

Messenger® Effect on Melons

Kai Umeda

Abstract

Messenger applied at three timely applications at early runner, bloom, and fruiting stages of watermelon versus bi-weekly applications, showed no significant statistical differences for vine length, number of blooms, or harvestable yields. Visual observations for the watermelon plant health at the end of the season tended to indicate that the three timely applications resulted in slightly more vigorous plants than the bi-weekly treated watermelon plants. Cantaloupe vine growth, number of fruit set, yield weight, and fruit size were not different between Messenger treatments and were not enhanced compared to the untreated check.

Introduction

Messenger® is a harpin protein product that when applied on crops, activates and enhances a plant's natural defense mechanism against pests, diseases, and stressful growing conditions. The protein also enhances the plant's growing systems to improve growth characteristics to improve yield quantity and quality. Melons grown in the desert conditions encounter extreme growing conditions from cold to high temperatures and insect and disease pressures. With the various stressful conditions imposed on melons crops, Messenger could offer some relief for melon plants to overcome these abnormal growing conditions. Field trials were conducted in cantaloupes and watermelons to evaluate multiple applications of Messenger to evaluate and determine efficacy in enhancing melon crop quality and/or yields.

Materials and Methods

The experimental field studies for watermelons and cantaloupes were conducted at the University of Arizona Maricopa Agricultural Center, Maricopa, AZ. Each of the tests was established with crops planted in single rows on raised beds with individual plots measuring 28 ft long in a randomized complete block design with four replicates. Melons were furrow irrigated season-long. All Messenger treatments were applied using a backpack CO₂ sprayer with a hand-held boom equipped with four 8002 flat fan nozzle tips spaced 20-in apart. The foliar sprays were applied in 25 gpa water pressurized to 30 psi.

Watermelon study. Watermelon cv. Sangria was hand-planted on 10 April 2001 on 40-inch beds and furrow irrigated. Messenger at 4.0 oz product/A was applied on watermelons at: 3 timely growth stages - early runner stage, first bloom, and first fruit set; and bi-weekly beginning at the 2-leaf stage. The 3 timely growth stages were applied on 18 May for the early runner stage, 06 June for the first bloom, and 13 June for fruit set (Table 1). The bi-weekly applications were applied on 09 May at the 2-leaf stage, 23 May at the early runner stage, 08 and 20 June. The corresponding weather and watermelon plant growth stages are described in Table 1.

Cantaloupe study. Cantaloupe cv. Topmark was planted on 12 April on every fourth 40-inch bed and furrow irrigated. Messenger at 4.0 oz product/A was applied on cantaloupes at: 3 timely growth stages - early runner stage, first bloom, and first fruit set; and bi-weekly beginning at the 2-leaf stage (Table 1).

Throughout the growing season and through harvest, various plant growth parameters were observed and measurements were collected.

Results and Discussion

Watermelon study. The hand-planted watermelon stand was established at 5.5 to 7.3 plants per plot (Table 1) and measurements for vine length, number of flowers, and fruit counts were adjusted per plant. For comparisons of Messenger applied at three timely applications at early runner, bloom, and fruiting stages of watermelon versus bi-weekly applications, no significant statistical differences were observed for the vine length, number of blooms, or harvest yields. Early season vine growth was increased slightly by one application of Messenger and reduced after two applications compared to the untreated check. The number of blooms was numerically more in the treated watermelons compared to the untreated check. Plant growth parameters were not evaluated after final applications. The total number of fruit harvested indicated that bi-weekly applications of Messenger resulted in producing almost 1 more harvestable fruit than the untreated and 2.5 more fruit than three timely applications of Messenger. Similarly, the total weight of watermelons harvested was highest for bi-weekly applications and lowest for the three applications. The rate of watermelon fruit setting showed that bi-weekly applications resulted in less fruit among the treatments and was less than the untreated check on 05 Jul at about 2 weeks after the last application (Figure 1). The three timely applications initially set slightly more fruit early but had the fewest at the last observation. The harvest was similar at the first picking date for all of the treatments (Figure 2). The highest yields were achieved on the second date for the bi-weekly applications. The three timely applications showed an increase in yield weight for each picking date but the yields were lower than the untreated check. No visual differences were strikingly noticeable among the treatments during the growing season until harvest. Visual observations for the watermelon plant health at the end of the season tended to indicate that the three timely applications resulted in slightly more vigorous plants than the bi-weekly treated watermelon plants. These observations were visible in three of the four replicates. The decline of the vines was primarily due to heavy whitefly infestations in all of the plots.

