Evaluation of Supreme AG™ Bagasse on Vegetable Growth and Yield

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ABSTRACT

This study evaluated the performance of two sugarcane-derived carbon mulches; raw bagasse (RB) and Supreme AGT (SGP+), on vegetable growth under Louisiana field conditions. Five crops (tomato, okra, bell pepper, cucumber, and eggplant) were grown under three substrate treatments: regular soil (NM), raw bagasse (RB), and Supreme AGT (SGP+) bagasse. The plants were grown in four replications with a split block design. Plant height, flower and fruit set and disease incidence was measured repeatedly as a non-destructive indicator of vegetative vigor, stress response, and yield potential. Results show that raw bagasse increased total biomass accumulation but showed high variability and instability, while Supreme AGT provided more stable growth and improved stress buffering while increasing flower and fruit set.

INTRODUCTION

Louisiana leads the nation in sugar cane acreage. Bagasse is the by-product remaining after the sugarcane juice is squeezed from the sugar cane. Approximately 30% of bagasse is burned as a fuel source at the sugar plant, but the remainder is largely a waste by-product of little value. Due to abundant surplus of bagasse in Louisiana research was initiated to determine additional uses of bagasse as mulch. The field experiment compared sugarcane bagasse mulch, no mulch control and patented supreme AGT treated bagasse for suitable mulching treatments for different vegetable production.

OBJECTIVES

Evaluate the impact of raw bagasse (RB) and Supreme AGT (SGP+) on vegetable growth and performance.

Assess vegetative vigor, pest damage, flower and fruit set in treated and control plants.

MATERIALS AND METHODS

Location: Horticultural farm, SU Ag center campus, Baton Rouge LA.

Soil Type: Silt Loam with 0 to 1% slope.

Design: Split Plot design, with four plots and three replications.

Crops: Tomato, okra, bell pepper, cucumber, eggplant

Treatments: regular soil (NM), sugarcane bagasse (RB), Supreme AGT (SGP+) bagasse.

Weather data: Temperature and growing degree day calculations.

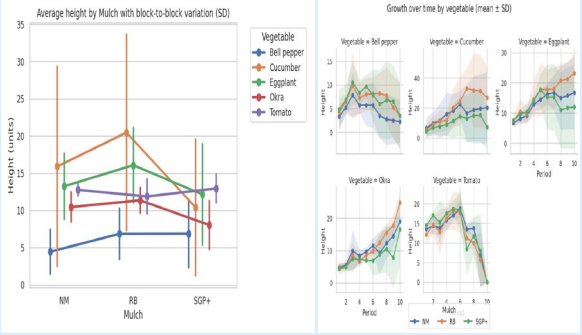
Soil moisture: maintained by rainfall supplemented by drip irrigation.

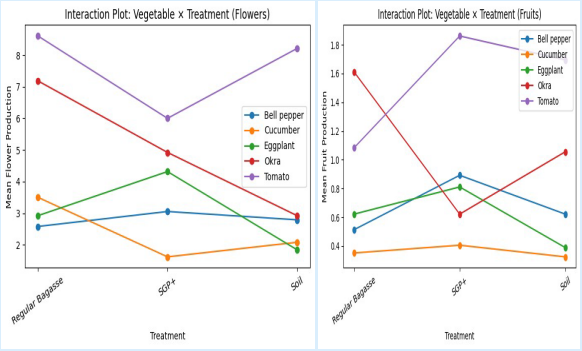
Measurements: Plant height measurements, number of flowers, fruit set, fruit weight, color, throughout the season.

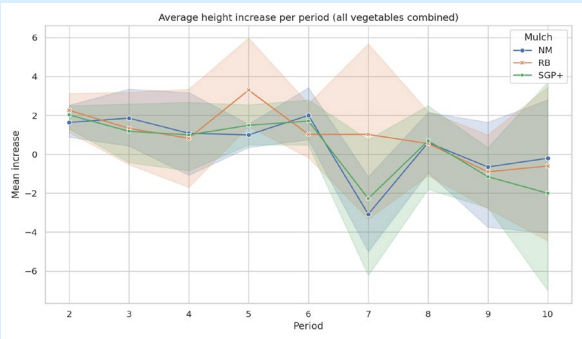
Indicator Used: Plant height as a non-destructive proxy for vegetative vigor, stress response, and yield potential.

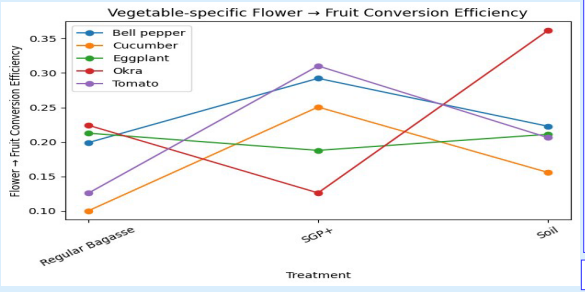
Statistical Analysis: Two factor split ANOVA with main plot as vegetable and subplot as mulch treatment then applied tukey HSD to determine if treatments are significantly different.

RESULTS









RESULTS AND DISCUSSION

Raw Bagasse (RB):

Produced the greatest total biomass accumulation, especially in cucumber, okra, and eggplant. Exhibited large growth surges followed by sharp declines, showed high variability and large standard deviations, demonstrated strong short-term stress buffering.

Supreme AGT (SGP+):

Generated moderate but more stable growth trajectories, reduced mid-season growth crashes, maintained consistent vegetative performance across stress periods, provided intermediate protection during stress events.

Soil (NM):

Produced the lowest overall growth, showed steep mid-season declines, Demonstrated limited moisture retention and weak stress buffering.

Highlights

- ❑ Regular bagasse improved flowering in most vegetables
- ❑ Supreme AG SGP+ performed best in eggplant and bell pepper
- ❑ Okra responded strongly to regular bagasse
- ❑ Tomato performed similarly in soil and regular bagasse,
- ❑ Regular bagasse produced the highest average number of flowers, followed by SGP+, while soil control had the lowest productivity.

CONCLUSIONS

- ❑ Application of bagasse mulch influenced fruit production in vegetable crops.
- ❑ Supreme AG+ treated bagasse resulted in the highest overall fruit yield compared with soil control and untreated bagasse mulch. However, crop-specific responses were observed.
- ❑ Tomato, eggplant, and bell pepper produced higher fruit yields under SGP+ treated bagasse, while okra responded more positively to regular bagasse mulch.
- ❑ Research is under progress to determine the impact of Supreme AG+ on soil microbes, C/N ratio, soil pH and allelopathy which might influence production.

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