

**Effects of the Experimental Plant Regulator XE-1019 on Cotton**

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Summary

The experimental plant regulator XE-1019, a product of Chevron Chemical Company, was applied to short staple cotton at the University of Arizona Marana Agricultural Center in 1985. Plant height was modified by the chemical due to greatly shortened internode length. The 1.0 lb. a.i. XE-1019 per acre rate applied before bloom yielded significantly less than the other treatments at final harvest. Data collected from eight harvests through the season from sub-plots resulted in significant yield differences from the second through the sixth harvest dates.

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Cotton producers continue to look for new methods to increase their efficiency of production. A new experimental plant regulator, XE-1019, from Chevron Chemical Company was tested on irrigated cotton at the University of Arizona Marana Agricultural Center in 1985.

The field was planted with Deltapine 50 cotton to a final stand of approximately 50,000 plants per acre in 40 inch rows. Each plot consisted of four - 30 foot rows with the two middle rows harvested for yield. Six replications were used in a randomized complete block design. Management practices conducive to good cotton production were applied as needed for this farm.

The experiment included three rates of XE-1019. Three dates of application were used for two of the rates with the third rate applied at one date. A non-treated check was included for a total of eight treatments. The rates used were 1.0, 0.1, and 0.01 lb. a.i. XE-1019 per acre. The two higher rates were applied before bloom, 2 July, and at first bloom on 11 July. Average plant height was 43 cm on 2 July and 57 cm on 11 July. All three rates were applied at full bloom, 23 July, when average plant height was 78 cm.

Application was with a hand sprayer with a single nozzle directed to the base of the plants to cover about 5 inches of the lower stem. Both sides of the row were sprayed with a total coverage of 18.5 gallons per acre including one percent X-77 surfactant.

Cumulative yield data were collected in four replications from 1/1000 acre sub-plots located in one of the two yield rows. Open cotton was hand picked in the sub-plots on 28 August, 5, 10, 17, and 25 September, 1 and 15 October and 6 November for a total of eight harvests. These cumulative data were analyzed statistically on a week to week basis with the cumulated yield over time. The entire experiment was machine harvested for yield on 15 November 1985.

Use of XE-1019 resulted in drastic shortening of internode length particularly at the 1.0 lb a.i. per acre rate. After application, plants continued to produce leaves and fruiting forms but internode length was much shorter. Plants with the early and heavy rate of application continued to remain shorter than the untreated check.

The effect of XE-1019 on plant height remained for a long time period and was related to the rate and date of application. Average height to the uppermost open bolls on the plant at harvest is shown in Table 1. Boll height of Treatment 2 with 1.0 lb a.i. XE-1019 per acre was significantly shorter than all other treatments. When 1.0 lb a.i. XE-1019 per acre was applied at first bloom, Treatment 3, boll height of these plants was significantly shorter than the untreated check. None of the other treatments were statistically different in plant height.

Final yield of Treatment 2 with 1.0 lb a.i. XE-1019 was significantly less than any of the other treatments, Table 2. None of the other treatments were statistically different in yield. The final yield data included yield of the machine harvest and of the sub-plots used to determine cumulative yield.

**Table 1. Mean Height of the Top Open Bolls at Harvest of Plants Treated with XE-1019, Marana, 1985**

Treatment	Height to top open bolls cm.
1. Check	73.5 a*
8. 0.01 lb Full bloom	72.0 a
7. 0.1 lb Full bloom	69.2 ab
5. 0.1 lb Before bloom	66.7 ab
4. 1.0 lb Full bloom	66.5 ab
6. 0.1 lb First bloom	62.7 ab
3. 1.0 lb First bloom	58.2 b
2. 1.0 lb Before bloom	43.2 c

\* Means followed by the same letter do not differ statistically at the 0.05 level according to the Student-Newman-Keuls' Test.

Cumulative yield data for five of the eight harvest dates are shown in Figures 1 and 2. Significant yield responses of the cumulative yield data were found at each of these five harvest dates which included all harvest dates in September and at 1 October. No statistical cumulative yield differences were found between treatments on 28 August, 15 October, or 6 November 1985.

