1978

Foliar Fertilization of Soybeans - 1977

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AGRONOMY NOTES

Vol. 11 No. 2

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Field investigations on the effect of foliar fertilization were continued on soybeans during 1977. Results from our 1976 studies have previously been published (1).

In 1976 we tested a material produced by TVA. We used the same TVA material in 1977 and in addition, included a commercially available product (Folian(tm), manufactured by Allied Chemical Corporation). Nutrient analysis of both materials is shown in the following table.

Special Products Tested

Product	lbs/gallon	% Content by Weight N	P_2O_5	K_2O	S
Folian(tm)	10	12	6	6	0.5
TVA	10	10	2.2	4	0.6

These materials were field tested at two locations (The University of Kentucky Agricultural Experiment Station Farm at Lexington and on a farm in Graves County, Kentucky) during 1977 at the following rates per application:

Folian(tm) - 10 gal (100 lbs) per acre
TVA - 25 gal (250 lbs) per acre

Each of these experiments is described in the following discussion.

(1) Test at Lexington

Soil type: Lanton silt loam, 0-2% slopes, uneroded.

Residual soil test: pH 6.0; P 300+ (VH); K 217 (M)

Additional soil application of fertilizer: 60 lbs K_2O/A broadcast and disked in.

Variety used: Cutler 71

Date planted: May 23 in 30-inch rows

Statistical design: Completely randomized block with 4 reps.

Plot size: 25 ft long x 4 rows wide

How foliar materials were applied: applied by hand with a CO_2 back-pack sprayer using a 4 row boom held 18-inches above top of canopy (No. 8002 TeeJet flat spray nozzle @ 30 p.s.i. liquid pressure). An adjuvant (Tween 80) was mixed with each material at a 1% volume concentration.

Harvest: Yields obtained by hand harvesting 16 ft from the two center rows of each plot on September 29, 1977, and then threshing with a small plot thresher. Moisture content of beans at harvest was 11-12%.

Treatments tested and results obtained are shown in the following table.

Treatment	Stage of Maturity 1/ When applied	Yield(Bu/A), Av. 4 Reps/tmt
No fertilizer	-	50.1
Folian, 1 application	R - 1	49.4
TVA, 1 application	R - 1	48.5
Folian, 1 application	R - 3	51.0
Folian, 2 applications	R - 3, R - 5	51.3
TVA, 2 applications	R - 3, R - 5	47.1
Folian, 3 applications	R - 3, R - 5, R - 6	50.9
TVA 3 applications	R - 3, R - 5, R - 6	52.3
Urea, 3 applications 2/	R - 3, R - 5, R - 6	54.1
		L.S.D. (.05) N.S.

1/ Date at which growth stage reached: R-1 (beginning bloom) July 18; R-3 (beginning pod) Aug. 2; R-5 (beginning seed) August 12; early R-6 (late pod) August 24.

2/ Applied in aqueous solution (25 gal./A) at rate of 25 lbs N/A per application.

The following table shows the effect of spraying on foliar burn. As indicated, foliar burn was mild and we do not feel that yields were reduced by this mild burning.

Time of Day Sprayed and Climatic Conditions

Sprayed at	Time of Day	Climatic Conditions	Foliar Burn 1/
R-1 (July 18)	11 AM	85°F Clear to hazy	Mild
R-3 (August 2)	11 AM	80°F Clear	Mild
R-5 (August 12)	late afternoon	77°F Cloudy	Mild
R-6 (August 24)	late afternoon	80°F Hazy	Negligible

1/ TVA product resulted in slightly more burn than Folian at each application

(2) Test at Graves County

Soil Type: Collins silt loam, 0-2% slopes

Additional soil application of fertilizer: 15-60-60 lbs N-P_2O_5-K_2O/A broadcast.

Variety used: Essex

Date planted: May 10, in 36-inch rows

Statistical design: randomized complete block with 4 replications

Plot size: 30 ft long x 12 ft wide

How foliar materials were applied: Applications were made by hand using a CO_2 back-pack sprayer using a row boom held about 18 inches above the canopy. Both materials were sprayed at 3 m.p.h. Folian (tm) was applied with 80015 TeeJet flat spray nozzle @ 20 p.s.i. T.V.A. material was applied with 8003 nozzles @ 25 p.s.i.

Harvest: 15 ft from two center rows of each plot was hand harvested 10-5-77, and threshed with a small, plot thresher.

Treatments tested and results obtained are shown in the following table.

Treatment	Stage of Maturity When applied	Yield(Bu/A), Av. 4 Reps/tmt
No fertilizer	-	60.1
Folian, 1 application	R - 3	59.0
TVA, 1 application	R - 3	64.1
Folian, 2 applications	R - 3, R - 5	54.2
TVA, 2 applications	R - 3, R - 5	54.3
Folian, 2 applications	R - 5, R - 6	58.3
TVA , 2 applications	R - 5, R - 6	59.1
		L.S.D. (.05) N.S.

1/ Date at which growth stage reached: R-3 (beginning pod) August 6; R-5 (beginning seed) August 16; R-6 (full seed) August 25.

Time of Day Sprayed

Sprayed at	Time of Day	Foliar Burn
R-3 (August 6)	6 PM	None
R-5 (August 16)	5 PM	None
R-6 (August 25)	7 PM	None

The results we have obtained in Kentucky during the past two years are very similar to those obtained in similar tests by other agricultural colleges.

SUMMARY OF STUDIES

1 - As in 1976, none of the foliar treatments we tested increased yields above the check treatment.

2 - Varying the first application from beginning bloom (R-1) to beginning pod (R-3) to beginning seed (R-5) had no influence on response.

3 - Varying the number of applications from 1-3 had no influence on yield response.

4 - Foliar burn observed was not judged to be harmful to yields.

REFERENCES

(1) Wells, K.L., et. al. "Foliar Fertilization of Soybeans." Agronomy Notes. 10:6, February 1977. University of Kentucky Agronomy Department.

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