

CENTRAL VALLEY POSTHARVEST NEWSLETTER

COOPERATIVE EXTENSION

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Editor

Contents

- **Establishing A Quality Control System.**
- **Preconditioning/Pre-Ripening Tips For Peaches, Plums And Nectarines.**
- **2001 – Inking Outbreak Evaluations.**
- **Section 18 For The “Reduced Risk” Fungicide Scholar 50WP Approved Again For 2001 For Postharvest Management Of Stone Fruit Decays.**
- **Future Events.**

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ESTABLISHING A QUALITY CONTROL SYSTEM

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In recent years, the production and marketing of fresh stone fruits has increased rapidly, but consumption remains low at approximately 5.9 pounds per capita per year for nectarines and peaches, and 1.3 for fresh plums and prunes. Surveys (Bruin, 1991) to explain this low consumption indicate that consumers object to hard fruit and lack of flavor. As the volume of

shipments is still increasing, greater attention must be given to the production and delivery of high quality stone fruits.

Preliminary and limited studies associated high soluble solids concentration (SSC) with higher consumer acceptance. Unfortunately, there are more factors involved such as acidity, phenolics, volatiles, etc. in consumer acceptance than just the simple SSC value. Thus, since we do not know enough about consumer acceptance and stone fruit chemical composition during maturation/ripening, we are not able to propose any quality standards. Furthermore, the variability of the SSC among fruit from different

orchards and within the tree is so large that it is impossible to set any minimum maturity standard.

The best way to assure high quality produce is by using the right cultivars, training systems, pruning, thinning, good irrigation and fertilization practices, etc., in combination with late harvesting.

It also is essential to evaluate production processes by establishing a quality control system. It will help to identify, segregate and keep records of fruit quality. Also, it will help to evaluate the effect of changes in cultural practices on fruit quality and to identify cultivars with high SSC levels. A correct handling of the information will benefit growers and the California fruit industry's reputation.

Measurement of fruit flesh firmness.

I. Materials.

- A. Effegi penetrometer or Magness-Taylor pressure tester, either hand-held or mounted on a stand for consistency.

II. Procedure.

- A. Make sure all fruits tested are comparable in temperature since warm fruits are usually softer than cold fruits.
- B. Make two puncture tests per fruit, one on each of the opposite cheeks, midway between the stem-end and calyx-end. If the variety of fruit being tested is known to soften unevenly, it is recommended that firmness measurements be taken at the softest positions (shoulder, tip, suture).
- C. Remove a disc (about 2 cm in diameter) of the skin with a stainless steel vegetable peeler or sharp knife.
- D. Use an appropriate tip (plunger) size for each commodity (5/16" for stone fruit and kiwifruit, D'Anjou pears,

Bosc pears, Comice pears, Bartlett pears, and Winter Nellis pears; 7/16" for most apples).

- E. All determinations for a given lot should be made by one person to minimize variability.
- F. Hold the fruit against a stationary hard surface and force the tip into the fruit at a uniform speed (take 2 seconds).
- G. Depth of penetration should be consistent to the inscribed line on the tip.
- H. Record reading to the nearest 0.5 lb or 0.25 kg.
 1. The unit should be written as pounds-force (lbf) or kilograms-force (kgf) in order to avoid confusion with the units of mass.

III. Maintenance.

- A. Before use on a given day, work the plunger in and out about 10 times to loosen up the springs inside the instrument.
- B. Clean the tips after use to prevent clogging with fruit juice.

IV. Calibration.

- A. Hold the firmness tester in a vertical position and place the tip onto the pan of an accurate scale.
 1. Press down slowly on the firmness tester until the scale registers a given weight, and then read the firmness tester. Repeat this comparison 3 to 5 times. If you find that the instrument is properly calibrated, it is ready to use.
- B. If the instrument reading is not in agreement with the scale reading, find out the magnitude and direction of the difference and proceed as follows:

1. Effegi fruit penetrometer:
 - a) Unscrew the chrome guide nut to remove the plunger assembly.
 - b) To make the instrument read lower, insert washers between the spring and the stationary brass guide.
 - c) To make the instrument read higher, insert washers between the chrome guide nut and the stationary brass guide on the plunger shaft.
 - d) Reassemble and recheck for calibration.
2. Magness-Taylor Pressure Tester:
 - a) Remove the plunger assembly from the barrel of the instrument and remove the bolt and washers from the end of the plunger assembly.
 - b) Pull the plunger and spring out of the metal cylinder, then shake the washers out of the cylinder.
 - c) To make the instrument read lower, move washers from inside to outside the metal cylinder.
 - d) To make the instrument read higher, move washers from outside to inside the metal cylinder.
 - e) Reassemble and recheck for calibration.
- C. If the indicator needle does not stop or does not release properly, clean the case in the area of the release button, remove the plunger assembly, and then lubricate the inside of the instrument with an aerosol lubricant.