**Table 2. Calculated Lint Yield at Final Harvest of Cotton Treated with XE-1019, Marana, 1985**

Treatment	Calculated lint yield per acre lbs.
8. 0.01 lb Full bloom	1569 a*
7. 0.1 lb Full bloom	1536 a
1. Check	1521 a
6. 0.1 lb First bloom	1499 a
4. 1.0 lb Full bloom	1479 a
5. 0.1 lb Before bloom	1422 a
3. 1.0 lb First bloom	1376 a
2. 1.0 lb Before bloom	1096 b

\* Means followed by the same letter do not differ statistically at the 0.05 level according to the Student-Newman-Keuls' Test.

Treatment 4 yielded statistically better than the check on 5 September, (Figure 1). By 10 September, Treatments 3 and 4 had significantly greater yields than Treatment 1, (Figure 1).

Treatments 4 and 8 had significantly better yields than Treatment 1 on 17 September, (Figures 1 and 2). On both 25 September and 1 October, Treatments 4, 6, and 8 had significantly greater yield than Treatment 2, (Figures 1 and 2).

Use of the Chevron plant regulator, XE-1019, in this one experiment resulted in some interesting plant characteristic and yield responses. If applied at too high a rate and too early, the plant may be overly stunted and yield may be reduced.

The chemical was very effective in reducing internode length of the main stem, fruiting and vegetative branches. This characteristic would be most beneficial when a cotton field is growing excessively and the grower is concerned about rank vegetative growth.

The response of reduced internode length after application is very rapid. The cumulative yield data indicate that during the first 6 weeks of flowering and fruiting there was evidence of yield enhancement with use of XE-1019.

The plant regulator XE-1019 has potential for cotton producers in altering plant architecture, promoting earliness and yield enhancement. The product shows promise for cotton producing areas with shorter fruiting seasons or if the crop is managed for a shorter fruiting period. It also has potential for late planted cotton following grain or other crops.

The plant regulator XE-1019 would appear to have excellent potential for cotton planted in 30-inch rows. If the plants were growing too fast for narrow row production, this plant regulator could be used to control plant growth. Continued research is planned for XE-1019 in 1986.

