Topics in Subtropics Newsletter

University of California Cooperative Extension

Fresno, Kern, Madera, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara,Tulare,&Ventura Counties

News from the Subtropical Tree Crop Farm Advisors in California

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Editor's Note:

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Please also let us know if there are specific topics that you would like addressed in subtropical crop production. Copies of Topics in Subtropics may also be downloaded from the county Cooperative Extension websites of the Farm Advisors listed.

Craig E. Kallsen
Editor of this issue

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'Valentine,' A Recently Released Anthocyanin-pigmented Pummelo Hybrid Developed at the University of California Riverside

By: Toni Siebert, Ottillia Bier, David Karp, Georgios Vidalakis, and Tracy Kahn

In the last two decades, many distinctive citrus selections have become available, on a large or small scale, at retail markets in the United States. These include cultivars such as 'Cara Cara' navel orange, 'Cocktail' pummelo-mandarin hybrid, 'Variegated Pink' lemon, 'Seedless Kishu' mandarin, and 'Buddha's Hand' citron. Among specialty citrus growers, there is intense interest in acquiring new varieties with novel or unusual characteristics of appearance, coloration, flavor, size and functional properties.

In the 1950s, Drs. Robert Soost and James Cameron, citrus breeders for the University of California-Riverside, compared the effects of acid and nonacid pummelos as female parents on the acidity of citrus hybrids. Using six different mandarin, orange, tangor and pummelo pollen parents, they found that hybrids obtained by crossing the low-acid pummelo 'Siamese Sweet' (CRC 2240) with various medium-acid varieties as the pollen parents had consistently low to medium average acidity levels but favorable soluble solids early in the season (Soost and Cameron 1961). This contributed to their later use of 'Siamese Sweet' as a maternal parent and other varieties as the pollen parent in their breeding program, resulting in the low-acid pummelo-grapefruit hybrid selections eventually introduced as 'Oroblanco' and 'Melogold,' and the pummelo-mandarin hybrid 'Cocktail,' which was originally released as 'Mandalo' (Soost and Cameron 1980, 1986; Moore, 1987). 'Valentine' is the most promising of the pigmented low-acid pummelo hybrids selected by Drs. Soost and Cameron in 1986 from a cross of 'Siamese Sweet' pummelo x ('Ruby' blood orange x 'Dancy' mandarin).

'Valentine' pummelo hybrid fruit combines the large size and low acidity from its pummelo parent, complex, floral taste from 'Dancy,' and juicy red pulp from 'Ruby.' It received its name from former Staff Research Associate for the Citrus Variety Collection Ottillia 'Toots' Bier, who nicknamed it 'Valentine' not only because the fruit matures in mid-February near the Valentine's Day holiday, but also because often when the fruit is cut lengthwise and turned upside down, the flesh of the fruit resembles a vibrant red heart. It is unique in being a grapefruit-like fruit with anthocyanin pigmentation, which is a potential marketing advantage at a time when many antioxidant-rich fruits, such as pomegranate, blueberry and blackberry, have seen sales increase because of their perceived health benefits.

'Valentine' fruit was formally evaluated by the UCR Citrus Variety Collection (www.citrusvariety.ucr.edu) from January to March of years 2006, 2007, and 2008. 'Valentine' fruits are round to somewhat pyriform in shape, usually with a slight to pronounced neck at the fruit base (stem end), but in some cases the neck is absent, resulting in a more typical spheroid grapefruit-like shape. The fruit

apex (blossom end) is rounded and smooth. The average fruit size is large with a mean width of 10.8 cm (4.25 inches) and a height (including the neck) of 11.0 cm (4.33 inches), giving an average height-to-width aspect ratio of 1.02, and a mean weight per fruit of 531.1 grams (18.7 ounces) (Table 1). Rind color is medium to dark yellow for fruit harvested in Riverside in mid-February, with similar values for fruit harvested from the Lindcove Research and Extension Center in Exeter, California. The average rind color based on a visual rating scale of 0 -13 with 0 being green and 13 being red-orange, was 8.6 for this hybrid from January through early March (Table 1). The rind texture is moderately smooth with a mean thickness of 8.8 mm (0.35 inches). Fruit samples from Lindcove generally have a thicker rind than samples from Riverside. The number of seeds per fruit averages 27.6 (Table 1). However, the mean number of seeds per fruit among 36 different 10-fruit samples ranged from 2.6 seeds per fruit to 51 seeds per fruit. The high seed content is probably the cultivar's biggest disadvantage for commercial growers. The rind is moderately easy to peel when fruits are mature. The mean juice weight is 201.8 grams (7.1 ounces) and the average juice content is 38.6% (Table 2). The red flesh color of 'Valentine' can be somewhat variable in its distribution and intensity inside the fruit. Color formation first appears in mid-January and becomes more intense in early to mid February. The anthocyanin pigmentation increases through March until the flavor becomes bland. Compared to Ruby blood orange, the flesh color of 'Valentine' is much more concentrated. Ruby flesh tends to be poorly colored in Riverside, containing a few red flecks of juice vesicles against bright orange flesh. 'Valentine' flesh is a clear red throughout.

