

Effect of Messenger® on Cantaloupe Growth Pattern and Yield

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Abstract

An experimental site was selected at Yuma Agricultural Research Center, University of Arizona, to evaluate the effect of Messenger on melon plant growth and yield. Four treatments in completely randomized block design replicated four times were applied to melon planted on 84-inch beds. High Mark open pollinated melon variety was planted on 3-20-2001 using a commercial planter. Treatments included Messenger applied at 3-leaf stage on 5-4-2001 Messenger applied every 14 days starting on 5-15, 5-29, 6-13, 6-27-2001, standard management practices and control. Observations collected included plant mapping and yield. Results were variable, showed no significant effect of Messenger on plant growth and yield. However, there was indication that Messenger may have an effect on plant growth pattern and yield. Messenger applied at 3-leaf stage and repeated applications seemed to induce an early melon formation, increased number of nodes and yield. It was not possible to make recommendation based on one-year results. Further investigation is needed to verify the results obtained from this experiment.

Introduction

Historically, Yuma County has been an important cantaloupe producing county. In 1945, 10,000 acres of cantaloupe were harvested in Yuma and La Paz counties, and about 20,000 acres in 1964. In 2000, 4000 acres of harvested cantaloupe generated \$35 million to Yuma County's economy (Arizona Agricultural Statistics, 1945-65 and 1989, 2000). Melon acreage is ranked fourth among vegetable crops after head lettuce, romaine lettuce and broccoli.

Cantaloupe is a profitable crop when all management practices are met. Among problems associated with melon production include powdery mildew (*Erysiphe cichoracearum*), fusarium wilt (*Fusarium oxysporum sp melonis*), plant vigor in early stage and vine decline (*Monosporascus cannonballus*) later. Reduction of light intensity induced by the development of dense plant canopy and moderate temperatures, and relative humidity in early spring, create a favorable environment for the development of diseases.

Messenger is a protein made of harpin aimed to enhance plant vigor improving the defense mechanism against diseases. It also increases yield and fruit quality. The research data evaluating the effect of Messenger on cantaloupe growth, yield and quality are limited. The objective of this investigation is to evaluate the effect of Messenger on plant growth and yield.

Materials and Methods

An experimental site was selected on Imperial-Glenbar-Hotville silt loam on Colorado flood plains to conduct the investigation. The field was previously cropped to lettuce. The experimental plots were prepared by several disking operations and laser leveled. Beds were shaped 84 inches wide and 50 feet long. High Mark open pollinated cantaloupe variety was planted on 3-20-2001 using a commercial planter. Cantaloupe was planted at 5-inch spacing, irrigated the following day, and subsequent irrigations were scheduled every three weeks. Plots were thinned on 5-3-2001 at 12-inch plant spacing for target melon population of 6600 plants per acre.

Four treatments were used in randomized complete block design (RCBD) replicated four times.

- 1 - Control
- 2 - Standard practices
- 3 - Messenger applied at 2.5 once per acre at 3-leaf stage on: 5-4-2001
- 4 - Messenger applied at 14 day interval at 2.5 once per acre each time on: 5-15, 5-29, 6-13, 6-27-2001

Treatments were dispensed in chlorine free water based on 20 gal/acre. Check plot was treated with chlorine free water only.

All plots received 200 lb N /acre and 100 lb P /acre, banded on 5-10-2001. Fungicides were applied to the check plot and to the standard plot with Quadras at 0.25 lb/A on 6-01-01. No fungicide was applied on Messenger treatments. Admire insecticide was applied one time only (foliar) to all plots for whitefly control on 5-15-2001. Weed control was performed by hand.

Observations made prior to the final harvest were collected from one bed and the final harvest data were collected from the second bed. Pre-harvest measurements were made based on three sub-samples per treatment to evaluate the number of vines per plant, number of nodes per vine, vine length, number of female flowers per vine and number of melons formed per plant. At harvest, total melons and total weight were evaluated. Marketable melons were collected three times on 6-27, 7-9 and 7-19, 2001 on ten linear feet per treatment and subject to variance analysis using GLM (SAS version 8).

Results

Plant growth

Messenger application and the date of its application did not have a significant effect on the number of melons formed, vine length and number of nodes. However, results reported in table 1 show that early application of Messenger at the 3-leaf stage seems to increase early melon formation and node formation. On the average when Messenger was applied at the early stage (3 leaves), 0.96 melons per vine and 0.60 melons resulted for the standard treatment on 5-31-2001, 10 weeks after planting. Similarly the number of nodes per vine was 20 for early Messenger application and 18.6 for standard treatment on 5-31-2001.

Harvest

Harvested melons were divided into various sizes 9, 12, 15, 18 and 21 as it is usually done in commercial fields. The results are shown on the top of the Figure 1. Data showed a significant effect of Messenger on melon size. However, the application of Messenger appeared to increase the production of medium size, 15 when Messenger was applied at 3 leaves. When Messenger was applied every fourteen days, melon size appeared to be evenly distributed. The results were variable. There was no clear explanation to this even distribution among sizes. Perhaps late treatment favored the continuation of melon growth and fruiting. It is not possible to make recommendations based on a one year and one location experiment. Further testing is needed for one or two years to verify these results.

Cantaloupe yield reported as pounds per acre and total melons per acre are reported in Figure 1 (bottom graph). There is no significant difference in yield expressed as pound per acre and number of cantaloupe per acre. However, there is a tendency toward yield increase due to one time application of Messenger at 3-leaf stage and repeated Messenger applications every fourteen days. These yield results confirm those obtained during early stage.

