ethephon Application	$39,996
Wang	Investigation of chemical and biological formation of styrene in black ripe table olives	$51,350
Wang	Comprehensive nutritional analysis of California green and black ripe table olives	$46,350
Preece & Ferguson	Propagating Dwarfing Olive Rootstocks and Establishing a Long Term Orchard	$35,442
Adaskaveg	Epidemiology and management of olive knot caused by Pseudomonas savastanoi pv. savastanoi	$18,900
Lovatt & Fichtner	Managing Alternate Bearing in olive with PGRs and Pruning	$23,845
Rosecrance & Krueger	Canopy Management, Tree Hedging and topping to Optimize Yield	$31,075
Lightle	Preliminary field study to identify new olive fly control materials	$19,647
Simpson	Northern Fly Trapping	$6,500
Stewart	Southern Fly Trapping	$6,333.33

CALIFORNIA OLIVE COMMITTEE
PROJECT PROGRESS REPORT: 2017 SEASON

Workgroup/Department: Olive / Plant Sciences, UC Davis

Project Year 2017 Anticipated Duration of Project: 1 year

Project Title:
Investigating Anti-Oxidant Amendments to Decrease the Leaf Abscission with Ethephon Applications:

Project Leaders:
Dr. Louise Ferguson: Extension Specialist, Department of Plant Sciences, 2037 Wickson Hall, Mail Stop II, UC Davis, 1 Shields Ave., Davis CA 95616, (530) 752-0507 [Office], (559) 737-3061 [Cell], LFerguson@ucdavis.edu.

Dr. Elizabeth J. Ficthner: Farm Advisor, University of California Cooperative Extension, 4437 South Laspina Street, Tulare CA 93274. (559) 684-3310 (Office), (559) 684-2057 (Cell). EJFichtner@ucdavis.edu.

Cooperators:
Dr. Richard Rosecrance: Professor, Chico State University
Mr. William H. Krueger: Farm Advisor Emeritus
Mr. Erick Nielsen: ENE Inc., pruning and harvesting designer, fabricator and contractor.

Commodity: Olive Relevant AES/CE Project No.

Year Initiated: 2017 Current Funding Request: **$39,996.00**

Problems and Significance:
Multiple studies, including our most recent California study (Burns et. al. 2008) have demonstrated that the higher concentrations of Ethephon required to decrease olive fruit removal force to make mechanical harvesting with trunk shakers more efficient also result in unacceptable levels of leaf abscission.

On October 11th 2016 a presentation at the International Society for Horticultural Science 8th International Olive Symposium in Split, Croatia a research group from Israel presented their results examining the anatomical and molecular differences between fruit and leaf abscission in table olives. The following is from their abstract discussion:

"We found that the the typical anatomical characteristics of the abscission zones such as small cells with less pectin compared to the neighboring cells, exist in the leaf but not the fruit abscission zone. Screening the response of the cultivars in our olive germplasm collection reveals differences in the response of the abscission zones of the leaves and fruits as expressed in their anatomical characteristics. Transcriptomic analysis of the of the various abscission zones

reveals induction of several hormones as well as cell wall degradation enzymes in the leaf and fruit abscission zones in response to exogenous ethylene. However, cellulase activation was found only in the leaf abscission zone. In addition, we found that reactive oxygen species mediated abscission in response to exogenous ethylene applications only in leaves. Thus, adding an antioxidant such as ascorbic or butyric acid to the abscission compound enhanced abscission of fruit but not leaves. Our findings suggest that advising growers to use an abscission agent exclusively tailored to induce the abscission of fruit would greatly promote the mechanized harvest of table olives". (Goldental-Cohen et. al. 2016)

The major table cultivar in Israel is Manzanilla so they have tested their theory on our major cultivar. The specific treatment they suggested was 0.3% ascorbic acid or 100 mM butyric acid added to the standard Ethephon treatment. As our cooperators Rosecrance and Krueger are currently conducting a mechanical pruning and harvesting experiment in California we arranged to have a preliminary trial done this October 15th 2016. Hopefully we will have the results for proposal review in 2016.

In fall of 2017 we proposed to evaluate the ability of both 0.3% ascorbic acid in combination with ethephon to enhance fruit removal efficiency without producing unacceptable leaf abscission when using trunk shaking mechanical to harvest Manzanillo olives. Drs. Louise Ferguson, Elizabeth Fichtner and Richard Rosecrance and Farm Advisor Emeritus William H. Krueger MSc will be the cooperators.

Progress through 10/15/2016:

A preliminary application of 0.3 ascorbic acid was applied by Dr. Richard Rosecrance and William H. Krueger, Farm Advisor Emeritus in the Nickles Estate moderate density olive block October 15th 2016. Effect on fruit pull force was evaluated on October 25th; there was no significant drop in fruit pull force.

2017 Objective: (April 1st – December 31st 2017)

Evaluate the ability of the best suggested treatment:

a. 0.3% ascorbic acid

to decrease fruit removal force and increase harvest efficiency of a trunk shaking harvester without producing more than 25% leaf loss.

2017 Experimental Procedures Completed:

Orchards pruned for trunk shaker harvesting was secured:

1. Nickles moderate density orchard (203 trees/acre) in Colusa County

Experimental design was be a randomized complete block: within 9 rows of each treatment was assigned once: 4 treatments x 3 trees x 10 replications (rows) = 120 treated trees: See Att. I

Sept. 29th 2017 9 randomly selected sets of 3 trees/treatment were sprayed to drip with the following treatments at the 100 GPA rate:

1. 2000 PPM Ethephon and 0.25% surfactant
2. 2000 PPM Ethephon and 0.25% surfactant + 0.3% ascorbic acid

3. 0.3% ascorbic acid and 0.25% surfactant
4. a water control and 0.25% surfactant

Before Harvest:
Fruit detachment force was taken from the middle tree of each 3 tree set on 10 shoots per tree with at least 5 olives per shoot before application and at 7 day intervals until harvest.

At Harvest:
At harvest the middle tree of the three was be harvested by trunk shaker, then hand gleaned.

Both sets of fruit were be weighed and samples submitted to Musco Olive for sample grades and value.

We did not to submit this set of fruit samples for canning, sensory and consumer evaluation unless the COC Research Subcommittee wants these tests done. We prefer to determine if the technique works before investigating effects on processed fruit quality. Also, Ethephon is unregistered.

After Harvest:
The middle tree of the treated tree sets will be evaluated monthly for leaf drop at harvest through the beginning of shoot growth the following spring:

1. The trees were visually rated for leaf drop on a 1-3 scale: 1= none, 2 = visible, 3 = severe.
2. Ten shoots per tree will be counted for % leaf drop: > 25% will be considered unacceptable.

Data was analyzed using ANOVA with an LSD means separation.

Desired Result:
The 2000 ppm ethephon treatment will decrease fruit removal force, increase harvesting efficiency to at least 90% without producing leaf loss over 25%.

First Analyzed Results: Att. II
As the attached results show when sprayed with the water control treatment and water control treatment + 3% ascorbic acid ~ 72% of the olives were removed by the trunk shaker. Adding Ethephon® to the spray increased fruit removal by ~ 6-8%, to 78-80%. However, neither Ethephon® treatment significantly decreased the pull force.

And, as the attached results show the Ethephon® alone and with 0.3% ascorbic acid significantly increased leaf loss as of harvest October 23rd. On a scale of 0-3, with three being the highest; the Ethephon® treated trees were rated at 1.5 (Ethephon® alone) and 2.5 (Ethephon® + 0.3% ascorbic acid); both significant levels of leaf loss versus the water control.

The final report will follow leaf loss through March 2018. However, the analyzed data demonstrates that while Ethephon® produced a modest 6-8 % increase in fruit harvest efficiency, and a modest decrease in pull force, from 0.5 kg for the control treatment to 0.4 kg for the Ethephon® treated trees, the leaf loss for Ethephon® treated trees at harvest was significant. On a

scale of 1-3, with 3 being the most severe leaf loss, the water control treatments, with and without 0.3% ascorbic acid, had leaf drop ratings below 0.5 while Ethephon® treated trees, with and without 0.3% ascorbic acid had leaf drop ratings of 1.5 and 2.2 respectively. These results demonstrate adding 0.3% ascorbic acid to Ethephon® did not significantly decrease fruit pull force, harvest efficiency or leaf loss

References:

Burns, J.K., L. Ferguson, K. Glozer, W.H. Krueger, and R.C., Rosecrance. 2008. Screening fruit loosening agents for black ripe processed table olives. HortScience 43(5):1449-1453.

Goldental-Cohen, S, I.B.Y. Mani, B. Avidan, S. Lavee, G. Ben-Ari. 2016. Anatomical and molecular differences between the olive fruit and leaf abscission zone enable development of a selective abscission compound. *Abstract*: Int. Soc. Of Hort. Sci.: 8th Int. Olive Symp. Oct. 10th – 14th 2016 Split, Croatia. P. 42.

Investigating the formation of styrene in California-style ripe table olives

Objective

The goal of this project is to understand the mechanism of styrene contamination and/or formation in the black ripe olive production process. Specific objectives include:

1. Compare levels of styrene in domestic and imported California-style black and green ripe olives.
2. Isolate and identify microbiota from these olives to determine species that are abundant in high-styrene olives.
3. Investigate the formation of styrene *in vitro* by incubating these isolated microbes with precursor compounds.
4. Inoculate olives with metabolically active microbes and quantify styrene formation under various storage conditions

Materials

Samples: Forty samples of California-style olives were provided by the producers or purchased from online retailers or grocery stores.

Reagents: Styrene and styrene d8 were purchased from Sigma Aldrich (St. Louis, MO).

Methods

Analysis of styrene in California-style olives. Thirty grams of olive was blended with 50 mL nanopure water. An additional 100 mL water was used to rinse the blender and 54 g baked sodium chloride was added to olive slurry. An aliquot of the mixture (60 mL) was transferred to a small amber bottle sealed with a septum cap. The SPME fiber (DVB/CAR/PDMS) was inserted into the headspace of the bottle for 30 min to extract styrene. The fiber was then manually injected into the GC-MS for analysis. Analyses were conducted in triplicate.

Results

- Domestic samples contained significantly less styrene than imported samples (Table 1).
- Seven out of twelve imported black ripe samples had higher than 0.3 µg/g styrene (Figure 1). Styrene has an odor threshold of 0.32 µg/g, meaning that sensory defects may be detectable in these samples.
- With the exception of one sample (0.2 µg/g), all other domestic olives had less than 0.055 µg/g styrene (Figure 1).

		Styrene concentration (µg/g)
Domestic	**Black (n=20)**	0.021 ± 0.044
	Green (n=6)	nd*
Imported	**Black (n=12)**	1.37 ± 1.83
	Green (n=2)	0.051 ± 0.044

Table 1. Average styrene concentration of domestic and imported black and green ripe olives

*nd = below detection limit

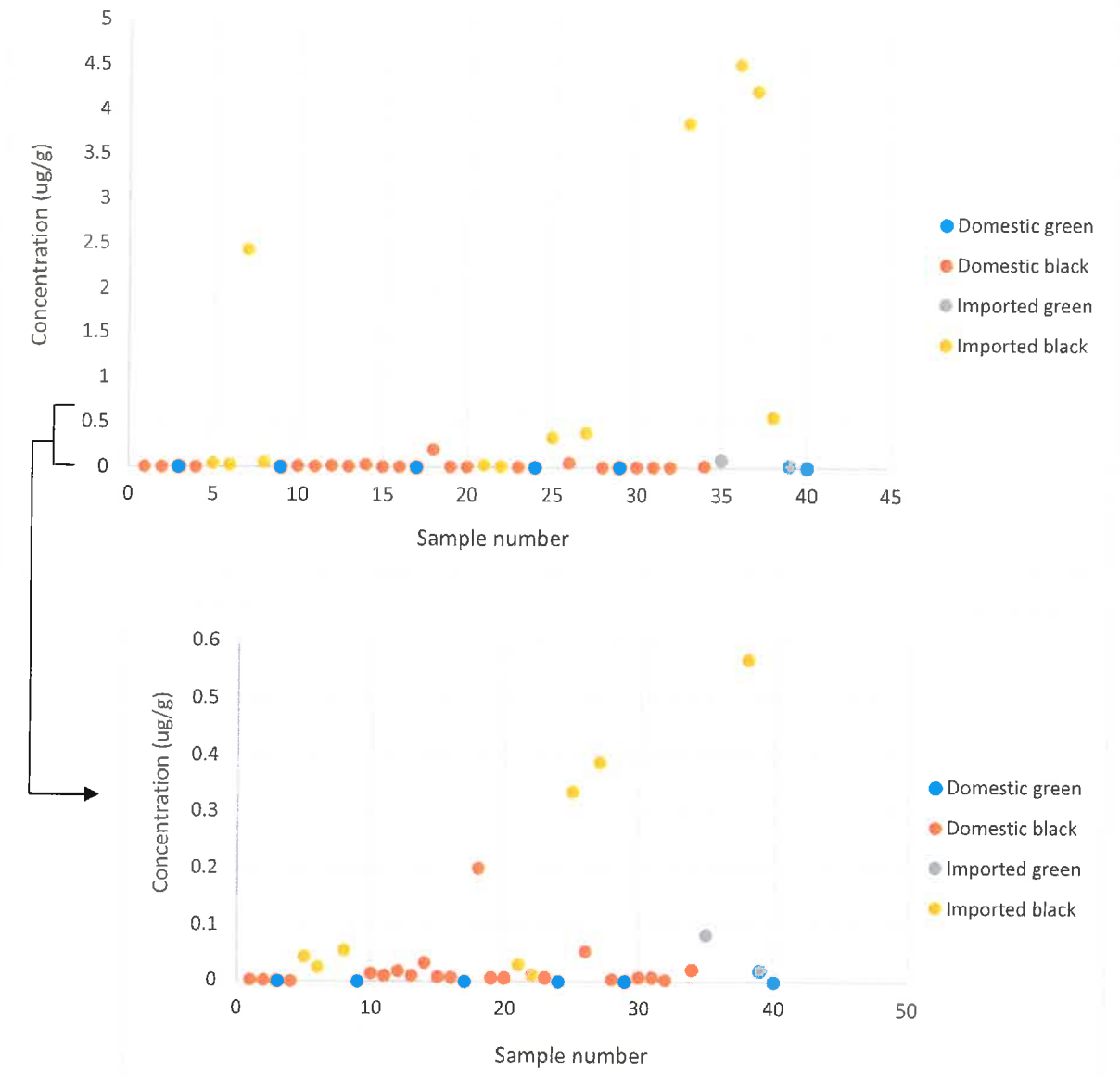


Figure 1. Styrene concentration in domestic and imported California-style olives

- Domestic green ripe olives did not have any detectable styrene and imported green ripe olives had significantly less styrene than imported black ripe samples.
- Samples 2, 30 and 32 were domestic samples processed without ferrous gluconate. There was no clear difference between these olives and traditional black ripe olives, which suggests that styrene content is not influenced by ferrous gluconate treatment.
- All domestic green ripe olives were processed fresh, whereas all domestic black ripe samples in this study were stored before processing. These results support the hypothesis that microbial growth during olive storage is causing production of styrene.
- No identifiable trend exists between olive style (whole, sliced, chopped), fruit size or cultivar and styrene content.

Future work

Isolate and identify of microbiota from high-styrene olives Oct-Nov. 2017

Olive tissue will be macerated in PBS and frozen at -20°C. DNA will be extracted using MoBio PowerFood microbial kit. PCR amplification will be performed on the V4 region of 16s rRNA genes for bacteria and the internal transcribed spacer (ITS) region for yeasts. DNA will be analyzed using Illumina sequencing at the UC Davis Genome Center. A FASTQ file containing reads will be subjected to bioinformatics analysis.

Assess styrene production by isolated microbes in vitro Dec-Jan. 2017

Microorganisms identified in high-styrene olives will be obtained from the UC Davis Phaff Yeast Culture and/or other commercial producers. Microbes will be individually inoculated into buffered peptone water fortified with cinnamic, p-coumaric, caffeic and ferulic acid (phenolic precursors to styrene and styrene derivatives). Following 3 days of incubation, the concentration of phenolic compounds and styrene/derivatives will be measured. Microorganisms that demonstrate the ability to convert phenolic precursors into styrene will be considered metabolically active.

Inoculate olives with metabolically active microbes to assess styrene production in vivo Jan-Feb. 2017

Fresh olives with negligible styrene content will be placed into brine. These olives will receive four different treatments in triplicate: (1) inoculation with metabolically active microorganisms only; (2) inoculation with all abundant microorganisms from the high-styrene olives; (3) no inoculation; (4) no inoculation + nisin/natamycin (to inhibit bacterial/yeast growth). The olives will be incubated and the phenolic/volatile profile will be measured every 3 days for 2 weeks, and then every 7 days for an additional 2 weeks. The microbiota of olives from each treatment will be analyzed.

Appendix

Table S1: Characteristics and styrene concentrations of California-style olive samples

Sample #	Color	Style	Size	Cultivar*	Origin	Styrene (µg/g)
1	Black	Sliced		Manzanilla	Domestic	0.0022 ± 0.0005
2	Black	Whole	Medium	Manzanilla	Domestic	0.0016 ± 0.0005
3	Green	Whole	Medium	Manzanilla	Domestic	0.0000
4	Black	Whole	Extra large	Manzanilla	Domestic	0.0000
5	Black	Whole	Jumbo	Gordal	Imported	0.0430 ± 0.014
6	Black	Whole	Large		Imported	0.0251 ± 0.0020
7	Black	Whole	Large		Imported	2.43 ± 0.072
8	Black	Whole	Large		Imported	0.0546 ± 0.0074
9	Green	Whole	Large	Manzanilla	Domestic	0.0000
10	Black	Whole	Jumbo	Sevillano	Domestic	0.0141 ± 0.0036
11	Black	Whole	Collosal	Sevillano	Domestic	0.0099 ± 0.0024
12	Black	Whole	Large	Manzanilla	Domestic	0.0181 ± 0.0059
13	Black	Chopped		Manzanilla	Domestic	0.0100 ± 0.0019
14	Black	Whole	Medium	Manzanilla	Domestic	0.0331 ± 0.0017
15	Black	Whole	Small	Manzanilla	Domestic	0.0081 ± 0.0008
16	Black	Whole	Extra large	Manzanilla	Domestic	0.0070 ± 0.0037
17	Green	Whole	Medium	Manzanilla	Domestic	0.0000
18	Black	Sliced		Mission	Domestic	0.1994 ± 0.013
19	Black	Whole	Jumbo	Barouni	Domestic	0.0067 ± 0.0025
20	Black	Chopped			Domestic	0.0063 ± 0.0002
21	Black	Whole	Large		Imported	0.0296 ± 0.003
22	Black	Whole	Extra large		Imported	0.0122 ± 0.0007
23	Black	Broken		Sevillano	Domestic	0.0070 ± 0.0013
24	Green	Whole	Medium	Manzanilla	Domestic	0.0000
25	Black	Whole	Large		Imported	0.3351 ± 0.026
26	Black	Sliced			Domestic	0.0531 ± 0.034
27	Black	Whole	Large		Imported	0.3862 ± 0.036
28	Black	Sliced			Domestic	0.0035 ± 0.0029
29	Green	Whole	Medium	Manzanilla	Domestic	0.0000
30	Black	Whole	Medium	Manzanilla	Domestic	0.0072 ± 0.0017
31	Black	Whole	Large		Domestic	0.0069 ± 0.001
32	Black	Whole	Medium	Manzanilla	Domestic	0.0026 ± 0.0007
33	Black	Whole	Medium		Imported	3.8528 ± 0.42
34	Black	Whole	Jumbo	Barouni	Domestic	0.0211 ± 0.0099
35	Green	Whole		Manzanilla	Imported	0.0821 ± 0.0032
36	Black	Whole	Extra large		Imported	4.5124 ± 0.60
37	Black	Whole	Medium		Imported	4.2105 ± 0.70
38	Black	Whole	Medium		Imported	0.5684 ± 0.056
39	Green	Whole		Manzanilla	Imported	0.0200 ± 0.0032
40	Green	Whole	Medium	Manzanilla	Domestic	0.0000

*Cultivars were unknown for many imported samples and samples purchased at the grocery store

Nutritional analysis of California-style black and green ripe table olives

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UC Davis

Objective

The goal of this project was to comprehensively measure the nutritional profile of domestic and imported black and green ripe olives in order to a) identify any potential health benefits or risks in table olives and b) to determine effects of processing method, sample origin, olive style and cultivar on chemical composition.

