

**THE INFLUENCE OF TIMING REGIMES ON COTTON
RESPONSE TO MESSENGER® IN LOUISIANA**
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Abstract

MESSENGER® (EDEN Bioscience Corporation) is a commercial product that contains Harpin Ea and has been shown to induce natural defense mechanisms in plants similar to those that would normally occur when a plant is attacked by diseases or insects. MESSENGER® has been shown to stimulate growth of cotton (*Gossypium hirsutum* L.) and, in some cases, increase yield. A trial was conducted in Northwest Louisiana to determine cotton response to MESSENGER® applied at 2.25 oz per acre at different cotton growth stages ranging from the 2-leaf stage to 3 weeks after first bloom. Although MESSENGER® has been reported to significantly increase cotton yields in recent studies, none of the application timing combinations in this study resulted in seed cotton or lint yields that were significantly different from the untreated control. MESSENGER® also had no significant effect on the total number of open bolls in 10 feet of row. MESSENGER® has also been reported to reduce the number of hard-lock bolls and, although significant differences were found among the different timing regimes in this study, none resulted in significantly lower number of hard lock bolls compared with the untreated control.

Introduction

MESSENGER® (EDEN Bioscience Corporation) is a commercial product that contains Harpin Ea, the naturally occurring protein derived from *Erwinia amylovora*. In plants, MESSENGER® induces natural defense mechanisms commonly referred to as systemic acquired resistance (SAR). In essence, application of MESSENGER® stimulates defensive biochemical reactions in a plant similar to those that would normally occur if it were under attack by diseases or insects. In addition, MESSENGER® has been shown to stimulate growth of cotton (*Gossypium hirsutum* L.) and, in some cases, increase yield (French, 2001). The objectives of this study were to examine the response of cotton yield and fruiting characteristics in response to MESSENGER® applied under different timing regimes.

Materials and Methods

This field study was conducted at the Louisiana State University Agricultural Center's Red River Research Station located in Northwest Louisiana. Four replications of Sure-Grow 501 BR were planted on May 9, 2001. Plots consisted of 6 rows, 45 feet in length spaced 40 inches apart. MESSENGER® was applied using distilled water as a carrier with a tractor-mounted CO₂ plot sprayer calibrated to deliver 20 gallons per acre. Applications of MESSENGER® at 2.25 oz per acre were made to the 4 center rows using the timing regime shown in Table 1. Immediately prior to harvest, 5 plants from each of the center 2 rows of each plot were selected for plant mapping. Plant height, number of nodes, and first and second-position fruiting forms (square, flower, green boll, open boll, rotten boll, hard-locked boll, or missing fruit) were recorded for each plant. Yield was determined by harvesting the center two rows of each plot with a spindle picker. Approximately 1 gallon of bolls were collected from each plot for determination of lint percentage and fiber analysis.

Results and Discussion

Seed cotton and lint yield response to 2.25 oz/A MESSENGER® applied at different timing regimes is shown in Figure 1. Although MESSENGER® has been reported to significantly increase cotton yields in recent studies (French, 2001), none of the application timing combinations in this study resulted in yield differences that were significantly different from the untreated control. MESSENGER® also had no significant effect on the total number of open bolls in 10 feet of row (Figure 2). MESSENGER® has been reported to reduce the number of hard-lock bolls (Wright et al., 2001) and, although significant differences were found among the different timing regimes in this study, none resulted in significantly lower number of hard lock bolls compared to the untreated control.

Plant mapping prior to harvest indicated that, although there were significant differences in first-position open bolls among the different MESSENGER® application regimes, these differences were not significantly different from the untreated control (Figure 3). MESSENGER® applications also did not significantly affect plant height or the plant height to node ratio compared to the untreated control (Figure 4).

References

French, N. 2001. MESSENGER® - Harpin Protein Use in Cotton Production. In: C. P. Dugger and D. A. Richter [eds.], Proceedings Beltwide Cotton Conferences, National Cotton Council of America, Memphis, TN. Vol. 1:49-57.

Wright, D. L., J. Marois, and P. Wiatrak. 2001. Effect of Rate and Timing, Row Spacing and Messenger on Hard Lock and Yield of Cotton. In: C. P. Dugger and D. A. Richter [eds.], Proceedings Beltwide Cotton Conferences, National Cotton Council of America, Memphis, TN. Vol. 1:596-598.

Table 1. Timing Regimes for Messenger Application.