Cantaloupe study. The cantaloupe stand was established at 15.3 to 17.8 plants per plot (Table 3). Numerically, Messenger treated cantaloupes exhibited more blooms than the untreated check. Similarly, the vine length appeared slightly longer for treated cantaloupe compared to the untreated check on 29 May after one of the three timely applications and two of the bi-weekly applications (Figure 3). However, three days later, all of the vines measured were very similar at 13.3 to 13.8 inches. On three dates when the number of fruit set were counted, the treated cantaloupes had fewer or the same number as the untreated check (Figure 4). Similarly, at harvest, more fruit was harvested in the untreated check than the treated cantaloupes (Figure 5). The fruit size was not enhanced by the Messenger treatments on cantaloupes with the untreated check having slightly larger diameter fruit (Table 3).

For both watermelons and cantaloupes, no significant statistical differences were observed for early season vine growth, number of visible flowers, fruit set, and harvest yields. The Messenger treated watermelons exhibited some numerical differences in number of blooms, fruit set, and yield but the differences were not consistent with any treatment. Watermelon vines appeared to exhibit slightly different vigor among the treatments with bi-weekly treated vines appearing more vigorous than the plants treated three times or the untreated check. In cantaloupes, Messenger did not demonstrate any visible differences for plant growth or fruit yield. Numerous tests under a variety of growing conditions should be conducted to further ascertain if Messenger affects melon crop plant growth or yields.

Table 1. Messenger dates of application on cantaloupe and watermelon in 2001

Growth stage / scheduled timing	cantaloupe		watermelon	
3 applications early runner, 1 st bloom, 1 st fruit	23 May	10- 12 leaf, 92F, clear	18 May	6 - 10 leaf, 98F, 20% cloudy
	30 May	bloom, 89F, clear	06 Jun	bloom, 79F, clear
	06 Jun	fruit, 79F, clear	13 Jun	fruit, 79F, clear,
bi-weekly applications	09 May	2 leaf, 100F, clear	09 May	2 - 4 leaf, 100F, clear
	23 May	10 - 12 leaf, 92F, clear	23 May	16 leaf, 92F, clear 10 to 12
	08 Jun	24" vine, 90F, clear	08 Jun	42" vine, 90F, clear
	20 Jun	>72" vine, 86F	20 Jun	>72" vine, 86F

Table 2. Messenger effect on watermelon growth and production.

Treatment	Rate	Timing ¹	Stand count ²	Vine length	Blooms ³	Harvest	
			Jun 13	Jun 01	Jun 01	No. fruit	Total wt.
Untreated check			7.3	29.5	1.1	6.5	56.5
Messenger	4.0 oz/A	3 apps	5.5	32.7	2.0	4.8	44.3
Messenger	4.0 oz/A	bi-weekly	5.8	25.4	1.5	7.3	60.1
LSD (p=0.05)			2.33	9.92	1.44	7.55	66.92

¹Timing of applications: 3 applications at early runner, bloom, and fruiting stages of melons; 4 bi-weekly applications initiated at 2-leaf stage.

²Number of plants per plot

³Number of blooms per plant

Table 3. Messenger effect on cantaloupe growth and production.

Treatment	Rate	Timing ¹	Stand count ²	Blooms ³	Fruit size ⁴
			08 May	01 Jun	20 Jul
Untreated check			15.3	3.0	4.02
Messenger	4.0 oz/A	3 apps	17.8	4.4	3.91
Messenger	4.0 oz/A	bi-weekly	17.0	5.1	3.93
LSD (p=0.05)			6.53	3.04	0.38

¹Timing of applications: 3 applications at early runner, bloom, and fruiting stages of melons; 4 bi-weekly applications initiated at 2-leaf stage.