Materials

Samples: Twelve samples were provided by Bell Carter. Ten samples were provided by Musco. The remaining eighteen samples were purchased from local grocery stores (Davis, CA) or online from Walmart. Sample characteristics are summarized Table S1 (appendix).

Reagents. HPLC grade methanol, dimethyl sulfoxide (DMSO), acetic acid and hexane were purchased from Fisher Scientific (Fairlawn, NJ). Hydroxytyrosol, tyrosol, p-coumaric acid, caffeic acid, benzoic acid, acrylamide and alpha-tocopherol standards were purchased from Sigma Aldrich (St. Louis, MO).

Methods

Ninety grams of olives were removed from the can, dried with a paper towel and homogenized in a food processor. A summary of analyses using this pulp is displayed in Figure 1.

Individual phenolics: Olive pulp (2 g) was vortexed with 10 mL dimethyl sulfoxide (DMSO) for 1 min and centrifuged (9000 rpm, 5 min). The extract was filtered (0.45 μm, nylon) and 0.25 mL was diluted with 0.25 mL methanol and 0.5 mL water. Samples were stored at -20°C until analysis using ultra performance liquid chromatography coupled to a diode array detector (UPLC-DAD).

Total phenols: DMSO extract (0.1 mL) from the individual phenolics assay was diluted with 1.9 mL water. Folin Ciocalteau reagent (0.1 mL) was added and the sample was briefly vortexed. One mL sodium carbonate (200 g/L) was added and the sample was vortexed again and placed in the dark for 45 min. Absorbance was measured at 725 nm using a spectrophotometer.

Acrylamide: Olive pulp (30 g) was sonicated with 60 mL water for 10 min, followed by stirring for 5 min. The sample was centrifuged (10,000 rpm, 5 min) and 10 mL of the aqueous supernatant was shaken with 10 mL hexane for 30 s to remove lipid interferences. The sample was centrifuged again (3000 rpm, 2 min) and the hexane layer was removed. The extract was filtered (0.45 μm, nylon) and analyzed using UPLC-DAD.

Benzoic acid: Olive pulp (2 g) was vortexed with 10 mL methanol for 1 min and centrifuged (8000 rpm, 5 min). Extract was filtered (0.45 μm, nylon), diluted 1 to 2 with water and stored at -20°C until analysis with UPLC-DAD.

Oil extraction: Olive pulp (5 g) was shaken with 25 mL hexane for 2 min. The mixture was centrifuged (5000 rpm, 5 min) and the hexane layer was evaporated in order to isolate the extracted oil.

Tocopherols: Oil (40 µl) was dissolved in 160 µL of hexane. Ethanol (200 µL) and methanol (600 µL) were added to the sample, which was vortexed for 1 min and centrifuged (5000 rpm, 5 min). Samples were stored at -20°C to allow oil to fully separate from the organic phase. The extract was filtered (0.45 µm, nylon) and analyzed using UPLC-DAD.

Fatty acid profile: Oil (10 µL) was dissolved in 4 mL toluene. The sample was mixed with 3 mL methanol plus 0.6 mL methanol/HCl (80:20, v/v) and heated at 80°C for 1 hour. Hexane (1.5 mL) and nanopure water (1 mL) were added to the extract, which was briefly vortexed. The sample sat for 5 minutes to allow separation of phases and the upper phase containing fatty acid methyl esters (FAMEs) was passed over anhydrous sodium sulfate to remove any additional water. Solutions were analyzed using gas chromatography flame ionization detection (GC-FID).

Ferrous gluconate: Ferrous gluconate was measured as a function of iron content. Olive pulp was frozen at -80°C and submitted to the UC Davis Analytical Lab for analysis. Nitric acid/hydrogen peroxide microwave digestion was used, followed by quantitation with inductively coupled plasma atomic emission spectrometry (ICP-AES).

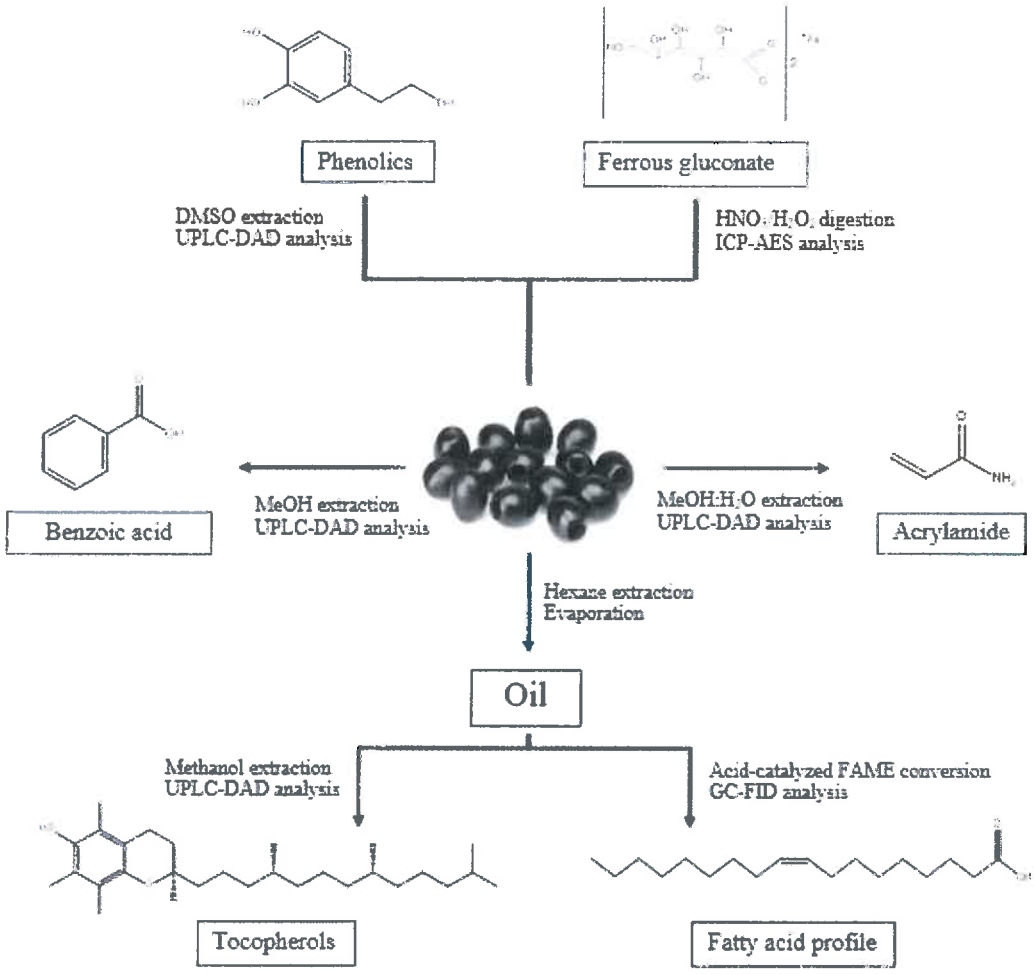

Figure 1. Summary of extraction and analytical methods

Results

Table S2 in the appendix contains data for individual samples.

Beneficial compounds (phenolics/tocopherols):

- Imported green ripe olives had significantly higher phenolics than the three other categories of olives (Figure 2). However, only two imported green ripe samples (both from the same brand) were analyzed.
- On average, domestic green ripe olives had higher amounts of hydorxytyrosol, caffeic acid, p-coumaric acid and α-tocopherol than black ripe olives, although the difference was not significant (Figure 2).
    - The variability in phenolics is very high when all domestic olives are considered together. However, separating the data by processor and cultivar greatly reduced variability. In the case of one processor, the difference between green ripe and black ripe olive phenolics was significant (see individual reports).
- The results suggest that green ripe olives are subjected to less oxidation during processing and may retain higher amounts of antioxidant compounds.

- Figure 3 shows that individual phenolic profile is somewhat cultivar-dependent, although principal component analysis did not yield well-separated clusters for all cultivars (Figure S1).
- β-tocopherol and γ-tocopherol were not identified in any sample.

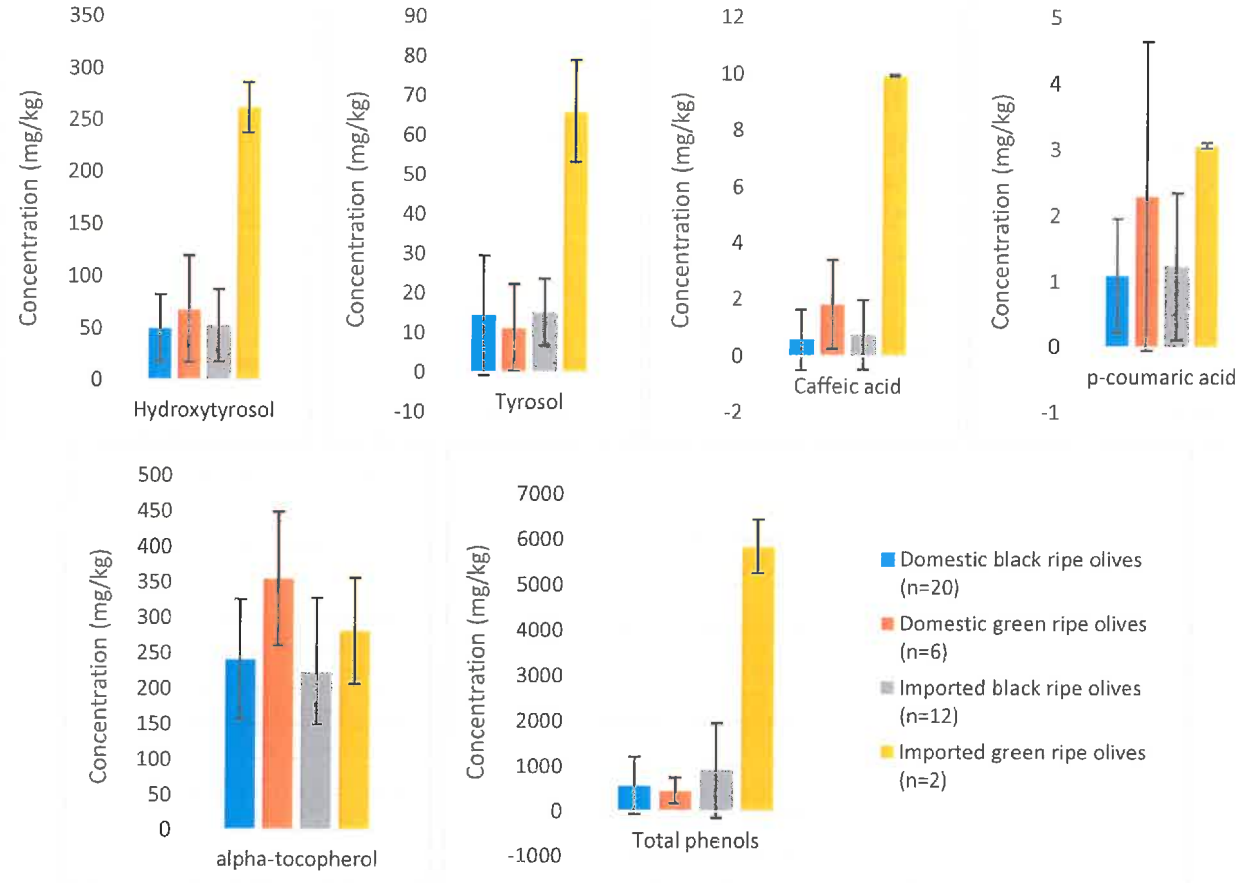

Figure 2. Phenolic compound and α-tocopherol content of domestic and imported black and green ripe olives.

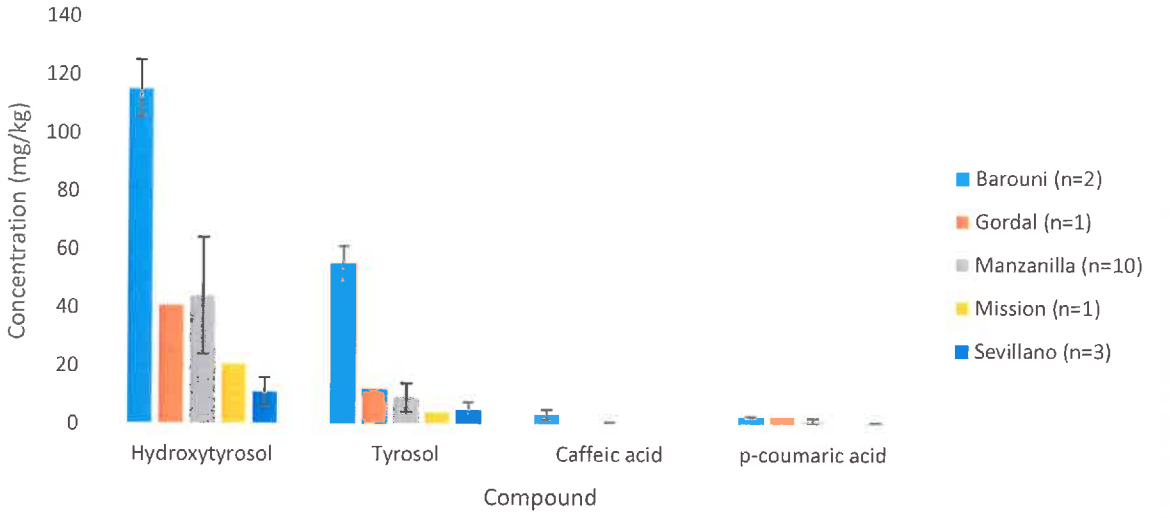

Figure 3. Phenolic composition of black ripe olives separated by cultivar.

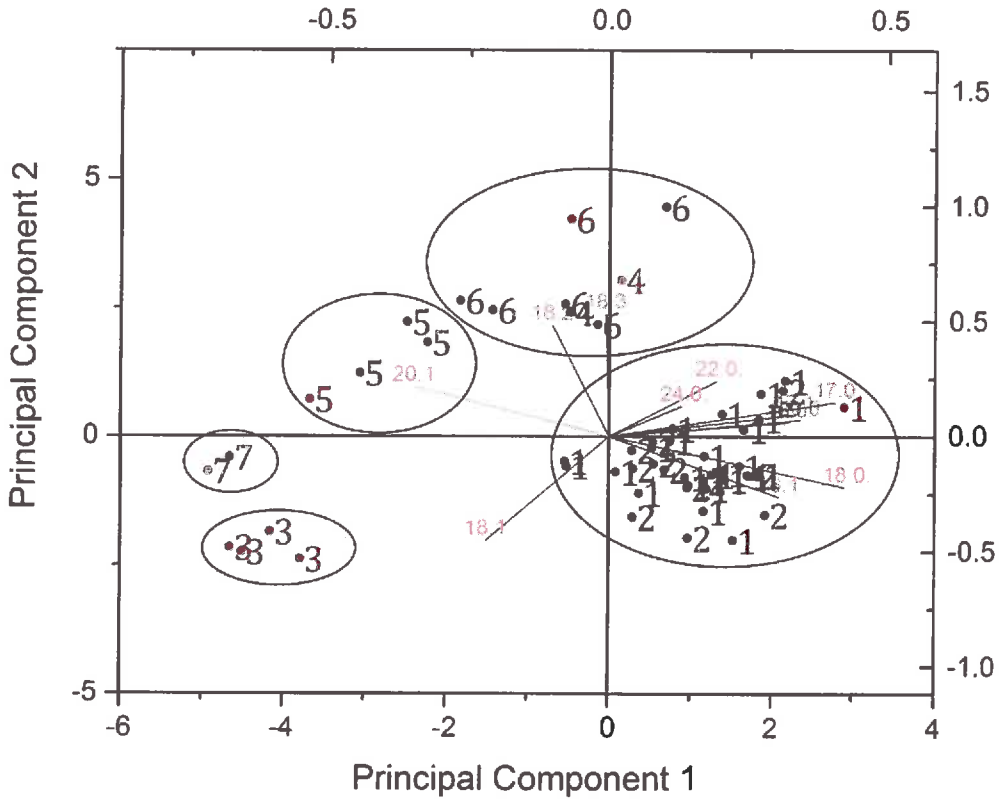

Figure 4. Principal component analysis of fatty acid profile data.
Samples are labeled according to cultivar: 1-Domestic Black Manzanilla; 2- Domestic Green Manzanilla; 3- Imported Green Manzanilla; 4- Gordal; 5- Barouni; 6- Sevillano; 7- Mission.
The duplicate measurements from each sample were used in the model to improve computation.