Treatment No.	Messenger Application Timings at 2.25 oz/A				
	2-Leaf Stage	Pinhead Square	Pinhead Square + 2 Weeks	First Bloom	First Bloom + 3 Weeks
1	X	X	X		
2	X	X		X	
3	X			X	X
4		X	X	X	
5		X		X	X
6			X	X	X
7	X	X	X	X	
8	X	X		X	X
9		X	X	X	X
10	X	X	X	X	X
11					

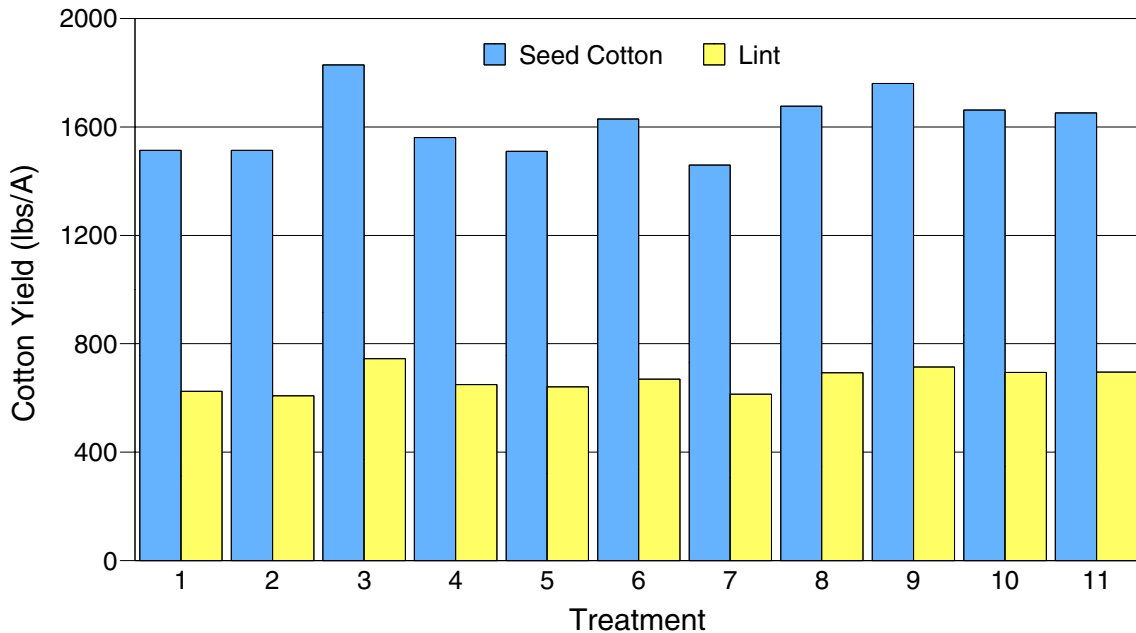


Figure 1. Seed cotton and lint yield response to Messenger® applied at different timing regimes. There were no significant difference in either seed cotton or lint yield among the different timing regimes.

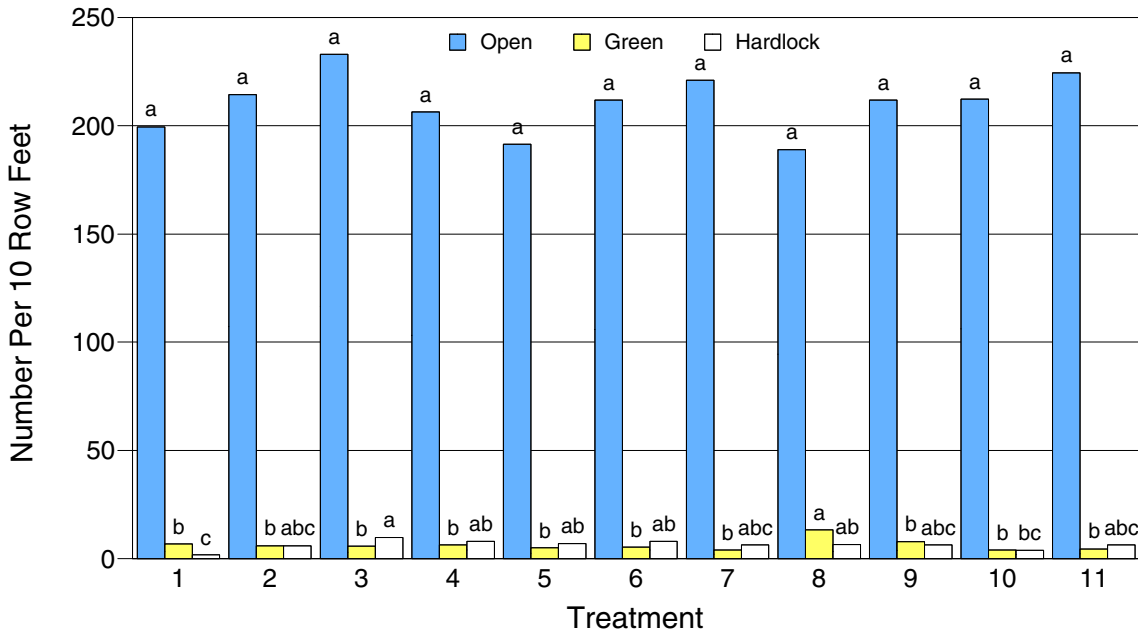


Figure 2. The effect of different Messenger[®] timing regimes on the number of open, green, and hard lock bolls in 10 feet of row. Bars within a boll type category followed by the same letter are not significantly different (DMRT, P ≤ 0.05).