²Number of plants per plot

³Number of blooms per plant

⁴Fruit size as average diameter of individual fruits

Figure 1. Messenger effect on watermelon fruit set.

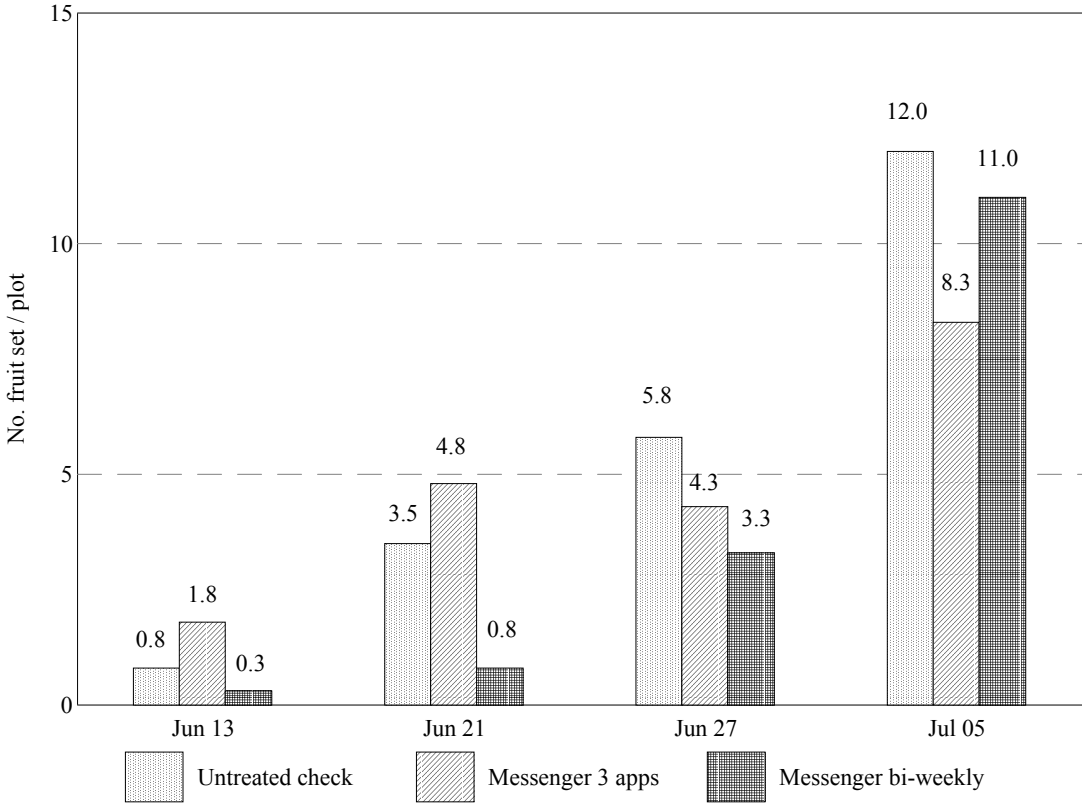


Figure 2. Messenger effect on watermelon yield

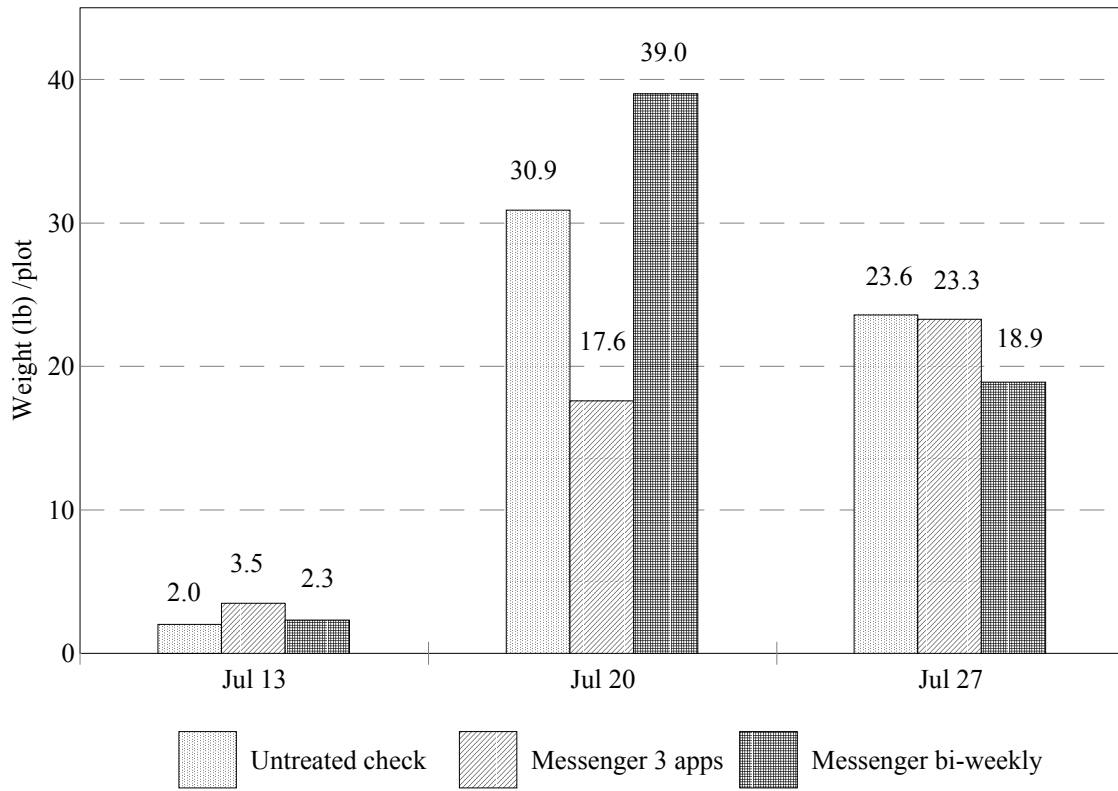


Figure 3. Messenger effect on cantaloupe vine length