		16:0	16:1	17:1	18:0	18:1	18:2	18:3
Domestic	**Black (n=20)**	16.6 ± 1.4	1.32 ± 0.3	0.23 ± 0.08	2.59 ± 0.4	70.9 ± 2.1	6.21 ± 2.1	1.07 ± 0.2
	Green (n=6)	16.9 ± 0.5	1.41 ±0.09	0.25 ± 0.03	2.80 ± 0.2	72.1 ± 0.7	4.53 ± 1.0	0.94 ± 0.09
Imported	**Black (n=12)**	15.2 ± 1.4	0.96 ± 0.3	0.23 ± 0.06	2.37 ± 0.4	72.4 ± 2.0	6.81 ± 0.9	1.04 ± 0.2
	Green (n=2)	15.6 ± 0.4	1.20 ± 0.04	0.08 ± 0.007	1.80 ± 0.003	77.1 ± 0.5	2.47 ± 0.04	0.91 ± 0.03

Table 1. Comparison of fatty acid profile based on sample origin and processing method.
*Fatty acids 17:0, 20:0, 22:0 and 24:0 are not displayed because percentages were very low

Fatty acid profile (FAP):

- As expected, oleic acid (18:1 n9) was the most abundant fatty acid in all olive samples (Table 1).
- ANOVA was performed on the data and there was no significant difference in FAP between domestic black and green ripe olives, even when controlling for cultivar (Table 1).
- Figure 4 shows a principal component analysis using FAP data. Samples formed clusters according to cultivar, which demonstrates the possibility using FAP for cultivar identification if a sufficient number of samples are analyzed.
- Both black and green domestic Manzanilla occupied the same cluster which, along with the ANOVA results, demonstrates that processing does not significantly impact FAP.
    - This result disprove our initial hypothesis that eliminating air treatment would decrease oxidation and increase the content of oleic acid and polyunsaturated fatty acids, 18:2 and 18:3.
- The Sevillano and Gordal samples occupied the same cluster as well, which suggests that these cultivars are the same or closely related.

Processing residues:

Benzoic acid-

- As expected, domestic green ripe olives contained less benzoic acid than domestic black ripe olives (Table 2).
    - For domestic green ripe olives, the variability in benzoic acid decreases when processors are considered separately (see individual reports). For black ripe olives, processor does not appear to influence benzoic acid concentrations.
- Interestingly, the three samples with the highest benzoic acid concentrations were all "jumbo" sized olives (two Barouni, one Gordal). However, there was otherwise no identifiable trend between cultivar or fruit size and benzoic acid.
- FDA regulations (CFR 21) set a maximum level of 0.1% in foods, or 1000 mg/kg. All samples were far below this limit.
- Sorbic acid was not identified in any samples.

		Benzoic acid (mg/kg)	Ferrous gluconate (mg/kg)
Domestic	**Black**	19.7 ± 17.3	92.4 ± 24.1
	Black no Fe	11.1 ± 18.2	3.67 ± 0.99
	Green	2.04 ± 2.45	3.37 ± 0.47
Imported	**Black**	6.83 ± 12.4	103.9 ± 38.8
	Green	8.78 ± 0.019	2.90 ± 1.51

Table 2. Benzoic acid and iron concentrations in domestic and imported olives

Ferrous gluconate-

- As expected, the green ripe and black ripe samples processed without ferrous gluconate had very low amounts of iron. These concentrations can be considered the natural range of iron in Manzanilla olive fruit (Table 2).
- Imported olives had a slightly higher average iron concentration than domestic olives (Table 2). Both averages were below the IOC Trade Standard of 150 mg/kg.
- One imported sample exceeded the Trade standard (#36, 156 mg/kg). Two other samples were close to the limit: domestic sample #31 (147 mg/kg) and imported sample #7 (141 mg/kg).

Acrylamide:

- On average, domestic green ripe olives have lower levels of acrylamide compared with domestic black ripe olives, although the variability is high. The same trend was not observed with imported olives, where green ripe olives had a high amount of acrylamide (Table 3).
- Considering only domestic black ripe olives (Figure 5):
    - All Barouni, Mission and Sevillano cultivar samples had low levels of acrylamide. This is potentially caused by the limited sampling of these cultivars compared with Manzanilla, although future study may be necessary to confirm this conclusion.
    - Olive style (sliced, chopped, etc.) and supplier did not have a clear effect on acrylamide content.
- Previous research has shown that phenolic additives can prevent acrylamide formation. However, this work found no correlation between acrylamide content and phenolic compounds like hydroxytyrosol and caffeic acid, or total phenolics in the fruit (R^2 values of 0.06, 0.13 and 0.05, respectively).
- Sample #31 had significantly higher amounts of acrylamide (2371 µg/kg) than the rest of the samples. This product is packaged in a plastic cup rather than a can. Further study is necessary to determine if this alternative processing method has an effect on acrylamide formation.

		Acrylamide (µg/kg)
Domestic	**Black (n=18)***	333 ± 273
	Green (n=6)	105 ± 132
Imported	**Black (n=6)**	391 ± 216
	Green (n=2)	577 ± 48

Table 3. Acrylamide concentrations in domestic and imported olives
*Sample 31 was removed as an extreme outlier.

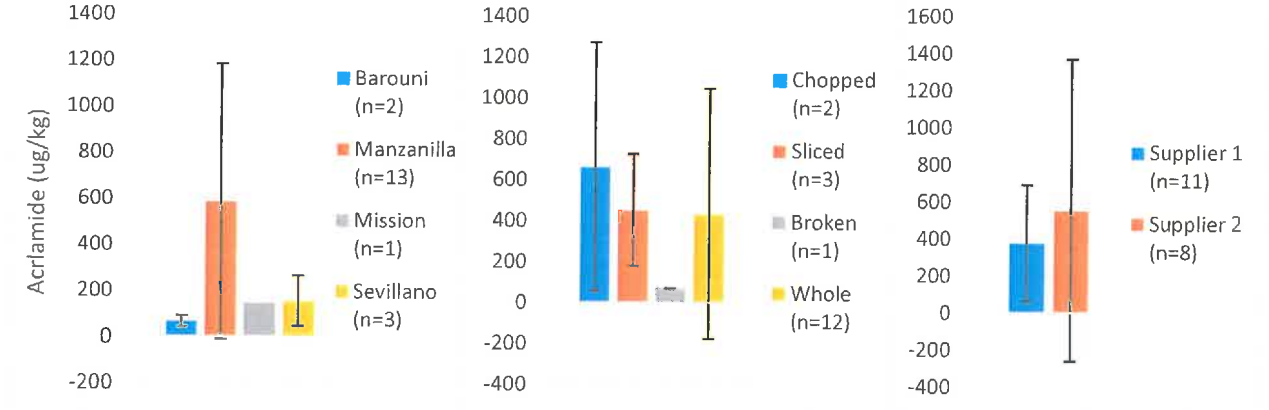

Figure 5. Acrylamide concentration in domestic black ripe olives separated by cultivar, olive style and supplier. Sample 31 was removed as an outlier, due to differences in processing method. The "broken" sample was Barouni cultivar.

Conclusions

Antioxidant compounds:

- Green ripe olives contained higher phenolics and α-toocpherol than black ripe olives in some cases, possibly due to elimination of air bubbling and reduced oxidation during processing.
- Although phenolic content is somewhat cultivar-dependent, there is too much variability (likely caused by processing method) and the differences are not sufficient for cultivar identification.

Fatty acid profile:

- Fatty acid profile was not affected processing method, as black and green ripe Manzanilla olives showed no difference in FAP.
- Samples clustered according to cultivar in the principal component analysis, suggesting that FAP could be an effective method for identifying the cultivar of an unknown olive.

Processing residues and acrylamide:

- Domestic green ripe olives contained minimal amounts of benzoic acid compared with black ripe olives. All samples were well below FDA regulations.
- Green ripe and black ripe olives processed without ferrous gluconate had very low levels of iron. All samples were below the 150 mg/kg trade standard with the exception of one imported black ripe sample. One domestic sample (#31) was very close to the limit.
- Domestic green ripe olives had a lower average acrylamide concentration compared with domestic black ripe olives. However, no clear correlation was identified between acrylamide content and olive producer, olive style, cultivar or phenolic content.

Appendix

Table S1: Characteristics of California-style olive samples

Sample #	Color	Style	Size	Cultivar*	Origin
1	Black	Sliced		Manzanilla	Domestic
2	Black	Whole	Medium	Manzanilla	Domestic
3	Green	Whole	Medium	Manzanilla	Domestic
4	Black	Whole	Extra large	Manzanilla	Domestic
5	Black	Whole	Jumbo	Gordal	Imported
6	Black	Whole	Large		Imported
7	Black	Whole	Large		Imported
8	Black	Whole	Large		Imported
9	Green	Whole	Large	Manzanilla	Domestic
10	Black	Whole	Jumbo	Sevillano	Domestic
11	Black	Whole	Collosal	Sevillano	Domestic
12	Black	Whole	Large	Manzanilla	Domestic
13	Black	Chopped		Manzanilla	Domestic
14	Black	Whole	Medium	Manzanilla	Domestic
15	Black	Whole	Small	Manzanilla	Domestic
16	Black	Whole	Extra large	Manzanilla	Domestic
17	Green	Whole	Medium	Manzanilla	Domestic
18	Black	Sliced		Mission	Domestic
19	Black	Whole	Jumbo	Barouni	Domestic
20	Black	Chopped			Domestic
21	Black	Whole	Large		Imported
22	Black	Whole	Extra large		Imported
23	Black	Broken		Sevillano	Domestic
24	Green	Whole	Medium	Manzanilla	Domestic
25	Black	Whole	Large		Imported
26	Black	Sliced			Domestic
27	Black	Whole	Large		Imported
28	Black	Sliced			Domestic
29	Green	Whole	Medium	Manzanilla	Domestic
30	Black	Whole	Medium	Manzanilla	Domestic
31	Black	Whole	Large		Domestic
32	Black	Whole	Medium	Manzanilla	Domestic
33	Black	Whole	Medium		Imported
34	Black	Whole	Jumbo	Barouni	Domestic
35	Green	Whole		Manzanilla	Imported
36	Black	Whole	Extra large		Imported
37	Black	Whole	Medium		Imported
38	Black	Whole	Medium		Imported
39	Green	Whole		Manzanilla	Imported
40	Green	Whole	Medium	Manzanilla	Domestic

Table S2: Phenolic, benzoic acid, acrylamide and ferrous gluconate content of forty samples (mg/kg)

Sample #	Hydroxytyrosol	Tyrosol	Caffeic acid	p-coumaric acid	Total phenols	α-tocopherol[a]	Benzoic acid	Acrylamide[b]	Ferrous gluconate[b]
1	68.2 ± 0.9	9.5 ± 1.3	0.2 ± 0.01	0.6 ± 0.01	358 ± 36.4	262 ± 19	18.6 ± 0.24	551 ± 7.2	75.8 ± 6.6
2	66.1 ± 3.0	7.7 ± 1.7	1.0 ± 0.1	1.7 ± 0.10	342 ± 17.6	225 ± 7.7	0.0	336 ± 77	3.7 ± 0.52
3	112.4 ± 19.5	16.9 ± 2.5	3.4 ± 0.7	4.6 ± 0.83	669 ± 55.4	316 ± 36	5.2 ± 0.52	301 ± 80	3.4 ± 0.31
4	56.2 ± 3.3	11.7 ± 1.6	0.3 ± 0.04	1.6 ± 0.12	270 ± 19.1	219 ± 55	16.3 ± 0.04	195	69.4 ± 2.1
5	41.1 ± 1.2	13.3 ± 0.4	0.3 ± 0.03	2.8 ± 0.14	234 ± 8.0		43.4 ± 0.10	226 ± 70	68.7 ± 3.1
6	36.7 ± 1.5	15.0 ± 0.7	0.3 ± 0.04	0.0	395 ± 24.9	314 ± 27	0.8 ± 0.30	502 ± 14	68.3 ± 3.4
7	71.9 ± 4.7	16.4 ± 1.1	1.2 ± 0.1	1.6 ± 0.11	409 ± 52.4	278 ± 17	2.9 ± 0.11	403 ± 38.5	141 ± 5.4
8	26.9 ± 1.0	9.7 ± 1.0	0.4 ± 0.03	1.1 ± 0.06	223 ± 2.4	265 ± 54	0.0 ± 0.00	630 ± 16	42.6 ± 2.5
9	23.1 ± 0.7	2.4 ± 0.2	0.7 ± 0.03	0.5 ± 0.03	139 ± 25.4	212 ± 35	1.0 ± 0.04	nd	3.1 ± 0.44
10	9.6 ± 0.9	4.4 ± 0.2	0.0	0.5 ± 0.01	125 ± 13.8	155 ± 8.0	18.4 ± 0.01	275 ± 9.6	111 ± 8.1
11	7.2 ± 0.3	2.7 ± 0.2	0.0	0.1 ± 0.001	103 ± 0.7	161 ± 9.2	11.0 ± 0.96	118 ± 7.7	109 ± 19
12	29.4 ± 2.1	4.5 ± 1.2	0.2 ± 0.04	1.0 ± 0.09	221 ± 30.2	218 ± 21	17.2 ± 1.50	418 ± 6.3	71.2 ± 6.7
13	42.3 ± 2.0	9.2 ± 0.2	0.0	0.2 ± 0.001	244 ± 51.9	116 ± 6.0	1.6 ± 0.02	232 ± 1.0	107 ± 13
14	50.9 ± 1.3	9.7 ± 0.1	0.3 ± 0.01	1.3 ± 0.04	330 ± 3.3	297 ± 40	38.1 ± 0.58	442 ± 11.5	74.0 ± 3.9
15	9.1 ± 0.2	1.1 ± 0.1	0.0	0.4 ± 0.03	105 ± 6.4	226 ± 28	0.0	79.4 ± 0.5	13 ± 11
16	17.1 ± 2.6	6.2 ± 0.2	0.2 ± 0.1	0.5 ± 0.11	203 ± 51.2	141 ± 12	7.6 ± 1.36	171 ± 18	88.4 ± 18
17	75.7 ± 2.2	8.9 ± 0.6	2.0 ± 0.04	2.5 ± 0.10	390 ± 21.9	260 ± 14	2.2 ± 0.04		
18	20.7 ± 2.5	4.2 ± 1.0	0.0	0.0	130 ± 29.2	180 ± 1.2	1.8 ± 0.002	144 ± 2.4	88.6 ± 12
19	122.1 ± 4.1	59.3 ± 1.4	4.5 ± 0.2	2.8 ± 0.16	836 ± 144.1	485 ± 26	61.8 ± 0.16	nd	69.3 ± 14
20	83.8 ± 2.3	15.7 ± 0.3	0.2 ± 0.03	0.5 ± 0.05	412 ± 17.5		11.2 ± 0.26	1089 ± 16	84.4 ± 8.1
21	17.9 ± 1.4	3.1 ± 0.5	0.0	0.0 ±	224 ± 136.8	198 ± 13	0.9 ± 0.07		
22	6.6 ± 0.1	4.5 ± 0.1	0.0	0.3 ± 0.02	63 ± 20.9	48.9 ± 11	16.6 ± 0.30		
23	16.6 ± 0.7	7.8 ± 0.5	0.0	0.6 ± 0.07	102 ± 17.3	25.4 ±	22.9 ± 0.77	68.8 ± 4.8	117 ± 19
24	20.7 ± 0.5	3.1 ± 0.0	0.2 ± 0.02	0.0 ±	108 ± 13.3	255 ± 5.7	0.0		
25	64.7 ± 2.4	21.6 ± 0.6	0.7 ± 0.1	0.8 ± 0.07	493 ± 12.0	297 ± 17	1.8 ± 0.23		
26	50.5 ± 0.8	15.8 ± 0.1	0.4 ± 0.03	1.0 ± 0.08	330 ± 3.3	398 ± 7.4	17.1 ± 0.01	656 ± 0.5	
27	22.2 ± 1.0	5.8 ± 0.2	0.0	0.4 ± 0.04	162 ± 32.0	221 ± 32	9.0 ± 0.17		85.8 ± 2.8
28	66.0 ± 2.2	13.5 ± 1.4	0.4 ± 0.02	0.8 ± 0.02	326 ± 2.1	337 ± 30	15.0 ± 0.26		59.0 ± 11
29	143.6 ± 11.7	30.8 ± 2.3	4.0 ± 0.3	5.6 ± 0.34	693 ± 155.3	257 ± 36	4.8 ± 0.50	21.5 ± 0.5	5.1 ± 0.21

30	57.4	±	0.3	12.1	±	0.5	0.7	±	0.02	1.4	±	0.01	1389	±	128.1	220	±	19	1.2	±	0.08	451	±	1.0	3.6	±	0.10
31	63.1	±	1.2	23.5	±	1.1	0.0			1.0	±	0.08	1564	±	41.5	225	±	5.1	21.7	±	1.12	2372	±	4.8	147	±	17
32	43.9	±	1.5	19.2	±	0.7	0.8	±	0.04	3.1	±	0.18	1518	±	80.1	179	±	10	32.1	±	1.68	635	±	9.1	2.8	±	0.1
33	68.6	±	2.1	19.0	±	0.5	0.7	±	0.03	0.8	±	0.06	1862	±	110.2	411	±	21	2.1	±	0.20	605	±	37	122	±	11
34	108.4	±	0.8	50.9	±	0.9	2.2	±	0.01	2.4	±	0.07	2329	±	285.4	519	±	28	55.4	±	0.02	83.5	±	12	84.1	±	8.7
35	245.8	±	35.8	57.1	±	5.7	9.9	±	1.4	3.1	±	0.50	5433	±	308.1	288	±	16	8.8	±	2.35	543	±	45	1.8	±	0.06
36	58.3	±	1.3	19.3	±	0.4	0.7	±	0.1	1.4	±	0.09	1516	±	147.4	288	±	3.3	0.6	±	0.26	173	±	0.5	153	±	21
37	133.6	±	1.2	30.6	±	0.3	4.5	±	0.1	3.6	±	0.08	3486	±	527.0	345	±	2.1	2.1	±	0.10	535	±	41	115	±	13
38	76.4	±	6.1	24.3	±	0.7	0.3	±	0.1	1.7	±	0.07	1633	±	15.4	282	±	36	1.9	±	0.10	nd			138	±	13
39	279.1	±	5.3	75.1	±	1.4	10.0	±	0.2	3.0	±	0.04	6259	±	369.3	333	±	40	8.8	±	0.47	611	±		4.0	±	0.15
40	32.9	±	0.1	6.3	±	0.9	0.8	±	0.03	0.6	±	0.02	694	±	57.7	229	±	32	0.0			46.7	±	7.2	3.1	±	0.34

[a]Insufficient oil was extracted from select samples, limiting α-tocopherol analysis

[b]Select samples did not contain enough olives for acrylamide or ferrous gluconate analysis.