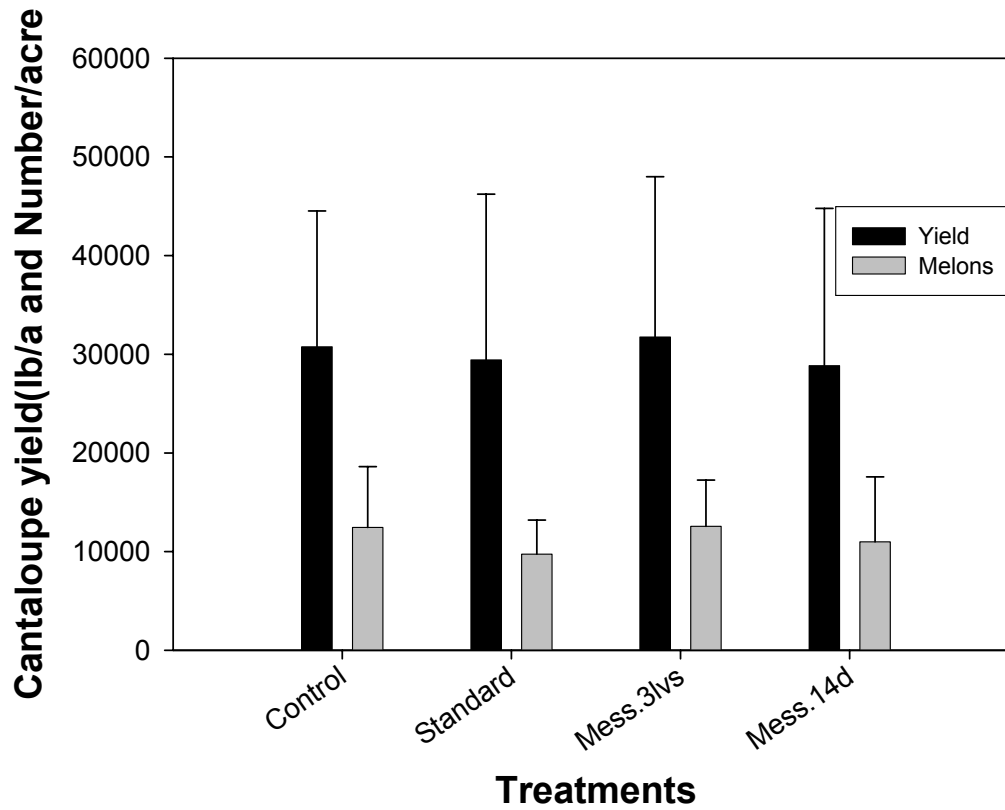
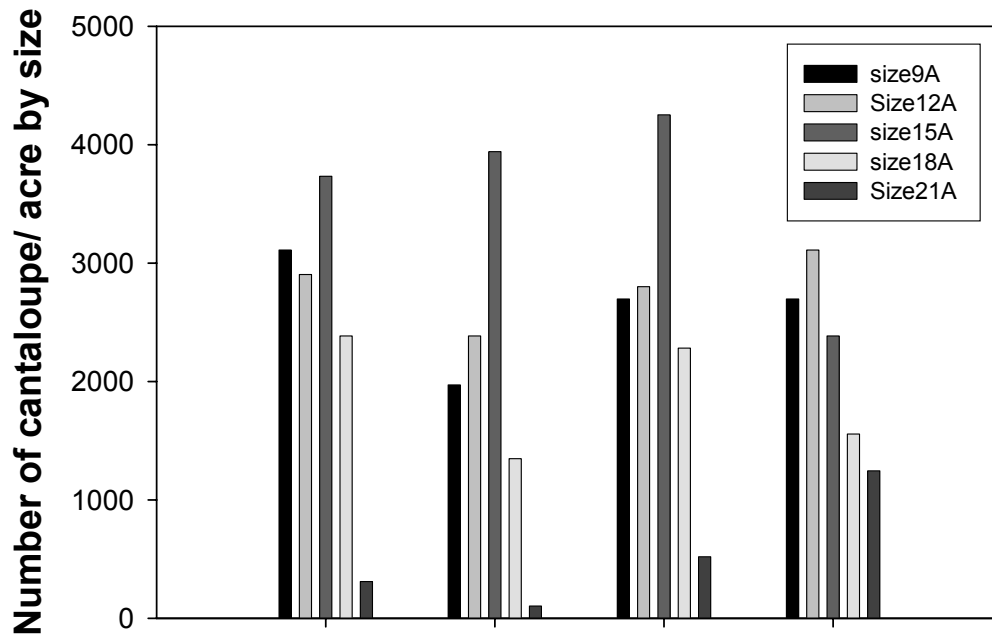


Figure 1. Number of Cantaloupe size 9, 12,15,18, 21 (above graph) and melon yield and number of melon per acre (bottom graph) as affected by Messenger applications at different growth stages at Yuma Agricultural Research Center, University of Arizona, 2001.

Table 1. Means of number of cantaloupe formed, vine length (inches) and number of nodes at 10 weeks from planting date as affected by treatments

Treatment	Cantaloupe Unit	Vine length Inch	Number of nodes
1 - Control	0.69 ab	48.9a	19.4ab
2 - Standard	0.60 b	47.9a	18.6b
3 - 3-leave stage	0.96 a	47.6a	20.0a
4 - 14 days Interval	0.75ab	45.4a	18.9ab

Means followed by the same letter are not significantly different from each other at 5% probability level.