

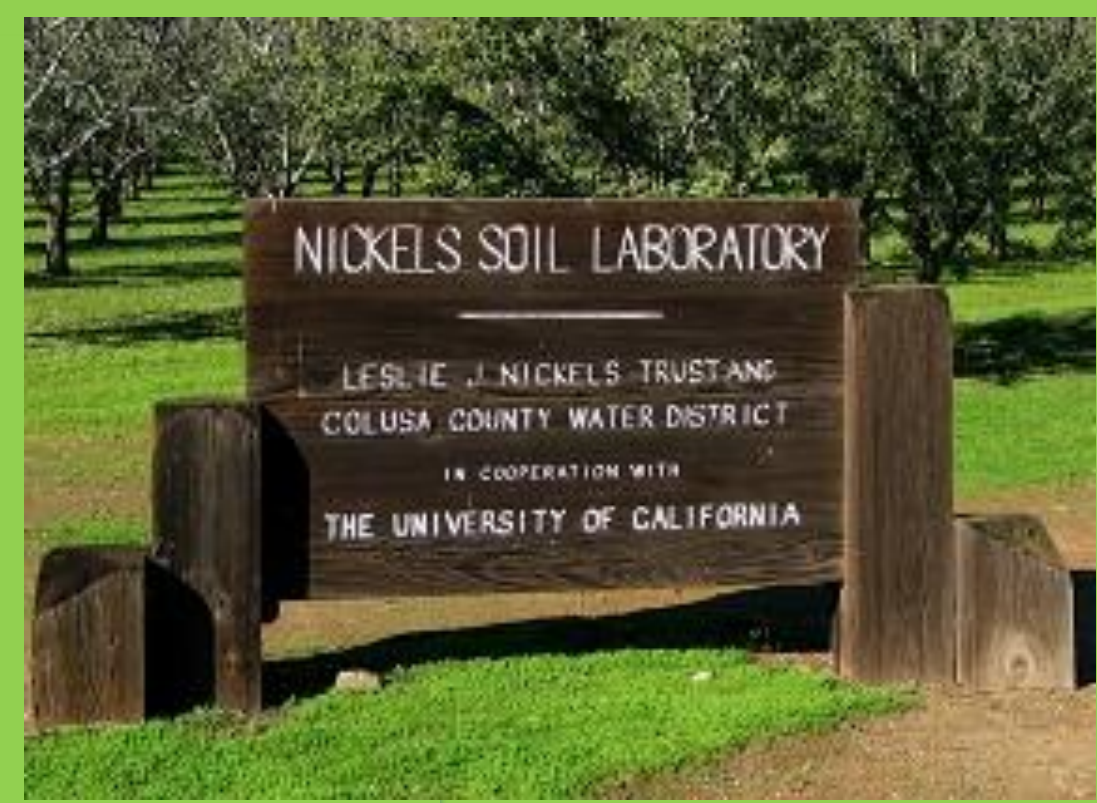


Concealed Damage Field Studies

Nickels Soil Lab/University of California Project

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Objectives: To test the role of different field conditions and practices on the development of concealed damage (CD) in the Monterey variety. The field work was conducted at the Nickels Soils lab during the 2011, 2012, and 2013 harvests and coordinated with ongoing studies led by Alyson Mitchell at Food Science and Technology, UC Davis. Results to date from 2013 work are presented here.

Materials and Methods: 2013

As in 2012, no rain fell before or during the 2013 study and drying weather was good to excellent. Five, 750’ rows (each) of Monterey variety on Brights seedling rootstock were used in this year, instead of small scale, artificial windrows in plastic laundry baskets used in the 2012 work. Monterey variety (17th leaf) trees were shaken (September 25), and allowed to begin to dry on the soil surface at the Nickels Soil Lab near Arbuckle, CA. Field trees treatments are shown in Table 1, and included a range of practices intended to improve nut drying conditions after rain. Nuts were wet twice (0.5” of irrigation water each time) after shaking (Figure 1) but before windrowing. A full inch of rain was applied in two separate 0.5” applications one day apart after windrowing. Kernel and hull moistures were measured at least weekly through October (Figures 2 and 3). Nuts were picked up on Nov 1 after a month on the ground placed in small stockpiles in an effort to mimic field stockpiling practices. Nuts will be left in stockpiles, covered if rain threatens, into December and then hulled, shelled and stored until January when they will be heated (roasted or blanched) and evaluated for concealed damage.

Table 1. 2013 concealed damage trial treatments.

