

**Early season nutrient applications for management of hazelnut kernel mold, 2023.**

The objective of this trial was to determine if early spring applications of foliar applied nutrients could result in less kernel mold at harvest. A block of 2 hazelnut breeding selections (379.050 and 391.001) planted in 1994 on a 13 x 17.5 ft spacing at the Botany and Plant Pathology Field Laboratory, Corvallis, OR was selected for this trial due to a consistent high production of moldy kernels. Treatments were arranged in a randomized factorial design. Foliar applied nutrient treatments were applied to 4 single-trees in each breeding selection. Foliar applied nutrient treatments were applied using a Stihl SR 450 backpack mister such that 14 L (3.7 gal) of a spray suspension was applied per 4 trees (176 gal/A). Treatments were applied on 29 Mar (bud break, BBCH 9), 14 Apr (BBCH 13), 28 Apr (BBCH 14), 12 May (BBCH 691), 25 May (BBCH 710) and 8 June (BBCH 710) for a total of 6 applications. Trees were lightly pruned to remove dead and overlapping branches on 21 Dec 2022. Suckers were cut by hand on 15 May, 5 Jul, and 3 Aug 2023. The orchard floor under trees was raked and prepared for nut drop (“floated”) on 31 May and 7 Aug, then flailed on 11 Jul and 9 Aug to remove old nuts, blanks, dead weeds and twigs. For the management of weeds, the following herbicides were applied as a general and/or spot treatment; GlyStar Plus (3%) was tank mixed with Galigan 2E (2 pt/A) and applied on 2 May and GlyStar Plus (4%) was applied on 19 Jul. Intrepid 2F (14 fl oz/A) was applied on 7 Jul for filbert worm management. Nuts were allowed to fall naturally onto bare soil. A total of 400 nuts were collected from under each tree on 12 Sept for both selections. A set of 200 nuts from each tree of each selection was cracked open and evaluated for kernel defects from 13 to 26 Sep. Another set of 200 nuts from each tree of each selection was rinsed with tap water, rinsed with 10% bleach (Clorox), rinsed again with tap water then incubated on wet orchard soil within moist chambers where nuts were always in contact with wet soil. Orchard soil was collected dry from the field and allowed to sit open in a greenhouse exposed to ambient temperature (60-77°F) and low humidity. This air-dried soil was placed into moist chambers and saturated by adding water until visibly saturated. After 2 weeks incubation in the greenhouse, nuts were rinsed and allowed to air dry for several hours, then cracked open with a hammer and evaluated for kernel defects. Scoreable “mold” included any kernel with visible mycelial growth.

Rainfall during the dormant season (Oct 2022 to March 2023) was 3.18 inches below normal. Spring weather conditions were normal to dry in April and the first week of May but then became very dry with little rainfall for the remainder of the season. There was no interaction between the cultivar and fungicide factors, which allowed pooling of the data to test for main effects. The selection 379.050 had significantly less kernel mold than selection 391.001 at harvest and after incubation on wet soil for 2 weeks. There were no significant differences in kernel mold between nutrient treatments at harvest or after incubation on wet soil for 2 weeks. No phytotoxicity was observed in any of the treated trees.

Factor	Kernel Mold Incidence (%)*		
	Harvest (12 Sep)	After 2 weeks on wet soil - greenhouse	After 2 weeks on wet orchard soil
<b>Breeding Selection</b>			
379.050.....	14.6 b	26.3 b	
391.001.....	27.9 a	41.5 a	
<b>Nutrient Treatment &amp; Rate/100 gal</b>			
Non-treated.....	19.7	33.1	31.7
Sil-Matrix at 1 gal/100 gal.....	24.2	35.8	
Calcium Nitrate at 5 lb/100 gal.....	19.8	32.8	

\* Means followed by the same letter do not differ significantly based on Fisher’s protected LSD ( $P=0.05$ ). Means without letters are not different.