Measurement of soluble solids concentration.

- I. Theory.
 - A. Sugars are the major soluble solids in fruit juice. Other soluble materials include organic and amino acids, soluble pectins, etc. Soluble solids concentration (SSC %, °Brix) can be determined in a small sample of fruit juice using a hand held refractometer. This instrument measures the refractive index, which indicates how much a light beam is “bent” when it passes through the fruit juice.
 - B. Temperature of the juice is a very important factor in the accuracy of reading. All materials expand when heated and become less dense. For a sugar solution, the change is about 0.5% sugar for every 10°F. Good quality refractometers have a temperature compensation capability.
- II. Materials.
 - A. 0-32% Brix temperature compensating refractometer, distilled water, Kimwipes, 5 or 10% sugar solution.
- III. Procedure.
 - A. Extract clear juice from fruit to be sampled.
 1. Sugar levels often vary within the fruit, being higher at the stem-end and lower at the calyx-end. For this reason, it is important to use longitudinal slices of fruit (from end to end) when sampling.
 - B. Place a drop of juice on refractometer prism.
 - C. Lower cover plate and read.
 1. In juice samples with high starch content, like unripe kiwi, it may be difficult to read the refractometer because the starch settles out on

the prism. To remedy this, put your thumb on the cover plate, turn the refractometer upside down, and re-read. This way the starch settles out on the cover plate and does not blur the reading.

- D. Rinse prism between samples with distilled water and dry with a soft, lint-free tissue (Kimwipe).

IV. Refractometer maintenance and calibration:

- A. Clean the instrument after each use with distilled water. Dry with a soft tissue (Kimwipe).
- B. Calibrate with a drop of distilled water. Adjust reading to 0°Brix if necessary with the small setscrew on the back. Verify accuracy with a drop of 5 or 10% sucrose solution (5 grams sugar in 100 milliliters of distilled water = 5% solution).
- C. Do not submerge the refractometer when cleaning. If water gets into the instrument it will need to be sent out for repair and resealing.

Measurement of pH and titratable acidity.

I. Materials.

- A. Required: pH meter or phenolphthalein, burette, burette clamp and stand, gram scale, graduated cylinder, beakers, 0.1N NaOH solution.
- B. Optional: magnetic stirrer & stir bar, automatic titrator.

II. Procedure.

- A. Obtain at least 25 milliliters of clear juice by one of the following methods:
1. Cut fruit, press with a hand press, and filter through cheesecloth, or
 2. Cut fruit into a blender, homogenize, centrifuge slurry, and pour off clear liquid for analysis.

** Sugar levels often vary within the fruit, being higher at the stem-end and lower at the calyx-end. For this reason, it is important to use longitudinal slices of fruit (from end to end) when sampling.

- B. Make sure samples are at room temperature before taking measurements.
- C. Measure the pH of the samples with a pH meter and record the value.
- D. For each sample, weigh out 6 grams of juice into a 100-milliliter beaker.
- E. To each sample, add 25 milliliters of water.
- F. Titrate each sample with 0.1 N NaOH to an end point of 8.2 (measured with the pH meter or phenolphthalein indicator) and record the milliliters (mls) of NaOH used.
- G. Calculate the titratable acidity using the following formula:

$$\% \text{ acid} = \frac{[\text{milliliters NaOH used}] \times [0.1 \text{ N NaOH}] \times [\text{milliequivalent factor}] \times [100]}{\text{grams of sample}}$$

Commodity	Predominant Acid	Milliequivalent Factor
Stone fruit, apples, kiwifruit	Malic Acid	0.067
Citrus	Citric Acid	0.064
Grapes	Tartaric Acid	0.075

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***PRECONDITIONING/PRE-RIPENING TIPS
FOR PEACHES, PLUMS AND
NECTARINES***

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Principle Findings

- Controlled delayed cooling can be used to precondition stone fruit susceptible to internal breakdown in order to maintain flavor and extend market life. Delayed cooling can also be used to pre-ripen susceptible and non-susceptible stone fruit in order to deliver a more “ready to eat” product to the consumer. It is important to know what you want to accomplish with each cultivar before changing your program.
1. In general, a 48-hour cooling delay at 68°F is the most effective preconditioning treatment to extend market life of internal breakdown susceptible peaches and nectarines.

