

Effect of a Plant Growth Regulator on Green Beans Grown for Processing

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Abstract

Three rates of the plant growth regulator Foliar Triggrr were applied to green beans grown for processing at 5% bloom. The 6 oz rate increased yields of size 1 and 2 beans compared to all other treatments and the untreated check, and had the fewest size 3 beans (which would be culls). The 11 oz rate was similar to the untreated check while the 16 oz rate decreased yields. Total bean numbers per plant were similar. Although treatment differences in this experiment were not statistically significant, a yield increase of 10.2% for the 6 oz rate compared with the untreated check may well result in increased economic returns.

Introduction

Green snap beans have been a crop grown for processing in the Parker Valley in recent years with as many as 900 acres planted for a spring crop. In promotional material from Westbridge Co., the product Foliar Triggrr (active ingredient = cytokinin (as kinetin)) increased garbanzo bean seed yields by 74.8% in a 1994 trial located at Wellton, AZ, while increasing pods per plant by 20.9%. As little data existed under Arizona conditions for the effects of any plant growth regulators on green beans, this study was initiated to determine what effects, if any, Foliar Triggrr has on green beans grown for processing.

Methods and Materials

Treatments were applied the morning of April 10, 1995. Plots consisted of 25 ft of bed, with each bed planted with two rows of Blue Lakes 94 green beans. Applications were made with a backpack CO₂ sprayer calibrated to deliver 53.6 gpa of 35 psi using two T-Jet 8002VS nozzles per bed. Water for treatments was buffered with Green-Up KeyLate+ (Gowan Co.) at a rate of 0.75%. A non-ionic surfactant (First Choice, Western Farm Services) was used at a rate of 1%. Three rates of the plant growth regulator Foliar Triggrr were applied (6, 11, and 16 oz of product/acre), with treatments replicated four times in a randomized complete block design.

Plots were sampled 21 days (May 1) after treatments were applied. All plants (foliage, stems and beans) in each plot were harvested, placed in large garbage bags, and transported to a laboratory. Mass bean weight for each plot was obtained.

A selection of 13-18 plants/plot were then made at random. Plants were weighed, beans were removed from plants, sized as 1s (large beans), 2s (medium beans) or 3s (culls, too small for canning and would probably have been discarded by a mechanical harvester). Beans were then counted and weighed from each sample.

Yields were calculated and data were standardized and analyzed using analysis of variance (Co-Stat 2.0).

Results

Highest yields per acre of sizes 1 and 2 beans (Table 1, fig. 1) were obtained from the 6 oz application, which was 698 lbs per acre more than the untreated check and represents a 10.2 % increase. The 6 oz rate also resulted in a 23.4% increase in size #1 and 2 beans compared to the untreated check, with the differences between the percentages being the weight difference in #1 and #2 beans (5.41 and 2.54 g/bean respectively).

Although no statistical differences existed for total number of beans, bean sizes or bean size combinations, a trend was noted for highest yields (sizes 1s and 2s) at the lowest rate applied in this trial (6 oz of product/acre) with decreased yields with increased amount of product. The middle rate evaluated (11 oz) was very similar to the untreated check, with yields from the 16 oz rate being reduced below those of the untreated check.

Highest total beans per plants were noted in the 11 oz rate (Fig. 2), which had the highest number of size 3s/plant (6.18), followed by the untreated check (5.61) and the 16 oz rate (5.58). The 6 oz rate had 44% fewer size 3 beans (4.28/plant) than the 11 oz rate as well as the fewest number of size 3s overall, while also having the highest number of size 1s and 2s. Low numbers of size 3s and high numbers of 1s and 2s per plant is beneficial for processing beans as this results in less split set and allows increased numbers of beans large enough for processing (larger, more uniform beans) for a one pass harvesting operation.

The average total number of green beans per plant overall for this experiment was 11.00 (Fig. 3), ranging from a high of 11.73 for the 11 oz rate to 10.41 for the 16 oz rate. Increased number of pod were not noted except with a slight increase for the 11 oz rate. With total number of beans per plant about equal for all treatments, the treatments applied primarily affected the proportion of beans sized 1, 2 and 3, and for processing beans was most beneficial for the 6 oz rate of Foliar Triggrr.