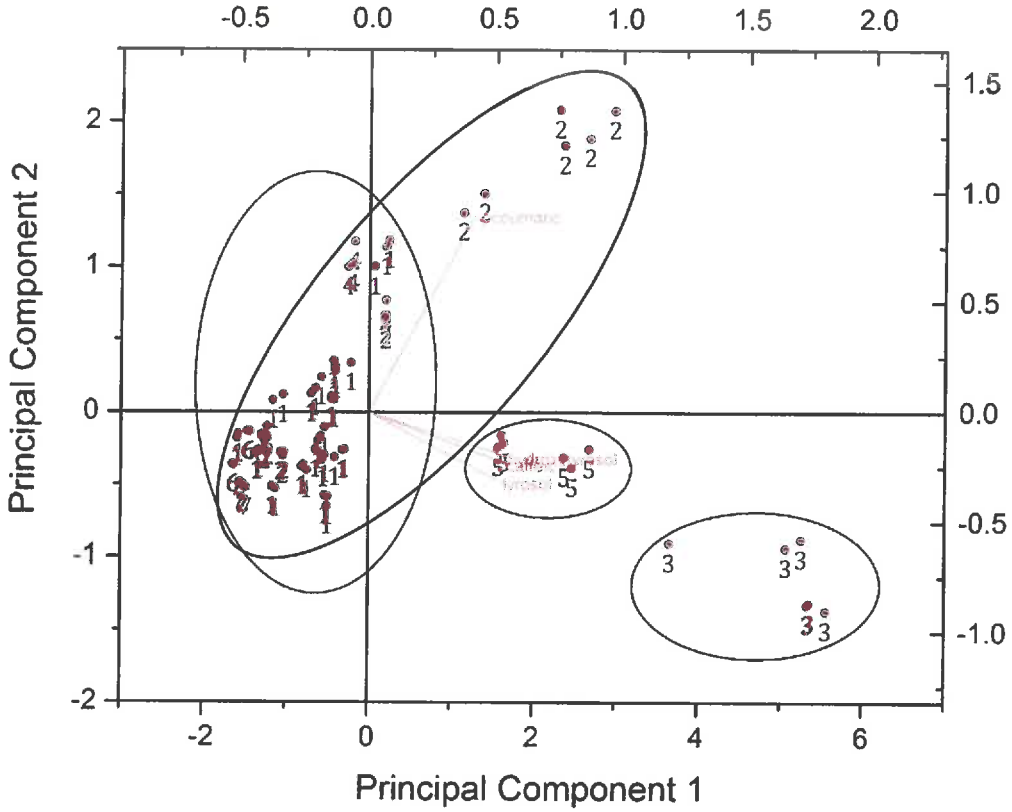

Figure S1: Principal component analysis of phenolic data
Samples are labeled according to cultivar: 1-Domestic Black Manzanilla; 2- Domestic Green Manzanilla; 3- Imported Green Manzanilla; 4- Gordal; 5- Barouni; 6- Sevillano; 7- Mission.
The triplicate measurements from each sample were used in the model to improve computation.

Table S3: Fatty acid profiles of the 40 California-style olive samples (expressed as %)

Sample #	16:0	16:1	17:0	17:1	18:0	18:1	18:2	18:3	20:0	20:1	22:0	24:0
1	16.5	1.3	0.2	0.3	2.8	73.0	3.9	0.9	0.5	0.3	0.1	0.2
2	16.4	1.5	0.2	0.3	2.8	72.2	5.0	0.8	0.5	0.1	0.1	0.1
3	17.3	1.4	0.2	0.2	2.5	72.8	3.6	1.1	0.4	0.3	0.1	0.1
4	16.6	1.3	0.2	0.2	3.0	71.1	5.9	0.8	0.5	0.3	0.1	0.1
5	17.5	1.1	0.2	0.2	2.1	68.2	8.4	1.4	0.4	0.3	0.1	0.1
6	14.6	0.8	0.1	0.2	2.2	73.8	6.5	0.9	0.4	0.3	0.1	0.1
7	13.6	0.7	0.2	0.2	2.8	73.1	7.8	0.8	0.4	0.3	0.1	0.1
8	14.9	0.8	0.1	0.2	2.2	73.2	6.9	1.0	0.4	0.3	0.1	0.1
9	16.8	1.5	0.2	0.2	3.1	71.4	5.0	0.9	0.5	0.3	0.1	0.1
10	16.5	0.9	0.2	0.3	2.3	67.9	9.2	1.6	0.4	0.3	0.1	0.1
11	15.1	0.9	0.2	0.3	2.0	71.0	8.3	1.3	0.4	0.3	0.1	0.1
12	15.7	1.4	0.2	0.3	2.9	70.4	7.3	0.9	0.5	0.3	0.1	0.1
13	16.8	1.4	0.2	0.2	2.9	71.3	4.9	1.2	0.5	0.3	0.1	0.1
14	18.0	1.7	0.1	0.2	3.0	71.1	3.9	1.1	0.5	0.3	0.1	0.1
15	15.3	1.4	0.2	0.3	2.3	73.7	5.0	1.0	0.4	0.3	0.1	0.1
16	15.9	1.5	0.2	0.2	3.1	68.1	9.2	0.8	0.5	0.2	0.1	0.1
17	16.4	1.3	0.2	0.3	2.7	72.7	4.4	0.9	0.5	0.3	0.2	0.2
18	12.9	0.7	0	0.1	2.2	74.9	7.5	1.0	0.3	0.3	0.1	0.1
19	16.8	1.3	0	0.1	1.8	67.0	11.0	1.1	0.3	0.3	0.1	0.1
20	19.0	1.7	0.2	0.2	2.8	68.0	5.8	1.3	0.5	0.3	0.1	0.1
21	17.1	1.4	0.2	0.3	2.6	71.6	5.2	0.9	0.4	0.3	0.1	0.1
22	15.4	0.8	0.2	0.4	2.1	72.5	6.5	1.3	0.4	0.3	0.1	0.1
23	16.4	0.8	0.2	0.3	2.3	70.8	6.8	1.5	0.4	0.3	0.1	0.1
24	17.1	1.5	0.1	0.2	2.7	71.3	5.3	0.9	0.4	0.2	0.1	0.1
25	13.7	0.8	0.1	0.2	2.4	74.7	6.3	0.9	0.3	0.3	0.1	0.1
26	20.1	1.7	0.1	0.2	2.7	69.1	3.8	1.3	0.5	0.3	0.1	0.1
27	16.3	1.6	0.1	0.2	3.3	70.3	6.2	1.0	0.5	0.2	0.1	0.1
28	16.4	1.3	0.1	0.3	2.9	73.0	4.0	1.1	0.4	0.3	0.1	0.1
29	17.6	1.4	0.2	0.2	3.0	72.6	3.3	0.9	0.4	0.2	0.1	0.1
30	16.8	1.3	0.2	0.3	3.0	72.6	3.3	0.9	0.4	0.2	0.1	0
31	16.9	1.6	0.1	0.2	2.6	71.3	5.4	1.0	0.4	0.3	0.1	0.1
32	16.7	1.4	0.2	0.3	3.0	71.5	5.2	0.9	0.4	0.2	0.1	0.1
33	15.6	1.0	0.1	0.2	2.1	71.4	7.7	1.1	0.3	0.3	0.1	0.1
34	16.6	1.2	0	0.1	1.7	70.7	7.9	1.0	0.4	0.3	0.1	0.1
35	15.9	1.2	0	0.1	1.8	76.8	2.5	0.9	0.3	0.3	0.1	0.1
36	14.6	0.8	0.1	0.2	2.1	72.7	7.5	1.1	0.3	0.3	0.1	0.1
37	16.2	1.0	0.1	0.2	2.1	71.3	6.9	1.2	0.4	0.3	0.1	0.1
38	13.4	0.7	0.2	0.3	2.5	75.5	5.8	0.8	0.4	0.3	0.1	0.1
39	15.3	1.2	0	0.1	1.8	77.5	2.4	0.9	0.3	0.3	0.1	0.1
40	16.5	1.4	0.2	0.3	2.7	71.5	5.7	0.9	0.4	0.3	0.1	0.1

CALIFORNIA OLIVE COMMITTEE

FINAL PROJECT REPORT

Workgroup/Department: Olive / Plant Sciences, UC Davis

Project Years: 2013-2017 Duration of Project: Four Years

Project Title:

Propagating Dwarfing Olive Rootstocks and Establishing a Long Term Orchard

Project Leaders:
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Project Summary:
To facilitate mechanical harvesting the newest table olive orchards are planted in hedgerows and require regular mechanical pruning to keep the trees small. Our 12 X 18' foot research planting established at Nickels Soils Laboratory in 2002 has demonstrated to us this will be difficult with the 'Manzanillo' olive cultivar. Such hedgerow 'Manzanillo' orchards designed for mechanical harvesting would be easier to maintain if they could be grafted on dwarfing rootstocks. Among those olives with promise for use as a dwarfing rootstocks are: Nikitskaya, *Olea cuspidata,* Verticillium Resistant Oblonga, Dwarf D and Little Ollie

In 2013 we proposed propagating these rootstocks and testing with grafted and non-grafted own rooted 'Manzanillo' controls for their dwarfing potential with 'Manzanillo' to produce a tree that is more amenable to mechanical harvesting. The own rooted 'Manzanillos' and 'Manzanillo' grafted to 'Manzanillo' in this orchard could also serve as the next generation hedgerow trained mechanically pruned orchard for mechanical harvesting with trunk and canopy contact shakers.

In 2013 year we were awarded funding to propagate the desired rootstocks and locate a suitable orchard site for establishment of the propagated trees. Due to difficulty of propagation with the dwarfing rootstocks the planting was in spring 2014. When the dwarfing rootstocks were large enough all the dwarfing rootstocks and the Manzanillo grafted controls were grafted with Manzanillo scions in late summer 2016. All the grafted trees were cut back spring 2017 to evaluate the ability to dwarf the Manzanillo scion.

As the results below demonstrate the two dwarfing rootstocks, *Olea cuspidata* and Dwarf D would not accept a graft; the successful grafting rate remained below 55%. Nitskaya and Verticillium Resistant Oblonga were successfully grafted and 92 and 77 %, respectively. However, after pruning back to the same size as the grafted Manzanillo control in early 2017 neither rootstock scion combination of Manzanillo on Nikitskaya, or Manzanillo on Verticillium Resistant Oblonga displayed any ability to dwarf, growing to 92% and 96% respectively of the size of the grafted Manzanillo on Manzanillo control trees. Observations of Little Ollie in other trials displayed little scion dwarfing of the Manzanillo scion either and was not grafted in this trial

Based on these these results, graft incompatibility of *Olea cuspidata* and Dwarf D and the inability of Nikitskaya, Verticillium Resistant Oblonga, and Little Ollie to dwarf a Manzanillo scion, there is no reason to continue this trial. Additionally, *Olea cuspidata* proved quite susceptible to Olive knot with over 93% of the trees demonstrating > 50% of young scaffolds with infection. The plot was removed December 20th 2017 and the irrigation system and stakes donated to the UC Olive Center orchards and healthy three year old trees to the UC Student Farm

Project Objectives and Experimental Design:

This application for initial funding was for two purposes:

I. **Propagation and grafting of the rootstocks with 'Manzanillo' scions.**
   a. Dr. John Preece supervised the development of specific propagation techniques for 112 each of the following olive cultivars used as dwarfing rootstocks; Nikitskaya, *Olea cuspidata,* Verticillium Resistant Oblonga and Dwarf D. Dwarf D and *Olea cuspidata* very difficult to root as cuttings so there were were in sufficient trees only for both spacings. At the wider spacing, Little Ollie, which roots easily was tested.

II. **Establishing the next generation olive hedgerow orchard for evaluation of mechanical harvesters.**
   a. Field 3556, a four-acre block located in Plant Sciences Field Facility located on the UC Davis Campus and maintained by UC Davis Plant Sciences field personnel was chosen as the planting site. This site had the added advantage of being located adjacent to oil orchards being developed by the UC Olive Center. The trees were planted in 2014. **Attachment I: Field Map: 3556.**

III. **Experimental Field Design:**
   a. Split plot design with the north half of the field at spaced at 10 X 16' and the south at 10 X 8'.
   b. There are 4 Randomized Complete Blocks
   c. Four different dwarfing rootstocks grafted with 'Manzanillo'
   d. Own rooted 'Manzanillo' and 'Manzanillo' grafted to a 'Manzanillo' grafting controls.
   e. Sevillano pollinizers were planted as border rows around the perimeter of the orchard and in the middle, as a row between the wide and narrow spacing.

Project Methods Summary: 2014-2017

The trees planted in 2014 were staked and grown through the summer of 2015 to allow the trees to reach sufficient size for grafting. Because there were insufficient trees available in 2014 to complete the border rows in spring of 2015, the border rows of 'Sevillano' pollinizers were completed by planting the last 41 trees.

Some of the rows of dwarf olives were incomplete, therefore additional cuttings were rooted and trees produced at the National Clonal Germplasm Repository nursery in 2015. The exception is that 'Dwarf D' has proven to be extremely difficult to root to produce plants for the wider spacing portion of the study. Therefore, in addition, cuttings of 'Little Ollie' were rooted as this cultivar proved to be easy to propagate.

Sierra Gold Nursery and staff of the National Clonal Germplasm Repository bark or whip grafted two scions onto each rootstock from September 28 – Oct. 1, 2015. This cooler time of the year was better for the grafts to heal and take. Following grafting, the orchard was sprayed with Kocide to control olive knot. Based on experience gained in grafting, the final trees planted in 2015 were sufficiently large for grafting late summer, 2016. During 2016, the weaker of the two grafts were pruned off to a single scion per rootstock

The block was pruned May 15-18, 2016. The block was rated July 20th 2016 with the following results: of the grafts done in September 28th 23 (3%) failed, and 87 rootstocks (11%) remain too small to graft, and 48 (6%) of the trees are dead or missing: The 3% graft failures and 11% too small in fall 2015 were regrafted fall 2016. The 11% dead is due to squirrel damage to the irrigation lines flooding individual trees. The lines have been repaired and moved further away from the trees as they are now larger; in winter 2016 the drippers were being replaced with microsprinklers.

The dwarfing olive planting was pruned on May 25 and May 30, 2017. This pruning included the grafted trees and the border rows so that the trees in the guard rows will not overgrow the grafted trees. The grafted trees were pruned to a nurse limb and the graft scions and the ungrafted border trees were pruned in a similar manner. Following pruning, the trees were sprayed with copper. Data on final grafting success and scion growth as a percentage of growth relative to the Manzanillo grafted on Manzanillo control growth was collected on November 20th 2017. The results are summarized below. The goal was to be able to dwarf the olive trees by using one or more of these rootstocks. Therefore, data focused on first on grafting success and second canopy volume growth of the rootstock: scion combinations as % of the grafted Manzanillo on Manzanillo control.

As the results below demonstrate Dwarf D and *O. cuspidata* have little potential as a dwarfing rootstock for Manzanillo as they are proving incompatible and the latter is susceptible to olive knot. The Oblonga and Nitskaya rootstocks were successfully grafted but, have canopy volumes that are statistically equal to that of a Manzanillo Scion grafted on a Manzanillo rootstock; neither displays any potential to dwarf a Manzanillo scion. It appears spacing and pruning will be the primary method of keeping a Manzanillo tree small for mechanical or hand harvesting

Project Results:

Figure 1. Grafted olives pruned to one nurse limb: May 25th 2017.

Figure 2. Border row of 'Sevillano' trees after pruning: May 25th 2017.

The grafting success was rated September 29th 2017. The Results are give in Table 1. below

Percentage of Grafting Success and Rootstock Survival: 2017

Rootstock	Manz. Graft	Oblonga	Nitskaya	O. cuspidata	Dwarf D
% Graft Success*	92 A	92 A	77 B	54 C	55 C
% Rootstock Survival (NSD)	100	97	95	96	96

- Values within a row followed by different letters are significantly different @ P= >0.05

Table 1. Based on lack grafting success, O. cuspidata and Dwarf D are not suitable rootstocks for Manzanillo because they do not accept a graft.

As can be seen above in Table 1. when compared to a grafted Manzanillo rootstock only the Oblonga and possibly the Nitskaya rootstocks produced successful grafts. The *O. Cuspidata* and Dwarf D have had repeated graft failures. Also as can be seen in Figure 3., below *O. cuspidata* is extremely susceptible to olive knot. Based on this olive knot susceptibility of *O. cuspidata* and the the inability to successfully graft these rootstocks neither *O. Cuspidata* nor Dwarf D appear to have potential as a dwarfing rootstock for Manzanillo.

Fig. 3. *O. cuspidata* rootstock on November 28th, 2017 with olive knot infestation.

Potential for Dwarfing Success: 2017

Rootstock	Manz. Graft	Oblonga	Nitskaya	O. cuspidata	Dwarf D
% Dwarfing (NSD)	100%	96%	92%	N/A	N/A

Table 2. Using the grafted Manzanillo canopy volume as a 100% standard for calculated canopy volume (canopy height X canopy width) and translated to a % of standard grafted Manzanillo on Manzanillo (Fig. 5) it appears thus far neither Oblonga (Fig. 6) or Nitskaya (Fig 4.) have any potential as a dwarfing rootstock. The stakes in the three figures are ` 8 feet tall to allow a visual comparison.

Fig. 4 Manzanillo on Nitskaya as of November 28th 2017.

Fig. 5 Manzanillo grafted on Manzanillo control on November 28th 2017.

Fig. 6. Manzanillo grafted on Oblonga on November 28th 2017.

Conclusions:
Based on the results Dwarf D and *O. cuspidata* have little potential as a dwarfing rootstock for Manzanillo as they are proving incompatible and the latter is susceptible to olive knot. The Oblonga and Nitskaya rootstocks have been successfully grafted but, have canopy volumes that are statistically equal to that of a Manzanillo Scion grafted on a Manzanillo rootstock; neither displays any potential to dwarf a Manzanillo scion. It appears spacing and pruning will be the primary method of keeping a Manzanillo tree small for mechanical or hand harvesting.

The trial was removed December 20th 2017. The stakes and irrigation system were donated to the UC Olive Center for use in their orchards. The healthy three-year old Manzanillos, grafted and ungrafted, and the Sevillanos were offered to the UC Davis Student Farm.

We gratefully acknowledge the the four years of support from the California Olive Committee

Department of Plant Pathology
Relevant AES/CE Project No.: 11103864

University of California
Division of Agricultural Sciences
ANNUAL RESEARCH PROGRESS REPORT
California Olive Committee/California Olive Oil Commission
Project Year: 2017

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Title: Epidemiology and management of olive knot caused by *Pseudomonas savastanoi* pv. *savastanoi (Psv)*

Introduction

Olive knot caused by the bacterium *Pseudomonas savastanoi pv. savastanoi* (Psv) is a serious disease of olives (*Olea europaea*) worldwide (7). The pathogen enters through wounds causing outgrowths (knots, tumors, galls) on branches and twigs, and infrequently on leaves and fruit. Olive knot is one of the most economically important diseases of olives as infection may lead to tree defoliation, dieback, and reduced tree vigor, which ultimately lowers fruit yield and quality (5). *Psv* can survive epiphytically on olives, but the main sources of inoculum are bacteria living within knots (6). Large quantities of bacterial ooze can be exuded upon wetting knots. This exudate is disseminated by rain, wind, insects, birds, as well as human activity. The opportunistic pathogen takes advantage of wounds caused by natural leaf abscission (3), frost, hail, as well as cultural practices such as pruning and harvesting. These latter practices also lead to direct mechanical damage of the knots, exposing and spreading inoculum to healthy tissue. In California, infections occur mostly during the rainy season (late fall, winter, and spring) but knots do not develop until new growth starts in the spring. Infections can occur at low temperatures (-5°C) and thus, wetness is the main limiting factor for the disease. Historically, the most susceptible olive cultivars are Manzanillo, Sevillano, Ascolano, and Mission. None of the currently grown cultivars is resistant to the pathogen (4).

