HAZELNUT (*Corylus avellana*)
Kernel Mold; *undetermined fungi*

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Early season nutrient applications for management of hazelnut kernel mold, 2024.

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. The same trial with the same treatments described below was conducted the prior year on the exact same trees. 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 7 L (1.85 gal) of a spray suspension was applied per 4 trees (88 gal/A) for the first three applications, while 8.75 L (2.31 gal) of a spray solution was applied per 4 trees (110 gal/A) for the four succeeding applications. Treatments were applied on 23 Feb (bud break, BBCH 9), 8 Mar (BBCH 9), 20 Mar (BBCH 12), 4 Apr (BBCH 13), 20 Apr (BBCH 14), 3 May (BBCH 14), and 16 May (BBCH 14/BBCH 691-695) for a total of 7 applications. Trees were lightly pruned to remove dead and overlapping branches on 19 Dec 2023. Suckers were cut by hand on 22 Apr, 24 Jun, and 5 Aug 2024. The orchard floor under trees was raked and prepared for nut drop ("floated") 5 Aug 2024 then flailed on 16 Aug 2024 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 (5.2 oz/gal) was applied on 18 Mar, Ranger Pro (4 fl oz/gal) was applied on 18 Jun, Lifeline (1.7 fl oz/gal) and Stinger (0.25 oz/gal) were applied on 30 Jul. Intrepid 2F (14 fl oz/A) was applied on 12 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 4 Sept for both selections. A set of 200 nuts from each tree of each selection was cracked open and evaluated for kernel defects from 9 to 12 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 (54-91^{o}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 4.1 inches above normal while spring weather conditions were close to long term norms. 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 more kernel mold than selection 391.001 at harvest, but there was no significant difference 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. There was also no significant differences in any other kernel defect between nutrient treatments as well (data not shown). No phytotoxicity was observed in any of the treated trees.

Factor	Kernel Mold Incidence (%)*	
	Harvest (4 Sep)	After 2 weeks on wet soil - greenhouse
Breeding Selection		
379.050……	17.1 a	28.7
391.001……	9.3 b	24.6
Nutrient Treatment & Rate/100 gal		
Non-treated……..	12.4	24.4
Sil-Matrix at 1 gal/100 gal……..……..…	13.9	30.3
Calcium Nitrate at 5 lb/100 gal……	13.2	25.4

* 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.

Notes: Post harvest conditions were not very wet and thus did not significantly increase mold counts in these breeding selections. Defect counts from a nearby mature Jefferson orchard had mold at 3% which we could increase to 17% when incubated for 2 weeks on wet soil. Defect counts from a nearby young Santiam orchard had mold at 11% which we could increase to 52% when incubated for 2 weeks on wet soil.