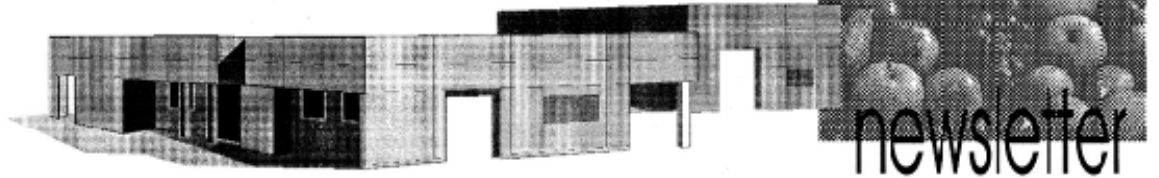




Central Valley **POSTHARVEST**

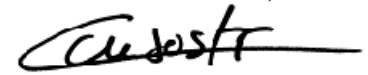


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UC COOPERATIVE EXTENSION
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August 2009
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Carlos H. Crisosto, Editor

UC Cooperative Extension and the Kearney Agricultural Center present:

2009 VARIETY DISPLAY AND RESEARCH UPDATE SEMINAR

Friday, August 21, 2009 – 8:00 to 10:00 a.m.
at the Kearney Agricultural Center

- | | |
|--|--|
| 8:00 am – 9:00 am | Variety display by stone fruit nurseries, breeders and the USDA |
| 8:00 am – 9:00 am | Postharvest Fruit Quality Program (C. H. Crisosto) <ul style="list-style-type: none">• Stop 1. Tasting Sensory Damaged Tree Fruit
Ms. Gayle Crisosto and Rosa Altisent |
| 9:00 am – 10:00 am
(F. Gordon Mitchell
Postharvest Building) | <ul style="list-style-type: none">• Stop 2. Inking Laboratory Test Results
Dr. Celia Cantin and Ana Mitchell
Dr. Li Tian and Dr. Xiaoqiong Qin• Stop 3. White Flesh Skin Burning Cooling Test Results
Mr. Kevin Day |

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UPDATE ON WHITE FLESH PEACH AND NECTARINE SKIN BURNING DISCOLORATION

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Executive Summary

Based on our current work, it looks like the **white flesh skin burning disorder** is triggered by the combination of physical damage during harvesting-hauling combined with ‘postharvest stresses’. Postharvest stresses such as fruit exposure to high air velocity during forced air cooling (FAC), dehydration, and high water pH during washing-brushing will induce development of this damage on the fruit.

During this season, our research team supported by the California Tree Fruit Agreement (CTFA), has been answering new questions related to inking formation such as:

- 1) How is inking triggered during packaging operations?
- 2) How do we establish minimum safe thresholds for Fe and Al concentration?

- 3) Are there additional potential precursors for inking such as air pollution, pH, air velocity, or other unknowns?
- 4) Are specific new cultivars more highly susceptible to inking?
- 5) Is cultivar pigment composition or quality composition related to inking susceptibility?
- 6) Is cultivar antioxidant capacity related to inking susceptibility?; and
- 7) Can we reverse or protect fruit from inking?

A high level of a new inking incidence type has been observed during our interactions with cooperators and discussion with visitors. As the symptoms are a little bit different than the traditional field inking previously reported, we have called this blemish which is frequently high in white flesh cultivars as “skin burning disorder” (Fig. 1). Because of the high frequency we have allocated our attention in the last 4 weeks to understanding this problem. One unique characteristic of this blemish, contrary to our traditional field inking, is that the incidence increases after packing, handling, and especially cooling. In fact, it was brought to our attention that most of the damage was observed on the exposed part of the fruit above tray cavity and no damage symptoms occurred under the PLU sticker.



Fig. 1. Incidence of ‘skin burning disorder’ on ‘Autumn Snow’

With the help of cooperators, we executed several large tests using different white flesh cultivars and postharvest treatments.

Because of the high incidence of this problem we would like to report our current findings to reduce some of the problem incidence during the end of this season:

Table 1. Different postharvest handling treatments on ‘Autumn Snow’

Treatments	Explanation	Sub-Treatment
Tree	Fruit was picked and packed directly from trees.	Room Cooling (RC)
Tree	Fruit was picked and packed directly from trees.	Forced Air Cooling (FAC)
Tote	Fruit picked and packed directly from totes at arrival at packinghouse.	Room Cooling
Tote	Fruit picked and packed directly from totes at arrival at packinghouse.	Forced Air Cooling
Short Dry packaging (SD)	Fruit was placed on the packingline after the washing-brushing-waxing, and water and wax were not used during their operation.	Room Cooling
Short Dry packaging (SD)	Fruit was placed on the packingline after the washing-brushing-waxing, and water and wax were not used during their operation.	Forced Air Cooling
Long Dry packaging (LD)	Fruit was placed on the packingline at dumping, but water and wax were not used during their operation.	Room Cooling
Long Dry packaging (LD)	Fruit was placed on the packingline at dumping, but water and wax were not used during their operation.	Forced Air Cooling
Long Wet packaging ^Z (LW)	Fruit was placed on the packingline at dumping and water, chlorine and wax were used.	Room Cooling
Long Wet packaging (LW)	Fruit was placed on the packingline at dumping and water, chlorine and wax were used.	Forced Air Cooling
Long Wet Box Liner packaging (LWBL)	Fruit was packed using a perforated box liner and fruit was placed on the packingline at dumping where water, chlorine and wax were used.	Room Cooling
Long Wet Box Liner packaging (LWBL)	Fruit was packed using a perforated box liner and fruit was placed on the packingline at dumping where water, chlorine and wax were used.	Forced Air Cooling
Long Wet Full Pallet Solid Wrap packaging (LWFPSW)	Fruit was placed on the packingline at dumping and water, chlorine and wax were used. Then full pallet was wrapped using a solid liner prior to FAC.	Forced Air Cooling

^Z Water pH during brushing was maintained at 7.4-7.6 by using Muriatic acid.