Control of olive knot is difficult, and growers rely on applications of copper-based bactericides as the only effective foliar treatment. Reliance on a single active ingredient has led to our detection of copper resistance in *Psv* strains in two olive orchards. These strains were highly virulent when inoculated to Arbequina and Manzanillo olive wounds, and application of copper provided reduced control as compared to inoculation with a sensitive strain. Still, the incidence of copper resistance is very low, however, the occurrence of resistance necessitates the development of alternatives.

We have been instrumental in the development of the new agricultural antibiotic kasugamycin (commercial name Kasumin) for several bacterial diseases of agronomic crops in the United States. Kasugamycin has high activity against *Erwinia* and *Pseudomonas* (2) and moderate activity against *Xanthomonas* species and other plant pathogenic bacteria. We found it to be the most promising new treatment for preventing olive knot in our extensive field studies. Registration of kasugamycin through the IR-4 project is expected in 2020. Kasugamycin would greatly complement current copper sprays and could be used in rotation or mixtures with copper. New antibiotic registrations, however, find little acceptance with regulatory agencies, and we are currently in discussion with EPA to develop a science-based approach on the use of antibiotics in plant agriculture.

In addition to developing conventional chemical compounds, research on alternative materials such as SDH, biopesticides, and food additives may provide new modes of action for managing olive knot. Salicylidene benzoylhydrazone (SBH) was recently discovered to display synergism when combined with copper. We performed preliminary tests with a derivative of this molecule with very promising results using several genera of phytopathogenic bacteria including *Psv*. Low concentrations of metallic copper combined with SBH were highly inhibitory in vitro against a copper-resistant *Psv* strain, while copper or SBH by

themselves at the same concentrations were not effective. Field trials will be necessary to support these initial in vitro findings.

Biopesticides such as Serenade and several food additives that are 'generally recognized as safe' (GRAS) have antimicrobial properties. They are often naturally produced molecules of gram-positive *Streptomyces* species. Although these compounds are typically applied to food products as preservatives, they may have potential for controlling plant diseases when applied as a foliar treatment. Integration of these alternative materials with conventional treatments may improve disease control, reduce the risk of resistance development, and provide olive growers with more resources for managing olive knot. Therefore, we evaluated nisin, epsilon-poly-L-lysine, and lactic acid.

Objectives

1) **Develop novel chemicals to improve performance of copper-based bactericides against *Psv***
   a) In-vitro sensitivity of *Psv* to copper in the presence of SBH (and potential derivatives) using selected copper/SBH ratios.
   b) Efficacy of copper-SBH mixtures for the management of olive knot caused by copper-sensitive and -resistant strains of *Psv* in field studies.
      i) Evaluate selected copper/SBH ratios with the goal to minimize the amount of copper applied while maintaining good disease control.

2) **Evaluate a biopesticide and several food additives for the control of olive knot**
   a) Determine the efficacy of the bio-pesticide Serenade (*Bacillus subtilis* strain QST 713) in field studies for the management of olive knot.
   b) Determine the efficacy of the GRAS food additives nisin, epsilon-poly-L-lysine, and lactic acid in field studies for the management of olive knot.

Materials and methods

1) Develop novel chemicals to improve performance of copper-based bactericides against *Psv*.

1a. To evaluate the toxicity of copper-SBH mixtures against *Psv*, a dilution plate method was combined with the spiral gradient endpoint (SGE) method. Agar media were amended with fixed concentrations of copper. Subsequently, SBH was spiraled onto the copper-amended plates producing a SBH concentration gradient in combination with a fixed copper concentration. Suspensions of *Psv* strains were streaked onto the amended media. This allowed the determination of minimal inhibitory values for *Psv* at different ratios of copper and SBH. These data were used to calculate appropriate field rates.

1b. Copper-SBH mixtures were tested in the field on Arbequina and Manzanillo olives at UC Davis. Plants were wounded with lateral and leaf scar wounds. Lateral wounds on 1-2-year-old twigs were made using a scalpel by removing the bark and exposing cambial tissue. Leaf scars were made by pulling leaves off the same twigs. Additionally, a natural leaf scar study was done in the spring when leaves naturally fall. Copper and copper-SBH treatments were sprayed onto wounds before inoculation with a suspension of copper-sensitive or -resistant *Psv* strains. The efficacy of treatments was assessed as the incidence of knots forming on treated, inoculated wounds as compared to wounds that were treated with water and inoculated (i.e., control). SBH was applied using rates based on the laboratory tests and also at the equivalent rate of mancozeb (1.8 lb a.i./A or 2.4 lb/A Manzate Prostick). Copper was also used at different rates.

1c. Similar in vitro and efficacy studies for zinc thiadiazole as copper-SBH evaluations in 1a and 1b.

2) Evaluate a biopesticide and several food additives for the control of olive knot

2a and b. Field tests were conducted on Arbequina and Manzanillo olives to evaluate the efficacy of Serenade, nisin, epsilon-poly-L-lysine, and lactic acid against *Psv*. The same wounding, treatment, and inoculation procedures were used as described above.

3) Continue to support the registration of the antibiotics kasugamycin and oxytetracycline (newly added) - UV-blockers and stabilizers are being evaluated to improve the performance of antibiotics and

copper. For this, Raynox Plus (Valent USA) at a rate of 5% and similar products that prevent sun damage by blocking UV light are being used with both antibiotics. Oxytetracycline is especially vulnerable to UV-degradation and new adjuvants (e.g., Tactic) are being tested.

Additionally, an inter-commodity and industry group is working with the Minor Crop Farmer Alliance to recommend an EPA policy change towards the use of antibiotics in plant agriculture. Specifically, a new internal EPA Guidance Document (GD) for use of antibiotics in plant agriculture needs to be developed based on science. Historically, EPA GD 152 for registration of antibiotics in animal husbandry is used for all requests in agriculture.

Results and Discussion

1a. In-vitro sensitivity of* Psv *to copper in the presence of SBH (and potential derivatives). Eight Cu-sensitive (growing at ≤25 mg/L MCE) or -resistant (growing at ≥50 mg/L MCE) *Psv* strains were exposed to a SBH concentration gradient from 0.3 to 31 mg/L in absence of presence of 10, 25, or 50 mg/L metallic copper equivalent (MCE). SBH by itself was not inhibitory at ≤31 mg/L to any of the strains. When the SBH gradient was combined with 10 mg/L MCE, inhibition was observed for all strains. The range of minimal inhibitory concentrations (concentration that reduces bacterial growth by ≥95%) for SBH against *Psv* was between 1.4 and 4.7 mg/L in the presence of 10 mg/L MCE. Using 25 mg/L or 50 mg/L MCE in combination with SBH, no growth was observed for all copper-sensitive and moderately-resistant strains. Inhibition against highly copper-resistant strains, however, was not greatly improved as compared to using 10 mg/L MCE.

1b. Efficacy of copper-SBH mixtures for the management of olive knot caused by copper-sensitive and -resistant strains of* Psv *in field studies. Field studies were initiated in the spring of 2017 on two olive cultivars in experimental or commercial plantings, and treatments are shown in Tables 1 and 2. DAS 1 and DAS 2 are SBH derivatives. DAS 2 is pre-formulated and includes copper. ZTD is a derivative of amino-thiadiazole (ATD) containing zinc that we previously tested in-vitro and that enhanced the efficacy of copper. On leaf scars, results indicate that copper-ZTD mixtures reduced disease incidence caused by a copper-sensitive strain from that of the control and copper alone. On lateral wounds, however, this treatment performed similarly to copper in reducing olive knot.

In the second trial in a commercial orchard, kasugamycin and kasugamycin-copper mixtures resulted in the lowest disease on lateral and leaf scar wounds with a >90% reduction in incidence. The mixtures of copper with ZTD or DAS-1 did not improve the performance of copper alone. Although registered in China, ZTD was rejected by the EPA as a biopesticide, and EPA indicated to the registrant that full toxicological and environmental persistence evaluations would need to be done. The registrant stated that this makes registration in the United States economically prohibitive. In contrast, the registrant of DAS-1 and -2 (the SBH products) is willing to test additional derivatives in the coming year.

In additional trials using natural leaf scars, copper and kasugamycin were highly effective reducing disease incidence by >95% when using a copper sensitive strain for inoculation (Table 3). The natural leaf scar as opposed to removing leaves by hand most likely had a natural abscission zone that helped to prevent bacterial ingress.

2a. Determine the efficacy of the bio-pesticide Serenade (*Bacillus subtilis *strain QST 713) in field studies. Serenade and Serenade-copper mixtures were not effective at the rates evaluated in reducing olive knot as compared to the non-treated control (Table 1).

2b. Determine the efficacy of the GRAS food additives nisin, epsilon-poly-L-lysine, and lactic acid in field studies. On leaf scars, lactic acid reduced disease incidence caused by a copper-sensitive strain from that of the control and copper alone. On lateral wounds, however, this treatment was less effective but was statistically similar to copper in reducing olive knot. Using a copper-resistant strain, lysine, nisin, and lactic acid had the lowest disease incidence on leaf scars. On lateral wounds, these treatments were similar in their performance to copper.

3) Continue to support the registration of the antibiotics kasugamycin and oxytetracycline (newly added) - UV-blockers/stabilizers and registrant-recommended adjuvants (e.g., Tactic) are currently being evaluated to improve the performance of antibiotics and copper. This research is ongoing.

Table 1. Evaluation of potential new bactericides for management of olive knot in a UC Davis experimental orchard

		Incidence of knot formation (%)							
	Product	cv. Manzanillo inocul. with Cu-sensitive strain				cv. Arbequina inocul. with Cu-resistant strain			
Treatment	Rate/A	Lateral wounds	LSD	Leaf scars	LSD	Lateral wounds	LSD	Leaf scars	LSD
Untreated	---	82.5	abc	92.5	abc	90	ab	85	abc
DAS 2	128 fl oz	97.5	a	92.5	ab	100.0	a	92.5	ab
ChampION+ DAS 1	2 lb + 64 fl oz	62.9	cde	85.7	abcd	100.0	a	90.0	abc
ChampION + SBH*	2 lb + 24 oz	72.5	bcd	67.5	defg	97.5	a	87.5	abc
Serenade Opti	20 oz	95.0	a	97.5	a	95.0	a	100.0	a
ChampION + SBH*	3.5 lb + 24 oz	35.0	efg	47.5	fghi	92.5	ab	92.5	ab
Serenade Opti + ChampION	20 oz + 3.5 lb	95.0	a	97.5	a	90.0	ab	95.0	ab
ChampION+ DAS 1	3.5 lb + 64 fl oz	11.3	h	45.0	ghi	92.5	ab	92.5	ab
ChampION + ZTD	2 lb + 500 ppm	45.0	def	57.5	efgh	90.0	ab	85.0	abc
DAS 2	64 fl oz	97.5	a	77.5	bcde	87.5	ab	82.5	abc
ChampION + Manzate	2 lb + 2.4 lb	22.5	gh	57.5	efgh	87.5	ab	97.5	ab
Nisin	1%	95.0	ab	75.0	def	87.5	ab	70.0	cde
ChampION	2 lb	60.0	cd	75.0	cdef	77.5	bc	82.5	abc
ChampION + Manzate	3.5 lb + 2.4 lb	12.5	gh	35.0	ij	75.0	bc	80.0	bcd
Lactic Acid	1%	30.0	fgh	27.5	ij	75.0	bcd	65.0	de
ChampION + ZTD	3.5 lb + 500 ppm	10.0	h	20.0	j	67.5	cd	82.5	bcd
Lysine	1%	77.5	abc	75.0	bcde	56.7	cd	56.7	e
ChampION	3.5 lb	10.0	h	37.5	hij	55.0	d	87.5	abc

[1]- Treatments were applied to leaf scar and lateral wounds of using a hand-held sprayer until runoff, allowed to dry, and wounds were inoculated with a copper-sensitive or -resistant *Psv* strain at 10^7 CFU/ml. A total of 50 leaf scar wounds and 50 lateral wounds were used for each treatment. The field study was done as a randomized complete block design and included an untreated-inoculated control.

Table 2. Evaluation of potential new bactericides for management of olive knot in a commercial olive orchard in Yuba City

	Product	% Incidence of knots on treated wounds			
Treatment	Rate (/A)	Lateral wounds	LSD	Leaf Scars	LSD
Untreated	---	74	a	62	a
DAS 2	64 oz	76	a	56	a
ChampION+ DAS 1 high	3.5 lbs + 128 oz	30	b	26	b
ChampION + ZTD	3.5 lbs + 500 ppm	20	b	10	c
ChampION + DAS 1 low	3.5 lbs + 64 oz	18	bc	10	c
ChampION	3.5 lbs	18	bc	6	c
Kasumin	200 ppm	2	cd	6	c
ChampION + Kasumin	3.5 lbs + 200 ppm	0	d	0	c

[1]-Treatments were applied to leaf scar and lateral wounds of Arbequina olive using a hand-held sprayer until runoff, allowed to dry, and wounds were inoculated with a copper-sensitive *Psv* strain at 10^7 CFU/ml. A total of 50 leaf scar wounds and 50 lateral wounds were used for each treatment. The field study was done as a randomized complete block design and included an untreated-inoculated control.

Table 3. Management of olive knot on natural leaf scars using new bactericides

Location	Treatment	Product Rate/A	% Incidence of knots on natural leaf scar wounds*	LSD
UC Davis	Untreated	---	39.4	a
	ChampION	3.5 lbs	0.0	b
	Kasumin	200 ppm	3.8	b
	ChampION + Kasumin	3.5 lbs + 200 ppm	0.0	b
Commercial orchard	Untreated	---	31.1	a
	ChampION	3.5 lbs	3.0	b
	Kasumin	200 ppm	0.0	b
	ChampION + Kasumin	3.5 lbs + 200 ppm	0.0	b

*- Incidence of knots occurring on natural leaf scar wounds made by removing yellow-dying leaves and inoculating the leaf scar after treatment. Experiments done during natural leaf drop in the spring.

A new suggested EPA Guidance Document (GD) for use of antibiotics in plant agriculture was submitted to the EPA through MCFA. Historically, EPA GD 152 for registration of antibiotics in animal husbandry is used for all requests in agriculture. USDA and EPA officials are addressing all uses of antibiotics currently under a CODEX workgroup. Goals including classifying plant agricultural uses as low potential sources of non-target human bacterial pathogen resistance as opposed to animal and human uses.

Benefits to the industry

For management of olive knot, in addition to cultural and sanitation practices, copper materials are currently the only effective treatments. With the detection of low levels of copper resistance in olive knot pathogen populations in California, alternatives are needed for a sustainable and effective management program. We initiated the registration of the new agricultural antibiotic kasugamycin and oxytetracycline for olive knot management through the IR-4 program. Still, new bactericidal products are being evaluated including SBH and other antibacterial food preservatives that potentially can be registered. The registration of several materials will allow the implementation of anti-resistance strategies and will prevent over-use of any single mode of action bactericide. Still, integrated practices will be critical for the successful management of the disease.

Supplemental efforts in 2017.

1) We published one Plant Disease article on sanitizing field equipment using quaternary ammonium (1).
2) We published a second manuscript in Plant Disease on the efficacy of copper and new bactericides for managing olive knot in California (2).
3) A third manuscript on the epidemiology of olive knot has been submitted to Plant Disease.

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Department of Botany and Plant Sciences
Relevant AES/CE Project No.: 4556

University of California
Division of Agricultural Sciences

PROJECT PLAN/RESEARCH GRANT PROPOSAL PROGRESS REPORT

Project Year: 2017 (Year 2)

Anticipated Duration of Project: New 2-year proposal to determine the efficacy of PGR and pruning treatments to manage alternate bearing; this requires yield data for 2 consecutive years.

Project Leaders:

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Project Title: ~~Managing Alternate Bearing in Olive with PGRs and Pruning~~ Managing Alternate Bearing in Olive with Plant Growth Regulators (PGRs) and Pruning

Cooperators:

Lindcove REC — 'Manzanillo' table olive orchard, Lindcove

Objectives for 2017 (Year 2): This project is based on our discovery of the four mechanisms by which the ON-crop of olive fruit reduces return bloom the following year and perpetuates alternate bearing in 'Manzanillo' olive trees:

(1) inhibition of summer vegetative shoot growth (Sibbett, 2000);
(2) inhibition of spring bud break;
(3) abscission of floral buds ; and
(4) inhibition of floral development.

Keep in mind that all of four effects are more severe on the bearing shoots of ON-crop trees, the majority of shoots, than they are on non-bearing shoots on ON-crop trees due to the combined effects of the fruit set on the shoot and crop load (the total number of fruit per ON-crop tree). Also note that the OFF crop has the opposite effect for each mechanism. Taken together, the four negative effects of the ON-crop on return bloom, especially the abscission of more than 70% of the floral buds for next year's bloom and the inhibition of floral development caused by the ON crop of fruit, make it abundantly clear that early fruit thinning (before pit hardening) is necessary to mitigate alternate bearing in 'Manzanillo' olive. Moreover, fruit thinning, which increases the number of non-bearing shoots, will improve the efficacy of PGR treatments that increase

summer vegetative shoot growth and spring bud break to increase floral intensity following the production of the ON crop (Fichtner and Lovatt, 2016; Fichtner et al., 2017).

This project utilizes what we have learned about the timing and efficacy of PGR treatments that we have tested in previous COC funded research as branch injections and whole tree sprays. For 'Manzanillo' olive, injection of 6-benzyladenine (6-BA) or adenosine (ADO) (alone or combined with tri-iodobenzoic acid [TIBA]) into scaffold branches of ON-crop 'Manzanillo' olive trees in July significantly increased summer vegetative shoot growth for non-bearing shoots of ON-crop trees to a value equal to that of non-bearing shoots of OFF-crop control trees and significantly greater than that of bearing shoots of ON-crop control trees ($P < 0.0001$) (Fichtner et al., 2017). However, only ADO (alone or combined with TIBA) significantly increased summer vegetative shoot growth on bearing shoots of ON-crop olive trees to a value equal to that of non-bearing shoots of OFF-crop control trees ($P < 0.0001$). For 'Manzanillo' olive, combining ADO with TIBA provided no benefit over using ADO alone to increase summer vegetative shoot growth. Injecting these same compounds into the scaffold branches of a second set of ON-crop 'Manzanillo' olive trees in February demonstrated that both 6-BA and ADO had a positive effect on spring bud break and floral intensity at return bloom (Fichtner et al., 2017). As a result, 6-BA and ADO increased the number of inflorescences produced by non-bearing shoots of ON-crop trees to values significantly greater than those of non-bearing shoots on both OFF- and ON-crop control trees at return bloom ($P < 0.0001$). Supplying TIBA with ADO reduced the benefit of ADO alone. All three treatments increased inflorescence number at return bloom for bearing shoots of ON-crop 'Manzanillo' olive trees relative to bearing shoots of ON-crop control trees, but not to the level of non-bearing shoots of either ON- or OFF-crop trees ($P < 0.0001$), confirming the need to increase the number of non-bearing shoots on ON-crop trees. (Fichtner et al., 2017). Further, current year treatments were modified based on the results obtained in Year 1 of this research.

