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TIMING OF PIX APPLICATIONS FOR GROWTH SUPPRESSION ON COTTON IN THE IMPERIAL VALLEY

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Abstract

The Maximum Internode Distance method appears to more accurately measure the growth responses of the cotton plant to Pix applications for mid and late season evaluations. The H:N method measures the growth of the plant the entire season and may not be as suitable for mid and late season evaluations.

Introduction and Objective

Cotton growers in the Valley are growing cotton more aggressively than in the past. New genetically modified varieties of cotton are being grown on better quality ground with more water and fertilizer.

Cotton growers were concerned that Pix applications were not providing the necessary growth regulatory effect when used according to label guidelines. They felt that the criteria or methods used to evaluate "when" to apply Pix were not appropriate for their area and growing technique.

As a result, a trial was established in the spring of 2003 to evaluate techniques for determining "when" to apply Pix. The "Height to Node" ratio (H:N) method was compared to the Maximum Internode Distance (MID) technique, both at lower activation levels than recommended by the label and the University of California. A multiple application treatment was included as a comparison along with a check.

Based on the information obtained in 2002, critical cotton development stages (first square, first bloom, and peak bloom) were chosen as target dates for Pix applications. These events are easily observed and can be tied to heat units for predictability.

Methods and Procedure

Cultural Practices

The cotton variety DP 448B was irrigated to stand on April 7. Stand counts indicated a final plant population of 41,250 plants per acre. It was sidedressed with 150 lbs. urea (46% N) on May 28 with a second sidedress of 210 lbs. of urea on June 18. Seven more irrigations were applied to alternate furrows on the following dates: May 29, June 19, July 1, July 9, July 16, July 23, and July 30.

Petiole samples for nitrate N were collected five times during the season: May 28 (14,401ppm), June 18 (14,806ppm), July 1 (16,971ppm), July 16 (10,550ppm), July 30 (2757ppm).

Insect Control

Plots were monitored weekly after emergence for mites, beet armyworms, lygus bugs, silver leaf whitefly (SWF). On June 10, SWF reached an economic threshold. The entire test area was sprayed with Knack (1 pt/A) by ground rig on June 12th. A subsequent application of Applaud was applied followed by two more applications of Assail. SWF migrating from declining melon trials nearby on the experiment station impacted the test area.

Pix Treatments and Application Dates

1. Multiple applications of Pix.
   a) 4 oz at match head square (May 28)
   b) 8 oz at first bloom (June 18)
   c) 16 oz at peak bloom (June 30)
2. Pix at 16 oz applied at First Bloom (H:N of 1.2) on June 18
3. Pix at 16 oz applied at Peak Bloom (MID of 5.00 cm) on June 30
4. No Pix applications.

Treatments were randomized and replicated 4 times. Plots were 100 feet long and 4-40 inch beds wide. Pix treatments were applied with a CO_2 hand-held boom equipped with two 8002E FF nozzles, one located over the center of each row. Pix was applied in 25 gpa of water using 40 psi. Rates were calculated at 50 % field coverage.

Field Sampling

The plant mapping process was conducted in field by selecting 5 plants from the middle two rows of the plot designated for sampling. The remainder of the plot area was set aside for collecting yield data. The selected plants were cut off at the soil line and examined for plant height, nodes, fruit retention, nodes above white flower, and internode distance between the 4th and 5th nodes.

The crop was defoliated with Ginstar at 8 oz per acre on August 22. Samples for cotton yields were collected by handpicking 13.1 row feet (one-thousandth acre) from each of the two center rows of each plot on September 9th. Samples were weighed and hand ginned to determine % turnout.

Discussion

In 2002, there were no significant differences between treatments when using the H:N as method for measuring plant growth as opposed to the MID technique which did indicate that Pix was having a regulatory affect on cotton growth.

This year's data shows that both methods did measure the growth regulatory effects of the Pix applications on June 30, July 15, and July 29. Neither method on June 10 nor June 17 sampling dates detected the 4oz-rate application on May 28. On the June 30 sampling date (12 DAT on 6-18), both methods showed identical statistical separation of means for the multiple applications and H:N 1.2 treatments. On the next two sampling dates (July 15 and 29) the MID method more precisely separated the means/treatments and provided a more clear picture of differences.

Several differences between the two years are worth mentioning. In 2003, a different variety was used (DP 5415 vs. DP 448B), plant population was higher in 2003 (41,250 vs. 31,300), and the fruit retention was 15% lower in 2003, (45% vs. 60%).

There were no significant differences in the treatments in relation to percent fruit retention (Table 3).

There were no differences in NAWF on July 15 sample date, but as the crop advanced toward cutout, the Pix treatments arrived at cutout earlier as indicated by the counts on July 29th.

Yield samples from all the plots indicated that there were no significant differences in yields between treatments. Petiole samples collected at various stages of growth indicated more than adequate nitrogen was present to sustain the crop.

Conclusion

The Maximum Internode Distance method appears to more accurately measure the growth responses of the cotton plant to Pix applications for mid and late season evaluations. The H:N method measures the growth of the plant the entire season and may not be as suitable for mid and late season evaluations.

Fruit retention was not affected by Pix applications. Perhaps a slightly earlier advancement into cutout due to Pix applications was detected. No effect on yield was noted, so the issue of timing of the applications is inconsequential relative to this data.

The following tables show the results of the Pix treatments on plant growth.

Table1. Cotton Growth Measurements Using the H:N Method.

Date	6-10	6-17	6-30*	7-15*	7-29*
Multiple Pix	1.01	1.09	1.38 b	1.39 b	1.35 b
Pix H:N 1.2	1.05	1.18	1.33 b	1.48 ab	1.49 ab
MID 5.0 cm	1.03	1.20	1.50 a	1.54 ab	1.48 ab
Check	1.06	1.20	1.48 a	1.64 a	1.65 a

*LSD .05

Table 2. Growth Measurements Using the Maximum Internode Distance Method in Centimeters.

Date	6-10	6-17	6-30*	7-15*	7-29*
Multiple Pix	3.05	3.75	3.98 b	4.00 b	3.75 b
Pix H:N 1.2	3.40	3.80	4.10 b	4.00 b	4.30 b
Pix MID 5.0 cm	3.25	4.15	5.00 a	4.30 b	3.85 b
Check	3.35	3.88	4.85 a	5.10 a	4.95 a

*LSD .05

Table 3. Percent Fruit Retention.

Date	6-17	6-30	7-15	7-29
Multiple Pix	47	44.	49.	38
Pix H:N 1.3	50	42	47	39
MID 5.0 cm	46	40	49	38
Check	42	40	46	37

No significant differences between treatments on any sample date.

Table 4. Nodes Above White Flower (NAWF) Evaluation.

Date	7-15	7-29*
Multiple Pix	4.2	1.2 b
Pix H:N 1.2	4.9	1.0 b
Mid 5.0 cm	5.0	1.8 b
Check	5.2	3.0 a

*LSD .05

Table 5. Yields from handpicked samples converted to Bales/Acre.

Treatment	Lbs. seed cotton	% Turnout	Lbs. lint	Bales / Acre
Multiple Pix	3138	38	1185	2.72
Pix H:N 1.2	3098	38	1162	2.66
MID 5.0 cm	3111	37	1151	2.64
Check	3092	38	1175	2.69

No significant differences between treatments