2. For peaches, nectarines and plums, the use of ethylene during the cooling delays (Preconditioning/Pre-ripening) did not increase market life with respect to internal breakdown symptom development.
 3. To pre-ripen stone fruit, delay cooling at 68°F for the minimum period of time necessary to achieve the desired level of ripeness (up to 6-8 lbf for peaches and nectarines, 5 lbf for plums measured on the weakest position on the fruit).
- Flesh firmness must be monitored on the weakest position on the fruit during the preconditioning/pre-ripening treatment. Peaches and nectarines become very susceptible to vibration injury during transportation when flesh firmness is <5 lbf.
 - Peach, nectarine and plum market life is longer when the fruit are stored at 32°F rather than 41°F.
 - Rapid cooling after preconditioning is important to stop further fruit flesh softening, senescent breakdown, decay, and prevent prolonged exposure to 41°F temperatures. More refrigeration capacity may be needed to execute this system.
 - More information can be found in <http://www.uckac.edu/postharv/>, <http://postharvest.ucdavis.edu/>, <http://fruitsandnuts.ucdavis.edu/> and <http://pom.ucdavis.edu/>. A full research report will be published as 2000 CTFA Research Report. A detailed article entitled “Preconditioned/Pre-ripening, A New California Fruit Delivery System Overview” is available. Please contact Lois Strole, Lois@uckac.edu or (559) 646-6545.

2001 – INKING OUTBREAK EVALUATIONS

Carlos H. Crisosto, Kevin R. Day, Harry Andris and F. Crisosto

Due to a reported high incidence of inking on yellow and white flesh peaches and nectarines last season, we decided to look into the situation. We surveyed two packinghouses during a two-day period, taking fruit samples at different steps during their postharvest operations. We defined inking as any black, brown, or tan colored areas on the fruit's surface. To quantify inking on the fruit, we used a metal loop 9 mm in diameter (internal area = 64 mm²) and counted the number of loops (to the nearest half loop) worth of fruit surface that were damaged. This loop area represented the damage threshold required for the fruit to be culled out. Inking is reported as both the incidence and score (severity). Incidence was the percentage of fruit that had ≥64 mm² of damaged area (1 loop). We also calculated the incidence of fruit having some inking, but not enough to cull, as those having half a loop of inking. Inking score was calculated as the average number of loops of inking on the fruit's surface. Inking was measured one, four, and seven days after sample collection.

Here are my recommendations to reduce fruit losses due to inking. More details can be found in *California Agriculture*, January-February 1999, pages 19-23. Article can be requested from Lois Strole at Lois@uckac.edu or (559) 646-6545.

Conclusions

- It took at least four days for inking damage to be fully expressed on white flesh cultivars. Any evaluation carried out prior to that time gave misleading results.

- High inking incidence was measured on fruit collected from bins immediately after arrival at the packinghouse.
- The final inking incidence measured after four days was not affected by chlorine washing, and brushing. The wax/fungicide application in some cases enhances inking intensity because of potential heavy metal contaminations. Dirty hydrocooler water may also induce inking.
- Inking score increased after wax/fungicide application only on fruit arriving with inking problems.

Table 1. Inking evaluations before and after packaging operations.

Cultivar (Code) Harvest Date	Evaluation Date (Days Incubation)	Inking Incidence (%) 0.5 Loop ^z (1.0 Loop)		Inking Score ^y	
		Before	After	Before	After
S. Lady (Mtv 55) 8/1/00	8/3/00 (3 days)	36 (13)	70 (56)	0.3	1.3
	8/7/00 (7 days)	97 (77)	97 (83)	2.2	4.5
S. Lady (B1221) 7/31/00	8/3/00 (3 days)	27 (11)	67 (56)	0.3	1.4
	8/8/00 (8 days)	97 (90)	94 (90)	3.3	3.7
S. Fire (N 0806) 7/31/00	8/3/00 (3 days)	6 (1)	7 (3)	0.07	0.07
F. Pearl (Blr 72) 8/1/00	8/3/00 (3 days)	56 (27)	67 (50)	0.5	13
S. Lady (P0 102) 8/1/00	8/7/00 (7 days)	67 (89)	99 (99)	2.2	3.7
O'Henry (M2030) 8/1/00	8/7/00 (7 days)	1.1 (0.5)	1.5 (0.5)	0.04	0.03

^z Loop area indicates the minimum damaged required to be call out; a loop represents a discolored area 9 mm in diameter.