Since 'Valentine' pummelo hybrid is a complex pummelo, blood orange and mandarin hybrid it would not be appropriate to use legal maturity standards that apply to pummelo, sweet orange or grapefruit fruits. Fruits of 'Valentine' reach complete pigmentation in February when the solids to acid ratio is an average of 16:1. A ratio of this level produces an extremely sweet, juicy and delicious fruit. However, as for 'Cocktail' hybrid, the flesh texture of 'Valentine' is soft, which may prove problematic for large-scale commercial packing and shipments, but should not be an issue for local or farmers market sales or for use as a backyard tree for homeowners.

The tree shape and growth habit of 'Valentine' is spreading and fairly vigorous. Older non-pruned trees tend to have long drooping branches. Thorns are absent on both twigs and branches. Leaves are ovate in shape with a slight winged petiole of medium width, similar to normal grapefruit in size and shape. The tree canopy has medium density branching with fruit borne singly on the inner parts of the canopy and skirting. The trees do not tend to bear fruit in clusters. 'Valentine' has only been grown and observed on trifoliate-type rootstocks of a few different varieties. Ten-year-old trees on Carrizo citrange rootstock have yielded fairly vigorous trees approximately 12 feet tall at Riverside and Lindcove, California, and 30-year-old trees are approximately 14 feet tall at Riverside. A single 10-year-old tree on Rich 16-6 trifoliate in Riverside has yielded a slightly less vigorous 10-foot-tall tree with an apparently lower yield. Two young trees on C-35 citrange have been planted in the Citrus Variety Collection, but are too immature to assess their performance. There have been no indications of rootstock-scion incompatibility or disease susceptibility using these rootstocks.

The performance of 'Valentine' trees has not been observed in desert or coastal locations. However, our knowledge of the inadequate performance of the pummelo and blood orange parents of 'Valentine' in desert and coastal areas would suggest that 'Valentine' would also not perform well in desert and coastal areas. The bright red pigmentation of this pummelo hybrid is what makes it unique; however these locations tend to produce little to no

color in otherwise heavily anthocyanin-pigmented varieties. No yield data have been collected for 'Valentine'. The trees examined have never had any intervening cultural treatments and have been observed to bear low to moderate crops. Yield when isolated from other pollen sources is not known. The data presented here, from Riverside and Lindcove, indicates that 'Valentine' is adapted to both the interior region of Southern California and the San Joaquin Valley.

The fruit of 'Valentine' pummelo hybrid is attractive, juicy, sweet and distinctive. Displays of fruit of this hybrid have elicited positive comments from a number of citrus nursery owners and growers when viewed at fruit displays and field days. No large-scale field trials have been conducted for this hybrid. Many questions remain about its commercial characteristics, such as yield, fruit quality in growing areas different than those where it has been evaluated, and range of rootstock-scion interactions.

Based on the disclosure of fruit quality data of 'Valentine' described here, the College of Natural and Agricultural Sciences gave approval for its release in July 2009. Georgios Vidalakis, director of the Citrus Clonal Protection Program (CCPP), evaluated CCPP's sources of 'Valentine' and reported that the CCPP has two vigorous, disease-tested trees of this hybrid (VI 597) in the protected Foundation Block that the CCPP registered with the California Department of Food and Agriculture (CDFA) for budwood distribution. In anticipation of the Valentine release the CCPP propagated six extra trees in January of 2009 that can serve as a budwood sources in the case of increased demand. These trees will supply budwood for the September budwood cut (ordering deadline is September 17) via the "Early Release" program through which each nursery can purchase 12 buds to start propagating trees.