Table 1. Mean number of various sized green beans per plant following treatment with Foliar Triggrr

<u>Rate/acre</u>	<u>1's</u>	<u>2's</u>	<u>3's</u>	<u>1's + 2's</u>	<u>Total</u>
0	2.91	2.44	5.61	5.35	10.97
6	3.45	3.15	4.28	6.60	10.87
11	2.77	2.78	6.17	5.56	11.73
16	2.58	2.25	5.58	4.83	10.41

No statistical differences existed at the $P \leq 0.05$ level for means in any column (S-N-K test).

MEAN GREEN BEANS PER PLANT AT 21 DAYS FOLLOWING TREATMENT OF FOLIAR TRIGRRR

FIGURE 1

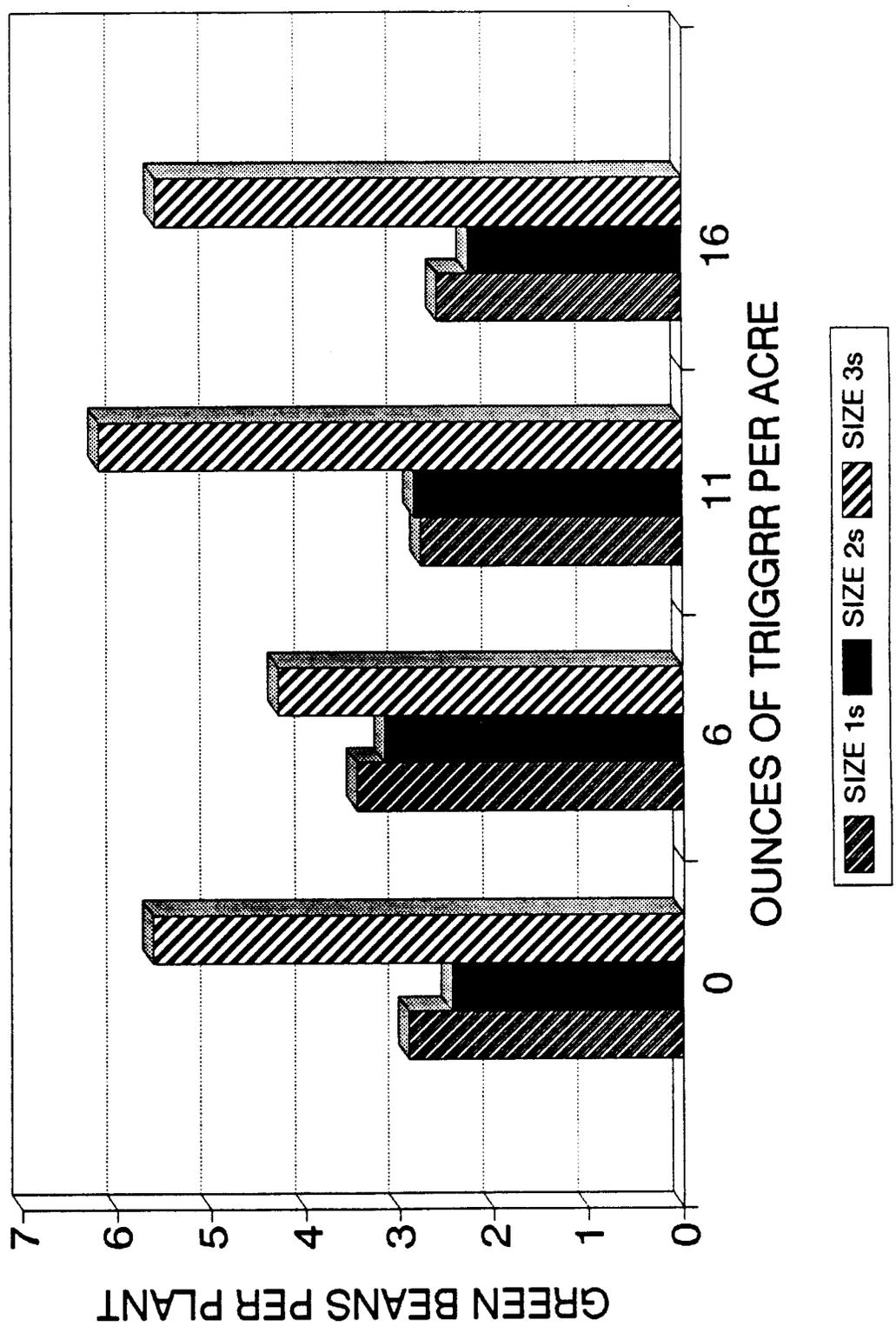


FIGURE 2

GREEN BEAN MEAN YIELDS 21 DAYS AFTER
TREATMENT OF "TRIGRRR"

