

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

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Early season fungicide use for management of hazelnut kernel mold, 2019.

The objective of this trial was to determine if early spring applications of fungicide could result in less kernel mold at harvest. A block of 4 hazelnut breeding selections (379.050, 380.057, 385.013, and 391.001) planted in 1994 on a 10 x 20 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 complete block design. Fungicide treatments were applied to 4 single-trees in each of 2 hazelnut breeding selections (379.050 and 391.001). The fungicide Luna Tranquility was tested on both selections at different application times. Fungicide treatments were applied using a Stihl SR 450 backpack mist blower such that 0.5 to 1 gal (109 to 218 gal/A) of a spray suspension was applied per tree before and after bud break, respectively. Treatments were applied on 16 Jan (75% bloom for 379 and pre-bloom for 391), 30 Jan (full bloom for 379 and 25% bloom for 391), 13 Feb (post-bloom for 379 and 75% bloom for 391), 1 Mar (post-bloom for 379 and full bloom for 391), 15 Mar (all bud swell), 29 Mar (all bud break), 18 Apr (1-2 leaves out) and 1 May (shoot elongation). Trees were fertilized with 46-0-0 at a rate of 0.5 lb/ tree on 8 Apr just before flooding. Suckers were cut by hand and trees were lightly pruned to remove dead and overlapping branches on 7 Jul. The orchard floor under trees was raked and prepared for nut drop ("floated") on 1 to 2 Aug to remove old nuts and flood debris. Weeds were sprayed with Makaze (32 fl oz/A) on 18 Mar and then Rely 280 (56 fl oz/A) on 24 May. There were no applications of insecticides in this block during the trial. Nuts were allowed to fall naturally onto bare soil. A total of 400 nuts were collected from under each tree on 24 Sep for 379.050. Due to low nut set an average of 259 nuts (ranging from 187 to 400) were collected from each tree on 18 Sep for 391.001. A set of 200 nuts from each 379.050 tree and an average of 122 from each 391.001 tree was cracked open and evaluated for kernel defects within a week after harvest. Another set of 200 nuts from each 379.050 tree and an average of 137 from each 391.001 tree was incubated on wet orchard soil within moist chambers where nuts were always in contact with wet soil. Orchard soil was collected from the field and dried by allowing it to sit open in a greenhouse exposed to ambient temperature (60°F) and low humidity. This air-dried soil was placed into moist chambers and saturated by adding water until visibly saturated. Moist chambers were then carefully tipped onto their sides to pour off any excess water. After 2 weeks incubation at ambient room temperature, nuts were cracked open with a hammer and evaluated for kernel defects. Scoreable "mold" included any kernel with visible mycelial growth.

Rainfall for the growing season (Oct 2018 to Sep 2019) was approximately 5 inches below the 115 yr average but temperatures were at the average of 59.2°F. March precipitation was 3 in below normal while April was 3 in above normal which led to localized flooding from April 9 to 16 through the middle of the orchard. September precipitation of 3.31 inches was 1.86 inches above normal. At harvest of selection 379.050 or once incubated on wet soil for 2 weeks, nuts from trees treated with Luna Tranquility after bud break had significantly lower kernel mold than nuts from non-treated trees or trees treated with Luna Tranquility during flowering prior to bud break. At harvest of selection 391.001 or incubated on wet soil for 2 weeks, there was no significant difference in kernel mold for nuts from treated or non-treated trees. No phytotoxicity was observed in any of the treated trees.

Hazelnut Selection and Treatment & Rate/100 gal	Time of Application*	Mold (% kernels)**	
		Harvest (24 Sep)	After 2 weeks on wet soil - lab
Hazelnut - Selection 379.050			
Non-treated.....	None.....	26.8 a	35.4 a
Luna Tranquility at 27 fl oz/100 gal..	A, B, C, D, E....	22.8 ab	33.4 ab
Luna Tranquility at 27 fl oz/100 gal..	F, G, H.....	17.5 b	27.1 b
Hazelnut - Selection 391.001		Harvest (18 Sep)	After 2 weeks on wet soil - lab
Non-treated.....	None.....	15.6	34.1
Luna Tranquility at 27 fl oz/100 gal..	A, B, C, D, E....	14.6	32.5
Luna Tranquility at 27 fl oz/100 gal..	F, G, H.....	16.5	32.4

* Treatments were applied on A = 16 Jan (75% bloom for 379 and pre-bloom for 391), B = 30 Jan (full bloom for 379 and 25% bloom for 391), C = 13 Feb (post-bloom for 379 and 75% bloom for 391), D = 1 Mar (post-bloom for 379 and full bloom for 391), E = 15 Mar (all bud swell), F = 29 Mar (all bud break), G = 18 Apr (1-2 leaves out) and H = 1 May (shoot elongation).

** Means followed by the same letter do not differ significantly based on Fisher's protected LSD ($P=0.05$).