Treatments	0.5” water (9/30)	Roll nuts	0.5” water (10/6)	Condition	1.0” water (10/14)	Condition	Condition
1	X	X	X	X	X	X	X
2	X	X	X	X	X		
3	X		X	X	X	X	X
4	X	X	X		X	X	X
5	X		X		X	X	X
6	X		X		X		

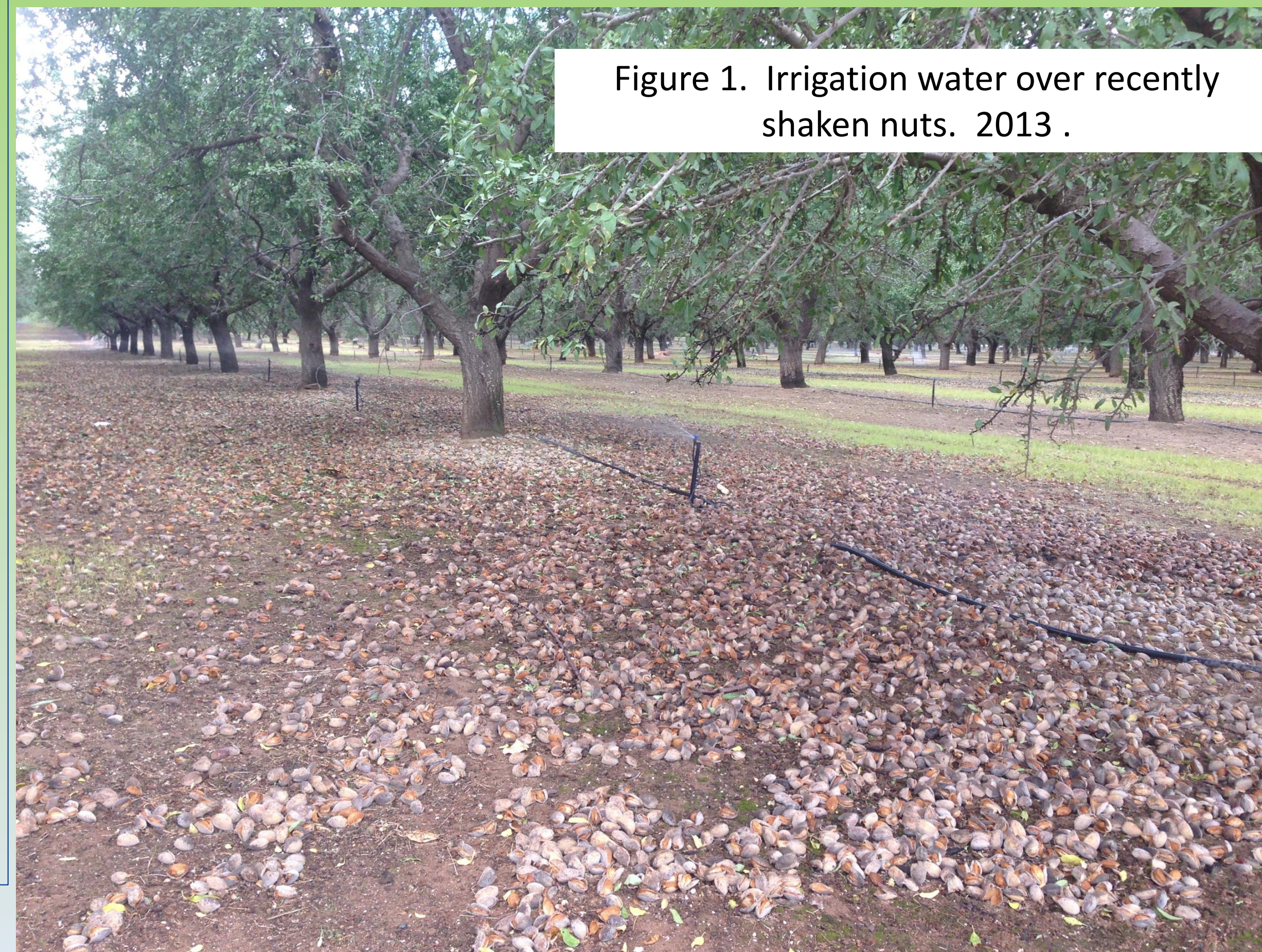


Figure 1. Irrigation water over recently shaken nuts. 2013 .

Figure 2. Hull moisture (%) in 2013 study nuts between harvest and pickup.