Please go to the Citrus Clonal Protection Program website at http://www.ccpp.ucr.edu for more information about how to obtain budwood of 'Valentine.' Registered users of the online budwood ordering system may visit http://ccpp.ucr.edu/budwood/budwood.php. If you are not a registered user, you can e-mail ccpp@ucr.edu with your name, address, e-mail, and phone number and the CCPP will generate a username and password for you. After becoming a registered user you will also receive announcements about future budwood distributions for other citrus varieties.

References Cited

Moore, P. 1987. Announcing the new Citrus hybrid 'Mandalo'. Indoor Citrus and Rare Fruit Growers Newsletter.10-12.

Soost, R. K. and J. W. Cameron. 1961. Contrasting effects of acid and nonacid pummelos on the acidity of hybrid Citrus progenies. Hilgardia. 30(12): 351-357.

Soost, R. K. and J. W. Cameron. 1980. 'Oroblanco', a triploid pummelo-grapefruit hybrid. Hortscience 15(5): 667-669.

Soost, R. K. and J. W. Cameron. 1986. 'Melogold', a new pummelo-grapefruit hybrid. California Agriculture. 40 (1-2): 667-669.

Additional color photographs are available on the Citrus Variety Collection website at http://citrusvariety.ucr.edu/citrus/Valentine.htm