Fig. 2. Preparing the trial to study 'skin burning disorder' on 'Autumn Snow'

Results

1. Fruit gently picked-packed directly from the tree and /or totes did not develop high incidence of **white flesh skin burning disorder** after forced air cooling (FAC).
2. **White flesh skin burning disorder** can be reduced and/or avoided on fruit that was subjected to any packing line system by using room cooling (RC) rather than FAC.
3. Fruit that was subjected to any standard packing line system combined with FAC had a high incidence of this problem.
4. Postharvest packaging treatments such as short dry and long dry packaging slightly reduced skin burning disorder incidence even when fruit was FAC after packaging.
5. Postharvest packaging treatments such as short dry, long dry and long wet packaging line did not make any difference on skin burning disorder when fruit was RC after packaging. In this commercial operation pH was kept at ~7.5.
6. Fruit packed using perforated liners still showed high incidence of the problem when FAC.
7. Fruit packed using pallet solid wrap showed low incidence of the problem when FAC, but the final fruit temperature after cooling period was undesirable during this test.
8. Protection of fruit from dehydration during harvesting-storage-transportation-retail handling will reduce the development of this blemish.

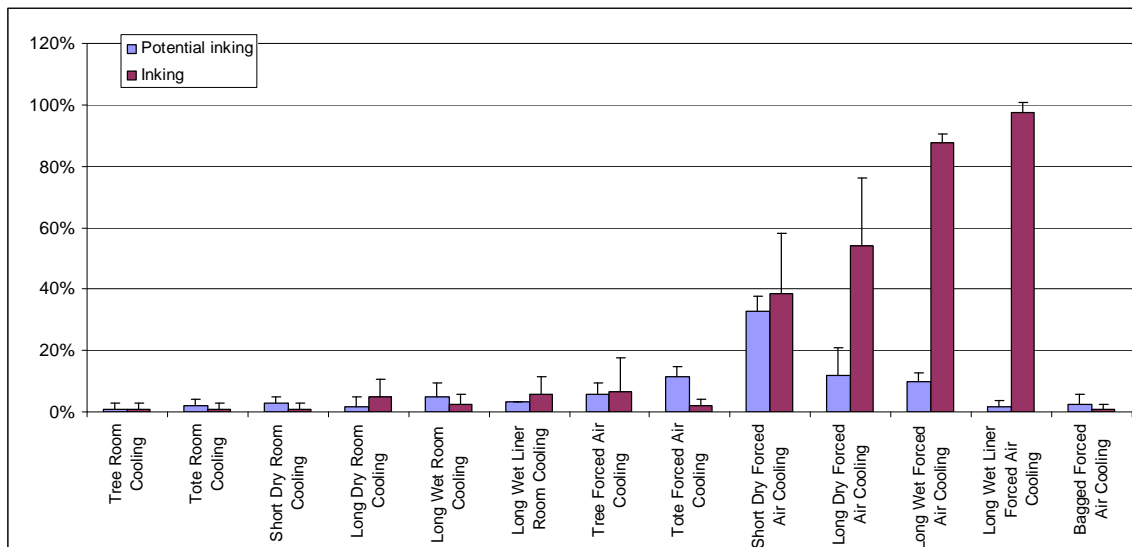


Fig. 3. Incidence of skin burning disorder affected by different postharvest handling on ‘Autumn Snow’.

Final Comments

Based on our current work, it looks like the **white flesh skin burning disorder** is triggered by the combination of physical damage during harvesting-hauling combined with ‘postharvest stresses’. Postharvest stresses such as fruit exposure to high air velocity during forced air cooling (FAC), warm air velocity, and high water pH during washing-brushing will induce development of this damage on the fruit. The fact that fruit picked-packed directly from the tree and /or totes did not develop high incidence of **white flesh skin burning disorder** after FAC pointed out that physical damage is necessary to trigger this skin blemish problem. In other field and laboratory tests, when fruit is exposed to high pH, skin burning

disorder will develop in areas that have been physically damaged during harvesting-hauling. This may explain why fruit from the dry (no exposure to water-chlorine) packingline treatments had lower white flesh skin burning disorder than fruit that was wet during the packing operation.

It is important to point out that by the end of this season, our research team has a much better understanding of the ‘white flesh skin burning disorder’ and traditional inking problems, but we still have a lot of work to do to find practical ways to predict and eradicate these problems from our California industry.

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FUTURE DATES

September 22-24, 2009. [14th Annual Fresh-cut Workshop](#). Fresh-Cut Products: Maintaining Quality and Safety. Davis, CA. [Enroll On-Line](#).

16th Annual Fruit Ripening and Ethylene Management Workshop. February 25 & 26, 2010 at the Kearney Agricultural Center, Parlier, CA. For further information contact Carlos H. Crisosto at carlos@uckac.edu or (559) 646-6596.

First Winter Postharvest Short Course. February 21 to 25, 2011 at the Kearney Agricultural Center, Parlier, CA. For further information contact Carlos H. Crisosto at carlos@uckac.edu or (559) 646-6596.

Upcoming events are posted on the Postharvest Calendar at the Agriculture and Natural Resources, University of California (ANR) website at:

<http://ucce.ucdavis.edu/calendar/calmain.cfm?calowner=5423&group=w5423&keyword=&ranger=3650&calcat=0&specific=&waste=yes>

Information about upcoming events can also be found on the Postharvest Technology Research and Information Center website at <http://postharvest.ucdavis.edu/>:

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