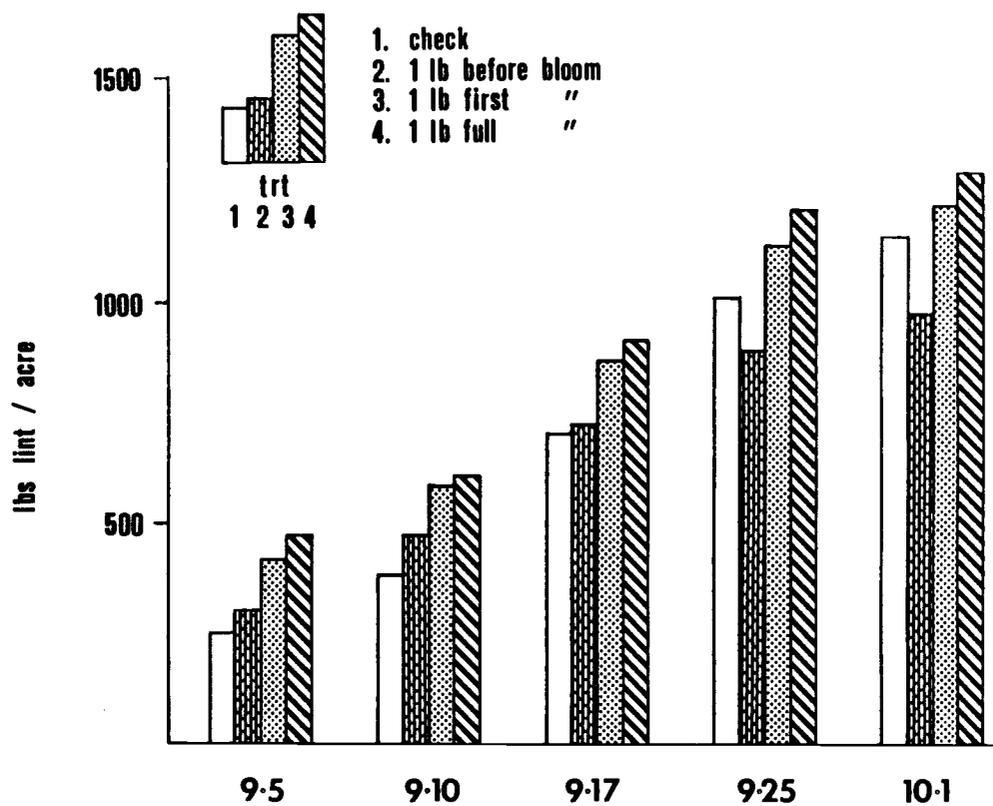


Figure 1. Cumulative lint yield at five harvest dates of cotton treated with XE-1019 at 1.0 lb a.i./acre and the non-treated check, Marana, 1985.

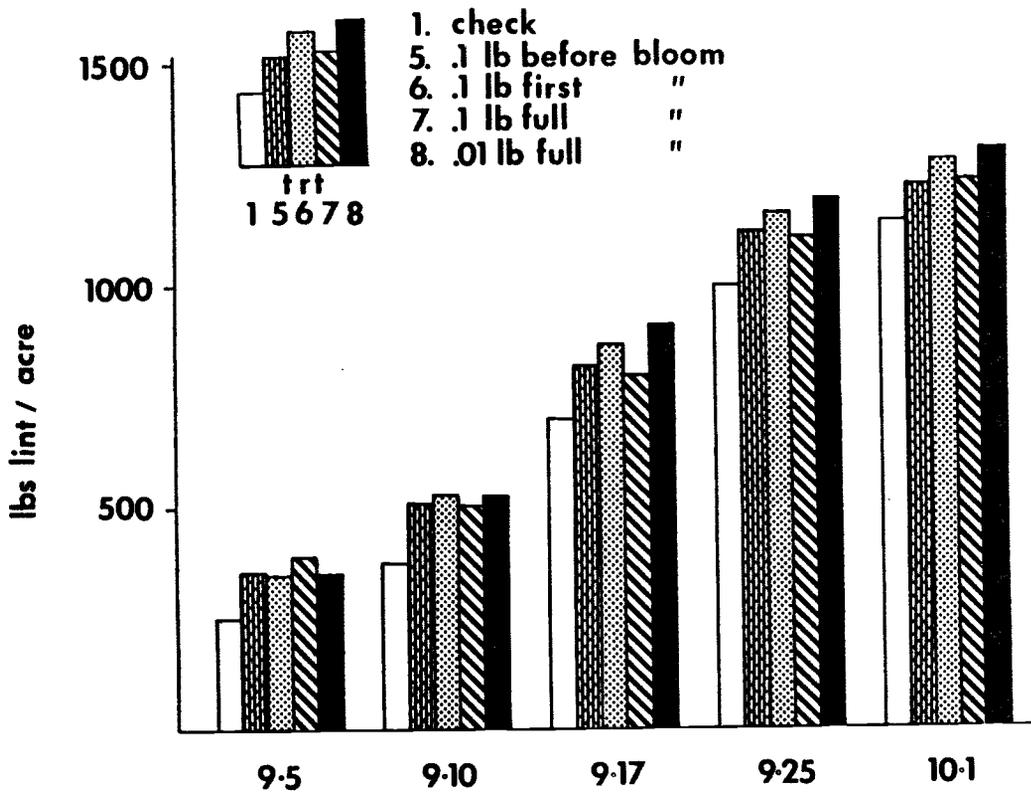


Figure 2. Cumulative lint yield at five harvest dates of cotton treated with XE-1019 at 0.1 and 0.01 lb a.i./acre and the non-treated check, Marana, 1985.