The PGRs included in the 2017 experiment are: (*i*) 6-benzyladenine applied pre-bud break in February (6-BA, Maxcel®, Valent BioSciences$_{TM}$), a cytokinin, to increase spring bud break and inflorescence number of olive trees going into an OFF bloom and an OFF-crop year, i.e., these olive trees were ON-crop trees last year and, in the summer of the ON-crop year were treated with 6-BA to increase summer vegetative shoot growth and the number of nodes that can bear inflorescences at spring bloom; (*ii*) aminoethoxyvinylglycine applied at 10% open flowers (AVG, ReTain®, Valent BioSciences$_{TM}$), an ethylene biosynthesis inhibitor, to reduce flower and fruit drop to increase fruit set by the OFF bloom and increase yield of the putative OFF-crop year, these trees were ON-crop trees last year; (*iii*) 1-naphthaleneacetic acid applied at full bloom to the east side of each tree (NAA, ALCO® Olive Stop, AMVAC Chemical Corporation), a fruit thinning agent, to reduce fruit set by olive trees going into an ON bloom and to reduce yield of the putative ON crop year in order to increase fruit size during the ON-crop year and increase yield the following year (these trees were OFF-crop trees last year), which will be left unpruned to determine if the crop gets switched from the west side of the tree this year to the east side next year in order to even out alternate bearing; (*iv*) NAA applied at full bloom to the east side of the tree followed by pruning of the east side of the tree to shift the bloom from the west side of the tree this year to the east side of the tree next year (the efficacy of treatments *iii* and *iv* will be compared to determine if NAA alone is sufficient to reduce crop load and also stimulate summer vegetative shoot growth to increase flowering the following year); (*v*) OFF-crop control trees; and (*vi*) ON-crop control trees. All treatments were applied to a single tree in each block of uniform yielding trees. There were 14 blocks and 6 treatments (i.e., 14 individual trees per

treatment in a randomized complete block design). In addition, we also tested a new proprietary product for fruit thinning being developed by Valent BioSciences on a separate set of ON-bloom 'Manzanillo' trees in a different block (Treatment *vii*). The thinning effect of this new material should be less sensitive to temperature and give more uniform results from year to year than NAA. The PGR treatments were applied to 'Manzanillo' olive trees in a block, which included 'Barouni' olive trees as the pollenizer planted at a ratio of one to ten, at the Lindcove REC in Exeter, CA; the trees had been lightly hand-pruned to maintain space and sunlight within rows and between rows in Year 1 (no light, no flowers).

Progress during funded year 2017 through June 2018 (NCE): ON-crop trees receiving a summer application of 6-BA last year (July 2016) to increase summer vegetative shoot growth were treated with 6-BA again in February 2017 to increase spring bud break and floral intensity at bloom. We continued to test AVG applied at 30% bloom to trees going into an OFF-bloom. Neither treatment increased yield to values greater than control trees going into an OFF-bloom; all produced OFF-crops that were significantly lower than control trees going into an ON-bloom and producing an ON-crop ($P < 0.0001$) (Table 1). In 2017 of our current project, based on the results presented above supporting the need to increase the number of non-bearing shoots on ON-crop trees and the large number of ON-crop trees present in our research orchard, as proposed we tested the efficacy of the PGR naphthaleneacetic acid (ALCO® Olive Stop™; AMVAC Corp.) applied at full bloom at the manufacture's suggested rate to just one side of ON-crop 'Manzanillo' olive trees to reduce bloom and fruit set in the ON-crop year in order to increase spring and summer vegetative shoot growth in the current year and spring bud break, floral intensity and yield on that side of the tree the following year so that it would not produce an OFF-crop. By chemically thinning only half of the tree, the impact of over-thinning on yield when a heat wave occurs is reduced. During the last week of June, we pruned (mechanically hedged) one side of a second set of ON-crop trees to compare the efficacy of chemical fruit thinning versus mechanical pruning on yield and fruit size of the current year's harvest and of next year's return yield following the ON-crop. For fruit removal by pruning, pruning was delayed to the end of June to enable growers to evaluate the crop set by their trees or the efficacy of NAA, if it was applied at bloom, in order to make an informed decision to prune or not, and how severely to prune. Removing fruit by pruning at this time is sufficiently early to promote summer vegetative shoot growth and to have a positive effect on floral bud retention and floral gene expression and spring bud break. Moreover, mechanical hedging is typically a less expensive method of pruning. All trees were topped during the first week of July 2017. In this strategy, the side of the tree that was not treated with NAA or not pruned is the source of the current year's crop, with an increase in average fruit size anticipated relative to fruit of untreated ON-crop control trees. However, the untreated side will produce an OFF-bloom and an OFF-crop the following year, although some increase in return bloom and yield is anticipated on this side of the tree due to the reduction in total fruit number per tree (crop load) on the treated side of the tree. The proposed strategy directs the grower to treat the other side of the tree the following year with NAA or pruning, based in the intensity of the bloom or crop set by June. Thus, each year, alternating sides of the tree would be treated with NAA or pruned. In our research, NAA and mechanical pruning (hedging) reduced yield equally, 28% and 23%, respectively, resulting in yields that were significantly lower than the yield of ON-crop control trees, but significantly greater than the yield of OFF-crop control trees by more than 2-fold ($P < 0.0001$) (Table 1). In addition, the results confirmed that removing fruit on one side of the tree significantly increased average fruit size for the whole tree. NAA and pruning increased fruit size by 20% and 15% compared to ON-crop control trees, respectively, but the fruit were still

10% and 15% smaller than fruit of OFF-crop control trees, respectively ($P < 0.0001$) (Table 1). The average size of fruit on OFF-crop trees was extra large (82 fruit/lb), for ON-crop trees, medium (111 fruit/lb) and for the NAA and pruned trees, large (93 fruit/lb). In a second orchard, we tested two concentrations of the new proprietary material (1-aminocyclopropane-1-carboxylic acid, ACC, a precursor of ethylene biosynthesis) from Valent BioSciences, the action of which might be less sensitive to high temperature, possibly reducing the potential for over-thinning in a heat wave. The treatment was also applied to only one half of the tree. The two concentrations of the proprietary fruit-thinning PGR ACC reduced yield 36% and 31% compared to ON-crop control trees, but the effects with ACC were not statistically significant do the low number of replications possible in this small set of trees (Table 3). The ACC treatments did not increase average fruit size per tree numerically or statistically. For all fruit thinning treatments, return yield data for next year is critical for determining the capacity of the treatments to even out yield in an AB orchard and establish the degree of thinning that is required. Imposing the treatments on alternate sides of the trees annually and collecting yield data over multiple years is essential to determine if good yields can be maintained and AB mitigated.

As first observed by Dr. Fichtner, there was a strong inverse relationship between the proportion of black and partially black fruit per tree and total yield per tree ($r = - 0.60$; $P < 0.0001$), with OFF-crop control trees having the largest proportion of black fruit (31%) per tree ($P < 0.0003$) with another 15% partially colored fruit and the fewest green fruit (54%) ($P < 0.0003$). Conversely, the proportion of fruit that remained green through harvest increased in parallel with total yield per tree ($r = 0.60$; $P < 0.0001$) with the majority (90%) of the fruit remaining green on ON-crop control trees and a statistically equal proportion remaining green on NAA (81%) and pruned trees (75%) ($P < 0.0003$). A greater proportion of green fruit might be another benefit from increasing return yield following the ON-crop year when evening out AB. Just prior to harvest we tested our ability to evaluate the effectiveness of the fruit-thinning treatments. The treated sides of the trees were rated on a scale from 0 (no crop present, 100% crop reduction), 1 (25% of crop present; 75% crop reduction) to 4 (100% of crop present; 0% crop reduction). The correlation between the crop load rating for each tree and the harvested yield per tree was positive and strong ($r = 0.71$; $P = <0.0001$).

We tested the rating system we developed at spring bloom for use as a tool to facilitate the grower's decisions related to flower thinning and/or pruning. We evaluated bloom intensity for the Year 1 OFF-crop control trees and OFF-crop trees receiving PGR treatments that had no effect on yield. These trees, now ON-bloom trees in Year 2, produced blooms greater than medium (> 2) but less than high (< 3) (Table 2). Trees treated with NAA at full bloom (May on the west side of the tree in Year 1 produced 57% more bloom on that side of the tree in Year 2 than the Year 1 ON-crop control trees, which are now in an OFF-bloom, and 83% more than trees pruned on the west side of the tree just prior to summer vegetative shoot growth (June 27 2017) in Year 1. In both cases, bloom was increased on the untreated east side of the tree (Table 2). The results suggest that the pruning treatment was too late in the season for the buds on the newly developing shoots to become floral. This year in our 2018 COC funded research, pruning was at the beginning of June to overcome this problem. The 2018 yield will be critical to determining the utility of the bloom intensity scale and for assessing the efficacy of our NAA and pruning strategies.

Select References:

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Sibbett, S. (2000). Alternate bearing in olive trees. California Olive Oil News. *3* (12),1

Table 1. Effects of plant growth regulators applied at spring bud break, 30% bloom and full bloom and pruning just prior to summer vegetative shoot growth on the west side of ON-crop 'Manzanillo' olive trees in Year 1 on yield, fruit size and quality for Year 1.

				Fruit color		
Tree status	Treatment[z]	Yield (kg/tree)	Fruit size (g/fruit)	Green (%)	Partially green (%)	Black (%)
OFF	None-control	30.8 c[y]	5.5 a	53.7 d	15.5 a	30.8 a
OFF	BA bud break (Feb)	20.3 c	5.6 a	66.1 bcd	15.7 a	18.2 bc
OFF	AVG 30% bloom (Apr)	15.4 c	5.5 a	61.9 cd	17.0 a	21.1 ab
ON	None-control	98.5 a	4.1 c	90.3 a	6.6 b	3.2 d
ON	NAA 100% bloom (May), west side of tree	71.3 b	4.9 b	81.3 ab	11.3 ab	7.4 cd
ON	Pruned (June), west side of tree	69.3 b	4.7 b	75.4 abc	14.5 a	10.1 bcd
P-value		< 0.0001	< 0.0001	0.0003	0.0085	0.0003

[z] All trees were topped in July.

[y] Mean values within a vertical column followed by different letters are significantly different at the specified *P* level by Fisher's Protected LSD test.

Table 2. Effects of NAA applied at full bloom and pruning just prior to summer vegetative shoot growth on the west side of ON-crop 'Manzanillo' olive trees in Year 1 on return bloom in Year 2.

		Bloom intensity in Year 2 on the east and west side of each tree[z]		
Tree status inYear 1	Treatment[y] in Year 1	East	West	Tree average
OFF	None-control	2.6 a[x]	2.7 a	2.7 a
OFF	BA bud break (Feb)	2.3 a	2.2 a	2.3 a
OFF	AVG 30% bloom (Apr)	2.6 a	2.6 a	2.6 a
ON	None-control	0.4 b	0.7 bc	0.6 b
ON	NAA 100% bloom (May), west side of tree	0.9 b	1.1 b	1.0 b
ON	Pruned (June), west side of tree	0.9 b	0.6 c	0.7 b
P-value		< 0.0001	< 0.0001	< 0.0001

[z] Bloom was evaluated on the following scale: 0, no inflorescences; 1, low floral intensity; 2, medium floral intensity; and 3, high floral intensity

[y] All trees were topped in July.

[x] Mean values within a vertical column followed by different letters are significantly different at the specified *P* level by Fisher's Protected LSD test.

Table 3. Effects of ACC at two concentrations applied to alternate bearing 'Manzanillo' olive trees on the current year's yield, fruit size and quality.

				Fruit color		
Tree status	Treatment	Yield (kg/tree)	Fruit size (g/fruit)	Green (%)	Partially green (%)	Black (%)
ON	None-control	49.7 a[z]	5.1 a	74.9 a	21.7 a	3.4 a
ON	ACC 500 ppm @ full bloom (May) ½ tree	31.9 a	5.2 a	74.5 a	20.2 ab	12.6 a
ON	ACC 1000 ppm @ full bloom (May) ½ tree	34.3 a	4.9 a	67.3 a	13.0 b	12.5 a
P-value		0.1534	0.6084	0.7473	0.0910	0.4913

[z] Mean values within a vertical column followed by different letters are significantly different at the specified *P* level by Fisher's Protected LSD test.

Canopy management, tree hedging and topping to optimize yield

Introduction and scope

Mechanical hedging and topping can be important tool in improving harvest efficiencies by affecting return bloom, helping to maintain trees in their allotted space and reducing hand pruning and harvest costs. Typically, hedging and topping result in smaller and more compact trees. Smaller trees will facilitate hand harvest by obviating the need for tall, cumbersome ladders and likely increasing the number of bins harvested per person-hour. Picking crews have repeatedly commented that they prefer to harvest from mechanically hedged and topped trees than from traditionally pruned trees (Louise Ferguson, personal communication). In oil olive orchards, mechanical hedging has resulted in increased harvest efficiency and reduced alternate bearing (Connor et al., 2014). However, timing of mechanical hedging is critical for optimal yields. Hedging too late in the season may not provide enough time for new shoots to grow and flower buds to initiate. Earlier work that we conducted on 'Arbequina' oil olives indicated that shoot growth that occurred after early July did not produce flowers the following year. Whether 'Manzanillo' olives will behave the same is unknown. Hedging too early in the season may cause extensive vegetative growth at the expense of fruit growth. Thus, finding 'the sweet spot' for the timing of mechanical hedging is important to maximize and help regulate yields.

Materials, methods and results

Nickels Trial Topping Trial

We initiated the trial in late April 2016 (Figure 1) at the Nickels Soils Lab in Arbuckle California on a mature north south hedgerow planting with a spacing of 12 feet in the row and 18 feet between the rows. The experimental design was a randomized block design with three treatments and four replicates. The treatments were: a) topped at 10 feet, b) topped at 13 feet and c) control – untopped. Hedging was performed on all the trees in the spring by passing down every other row with a double boomed hedger cutting 5 feet from the trunk on the east side of one row and the west side of the other. This was followed by hand pruning. The topping treatments were repeated in 2017 on the same trees and hedging was applied to the row middle that was not hedged in 2016 (Figure 2). In 2016, we measured the time it took for 7 professional pruners to prune all the trees in each replicate of each treatment. In 2017, we measured the time required to prune the 10 trees in the center row of each plot (40 trees for each treatment). This information was used to estimate the pruning costs for each of the treatments. Trees were harvested on October 13, 2017 and samples were taken to Musco Olive to evaluate fruit size and value of the crop.

Trees topped at 10 feet had lower cumulative yields, lower pruning costs, smaller canopy diameters and larger fruit than trees topped at 13 feet and the non-topped control (Table 1). Hand pruning costs were less for all treatments in 2017 compared to 2016 because the trees had not been pruned in 2015 and more pruning was necessary to get them back in the desired condition. Trees that were topped at 10 feet could be pruned without the use of ladders, which

significantly reduced the time needed to prune. These trees were more compact and had smaller canopy diameters. Trees topped at 10 feet also produced larger fruit, and although not significant, there was a trend for a greater price per ton in the smaller trees (Table 1). This greater value, however, did not compensate for reduced yields.

Light levels were measured in the tree canopy throughout the season in 2017 (Figure 3 and 4). On a typical day, light levels measured at 1.5 meter from the ground (lower canopy) were significantly greater in trees that were topped at 10 feet than trees topped at 13 feet (Figure 5). The smaller trees caused less shading and likely increased fruit size lower in the canopy compared with trees topped at 13 feet.

Hedging Timing Trials

Orland Trial

A major goal of these trials is to determine the most effective timing of canopy hedging to ensure return bloom and minimize excessive vegetative growth. Another important goal is to evaluate hedging effects on alternate bearing. In oil olive, hedging reduces the severe yield swings in alternate bearing trees (Connor et al., 2014). The experiment was established as a randomized block design with four replicates in a 14-year-old east west hedgerow orchard with 9 feet by 18 foot spacing at Erik Nielsen's farm. The hedging and collection of shoot growth and bloom and fruit set data was done on the south side of the row due to greater growth on that side. In 2017, monthly hedging began on March 1 and ended May 3 (Figure 6).

Hedging influenced fruiting intensity, fruit set, and yield in 2017 (Table 2). Severe hedging decreased fruiting intensity but increased fruit set. Severe hedging in 2016 decreased yields in 2017. These data indicate that severe hedging not only decreased yields in 2016 but also in 2017. These carryover yield effects were not found with moderate hedging. Trees that were moderately hedged in 2016 produced similar yields to the non-hedged control in 2017.

Timing of tree hedging influenced vegetative and reproductive growth (Table 2 and Figure 7). Trees that were hedged earlier in the season produced greater canopy diameters, greater shoot growth, and number of inflorescences than trees that were hedged later in the season. Trees that were hedged after mid-July produced no inflorescences the following year on the resulting regrowth. This indicates that early spring hedging increases shoot growth and return bloom the following year compared to hedging in summer.

Corning Trial

In Spring 2017, we initiated a new trial on 8-year old olive trees planted in a north-south hedgerow with a spacing of 12 by 18 feet at Heath Burrison's orchard (Figure 8). The trial was set up as a factorial design with four hedging dates and two canopy sides (east or west) and replicated 5 times. The 10-tree plots were hedged on March 8, April 5, May 8, and June 8, 2017. Trees tend to grow slightly more on west-facing canopies and on canopies facing east. Therefore, in order to approximate the same degree of hedging, hedging on the east side of the row was generally a little closer to the trunk than hedging on the west side of the row.

No significant yield differences were found, however there was a trend for greater yields at the earlier hedging dates (Table 3). Trees hedged in March or April typically produced larger fruit and yielded 1 ton per acre more than trees hedged in May or June. Moreover, canopy regrowth from trees hedged in March was significantly greater than regrowth from trees hedged in May and June. It is interesting to note that although the canopy diameters were significantly smaller in the hedged compared to the non-hedged control, no differences in olive yield were found. This may indicate better light environments in the hedged trees. We are currently evaluating light environment in the hedged and control trees.

Additional Activities

'Manzanillo' olives have been collected from various olive orchards in 2016 and 2017 and analyzed for nutrient content (Table 4). These data will be used to develop a nutrient removal calculator for 'Manzanillo' olives.

