Evaluation of Simulated Hail Damage to Peppermint in Central Oregon, 2003

Marvin Butler, Mark Zarnstorff, Claudia Campbell, and Macy Farms

Abstract

This is the third year of a multi-year study to determine the effect of simulated hail damage on oil yield of peppermint. Damage levels were 33, 67, and 100 percent inflicted 17 and 35 days before harvest. There was a yield loss for all levels of damage inflicted both 17 and 35 day prior to harvest. The amount of oil per biomass was increased by all treatments 35 days prior to harvest and by 33 percent damage 17 days prior to harvest.

Introduction

Peppermint oil production has historically been an integral part of agriculture in central Oregon. In recent years there has been a decline in acreage due to reduction in price from an over supply of peppermint oil. Locally there is also an increasing amount of verticillium wilt that persists in the soil and reduces yields. The objective of this project was to determine the impact of hail damage timing and severity on peppermint grown for oil. This information will assist the National Crop Insurance Service in developing methodology to evaluate hail damage on peppermint.

Methods and Materials

This is the third year of a multiple year evaluation on the effect of simulated hail damage to peppermint grown for oil. The study was conducted in a commercial first-year field under solid-set sprinklers near Culver, Oregon. Plots were 5 ft by 10 ft, with 3-ft alleyways, replicated three times in a randomized complete block design.

Variables established for this study included three treatment timings and four levels of damage. Projected timing of damage was 6, 4, and 2 weeks prior to harvest, with the actual timing being 37 and 17 days prior to harvest. Severity of damage included 33, 67, and 100 percent damage, compared to undamaged plots.

A Jari mower was used to cut 3-ft alleyways across the front and back of each row of plots on July 14. Treatments were made on July 14 and August 1 using a battery-powered hedger to remove either one-third of the growth, two-thirds of the growth, or all but the bottom 3 inches of growth. A weed eater held on edge and running slowly was used to damage the remaining foliage at the same rate as the growth reduction applied to each plot. A 40-inch by 10-ft portion from the center of each plot was harvested with a plot-sized swather August 16, just prior to commercial harvest of the field. The oil was distilled at the Oregon State University Crop and Soil Science’s Hyslop Farm in Corvallis.

Results and Discussion

The earlier the damage and the less severe the damage, the more time the crop had to recover before harvest (Table 1). There were statistical differences in oil yield and biomass harvested between the untreated control and all damaged plots. However, biomass was reduced to a greater degree than oil yield. This is indicated by the increase in oil per biomass by 10-19 percent for the three damage treatments 35 days prior to harvest. From visual observation it would appear that this is the result of increased numbers of leaves on the new growth following the simulated hail damage.

The most significant factor one should consider when evaluating a reduction in oil yield is the time between the damage event and harvest. The longer one can postpone harvest, the more time the crop has to recover. However, the later in the season the damage occurs the more weather limitations there are to providing adequate time for the crop to recover. It appears that biomass following damage does not have to fully recover to get the same yield as undamaged mint, as indicated by increased oil per biomass in damaged plots.

Table 1. Simulated hail damage on peppermint grown for oil with damage inflicted 35 and 17 days prior to harvest on August 16, 2003, near Culver, Oregon.

Hail damage		Oil yield			Oil / biomass			Biomass	
% damage	days before harvest	--lb/acre--		% check	--lb/t--		% check	--t/acre--	
0	---	55.0	a[1]	100.0	7.2	b	100.0	7.6	a
33	35	39.0	b	70.9	8.0	ab	110.4	4.9	b
67	35	25.2	c	45.8	8.5	a	118.2	3.0	b
100	35	18.2	c	33.0	8.6	a	119.1	2.1	b
33	17	26.3	c	47.8	7.6	ab	105.3	3.5	b
67	17	8.0	d	14.6	5.6	c	77.0	1.4	b

[1] Mean separation with Least Significant Difference (LSD) at $P \leq 0.05$.