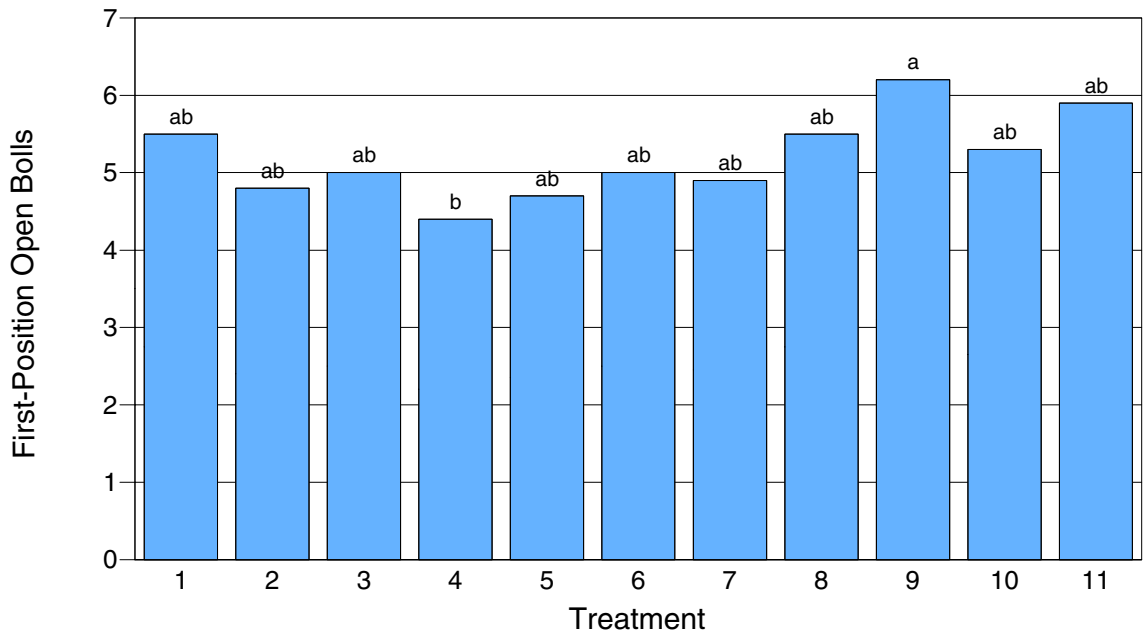


Figure 3. Effect of Messenger[®] applied at different timing regimes on the number of first-position open bolls per plant. Bars followed by the same letter are not significantly different (DMRT, P ≤ 0.05).

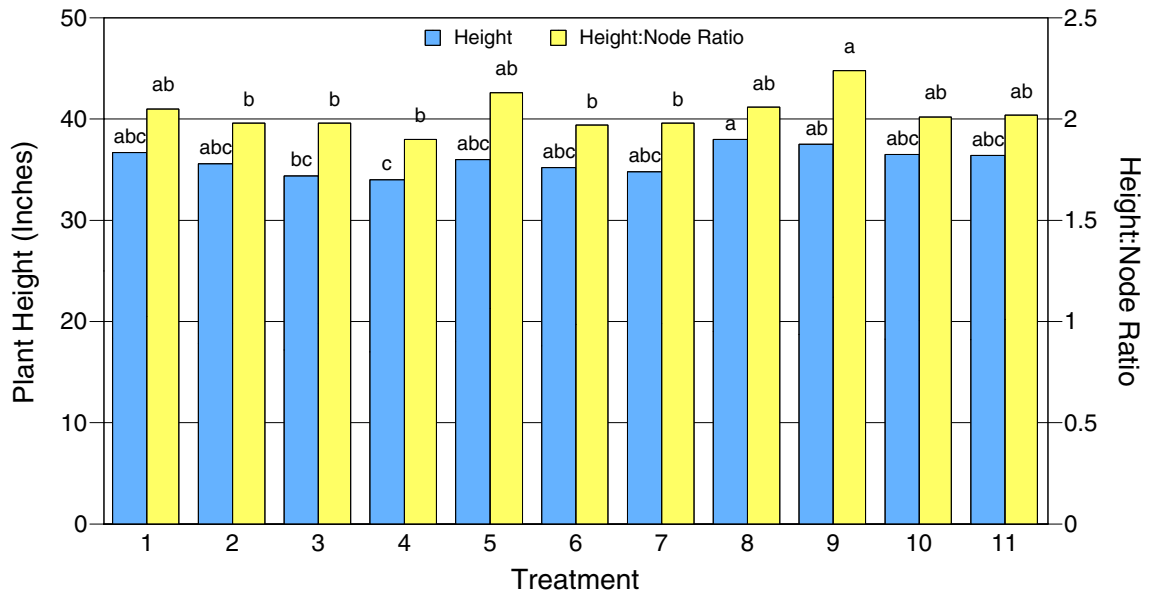


Figure 4. The effect of different Messenger® timing regimes on cotton plant height and height:node ratio. Bars within a variable grouping followed by the same letter are not significantly different (DMRT, $P \leq 0.05$).