

Effects of Foliar Fertilizers on Fungicide Efficacy on Pumpkins

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Interpretative Summary

The fungicide + HM 0102 treatment in the high management plots produced the highest number of marketable pumpkins and the highest fruit weight in the study. Fungicide + HM 0125 produced significantly lower fruit numbers and fruit weight. Low-management plots could not be sprayed when needed because of excessive rainfall.

Introduction

Pumpkins grown in West Tennessee are subjected to higher temperatures and relative humidity than in areas at higher elevation and are more vulnerable to foliar diseases. This study was conducted to determine the effects of foliar fertilizers in combination with two fungicides commonly used on pumpkins and to determine if fungicide efficacy was enhanced by tank-mixing the two materials.

Materials and Methods

The plot area at the West Tennessee Experiment Station was prepared by disking and smoothing with a spring-tooth harrow. Fertilizer was broadcast and incorporated at a rate of 530 lbs per acre of 15-15-15. Plots were 20 feet long and spaced 15 feet apart with plants two feet apart within the row. Seeds of 'Lil Goblin' pumpkin were planted by hand on July 19, 2002. Admire (imidacloprid) insecticide was applied as a drench to the seed before covering at a rate of 7 oz per acre (4.8 oz/1000 plants) and covered with a moistened potting mix containing vermiculite, peat, and perlite. The herbicide Curbit (ethalfluralin) was broadcast at a rate of 4 quarts per acre after planting and watered in with a center pivot irrigation system. Plants were thinned to one per hill after emergence.

The fertilizer materials used in the study were HM 0125 (an alkali metal bicarbonate) at 4.0 lb ac⁻¹, HM 9310 (a blend of ammonium sulfate, s-tetrahydrotriazone, urea, and water) at 4.0 pt ac⁻¹, and HM 0102 (a blend of potassium phosphide and soluble potassium derived from potassium hydroxide and phosphorous acid) at 3.0 pt ac⁻¹. The fungicides Quadris (azoxystrobin) at 15.4 fl oz ac⁻¹ and Equus (chlorothalonil) at 3.0 pt ac⁻¹ were alternated for each treatment date which was spaced about every 10 days as weather and soil conditions permitted. The first application of fertilizer/fungicide was made on 8 Aug. High-management treatment plots were sprayed four times at 10-day intervals beginning 20 days after planting. Low-management plots were not sprayed until either 60 days after planting or when foliar disease symptoms appeared. Plots were sprayed with a tractor-mounted sprayer at a pressure of about 40 psi and calibrated to apply 33 gallons of water per acre. Treatment dates following the 8 Aug

date were 20 Aug, 28 Aug, 9 Sept, and 19 Sept. Spraying of low-management plots was postponed until after formation of extensive foliar disease symptoms due to excessive rains and wet field conditions. These plots received only one fertilizer/ fungicide treatment.

Marketable fruit from the eight center plants in each plot were harvested on 2 Oct. Misshapen or rotten fruit were not included in the data. Sound fruit from each plot were counted and weighed. Mean fruit weight for each plot was calculated. Data were adjusted for missing plants and analyzed by appropriate ANOVA procedures for a randomized complete block design using SAS software.

Results and Discussion

We had a very high incidence of virus disease in the planting. Most plants and fruit showed symptoms of the virus with mottled and misshapen leaves and areas of green interspersed with dark orange color on the mature fruit. Almost all of the plants had foliar symptoms and few fruit developed without some green color on the skin. These virus diseases may have contributed to less yield and smaller fruit than normal.

The fungicide + HM 0102 treatment in the high management plots produced the highest number of marketable pumpkins and the highest fruit weight in the study (Table 1). Fungicide + HM 0125 produced significantly lower fruit numbers and fruit weight. Unfortunately, we were not able to begin application of fertilizer/fungicide treatments to the low management plots when foliar disease symptoms first appeared due to weather conditions. With the wet conditions and high humidity, the disease complex developed very rapidly on the low management plots and most foliage was destroyed by the time the second treatment was scheduled.

Table 1. Fruit number and yield per acre and mean fruit weight of pumpkins treated with a combination of Quadris and fungicides at two management levels, West Tennessee Experiment Station, 2002.

| Fungicide treatment | Management level | Fruit per acre | Yield (lbs/acre) | Mean fr wt (lbs) |
|----------------------------|------------------|----------------|------------------|------------------|
| Control | High | 4484ab | 4404ab | 0.99 |
| Quadris or Equus | High | 3990ab | 4146ab | 1.04 |
| Quadris or Equus + HM 9310 | High | 4413ab | 3897ab | 0.93 |

| | | | | |
|---|------|--------|--------|------|
| Quadrus or Equus + HM 0125 | High | 3007b | 2564b | 0.87 |
| Quadrus or Equus + HM 0102 | High | 5419a | 5143a | 0.94 |
| Quadrus or Equus + HM 0125 + HM 0102 | High | 3616ab | 3180ab | 0.88 |
| Quadrus or Equus + HM 9310 + HM 0125 + HM 0102 | High | 3942ab | 3965ab | 0.93 |
| Control | Low | 4522ab | 4225ab | 0.90 |
| Quadrus or Equus | Low | 3734ab | 3171ab | 0.87 |
| Quadrus or Equus + HM 9310 | Low | 4175ab | 3695ab | 0.87 |
| Quadrus or Equus + HM 0125 | Low | 3385ab | 3561ab | 1.07 |
| Quadrus or Equus + HM 0102 | Low | 4424ab | 4297ab | 0.96 |
| Quadrus or Equus + HM 0125 + HM 0102 | Low | 2944b | 2882ab | 0.97 |

| | | | | |
|---|-----|--------|--------|------|
| Quadris or Equus + HM 9310 + HM 0125 + HM 0102 | Low | 5137ab | 4570ab | 0.89 |
|---|-----|--------|--------|------|

^zHigh management - Fertilizer/fungicide sprays applied approximately every 10 days

^yFruit number and yield adjusted for missing plants.

^xMeans followed by the same letter are not significantly different, Duncan's multiple range test, 5% level.

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This research represents one season's data and does not constitute recommendations. After sufficient data is collected over the appropriate number of seasons, final recommendations will be made through research and extension publications.