Table 1. Characteristics of Valentine Pummelo Hybrid

CULTIVAR	SAMPLE LOCATION	DATE	FRUIT PER SAMPLE	AVG LENGTH/FRUIT (cm)	AVG WIDTH / FRUIT (cm)	LENGTH /WIDTH RATIO	AVG WT/FRUIT (grams)	EXTERNAL RIND COLOR	RIND TEXTURE	RIND THICKNESS/FRUIT (mm)	SEED NUMBER/FRUIT	AVG JUICE WT/FRUIT (grams)	% JUICE	TOTAL SOLUBLE SOLIDS	TSS/DATE AND LOCATION	% ACID	% ACID/DATE AND LOCATION	RATIO (TSS / % ACID)	AVG RATIO/DATE/LOCATION
Valentine	Riverside	1/23/2006	10	12.0	11.1	1.09	637.9	9.0	4.0	9.5	18.7	277.7	43.5	10.9	11.8	0.8	0.8	14.6	15.4
Valentine	Riverside	1/23/2006	10	10.2	10.2	1.00	484.9	9.0	4.0	7.9	34.9	229.8	47.4	11.6		0.8		14.7	
Valentine	Riverside	1/23/2006	10	10.2	9.5	1.08	395.7	9.0	2.0	8.1	31.2	185.6	46.9	12.9		0.7		17.4	
Valentine	Riverside	1/23/2006	10	10.1	9.7	1.04	405.3	9.0	2.0	8.2	33.1	192.0	47.4	11.9		0.8		15.0	
Valentine	Lindcove	1/25/2006	10	11.3	10.9	1.03	521.7	7.0	3.0	11.7	12.8	185.2	35.5	8.9	8.9	0.6	0.6	15.7	15.7
Valentine	Lindcove	2/16/2006	10	11.7	11.4	1.03	570.3	9.0	3.0	9.7	13.8	211.3	37.1	8.8	8.8	0.6	0.6	15.2	15.2
Valentine	Riverside	3/6/2006	10	11.5	10.2	1.12	490.5	8.0	3.0	10.5	27.1	205.6	41.9	11.9	11.8	0.8	0.7	15.4	16.9
Valentine	Riverside	3/6/2006	10	11.6	10.5	1.11	504.1	8.0	2.5	9.6	33.6	219.4	43.5	12.6		0.7		19.1	
Valentine	Riverside	3/6/2006	10	10.6	10.4	1.02	507.9	8.0	4.0	8.5	28.6	234.1	46.1	12.3		0.8		15.9	
Valentine	Riverside	3/6/2006	10	12.2	12.4	0.98	754.4	8.0	4.0	9.0	29.2	325.7	43.2	10.4		0.6		17.1	
Valentine	Lindcove	3/9/2006	10	10.5	10.9	0.97	471.0	10.0	2.0	11.5	2.6	166.4	35.3	8.3	8.3	0.6	0.6	15.1	15.1
Valentine	Riverside	1/16/2007	10	9.0	9.6	0.94	362.6	7.0	3.0	6.2	39.6	114.0	31.4	15.4	14.1	1.6	1.3	9.7	11.4
Valentine	Riverside	1/16/2007	10	8.6	8.9	0.96	306.0	7.0	3.0	5.0	51.0	120.1	39.3	15.8		1.4		11.4	
Valentine	Riverside	1/16/2007	10	9.9	10.2	0.98	454.9	8.5	3.5	7.4	22.9	168.2	37.0	11.5		1.2		10.0	
Valentine	Riverside	1/16/2007	10	9.4	9.7	0.96	389.1	10.0	2.0	7.6	37.2	132.4	34.0	13.7		1.0		14.4	
Valentine	Lindcove	1/23/2007	10	11.8	12.1	0.98	632.8	6.0	3.5	11.7	19.8	176.9	28.0	8.6	8.6	0.6	0.6	13.5	13.5
Valentine	Riverside	2/12/2007	10	9.0	9.0	1.00	332.2	10.0	2.5	7.3	45.4	118.7	35.7	16.4	13.1	1.0	0.9	16.1	15.2
Valentine	Riverside	2/12/2007	10	9.4	9.9	0.95	370.0	7.0	3.5	9.0	10.0	120.5	32.6	9.7		0.7		14.2	
Valentine	Riverside	3/5/2007	10	8.3	8.3	1.01	263.6	10.0	2.0	5.4	41.4	97.1	36.8	17.3	14.4	1.1	0.9	15.4	16.1
Valentine	Riverside	3/5/2007	10	10.8	10.2	1.05	471.8	10.0	3.5	7.5	15.8	181.1	38.4	12.6		0.8		16.2	
Valentine	Riverside	3/5/2007	10	9.1	9.2	0.99	338.5	10.0	2.5	8.3	19.2	122.1	36.1	13.4		0.8		16.7	
Valentine	Lindcove	1/7/2008	10	13.1	14.1	0.93	857.7	6.5	3.5	13.6	18.6	249.8	29.1	8.6	8.8	0.5	0.5	18.0	18.0
Valentine	Riverside	1/7/2008	10	9.8	9.4	1.03	367.1	7.0	2.5	7.7	24.2	146.2	39.8	10.6	10.4	0.6	0.6	16.5	18.3
Valentine	Riverside	1/7/2008	10	9.7	9.6	1.02	379.7	6.0	2.5	7.1	35.0	167.4	44.1	9.6		0.6		15.5	
Valentine	Riverside	1/7/2008	10	10.8	11.0	0.98	568.3	8.0	3.0	7.1	16.1	255.3	44.9	10.7		0.6		19.4	
Valentine	Riverside	1/7/2008	10	10.7	10.4	1.03	500.1	6.0	3.0	5.7	30.5	216.1	43.2	10.7		0.5		21.9	
Valentine	Lindcove	2/4/2008	10	13.0	13.8	0.95	782.0	8.0	3.0	13.0	23.8	238.1	30.4	8.8	8.8	0.5	0.5	16.4	16.4
Valentine	Riverside	2/4/2008	10	12.7	12.1	1.05	786.3	10.0	3.0	7.1	26.5	324.2	41.2	10.5	10.2	0.7	0.7	14.5	14.6
Valentine	Riverside	2/4/2008	10	13.0	12.1	1.07	781.8	10.0	3.0	7.9	36.6	310.9	39.8	10.8		0.6		17.3	
Valentine	Riverside	2/4/2008	10	10.5	10.0	1.05	440.7	10.0	2.5	8.0	30.5	188.2	42.7	10.9		0.9		12.1	
Valentine	Riverside	2/4/2008	10	11.0	10.3	1.07	467.0	10.0	2.5	7.9	35.4	191.0	40.9	8.7		0.6		14.5	
Valentine	Riverside	2/25/2008	10	11.4	10.4	1.10	506.7	10.0	3.0	8.9	36.1	220.9	43.6	11.1	10.9	0.7	0.6	15.8	17.6
Valentine	Riverside	2/25/2008	10	10.2	9.9	1.04	412.1	10.0	2.0	7.8	30.2	179.0	43.4	10.2		0.7		14.5	
Valentine	Riverside	2/25/2008	8	15.7	15.2	1.03	944.2	10.0	2.0	7.8	35.8	301.1	31.9	11.0		0.6		18.7	
Valentine	Riverside	2/25/2008	5	13.6	12.8	1.06	867.0	10.0	3.0	14.4	26.0	328.0	37.8	11.3		0.5		21.3	
Valentine	Lindcove	2/29/2008	10	13.9	12.9	1.08	795.0	8.0	4.0	14.3	18.6	163.2	20.5	8.6	8.6	0.5	0.5	18.6	18.6
Means for all fruit sampled, sample dates and both locations:				11.0	10.8	1.02	531.1	NA	2.9	8.8	27.5	201.0	38.6	NA	NA	NA	NA	NA	NA

Rind color and texture are visual ratings. Rind color is based on a scale of 0-13, with 0 being green and 13 being red-orange. Rind texture based on a scale of 1-8 with 1 being very smooth and 8 being extremely coarse.

