

# Managing Almond Hull Rot and Stick Tights with Regulated Deficit Irrigation

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Hull rot is caused by two fungal genera, *Rhizopus stolonifer* (the bread mold fungus) and *Monilinia spp.*, the brown rot fungi. As almond hulls split, the fungi colonize the hull interior. Toxins produced by the fungus cause dieback of the spur and connected shoots. Excessive dieback can lead to depletion of lower fruit wood. The disease can be especially bad in the Nonpareil and Sonora varieties. There are no fungicide controls but the way we irrigate and fertilize has a big influence on disease severity.

Early in the season when almond kernels are developing, any amount of water stress can lead to significantly smaller nuts and reduced yield. However once hull split begins, short-term, moderate water stress has very little if any ill effect on yield and can provide some benefits.

Research and demonstration trials conducted by many UC specialists and farm advisors have shown that mild water stress for during the early hull split period can reduce hull rot and improve nut removal. UC Farm Advisors throughout the state conducted demonstrations in 2001 (11 orchards in all) to look at the effects of regulated deficit irrigation (RDI). In those orchards that had hull rot, disease tended to be reduced by RDI. In a flood-irrigated Stanislaus County orchard, hull rot was reduced from 44 strikes per tree to 27 strikes per tree (a reduction of about 40%). There was no reduction in yield from the RDI treatment in any of the 11 orchards.

Yolo & Solano County Farm Advisor, Wilbur Reil conducted trials from 1992 – 1996 in a drip-irrigated orchard where he reduced his irrigation by 50% for 2-4 weeks starting when the first blank nuts started to split. Over the five year trial period, the number of shoots killed from hull rot were reduced by an average of 81% by imposing the mild water stress. Nuts remaining on trees after harvest were reduced by 71%.

A pressure bomb can be an ideal tool to monitor stress levels in the orchard. Prior to hull split, almond trees should be maintained between -6 to -10 bars. During the RDI period, stress levels should be maintained at -14 to -18 bars. After the RDI period, fully irrigate trees to reduce stress prior to harvest. If you are interested in learning how to use a pressure bomb, let me know and I can give you a demonstration at our office.

If you don't have a pressure bomb, you can use the "shoot from the hip" technique.

- Begin deficit irrigation when the first blanks begin to split (RDI should begin sooner in heavy soils with high water holding capacity, later in sandy soils).
- Reduce micro-irrigation to 50% of ET for 3-4 weeks (period may vary depending on speed of hull split).
- If orchard is flood-irrigated, extend dry period 4-5 days longer than usual. Do this for two irrigation cycles. Be careful, flood-irrigated trees can go from moderate to severe stress very quickly.

Points to remember:

- Trees that are already stressed from inadequate irrigation will not benefit from RDI
- We want moderate stress, not excessive stress that will lead to defoliation or increased sticktights.
- Return to full irrigation before harvest
- Do not stress trees post-harvest