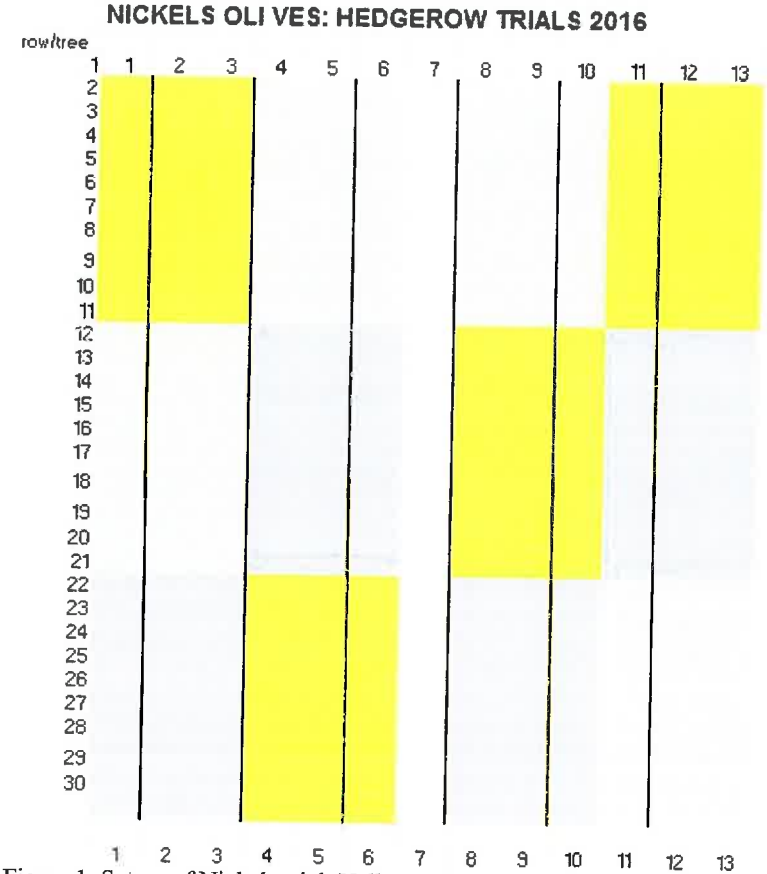

Figure 1. Set up of Nickels trial. Yellow = 10 foot topping followed by hand pruning to thin canopy and remove stubs with thinning cuts; Blue = 13 foot topping followed by hand pruning to thin canopy and remove stubs; Green = Hand pruned to thin canopy. Upright branches were cut to outside lateral branches at approximately 13 feet to control tree height. Solid line represents where double boom hedger traveled in May 25, 2016 (5 feet from trunk). In 2017 the hedger traveled down the alternate row.

Figure 2. Trees following 10 foot topping and hedging 5 feet from the trunk.

Figure 3. Measuring light levels using a point PAR sensor in the canopy (left) and using a quatum sensor (right) following hedging

Figure 4. Students installing point PAR sensors in the canopy in June 2017.

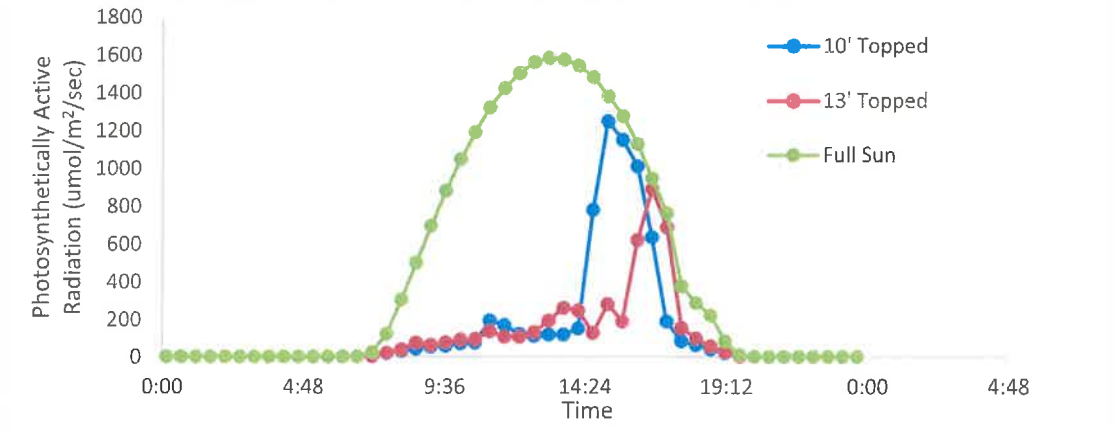

Figure 5. Light levels at full sun (green), in a 10'(blue) and a 13' topped tree taken on the west-facing canopy at 1.5 meters from the grown (lower canopy) on September 9, 2017.

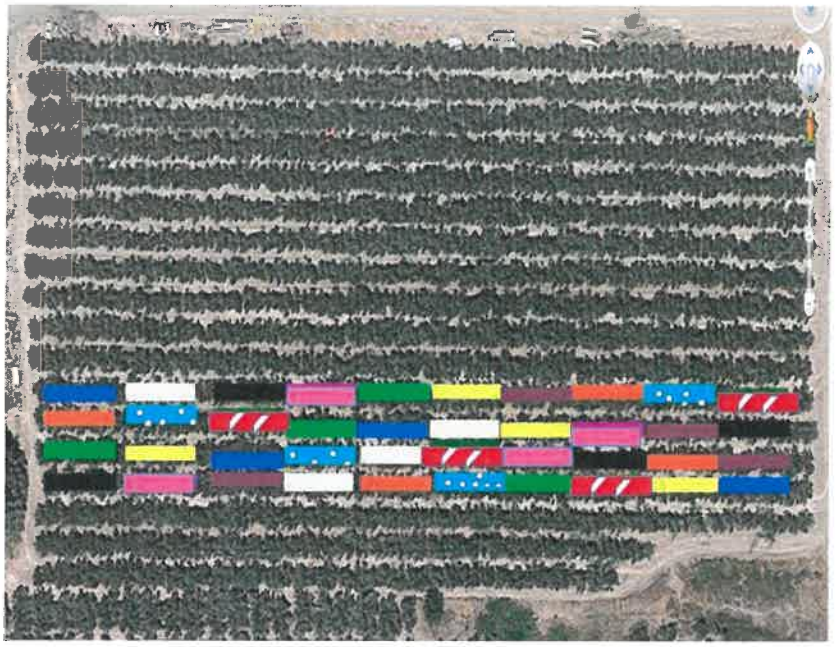

Figure 6. Set up of Nielsen trial in Orland, California. Colors correspond to the following hedging dates:
Black = 27-Apr -16 Blue = 15-Jul-16 Severe Blue Pokadot= 24-May-16 Severe
Green = 24-May-16 Pink = 27-Apr-16 Severe Orange = 15-Jul-16
Red/White = 1-Mar-17 Purple = 29-Mar-17 Yellow = 3-May=17
White = Control unhedged

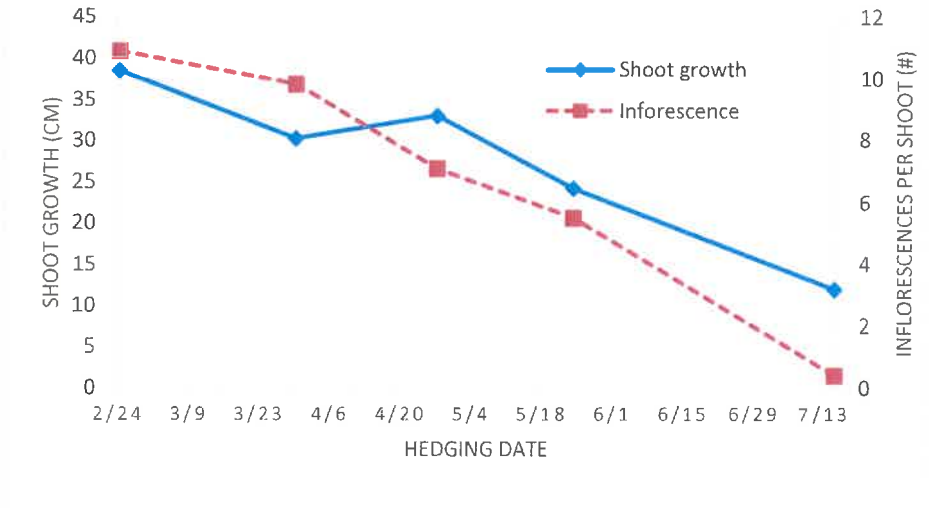

Figure 7. Relationship between hedging date and shoot growth and number of inflorescences per shoot taken on May 12, 2017.

Figure 8. Hedging timing trial located at Heath Burreson's orchard, Orland, California. Trees hedged at the following times: Yellow = 8-Mar-17, Red = 5-Apr-17, Blue = 8-May-17, Orange = 8-Jun-17, and White = No Hedge Control. Experiment is set up as a factorial design with 5 hedging timings and 2 hedging positions (east and west) with 5 replicates.

Table 1. Relationship between topping height and canopy diameter, pruning costs, 'Manzanillo' olive yields, fruit value, and return at Nickels farm.

Treatment	Canopy Diameter (ft)*	Pruning Costs 2016** ($/a)	Pruning Costs 2017 ($/a)	Pruning Cost Cumulative	Yields (t/a) 2016	Yields (t/a) 2017	Yields Cumu-lative (t/a) (2016 - 2017)	Large Fruit (%) 2017 ****	Value ($/t) *****
Topped at 10'	10.8 a	500 a***	237 a	737 a	2.01	3.78	5.79 a	92 a	1352
Topped at 13'	12.2 b	885 b	317 b	1202 b	3.57	5.27	8.64 b	82 ab	1330
Control	13.1 b	930 b	304 b	1234 b	4.65	4.37	8.63 b	79 b	1334
P value		0.045	0.026	0.017	0.091	0.241	0.016		0.15

*canopy measurement taken on 5/21/17
**pruning costs based on time needed to prune the trees multiplied by $11/hr.
***different letters in the same column indicate significance $p < 0.05$.
**** calculated from grade sheets (Musco Olive) percentages are the sum of extra-large, large, and medium fruit
***** calculated from grade sheets (Musco Olive)

Table 2. Effects of hedging date and severity of hedging on 'Manzanillo' olive yields and flowering on a east-west oriented planting at Erik Nielsen's farm.

Hedging Date	Severity of Hedge*	Flowering Intensity**	Fruit Set per 20 Inflores-cence	Yield Ranking 2017***	Canopy Diameter (ft)****
No Hedge	NA	2.6 a	6.1	7.0 ab	14.7 a
24-May-16	Moderate	2.3 a	6.8	7.4 a	14.9 a
27-Apr-16	Moderate	2.3 a	6.8	7.1 ab	14.5 ab
15-Jul-16	Severe	2.2 a	7.4	5.3 bc	14.3 ab
15-Jul-16	Moderate	2.2 a	5.9	6.3 ab	13.6 ab
27-Apr-16	Severe	0.81 b	7.5	6.7 ab	13.3 ab
1-Mar-17	Moderate		6.2	5.1 bc	12.6 b
29-Mar-17	Moderate			4.3 c	12.5 b
3-May-17	Moderate			5.1 bc	12.1 b
P value		0.0043	0.09	0.0001	0.002

* Moderate = approximately 8.5 feet from trunk; Severe = approximately 6.5 feet from trunk
** Rating - 5 = very heavy flowering, all branch have flowers present over the full length of the canopy; 0 = no flowers present
*** Ranking – 10 = excellent, 5 = average, 1 = poor
**** Measurements taken December 15, 2017

Table 3. Effects of hedging date and severity of hedging on 'Manzanillo' olive yields, fruit size, and canopy diameter at the Corning Ranch.

Hedging Date	Yield 2017 (t/a)	Large Fruit (%)*	Canopy Diameter (ft)**
No Hedge	9.4	33.8 b	6.1 a
8-Mar-17	8.9	40.4 a	4.7 b
5-Apr-17	9.1	45.1 a	4.0 bc
8-May-17	7.9	27.9 b	3.68 c
8-Jun-17	7.8	28.8 b	3.03 c
P value	0.16	0.0001	0.0004

* calculated from grade sheets (Musco Olive) percentages are the sum of extra-large, large, and medium fruit
** Measurements taken December 15, 2017

Table 4. Nutrient removed in the fruit per ton of crop of Manzanillo table olives from 5 locations in the Sacramento Valley in 2016 and 2017.

	Nutrient Removal (pounds per ton or ounces per ton)										
Year	N	P_2O_5	K_2O	Na	Ca	Mg	Fe	Cu	Mn	Zn	B
	Nitrogen (lbs./ton)	Phosphate (lbs./ton)	Potash (lbs./ton)	Sodium (lbs./ton)	Calcium (lbs./ton)	Magnesium (lbs./ton)	Iron (oz./ton)	Copper (oz./ton)	Manganese. (oz./ton)	Zinc (oz./ton)	Boron (oz/ton)
2016	18.2	5.6	31.5	0.08	2.0	0.9	1.54	0.63	0.29	0.57	
2017	19.8	6.3	37.1	0.03	6.8	1.5	2.36	1.13	0.28	0.41	1.29

Literature Cited

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Evaluation of New Materials for Olive Fly Control

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Problem and its Significance:

Olive fruit fly (*Bactrocerca olaea)* is the most damaging direct fruit pest of table olive production. For years, the primary material utilized for olive fly control has been GF-120 (spinosad), applied by ground as a large droplet treatment by ATV. Because of the continued repeated use of GF-120 with little or no material rotation, many growers have been reporting decreased efficacy of GF-120. A second material, Danitol (fenpropathrin) was registered in 2012. While Danitol is highly efficacious, it can also cause outbreaks of black scale due to disruption to biological control agents of scale. Additionally, it has not received very wide adoption by growers, in part because many growers prefer the convenience of low volume treatments applied by ATV over a full cover treatment.

Methods:

Full Cover: A Sevillano orchard was selected in the Woodson Bridge area, Corning, CA (Tehama County). Treatments were replicated four times in a randomized, complete block design. Each replicate was nine trees arranged in a 3x3 tree square. Data were collected from the center tree. Treatments are shown below:

Treatment[a]	Rate form/ac	No. Applications
Assail 30SG[a]	8.0 oz	2
Sivanto 200 SL[a]	14.0 fl. oz	2
Venerate XC[a]	128.0 fl. oz	2
Danitol 2.4EC[a]	16.0 fl. oz	2
Untreated control[a]		2
[a]All treatments included molasses at 5.0% v/v		

Foliar sprays were applied with a handgun orchard sprayer operating at 250psi with a finished spray volume of 150 gal/ac. Treatments were applied after monitoring traps showed an increase in olive fly pressure. The first treatment was applied 1 week after pit hardening, June 28-29, and the second was applied when olive fly populations increased, August 23-24, approximately 1.5 months before harvest.

Adult olive flies were monitored with McPhail traps baited with Torula yeast tablets from June 5 to September 12. Traps were placed in the center tree of each replicate, and were checked and bait was changed weekly. At harvest, a minimum of 20lbs of olives (up to 1500 fruit/ treatment) were evaluated for olive fly damage (stings). All fruit showing damage were dissected and larvae or pupae noted, if

present. Data were analyzed using ANOVA with mean separation using Fisher's Protected LSD at $p \leq 0.05$.

Low Volume: A Sevillano orchard was selected in the Woodson Bridge area, Corning, CA (Tehama County). Treatments were replicated four times in a randomized, complete block design. Each replicate was nine trees arranged in a 3x3 tree square. Data were collected from the center tree. Treatments are shown below:

Treatment[a]	Rate form/ac	No. Applications
Grandevo WDG[a]	48.0 oz	5
Venerate XC[a]	128.0 fl. oz	5
Danitol 2.4EC[a]	7.1 fl. oz	5
GF-120 NF[a]	20.0 fl. oz	5
Untreated control[a]		5

[a]All treatments included molasses at 5.0% v/v and ammonium acetate at 5.0% w/v

Foliar sprays were applied with a mini-air blast sprayer (Lil' Squirt, PBM Supply & Mfg, Inc.) towed behind a quad running at 2 mph with a finished spray volume of 10 gal/acre at 40psi. Treatments were applied approximately every 16-19 days beginning in early June after monitoring traps showed the presence of olive flies. The first treatment was applied June 12, 2017 and continued until August 23, 2017. Application dates were: June 12; June 27, 29; July 17-18; August 3-4; & August 22-23.

Adult olive flies were monitored with McPhail traps baited with Torula yeast tablets from June 5 to September 12. Traps were placed in the center tree of each replicate, and were checked and bait was changed weekly. At harvest, up to 1500 fruit/ treatment were evaluated for olive fly damage (stings) [some trees had low crop set and 1500 fruit could not be collected from all trees]. All fruit showing damage were dissected and larvae or pupae noted, if present. Damage was analyzed with an ANOVA.

Results and Discussion:

2017 was a challenging year for olive fly research because of the sustained high heat (7 consecutive days over 105 degrees June 18-24; significant mortality for olive flies is experienced at 3 consecutive days above 100). Consequently, fly pressure was much lower in 2017 than in previous growing seasons.

Full Cover: Despite the temperatures, the site's proximity to water (Sacramento River & Kopta Slough) appeared to sustain a minimal fly population. The number of flies increased in June and treatments were applied approximately one week after pit hardening. Fly populations were minimal throughout July and early August, increasing slightly near the end of August, when the second spray was applied (Fig 1). Because of the low populations, we did not apply more than two treatments. Fruit were harvested on September 28 and October 5. Consistent with the fly populations, fruit damage and infestation rates were low relative to recent seasons. The mean total percent olive fly infestation was 2.6% in the untreated check and there was significantly greater total percent infestation in the untreated check compared to Venerate XC (0.76%), Danitol 2.4EC (1.2%), and Sivanto 200 SL (1.2%). There was no significant difference between the untreated control and Assail 30SG (Table 1).

Low Volume: Fruit were harvested on October 12. Consistent with the fly populations, fruit damage and infestation rates were low relative to recent seasons. The mean total percent olive fly infestation was less than 1.0% in all treatments (Table 2). There were no significant differences between treatments.

Conclusions:

Full Cover: Venerate XC provided good control of olive fly and performed better than the untreated check and Assail 30SG. Sivanto 200 SL provided a similar level of control as Danitol 2.4EC. Assail 30SG did not control olive fly in this study. There was a possible phytotoxic reaction to the molasses feeding stimulant.

Low Volume: Damage was too low to detect any differences between treatments at this site. There was a possible phytotoxic reaction to the molasses feeding stimulant.

Acknowledgements:

Thank you to Cindy Montes for help with data collection; C. Montes and Christian Cabuslay for assistance with treatment applications; and to PBM Manufacturing and Supply, Inc., for kindly providing the mini-air blast sprayer for low volume applications.