^y Average loop area.

Total chlorine = 10-98 ppm, active chlorine = 0-90 ppm , and pH = 8.3.

Table 2. Inking measured after three days incubation on ‘Summer Lady’ peach (B-1221) harvested on 7/31/00 and collected at different steps during packaging operations.

Steps During Packaging	Inking Incidence (%) – 0.5 Loop	Inking Incidence (%) – 1.0 Loop	Inking Score
Before Hydrocooler	27 a	11 a	0.27 a
After Hydrocooler	63 ab	35 ab	0.73 ab
After Wax/ Fungicide	70 b	57 b	1.40 b

Table 3. Inking measured after seven days incubation on ‘Summer Lady’ peach (B-1221) harvested on 7/31/00 and collected at different steps during packaging operations.

Steps During Packaging	Inking Incidence (%) – 0.5 Loop	Inking Incidence (%) – 1.0 Loop	Inking Score
Before Hydrocooler	97 a	90 a	3.3 a
After Hydrocooler	95 a	84 a	3.7 a
After Wax/ Fungicide	94 a	90 a	5.0 b

Table 4. Inking measured after two days incubation on ‘Summer Lady’ peach (MTV-55) harvested on 8/1/00 and collected at different steps during packaging operations.

Steps During Packaging	Inking Incidence (%) – 0.5 Loop	Inking Incidence (%) – 1.0 Loop	Inking Score
Before Hydrocooler	36 a	13 a	0.27 a
After Hydrocooler	55 ab	35 ab	0.73 ab
After Wax/ Fungicide	70 b	56 b	1.30 b

Table 5. Inking measured after seven days incubation on ‘Summer Lady’ peach (MTV-55) harvested on 8/1/00 and collected at different steps during packaging operations.

Steps During Packaging	Inking Incidence (%) – 0.5 Loop	Inking Incidence (%) – 1.0 Loop	Inking Score
Before Hydrocooler	97 a	77 a	2.2 a
After Hydrocooler	96 a	86 a	2.5 a
After Wax/ Fungicide	97 a	82 a	4.5 b

Table 6. ‘Snow King’ white flesh peach inking measured before and after packaging (harvested 8/1/00).

Packaging	Inking (8/2/00)		
	Mean Score	Incidence (%)	
		≥ 0.5	≥ 1.0
Before	0.7 a	58.0 a	34.0 a
After	2.4 b	94.0 b	85.0 b

Packaging	Inking (8/7/00)		
	Mean Score	Incidence (%)	
		≥ 0.5	≥ 1.0
Before	5.4 a	100.0 a	99.0 a
After	9.2 b	100.0 a	100.0 a

Total chlorine = 170 PPM, free chlorine = 160 PPM, pH = 8.6

Table 7. ‘Snow King’ white flesh peach inking measured before and after packaging (harvested 8/5/00).

Location	Inking (8/9/00)		
	Mean Score	Incidence (%)	
		≥ 0.5	≥ 1.0
After Dumping	3.8 a	99.0 a	94.7 a
After Chlorine	4.0 a	94.7 a	94.7 a
After Waxing/ Fungicide	10.2 b	100.0 a	100.0 a

Total chlorine = 116 PPM, free chlorine = 99 PPM, pH = 8.7

- Even in the cases where fruit arrived with inking problems, high chlorine levels (approximately 150 ppm) and pH (8.6) in the hydrocooler or washer did not increase inking score or incidence.
- These data point out the inking was triggered in the field or during transportation. Fruit that were free of inking at arrival did not develop inking (score or incidence) during the packaging operation.
- The fact that some lots did not show any inking damage at arrival or after processing on the packingline could help us find out if the damage is related to any special preharvest chemical treatment or management system.
- I encourage the development of a database for this type of information so that it can be immediately retrieved to find solutions to operational problems in the future.
- I suggest the screening of postharvest materials, such as detergent and waxes, for heavy metals (Fe, Al and Cu).

