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

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Effect of orchard and autoclaved soil on kernel mold development, 2016.

The purpose of this trial was to determine the effect of soil moisture and sterility on the development of kernel mold in hazelnut.

Orchard soil was collected from the field and dried by allowing it to sit open in the laboratory exposed to ambient temperature and low humidity. Drying was accelerated by oven drying half the soil at 40°C for 16 hours, cooling back to room temperature for 4 hours and then mixing it back in with the rest of the soil. 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. Another set of moist chambers were set up in the same way but using autoclaved soil instead. Nuts from a commercial 'Lewis' orchard were mechanically harvested on 15 Sep 16, placed into gunnysacks and stored at 40° F. Nuts were surfaced sterilized with 10% bleach for 1 min and allowed to air dry at ambient room temperature (65° to 70°) on paper towels. Nuts were then placed into plastic moist chambers onto a 4 inch layer of either orchard soil or autoclaved soil. Although nuts were in a single layer, many were touching each other. Nuts were incubated for 14 days on orchard or autoclaved soil within moist chambers either dry (with lids off and open to the room) or wet (lids on with water saturate soil). Nuts were always in contact with either air-dried or wet soil. Sets of 200 nuts per moist chamber were replicated 8 times for each of 4 treatments for a total of 1,600 nuts per treatment. The experiment was repeated twice. 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.

A significant interaction term between soil and wetness factors meant each combination had to be analyzed separately, as indicated below, rather combining factors. Lowest mold was associated with nuts incubated on either orchard or autoclaved soil that was kept dry. Highest mold was associated with wet orchard soil and was significantly higher than mold found on nuts incubated on either air-dried soil or wet autoclaved soil. Wet autoclave soil had significantly less mold develop than wet orchard soil. These results indicated that not only is wet soil important for mold development but fungi already in the nut are also very important.

Treatment [Z]	Mold (%)[Y]	
	Experiment 1	Experiment 2
Orchard Soil - Dry	4.6 c	5.1 c
Orchard Soil - Wet	41.4 a	48.5 a
Autoclaved Soil - Dry	4.0 c	3.6 c
Autoclaved Soil - Wet	20.6 b	38.1 b

[Z] Orchard Soil Dry = nuts were incubated on air-dried soil with moist chamber lids off; Orchard Soil Wet = nuts were incubated on water saturate soil; Autoclaved Soil Dry = nuts were incubated on air-dried sterile soil with moist chamber lids off; Autoclaved Soil Wet = nuts were incubated on water saturate sterile soil.

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

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