Figure 1. Full cover study: Mean number of olive flies captured per trap per day. Arrows point to timings of treatment applications. Note that fly numbers decreased prior to the first application – this timing coincides with the week of > 105° temperatures.

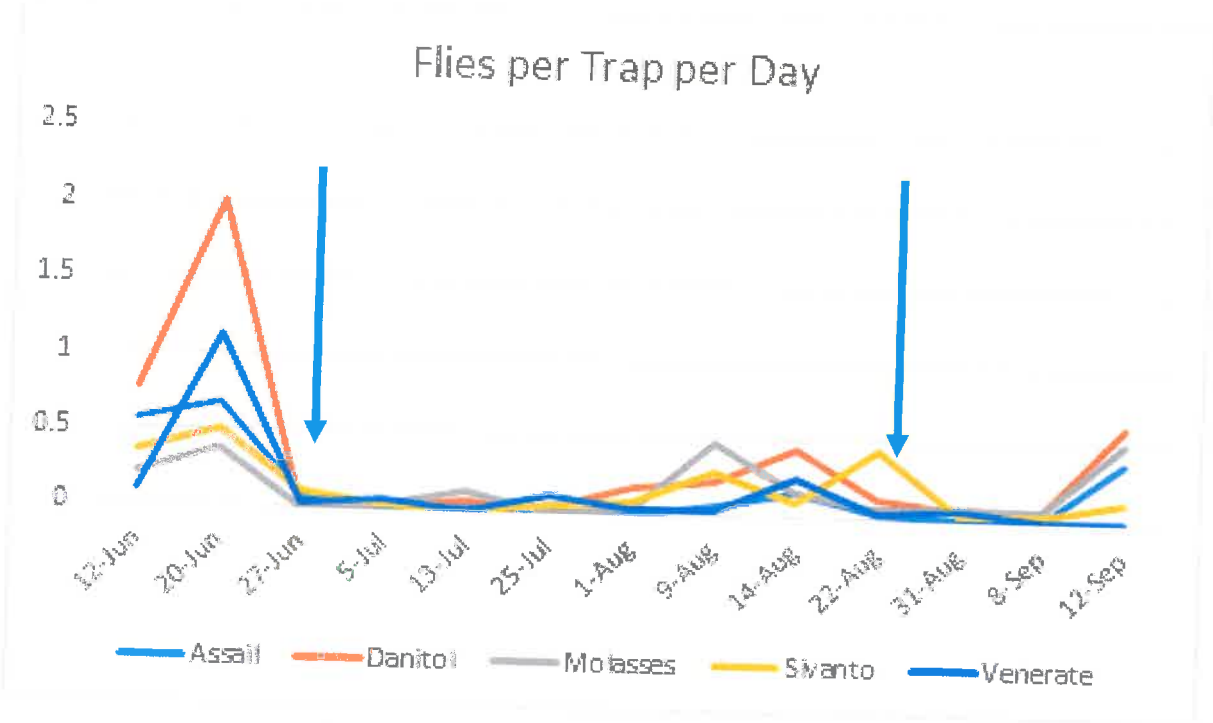

Table 1. Full cover study: Mean total percent olive fly infestation in Corning, CA in 2017.

Treatment[b]	Rate form/ac	Mean Total Percent Olive Fly Infestation
Assail 30SG[a]	8.0 oz	1.91 ab
Sivanto 200 SL[a]	14.0 fl. oz	1.21 bc
Venerate XC[a]	128.0 fl. oz	0.76 c
Danitol 2.4EC[a]	16.0 fl. oz	1.19 bc
Untreated control[a]		2.60 a

[a]Means followed by the same letter in a column were not significantly different (Fisher's LSD at $p \leq 0.05$).

[b]All treatments included molasses at 5.0% v/v

Figure 2. Low Volume study: Mean number of olive flies captured per trap per day. High temperatures suppressed olive fly populations in 2017.

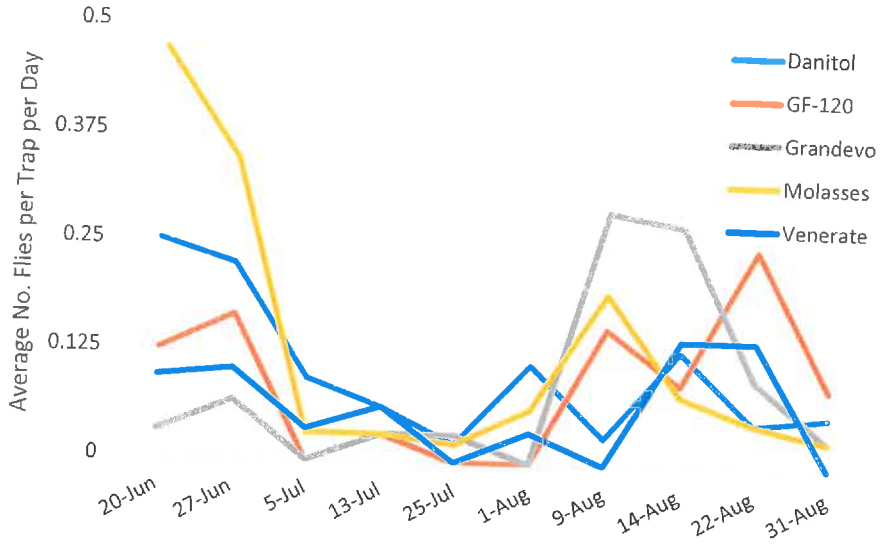

Table 2. Low volume study: Mean total percent olive fly infestation in Corning, CA in 2017.

Treatment[b]	Rate form/ac	Mean Total Percent Olive Fly Infestation
Grandevo WDG[a]	48.0 oz	0.72 a
Venerate XC[a]	128.0 fl. oz	0.48 a
Danitol 2.4EC[a]	7.1 fl. oz	0.62 a
GF-120 NF[a]	20.0 fl. oz	0.32 a
Untreated control[a]		0.68 a

[a]Means followed by the same letter in a column were not significantly different ($p \geq 0.05$).
[b]All treatments included molasses at 5.0% v/v

UCCE Glenn County - Olive Fruit Fly Populations
for Glenn and Tehama County

	3-Apr		10-Apr		17-Apr		24-Apr		1-May		9-May		15-May		22-May		30-May		5-Jun		12-Jun		21-Jun		26-Jun		TOT/YR	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Orland 1 Glenn County Fairgrounds	9	4	0	1	0	1	24	6	30	18	19	15	2	1	1	2	4	0	1	0	4	1	34	7	5	1	133	57
Orland 2 Road 200 & Road E	1	1	1	1	0	0	7	5	54	25	67	37	28	17	23	15	9	3	5	7	13	17	3	4	1	0	212	132
Orland 3 SE Orland N & 16	43	26	8	5	0	1	17	8	49	22	31	22	2	2	11	9	2	3	1	2	4	3	8	3	0	0	176	106
Orland 4 NE Orland Rd 12 & N	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	2	0	3	0	0	2	7
Orland 5 Rd 21 & M	0	0	1	2	0	0	0	0	1	4	2	1	0	0	0	0	0	0	0	0	8	4	10	8	2	1	24	20
Orland 6 Hwy 99W & Rd 18	49	22	9	9	3	0	28	6	16	7	10	5	0	0	0	0	0	1	0	1	0	6	1	0	8	4	124	61
Corning 1 Northbound I-5 Reststop	2	2	9	7	0	0	13	4	19	6	19	7	14	2	13	7	3	0	9	6	28	15	34	14	1	0	164	70
Corning 2 Fig Lane & Houghton	0	0	1	1	2	0	4	1	8	1	14	9	5	0	2	2	0	0	3	2	16	7	63	29	2	7	120	59
Corning 3 Barham & Sampson	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	9	2	3	5	0	0	12	8
Corning 4 Sac River - Kopta Rd	0	0	0	0	0	0	1	1	2	1	0	0	1	0	0	0	0	0	0	0	9	7	4	5	0	0	17	14
Corning 5 Viola Ave & Orchard Ave	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	4	2	0	0	1	11	6
Corning 6 Dora Ave & Marguerite Ave	0	0	0	0	0	0	2	1	1	4	3	1	3	0	3	3	2	0	0	0	0	0	1	2	1	0	16	11
Total	104	55	29	27	5	2	96	33	180	88	165	98	56	23	53	38	20	7	19	18	101	68	163	80	20	14	1011	551

	5-Jul		11-Jul		18-Jul		24-Jul		31-Jul		7-Aug		14-Aug		21-Aug		28-Aug		6-Sep		12-Sep		18-Sep		26-Sep		TOT/YR	
	M	F	M	F	M	F	M	F	0	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Orland 1 Glenn County Fairgrounds	4	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	138	59
Orland 2 Road 200 & Road E	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	214	132
Orland 3 SE Orland N & 16	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	178	106
Orland 4 NE Orland Rd 12 & N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8
Orland 5 Rd 21 & M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	20
Orland 6 Hwy 99W & Rd 18	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	126	63
Corning 1 Northbound I-5 Reststop	0	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	1	0	167	74
Corning 2 Fig Lane & Houghton	0	0	29	31	20	10	11	3	4	0	0	0	1	0	1	0	0	0	2	0	0	0	0	0	1	0	189	103
Corning 3 Barham & Sampson	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	8
Corning 4 Sac River - Kopta Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	14
Corning 5 Viola Ave & Orchard Ave	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	6
Corning 6 Dora Ave & Marguerite Ave	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	11
Total	9	2	31	32	21	12	13	4	4	0	0	1	1	0	2	0	0	2	3	0	0	0	0	0	2	0	1097	604

	4-Oct		10-Oct		16-Oct		24-Oct		30-Oct		6-Nov		13-Nov														TOT/YR	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Orland 1 Glenn County Fairgrounds	0	0	0	0	0	0	0	0	0	2	0	0	0	0														
Orland 2 Road 200 & Road E	0	0	0	0	0	0	3	1	2	1	0	1	0	0													138	61
Orland 3 SE Orland N & 16	0	0	0	0	0	0	1	0	0	2	0	0	0	0													219	135
Orland 4 NE Orland Rd 12 & N	0	0	0	0	0	0	0	0	1	0	0	0	0	0													179	108
Orland 5 Rd 21 & M	0	0	0	0	0	0	0	0	2	0	0	0	0	0													3	8
Orland 6 Hwy 99W & Rd 18	0	0	0	0	1	1	6	2	5	12	0	1	0	0													26	20
Corning 1 Northbound I-5 Reststop	0	0	0	0	0	0	0	0	1	2	0	0	0	0													138	79
Corning 2 Fig Lane & Houghton	0	0	0	0	0	1	1	0	2	0	0	0	0	0													168	76
Corning 3 Barham & Sampson	0	0	0	0	0	0	0	0	0	0	0	0	0	0													192	104
Corning 4 Sac River - Kopta Rd	0	0	0	0	0	0	0	0	0	0	0	0	0	0													13	8
Corning 5 Viola Ave & Orchard Ave	0	0	0	0	0	0	0	0	0	0	0	0	0	0													17	14
Corning 6 Dora Ave & Marguerite Ave	0	0	0	0	0	0	0	0	0	1	0	0	0	0													11	6
																											18	12

Southern Region Olive Fruit Fly Project

Sponsored by: California Olive Committee, Leffingwell Ag Sales & Ag IPM Consultants

2017 Total OLFF for the Week Ending

	Mar.31		Apr. 07		Apr.14		Apr. 21		Apr.28		May. 05		May.12		May. 19		May.26		Jun. 02		Jun.09		Jun. 16		Jun.23		Jun. 30		TOT/YR	
Block	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	**M**	**F**
Woodlake	set	set	14	2	31	7	20	24	13	35	6	16	1	1	2	2	0	3	0	2	5	10	8	5	0	4	1	0	**101**	**111**
Ivanhoe	set	set	1	0	16	3	10	6	3	4	0	5	1	1	4	3	0	4	1	1	4	2	5	8	0	2	2	0	**47**	**39**
Exeter	set	set	4	1	9	4	6	7	8	9	3	8	0	1	3	1	0	1	0	1	0	0	6	3	2	0	3	1	**44**	**37**
South Exeter	set	set	1	1	3	0	3	3	3	8	1	0	0	1	1	0	0	0	0	0	3	5	2	5	0	1	0	0	**17**	**24**
Tonyville	set	set	6	3	19	4	5	8	17	6	5	0	5	2	10	2	3	0	2	1	2	2	10	3	3	0	11	6	**98**	**37**
W. Lindsay	set	set	19	5	44	6	53	9	14	5	7	4	8	2	5	3	5	6	1	0	6	2	10	4	3	0	1	0	**176**	**46**
Strathmore	set	set	11	2	7	0	38	17	7	1	9	1	4	1	16	3	4	1	1	1	10	1	7	3	5	1	13	3	**132**	**35**
Porterville	set	set	1	0	5	1	17	6	5	1	5	1	1	0	5	1	8	1	1	1	3	0	9	4	0	0	2	0	**62**	**16**
Terra Bella	set	set	7	0	10	0	7	0	11	1	2	0	4	2	7	2	5	1	3	1	5	1	13	4	0	0	1	0	**75**	**12**
Total			**64**	**14**	**144**	**25**	**159**	**80**	**81**	**70**	**38**	**35**	**24**	**11**	**53**	**17**	**25**	**17**	**9**	**8**	**38**	**23**	**70**	**39**	**13**	**8**	**34**	**10**	**752**	**357**
City of Visalia	set	set	13	1	5	0	10	1	10	4	1	5	2	0	2	8	4	1	5	5	27	14	16	9	8	7	0	0	**108**	**55**
	Jul. 07		Jul. 14		Jul. 21		Jul. 28		Aug. 04		Aug. 11		Aug. 18		Aug. 25		Sep. 01		Sep. 08		Sep. 15		Sep. 22		Sep. 29		Oct. 06		TOT/YR	
Block	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	**M**	**F**
Woodlake	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	3	0	7	2	1	0	2	0	**114**	**118**
Ivanhoe	4	2	0	0	0	1	4	2	0	1	1	0	2	1	1	0	0	0	1	0	3	2	3	0	6	1	3	1	**75**	**50**
Exeter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4	0	2	0	2	0	1	0	**54**	**37**
South Exeter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**17**	**24**
Tonyville	4	2	1	0	2	0	1	0	2	5	1	3	4	2	1	0	1	1	1	0	0	0	1	0	0	0	2	1	**119**	**51**
W. Lindsay	1	0	2	0	1	0	1	1	3	1	0	0	1	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	**191**	**48**
Strathmore	11	3	2	1	2	1	3	0	4	1	1	0	0	0	3	0	1	0	1	0	0	0	3	1	1	0	2	1	**166**	**43**
Porterville	1	2	1	0	0	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	**71**	**18**
Terra Bella	1	12	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	2	2	2	1	2	1	**85**	**29**
Total	**22**	**22**	**6**	**1**	**5**	**2**	**12**	**6**	**10**	**8**	**5**	**4**	**7**	**3**	**8**	**1**	3	1	**3**	**0**	**11**	**2**	**21**	**5**	**14**	**2**	**13**	**4**	**892**	**418**
City of Visalia	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	**0**	**0**	**110**	**58**
	Oct. 13		Oct. 20		Oct. 27		Nov. 03		Nov. 10		Nov. 17		Nov. 24																TOT/YR	
Block	M	F	M	F	M	F	M	F	M	F	M	F	M	F															**M**	**F**
Woodlake	0	0	0	0	1	0	0	0	2	3	5	2	**11**	**1**															133	124
Ivanhoe	0	0	0	0	3	1	10	4	6	1	9	5	**16**	**2**															119	63
Exeter	0	0	0	0	0	0	8	6	6	1	2	6	**3**	**0**															73	50
South Exeter	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**															17	24
Tonyville	1	0	0	0	1	0	10	2	15	5	27	5	**13**	**3**															186	66
W. Lindsay	0	0	0	0	0	0	1	0	3	0	5	0	**1**	**0**															201	48
Strathmore	2	1	1	0	2	0	2	2	12	4	22	2	**7**	**3**															214	55
Porterville	0	0	1	0	0	0	4	0	5	4	2	0	**12**	**2**															95	24
Terra Bella	2	0	3	1	1	0	19	6	32	11	24	5	**19**	**4**															185	56
Total	5	1	5	1	8	1	54	20	81	29	96	25	**82**	**15**															1223	510
City of Visalia	0	1	1	0	3	0	1	1	0	3	8	2	**7**	**3**															130	68

THIS IS THE LAST REPORT FOR THIS YEAR. THE REPORTS WILL START AGAIN NEXT APRIL. BEST WISHES FOR THE NEW YEAR.

Southern Region Olive Fruit Fly Project 2017

Date Check	Block	1		2		SUBTOT	
						M	F
Nov 22	Woodlake	6	1	5	0	11	1
Nov 22	Ivanhoe	6	1	10	1	16	2
Nov 22	Exeter	2	0	1	0	3	0
Nov 22	South Exeter	0	0	0	0	0	0
Nov 22	Tonyville	5	1	8	2	13	3
Nov 22	W. Lindsay	1	0	0	0	1	0
Nov 22	Strathmore	0	1	7	2	7	3
Nov 22	Porterville	10	2	2	0	12	2
Nov 22	Terra Bella	8	1	11	3	19	4
	TOTAL					82	15
Nov 22	City of Visalia	0	1	7	2	7	3

2018 Research Projects

Updated 5/7/2018

Researcher	Project	Amount	Finalized MOU	Paid thus far	% Paid	No Cost Extension
Reza Ehsani	A new fruit removal head for an olive harvesting system	$ 45,741.00	1/5/2018		0%	
Rich Rosecrance	Canopy Management, Tree Hedging and topping to Optimize Yield	$ 31,075.00	1/29/2018		0%	
Carol Lovatt & Elizabeth Fichtner	Managing Alternate Bearing in olive with PGRs and Pruning	$ 20,698.00	1/9/2018		0%	
Selina Wang	Evaluation of Several Promising Additives for Reducing Acrylamide in Black Ripe Table Olives	$ 53,280.00	1/31/2018		0%	
Selina Wang	Differentiation of olive cultivars using DNA and NMR-based fingerprinting methods	$ 67,433.00	1/31/2018		0%	
Jim Stewart	Southern Fly Trapping	$ 6,400.00	1/9/2018	$791.67	12%	
Ernie Simpson	Northern Fly Trapping	$ 6,500.00	1/11/2018	$1,000.00	15%	
J. E. Adaskaveg	Epimiology and management of olive knot caused by Pseudomonas savastanoi pv. Savastanoi	$ 16,650.00	3/23/2018		0%	
Debra Keenan	Evaluation of new chemistries to control Olive Fruit Fly (contingency fund)	$ 25,000.00	1/29/2018	$5,000.00	20%	
J. E. Adaskaveg	Management of foliar diesease of olive (contingency fund	$ 15,000.00	4/3/2018		0%	
	Contingeny Fund	$ 50,000.00		$40,000.00	80%	
	Total	**$ 337,777.00**			0%	