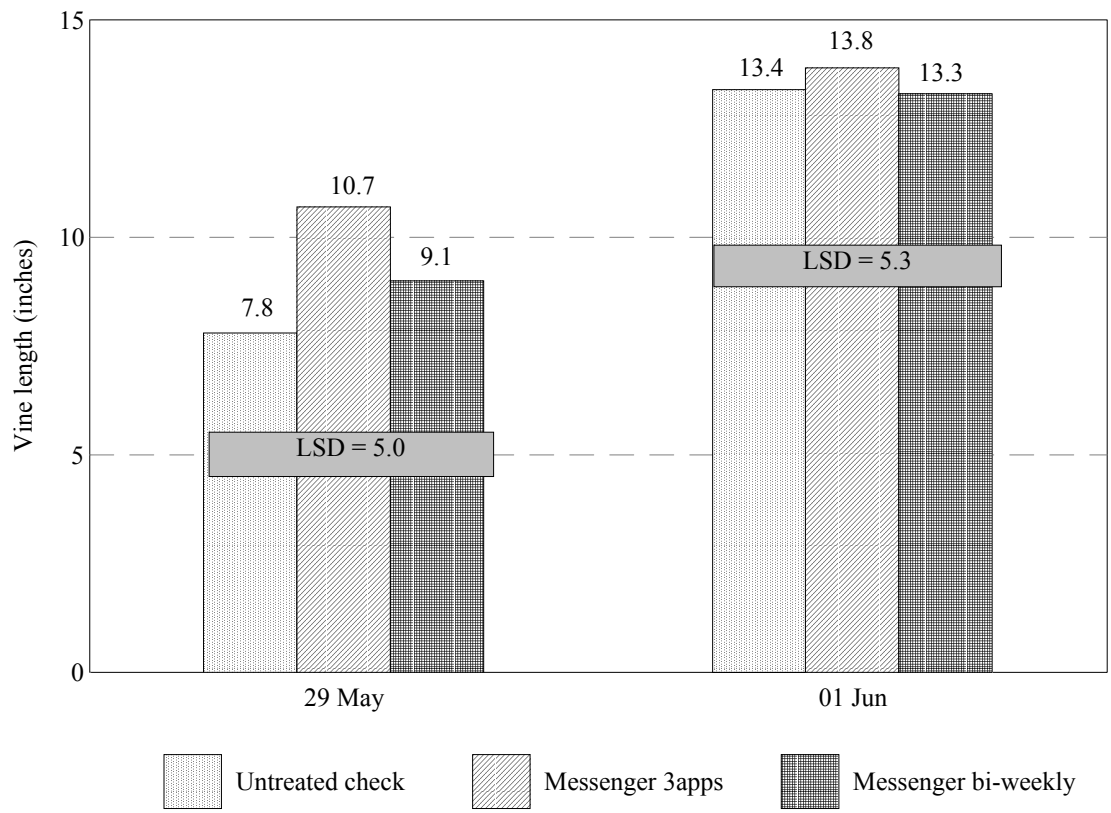


Figure 4. Messenger effect on cantaloupe fruit set.

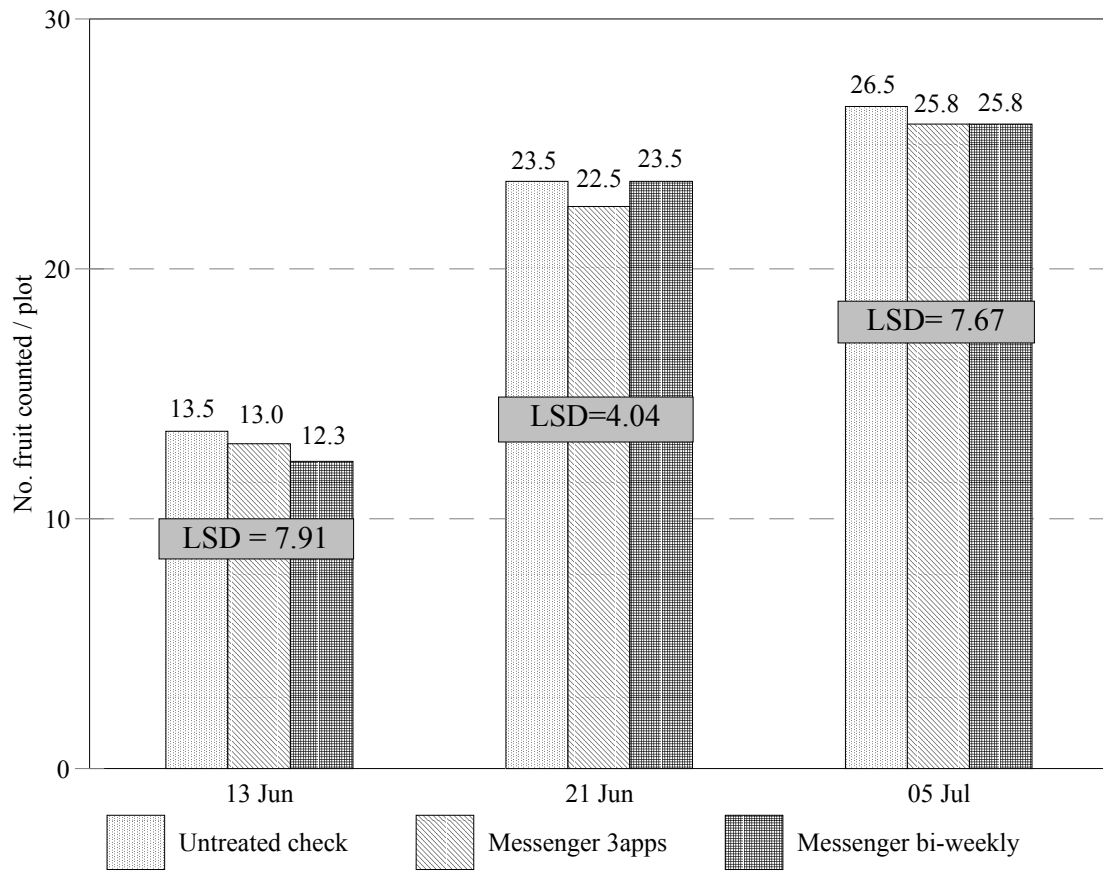


Figure 5. Messenger effect on cantaloupe yield