**SECTION 18 FOR THE “REDUCED RISK”
FUNGICIDE SCHOLAR 50WP
APPROVED AGAIN FOR 2001 FOR
POSTHARVEST MANAGEMENT OF
STONE FRUIT DECAYS**

Fungicide Stewardship Guidelines as a Long-Term Strategy for Maintaining Efficacy

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For a fourth growing season, an emergency registration for postharvest use of the “reduced-risk” fungicide Scholar 50WP (fludioxonil) on fresh-shipment of apricot, peach, plum (prunes),

and nectarine was approved by the US-EPA and by the California Department of Pesticide Regulation (DPR). Twenty-three stone-fruit-growing counties throughout California were included. The rate of application remains the same with 8 oz of the formulated fungicide (4 oz active ingredient) applied to 200,000 lb of fruit. The time-limited residue tolerance was established at 5.0-ppm fludioxonil (active ingredient) and the total amount of fruit treated is limited to 500,000 tons. A full Section 3 registration for the fungicide was expected this season. The registration, however, was voluntarily postponed last summer in a cooperative decision with the study director of the IR-4 program, Syngenta product managers, and the senior author to broaden the number of application methods under the proposed label. Currently, the fungicide is expected to be fully registered by late summer to early fall 2001 with uses and application methods similar to the emergency label, but expanded to include sweet cherry and a range of use rates.

The 2001 Section 18 label is similar to last year’s label with one important exception: the application volume (dilution rate) has been expanded from 25 - 100 gal for last year’s label to 8 - 100 gal for this year’s label. This change allows for all of the diverse application systems for the many different varieties of stone fruit crops. Mixing the fungicide in water, fruit coating, or a water dilution of a fruit coating also remains the same as last year for both high and low volume systems including T-Jet, controlled droplet, or similar methods. Packinghouse guidelines for determining rates of fungicide usage are shown in Table 1.

Last year, postharvest decay incidence was very low for most stone fruit packers who used Scholar. In our studies, however, we found that an average decay potential was still there, but the fungicide was highly effective in preventing brown rot, gray mold, Rhizopus rot, and Gilbertella decay. Thus, integrated pest management programs together with the postharvest use of Scholar were very effective in

preventing crop losses. No fruit staining was reported that could be correlated with the use of Scholar. Staining problems that were brought to our attention could be traced to excessive applications of alkaline fruit coatings to susceptible crop cultivars. The reason for excessive coating applications was due to concerns for ensuring adequate fungicide residues. The 2001 Section 18 label modification as indicated above allows for more concentrated fungicide mixtures (minimum volume of 8 gal) without over-application of fruit coatings. We have also contacted the service companies to ensure that fruit coatings and other postharvest treatments (e.g., sanitation and hydrocooling washes) have properly adjusted pH values between neutral and slightly alkaline conditions. Ideally, pH values of all treatments should be 7 - 8.5 and should not exceed 9.

Studies also have been conducted to evaluate the stability of fludioxonil in water and in dilutions of two water-based emulsions of paraffinic or vegetable fruit coatings. Only a minor reduction in fungicide concentration was detected under packinghouse conditions at concentrations of ca. 600- (4 oz ai/50 gal) or 3600-ppm ai (4 oz ai/8 gal) after 14 days in any of these preparations, whether stationary or continuously mixed (Table 2). Thus, packinghouse operations need no special adjustments to accommodate for the usage of this new fungicide besides not storing treated fruit in sunlight. The fungicide is light sensitive and degrades when exposed to sunlight.

Scholar, like most of the new fungicides, has a single-site mode of action that acts on one specific biochemical process. Consequently, a single mutation or selection process can lead to successive generations of less sensitive or resistant strains in decay pathogen populations. Thus, compared to the older multi-site mode of action fungicides, extra care must be taken to avoid the development of resistance with single-site mode of action fungicides. Scholar belongs to a distinct class of fungicides with a different

mode of action from other fungicides registered on stone fruit. The fungicide will only be registered for postharvest use and not for preharvest use on stone fruit crops. Because other postharvest uses such as drench treatments will *not* be labeled, pathogen populations will only be exposed once to the fungicide. This significantly reduces the potential for resistance development. With proper application and with adequate fungicide residues (0.5-1.0 ppm, depending on the crop), the fungicide should remain highly effective for years. Adequate residues will decrease the potential for resistance development and they should be maintained and monitored regularly (e.g., weekly) throughout the season.

