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Central Valley POSTHARVEST newsletter

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UC COOPERATIVE EXTENSION
Department of Plant Sciences, UC Davis
located at Kearney Agricultural Center
9240 South Riverbend Avenue
Parlier, CA 93648 / USA
(559) 646-6500

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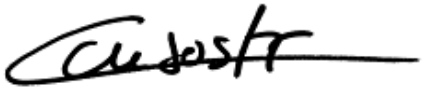


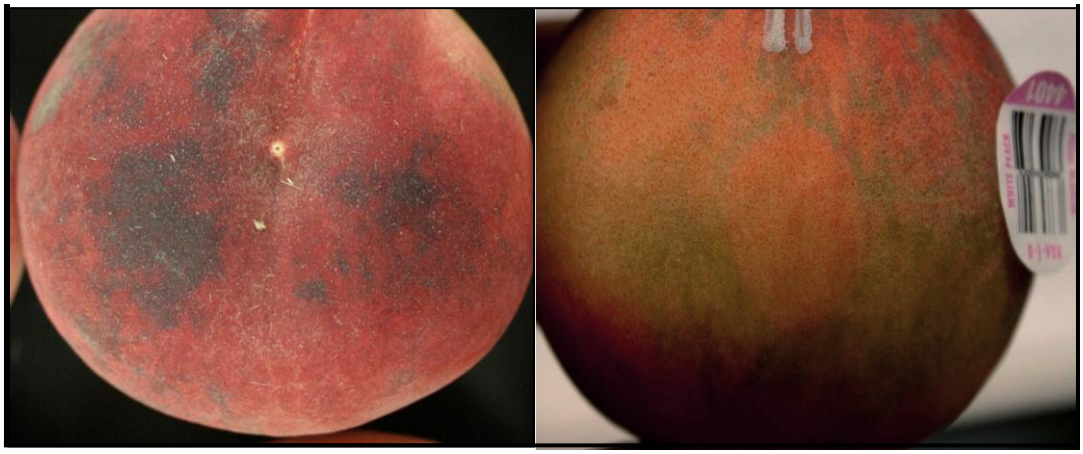
Carlos H. Crisosto, Editor

SKIN BURNING

Celia M. Cantin and Carlos H. Crisosto
University of California
Department of Plant Sciences
chcrisosto@ucdavis.edu

Importance: Skin burning is a type of skin discoloration that has become a frequent problem in the last five years in California on specific susceptible peach and nectarine cultivars. Rejections due to skin burning can reach a very high incidence. Our results from several years indicate that field inking and skin burning peach and nectarine skin discolorations are triggered by the combination of physical damage during harvesting-hauling combined with different post-harvest stresses. However, although field inking and skin burning disorders have similar symptoms, they have different triggers and different biological mechanisms of development, and therefore it is important to understand the differences between both cosmetic skin disorders.

Symptoms: Skin burning symptoms appear as brown and/or black areas that are restricted to the skin. In contrast to field inking, these symptoms are mainly triggered during packing operations, principally at the brushing-washing point, although abrasion which occurred previously will also contribute to its development. Symptoms can be observed very soon after packing and especially after cooling, but the symptoms increase during cold storage due to dehydration. In fact, it was brought to our attention that most of the skin damage observed was on the exposed part of the fruit above the tray receptacle and no damage occurred under the price-look-up sticker.



Causes: Skin burning is the skin damage mainly observed after fruit packing and handling, and is caused by the combination of pre- and/or post-harvest physical abrasion with exposure to high pH and/or high velocity forced air cooling. The incidence of this skin disorder increases significantly after the post-harvest operations (washing, handling and cooling). Different susceptibilities to skin burning have been observed among peach and nectarine cultivars, depending mainly on their skin phenolic composition.

Control of skin burning

- Minimize physical damage or abrasion on the fruit surface during pre- and/or post-harvest operations. Handle fruit gently, avoid long hauling distances and keep harvest containers free of dirt.
- In a standard packing operation, washing water pH in the brushing-washing or hydrocooling operation should be continuously maintained around 6.5-7.0. The installation of automated systems (ORP) to monitor and/or adjust active/effective chlorine and pH levels is critical to increase disease control effectiveness and decrease potential skin burning development.
- Based on our current results, we recommend dry packing (without brushing and a chlorine rinse) for the very susceptible peach or nectarine cultivars.
- Avoid the fast cooling air velocities for the skin burning susceptible peach or nectarine cultivars. For these susceptible cultivars, we suggest cooling the fruit by room cooling, without forced air.
- Detailed work focused on forced air cooling skin damage will be performed during this upcoming season to find practical approaches to reduce skin burning incidence on peaches and nectarines and to understand the mechanisms driving this economically important disorder.

References

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Crisosto, C.H., Cantin, C.M., and Suslow, T. 2009. The importance of adjusting your water-chlorine pH during your brush-washing operation for the San Joaquin Valley stone fruit industry. Central Valley Postharvest Newsletter 18(3): 1-5.

FIELD INKING OR BLACK STAINING

Celia M. Cantin & Carlos H. Crisosto
University of California
Department of Plant Sciences
chcrisosto@ucdavis.edu

Importance: Field inking or black staining is a type of skin discoloration and a frequent problem in California, Washington, Georgia, South Carolina, New Jersey, and Colorado, as well as in other production areas in the world such as Italy, Spain, New Zealand, Australia, Argentina, and Chile. Rejections due to skin discoloration can reach up to 50%.

Causes: Abrasion damage in combination with heavy metal contamination is required for inking development. The skin cells, where the anthocyanin/phenolic pigments are located, collapse and their contents react with heavy metals turning their color dark brown/black. Iron, copper and aluminum are the most deleterious contaminants. Only 5-10 ppm iron is enough to induce inking at the physiological fruit pH (~ 3.5). This contamination can occur in the field within 15-20 days before harvest or during harvesting operations. Foliar nutrient, fungicide and insecticide pre-harvest sprays which contain the above-mentioned metals in combination with abrasion damage have the capacity to induce inking on peach and nectarine fruit when applied close to harvest.

Symptoms: Field inking symptoms appear as brown and/or black spots or stripes that are restricted to the skin. Symptoms become evident within 48 hours after harvest. However, inking symptoms are triggered during harvest and during transportation to the packinghouse. Field inking usually begins in the field, although symptoms may take more time to become apparent.

Control of field inking

- Reduce fruit abrasion damage by treating fruit gently and avoid long hauling.
- Reduce fruit contamination by keeping picking containers dirt free and clean; avoid dust contamination on fruits.

- Check your water quality for contamination with heavy metals (Fe, Cu & Al).
- Test your pesticides for presence of heavy metals (Fe, Cu & Al) early in the season.
- Do not spray foliar nutrients or pre-harvest fungicides containing Fe, Cu, or Al within 21 days of predicted harvest.
- Chemical manufacturing companies should attempt to identify and remove from their products any potential sources of contaminants that may contribute to inking formation, and to develop safe pre-harvest spray intervals (PHI) for foliar nutrients, fungicides, miticides, and insecticides.
- Growers need to know the composition of the chemicals commonly used in their tree fruit pre-harvest and post-harvest operations and understand how they may affect inking incidence.
- In orchards where inking is a problem, delay packing for ~48 hours so you will be able to remove fruit with field inking before placing fruit in the box.
- Fine tune your post-harvest fungicide application to assure that your residues are above the effective minimum recommended, but well below the maximum residue limit (MRL) or tolerance.

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FUTURE DATES

Upcoming events are posted on the Postharvest Calendar at the UC Agriculture and Natural Resources, 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/