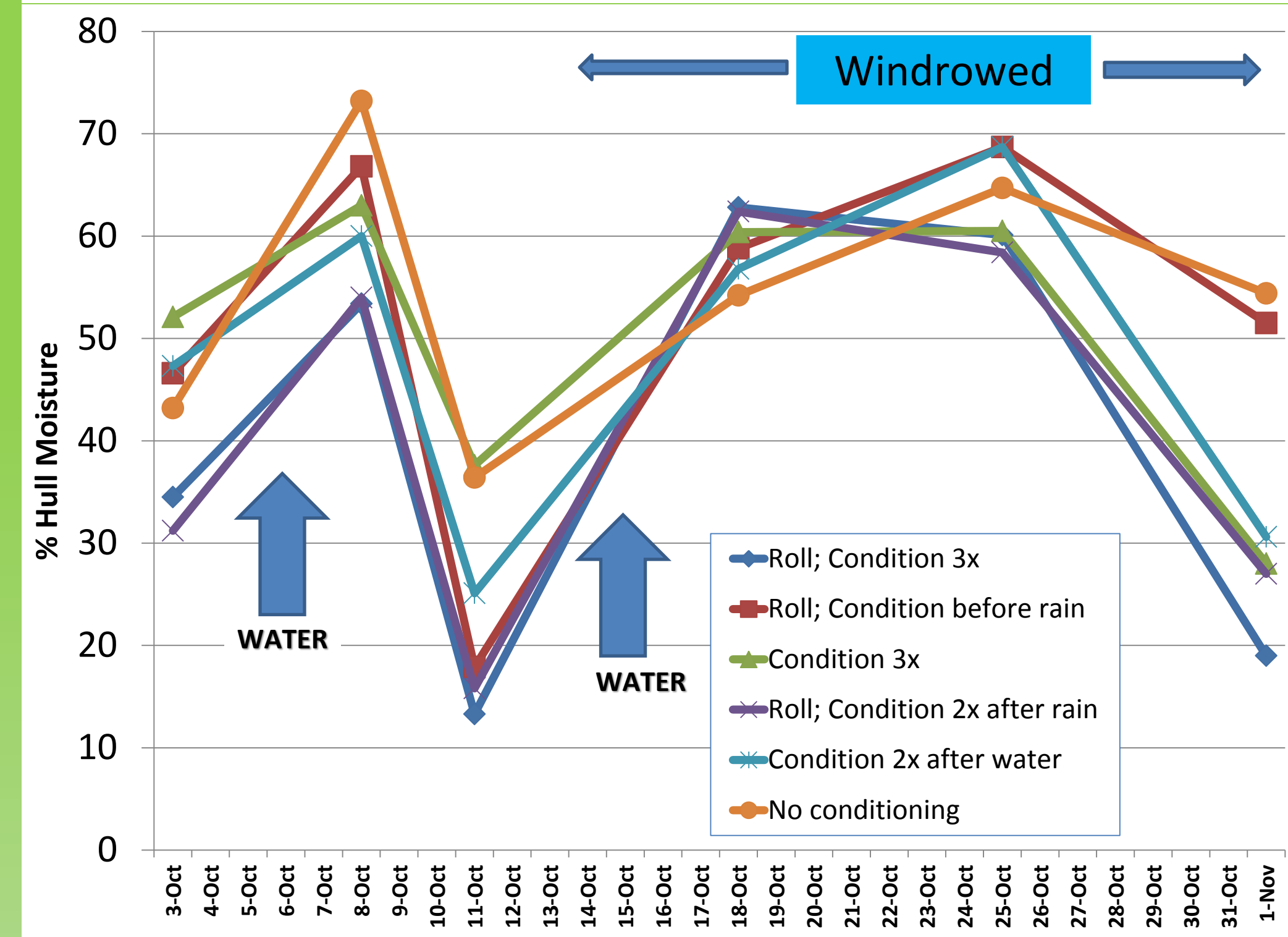
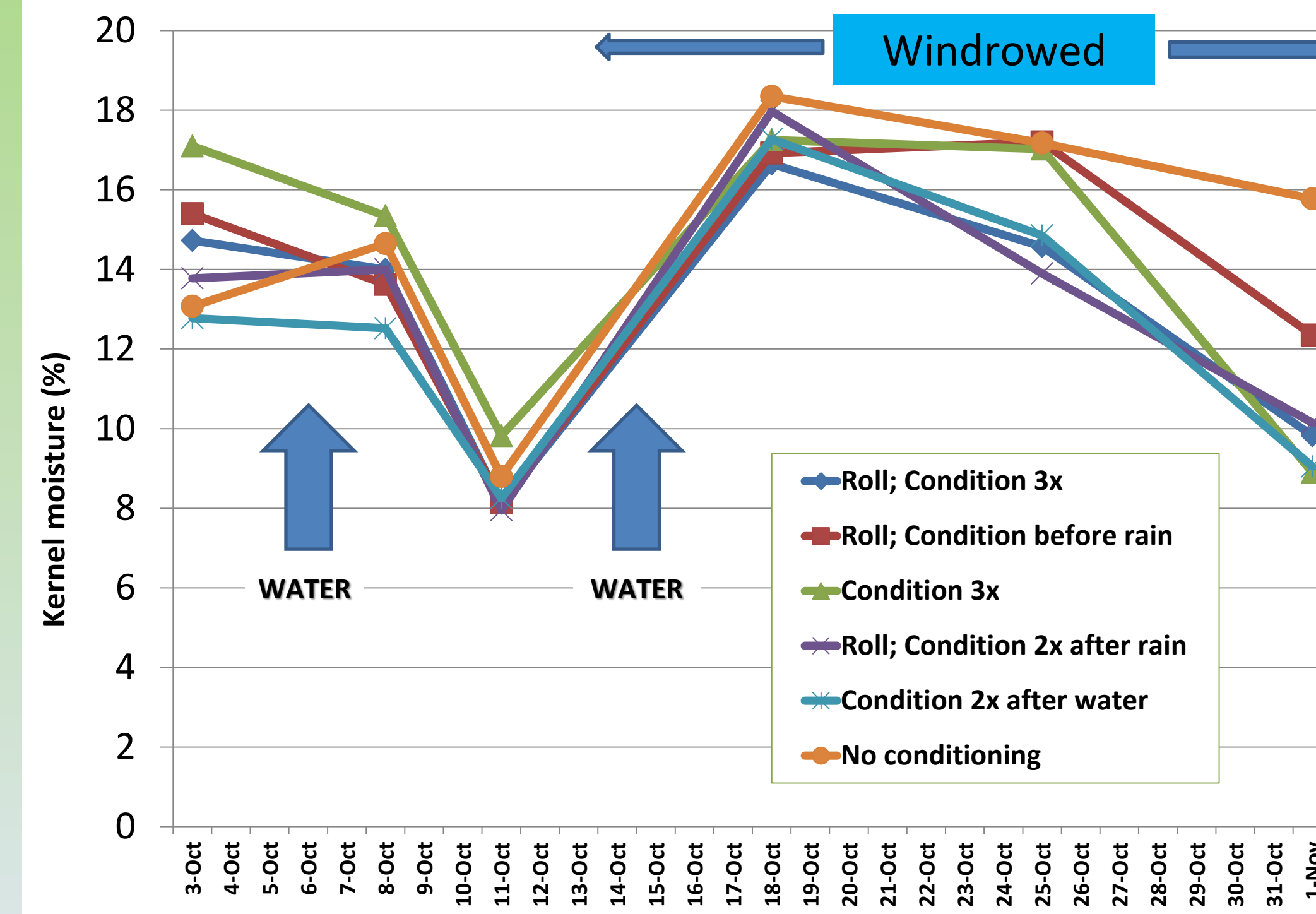