With the advent of pre-conditioning of fruit, postharvest decay management is faced with new challenges. Because fruit is partially ripened more decay is likely to develop. Thus, integrated postharvest management strategies are essential and more important than ever before. Effective practices include preharvest disease management programs (e.g., cultural practices, fungicide programs), harvest practices that minimize injuries, sanitation programs for obtaining clean, pathogen-free fruit, good sorting practices to remove off-grade or injured fruit, and effective temperature management programs. These practices are necessary to assure high fruit quality and minimal losses from fruit decay. Chlorination (an essential part of sanitation) and proper fungicide application of fruit need to be emphasized in controlling postharvest decays. Just because Scholar is very effective does not justify skipping or eliminating other decay control practices. Pro-actively, we are planning to incorporate resistance-monitoring programs into existing IPM practices once the fungicide is fully registered.

Research is ongoing to obtain registrations of Scholar also on other crops, including citrus, pome fruit, pomegranate, and kiwifruit. Decay control studies on these crops have been conducted with excellent results and IR-4 residue studies have been initiated or completed

for these crops. Research is also ongoing for registration of additional postharvest fungicides. A range of postharvest treatments that can be used in rotations or mixtures will help to prevent resistant pathogen populations from developing and minimize crop losses. Thus, registering

additional materials and following sound management practices that minimize the risk for the development of resistance in target populations of fungal pathogens will ensure proper fungicide stewardship and effective decay management for years to come.

Table 1. Guidelines for postharvest calculations of Scholar 50WP on stone fruit.

A. Time required for correct usage of Scholar 50WP at different fruit processing rates

Scholar (oz)	Fludioxonil (oz)	Fruit (lb)	Bin (lb)	Rate (Bin/hr)	Fruit (lb/hr)	Time (hr/200K lb)	MTR* (ppm)
8	4	200000	900	40	36000	5.6	1.25
8	4	200000	900	60	54000	3.7	1.25
8	4	200000	900	80	72000	2.8	1.25
8	4	200000	900	100	90000	2.2	1.25

* - Maximum theoretical residue (MTR) based on ideal application conditions.

** - For example, if you are treating 60 bins/hr then 8 oz of Scholar 50WP should be used up in 3.7 hr to obtain the MTR on 200,000 lb of fruit.

B. Scholar application volumes and concentrations for high and low volume application systems

Vol (gal)	Fludioxonil Conc.(ppm)	Rate (Bin/hr)	Time (hr/200K lb)	Rate (gal/hr)	Rate (ml/min)
100	300	60	3.7	27	1703.3
50	600	60	3.7	13.5	851.6
25	1200	60	3.7	6.75	425.8
8	3600	60	3.7	2.16	136.3

* - For example, if you mix 8 oz of Scholar 50WP in a volume of 50 gal the concentration is 600 ppm. Thus, at a rate of 60 bins/hr it should take 3.7 hr at a pump rate of 13.5 gal/hr to treat 200,000 lb of fruit.

C. Wax volumes and rates of application for high and low volume application systems

Wax Vol. (gal)	Fruit (lb)	Bin (lb)	Rate (Bin/hr)	Fruit (lb/hr)	Wax Time (hr/30K lb)	Wax Vol (gal/200K lb)	Time (hr/200K lb)
1	30000	900	60	54000	0.6	6.7	3.7
0.5	30000	900	60	54000	0.6	3.3	3.7

** - For example, if you are treating 60 bins/hr and use 1 gal of wax on 30,000 lb of fruit, it should take 0.6 hr. Thus, 6.7 gal of wax should be pumped onto 200,000 lb of fruit in 3.7 hr.

Table 2. Reduction of fludioxonil in aqueous solutions or aqueous mixtures with paraffinic or vegetable fruit coatings after 14 days under packing house conditions.

Scholar Rate	Fludioxonil conc. (ppm)	Fruit Coating	Dilution (Coating:Water)	Concentration of Fludioxonil (ppm)	
				14-day-old	% Reduction
8 oz/50 gal	625	water	---	568	9.1
8 oz/8 gal	3750	water	---	3610	3.7
8 oz/8 gal	3750	paraffinic	1:3	3681	1.8
8 oz/8 gal	3750	vegetable	1:3	3072	18.1**
8 oz/8 gal	3750	paraffinic	undiluted	3681	1.8
8 oz/8 gal	3750	vegetable	undiluted	3442	8.2**

- * - All mixtures in 8-gal volumes were continuously agitated during the 14-day period. The 50-gal mixture rate was kept stationary and mixed for 3 hours just prior to analysis.
- ** - Mixtures with the high-solids, vegetable-based fruit coating showed a decrease in fungicide concentration due to minor fractionation in the oil.

FUTURE EVENTS

July 8-11, 2001

5th International Peach Symposium, Davis, CA.

Followed by optional field excursion to the San Joaquin Valley from July 12-14, 2001.

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