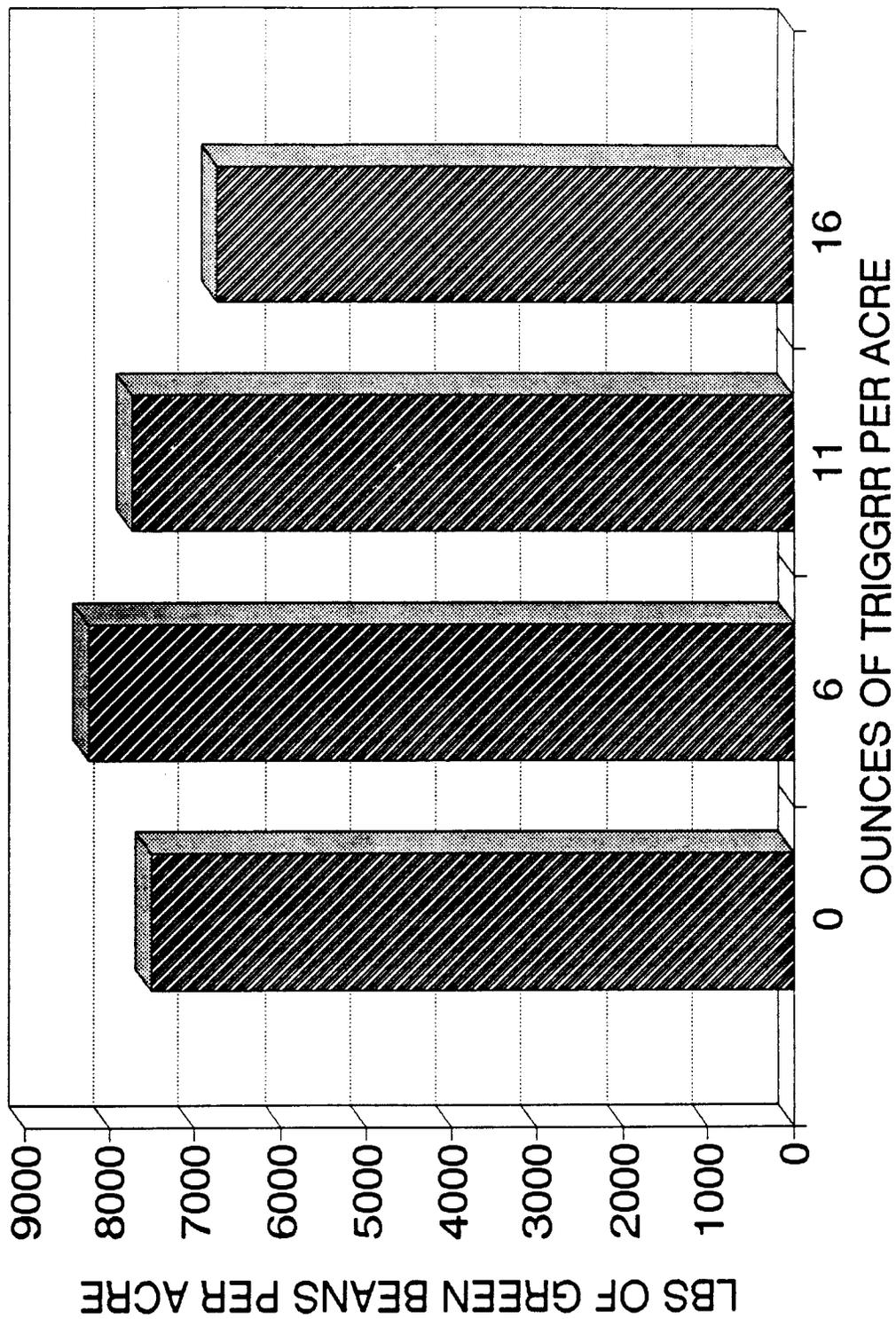


FIGURE 3

MEAN GREEN BEANS PER PLANT AT 21 DAYS FOLLOWING TREATMENT OF FOLIAR TRIGRRR