Figure 3. Kernel moisture (%) in 2013 study nuts between harvest and pickup.



Results:

Despite three “rain events” that delivered a total of 2” of water to the fallen nuts, good drying conditions helped nuts dry rapidly, especially those conditioned after windrowing (Figures 2 and 3).

At pickup on Nov 1, only nuts from treatment 6 (unconditioned and unrolled) measured a significantly higher ($p < 0.05$) moisture level – hulls and kernels – than the nuts in treatment 1 that were rolled once and conditioned 3 times. Nuts conditioned before wetting in the windrows also tended to have a higher moisture content than nuts conditioned after wetting in the windrows.

Considerable variability in kernel and hull moisture existed within treatments and this made it difficult to establish significant treatment differences.

Stockpiled nuts will be processed later this month.

Conclusions to date:

Over the 3 years of this study, nuts conditioned after wetting consistently dried the fastest of all nuts – regardless of whether they were also conditioned before wetting.

Conditioning before wetting can help reduce drying time by removing dirt and trash that traps water in the windrow. But post-rain conditioning makes the biggest difference in drying time.

Nut moisture can differ considerably across an orchard depending on tree size, croplod and canopy condition (leaves dropped at harvest).

Weeks of moisture appear to be required to produce significant amounts of concealed damage if nut temperatures remain low (<80°F).