The University of California - Riverside Citrus Variety Collection and Citrus Clonal Protection Program Websites Provide Information, Photographs, Fruit Quality Data and More

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Two programs at the University of California-Riverside are working together to provide information on new and existing varieties of citrus as well as information on other types of citrus diversity.

The University of California-Riverside Citrus Variety Collection (CVC) is one of the most diverse living collections of citrus varieties and related genera in the world. This collection encompasses varieties and species of genera in the Aurantiodeae subfamily of the Rutaceae (citrus). With two field trees of each of the over 1000 different types, this collection preserves valuable citrus types for research and to extend knowledge about citrus and citrus diversity. Although the main focus of the Citrus Variety Collection focus is to conduct research on new citrus varieties and facilitate the use of the collection for research by researchers, we also extend knowledge about citrus diversity by writing articles and providing a website with information about the different types of citrus in our collection: www.citrusvariety.ucr.edu Toni Siebert, David Karp and Tracy Kahn with the Citrus Variety Collection are in the process of "growing" our website to provide information and photographs of all of the different types in the collection. Please visit our website to learn more about other types citrus in the collection. Our website also has links to other citrus articles, references and citrus related information as well as a history of the collection and how you can help support the collection to preserve citrus diversity for the future.

The University of California-Riverside Citrus Clonal Protection Program (CCPP) is a cooperative program with federal, state, and citrus industry agencies and its purpose is to provide a safe mechanism for the introduction into California of citrus varieties from any citrus-growing area of the world. This procedure is highly regulated by federal and state law and only three programs in the whole country have authorization to introduce citrus varieties into the USA. The citrus variety introduction mechanism is complex and highly specialized and includes, disease diagnosis and pathogen elimination followed by maintenance and distribution of true to type, primary citrus propagative material. Currently the CCPP germplasm collection extents in more than 20 acres and contains over 1,200 trees representing over 350 different commercially important scion and rootstock varieties. The trees in the CCPP collection are constantly evaluated for several horticultural characteristics such as vegetative growth, fruit yield, and fruit quality. All the information related to the variety evaluation along with budwood distribution, citrus disease and citrus management issues is available to the public via the web site www.ccpp.ucr.edu.

The University of California-Riverside CVC and CCPP are in close collaboration and citrus variety information is exchanged between their websites. In the near future a dynamic data-based website will be launched enabling the users to query from the web pages of both the CVC and the CCPP at one time in order to answer specific questions and to compare variety data from either or both websites.

Water Infiltration Problems

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By the beginning of the irrigation season, the entire root zone is usually wetted by winter rainfall. Under low volume irrigation during the irrigation season only fifty percent or less of the root zone is wetted with each irrigation on most soil types. Soils with slow infiltration do not allow enough water to penetrate into the root zone to meet the plant's water requirement. During an irrigation the water puddles while the soil beneath remains dry. Less than ten percent of the soil in the root zone may be wetted during an irrigation when water infiltration is a problem. Water storage in such a small volume

of soil may amount to only two to three days of evapotranspiration. The tree may be under stress even though the amount of applied water exceeds the amount lost by evapotranspiration (ET). An infiltration problem is often associated with irrigation water low in salt and/or soils with inherently slow infiltration rates. Soil particles contain sites occupied by electrically charged ions such as calcium, sodium, and magnesium. In an optimum situation, a sufficiently high percentage of these sites are occupied by calcium which results in an aggregating or clumping effect among soil particles allowing water to penetrate. When the percentage of sites occupied by calcium is low and sodium predominates there is a repelling or dispersion of particles and water penetration is reduced. With increasing numbers of the exchange sites occupied by sodium ions the soil particles swell and repel each other creating a dispersion or loss of aggregation resulting in single particles. As this happens the porosity (or pore space) is reduced and the ability of water to enter is reduced. On the other hand as the exchange sites become more occupied by calcium the particles move closer together and aggregate or clump resulting in an increase in pore space. Therefore, soils that have a high percentage of the exchange sites occupied by sodium ions are dispersed and deflocculated and resist the entry of water while those with a high percentage of calcium ions are flocculated and favor water infiltration. With the use of low salt water over time, such as snow melt water, calcium may be removed from the soil particles exchange sites and these sites may then become occupied by another ion such as sodium.

Research addressing this problem of low infiltration was conducted in citrus under low volume irrigation by University of California researchers Peacock, Pehrson and Wildman. The soils type, at the experimental site of mature navel oranges, was a San Joaquin sandy loam characterized by a low infiltration rate. Canal water with a low salt content was used for irrigation. The trees were irrigated with a drip system every week day. Treatments began in June when soils typically begin to exhibit a reduced infiltration rate and were continued until mid-August but measurements continued until September. Simple devices for measuring the infiltration rate, called infiltrometers, were made from 12 inch PVC pipe and installed in the orchard. Chemical treatments and water were applied and rates of water infiltration were measured within these infiltrometers. Gypsum was applied weekly to the soil surface to maintain a slight excess continually on the soil surface and watered in resulting in gypsum application with each irrigation. Calcium nitrate and CAN-17 were each injected into the irrigation water. Calcium nitrate was introduced into the irrigation water at the rate of ten pounds per acre per irrigation. Calcium nitrate was applied daily, biweekly and in a single application. CAN -17 was applied daily, biweekly and in a single application. With these injections into the irrigation water, calcium was being introduced into the water at the rate of 3 milliequivalents per liter. Adding calcium continuously to irrigation water doubled infiltration rates over that of untreated low-salt water. It took 2-3 weeks before a treatment difference could be measured. However, the occasional additions of calcium nitrate or CAN-17 were not effective in maintaining infiltration rates. There were concerns that nitrogen application from these treatments could result in the nitrogen level in the tree being in excess of the tree's nutritional requirements. Following this research equipment was made available on a commercial basis for regulated injection of materials into low volume irrigation systems.

Attention San Joaquin Valley Citrus Growers: What Do You Plan to Do If It Comes For You?

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As growers in southern San Diego, Imperial, and Riverside County have experienced, the sudden discovery of the Asian citrus psyllid (ACP) in your backyard and the imposition of quarantine can really interfere with citrus harvest, transportation and marketing plans. With the find of ACP along the Highway 5 transportation corridor in Santa Ana and now Los Angeles County, the future discovery of ACP in the San Joaquin Valley in the near future is a very real possibility. In Kern County, for example, several governmental agencies as well as a host of private growers and pest control advisors have been looking for this pest, both in urban and rural areas, for several years by several means

including visual inspections of plant parts and traps. This increased scrutiny greatly increases the odds that if it is already here, or if it newly arrives, that it will be rapidly detected.

Let's imagine the following scenario in Kern County, although many other scenarios are possible for anyone moving fruit in and out of the San Joaquin Valley. The date is October 20th, 2009 and the early navel fruit harvest season is kicking into full gear. Trucks loaded with fruit for gassing are heading north for the packing houses, the harvest schedule for the next month is set, and the marketers have been selling fruit enthusiastically – and ACP is found triggering a quarantine of either the southern half of Kern County or all of Kern County. What happens next?

As a result of quarantine, generally, handlers and haulers have had to sign "compliance agreements" before moving product out of the quarantined area. These agreements state that the fruit has been processed and cleaned in such a way that eliminates all plant parts including leaves, stems and debris and that the cleaning has eliminated all life stages of the Asian citrus psyllid. In Riverside County, all harvested citrus in the quarantine area must be commercially cleaned and packed before it can be moved out of the area. What would be required in Kern County would likely be similar to what is occurring in other citrus growing areas where this pest is found.

The objective of my scenario is not to needlessly panic growers and packers, but to encourage them to think about how regulations associated with the sudden imposition of quarantine would be addressed. Most companies have probably already developed plans of actions should this occur. However, the observation that much of Kern County's fruit is packed outside the county, may make compliance with quarantine regulations potentially more difficult for many growers and packers that produce fruit in Kern County. It would be prudent to have plans for how fruit will be cleaned should quarantine occur, well before any potential quarantine is instituted.