

Increasing Broccoli Yield With Grower's Secret Pro

Summary of a study performed by M. D. Orzolek. 2004. Pennsylvania State University, Penn State Horticultural Research Farm, Rock Springs, PA.

Prepared by W. Chun

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ABSTRACT

Application of Grower's Secret Pro was applied at transplant, foliar twice a month, foliar higher concentration every three weeks, and as a combination of transplant and foliar applications to broccoli 'Brogan.' Average head weights for GSPro treatments were 11% to 22% higher compared to controls. Average side shoot weights for GSPro treatments were 11% to 20% higher compared to controls. Significant increases in marketable yields were observed only for the transplant plus foliar treatment. A 5% increase in number of heads and a 16% increase in weight were observed. These results show the positive benefit of GSPro use for broccoli production.

INTRODUCTION

Grower's Secret Inc (formerly ABR LLC) commissioned a series of field validation tests with its flagship product Grower's Secret Pro (GSPro). In 2003, the first series of GSPro was produced. It was then named Maui LCF concentrated syrup. It was a heat pasteurized, filtered long term culture of the company's proprietary mushroom grown in a mixture of pineapple juice, papaya puree, and sugarcane molasses. The product was heat concentrated but was 32-fold more dilute than the GSPro that is produced today (1 fl oz GSPro = 1 qt LCF).

Broccoli was selected as a test crop since the US is the largest producer, there is an active broccoli industry in Pennsylvania, and Michael D. Orzolek (Ph.D. Horticulture) was actively conducting research on broccoli and other vegetables. Money for support of this work came from a joint USDA/EPA sponsored grant received by Grower's Secret Inc. in 2002. The original report from professor Orzolek can be found in Appendix I.

MATERIALS AND METHODS

Broccoli seedlings (var. Brogan) were transplanted in June 2004 into test plots at the Penn State Horticultural Research Farm in Rock Springs, Pa. Each plot had 10 plants, at 24" in row and 44" between row spacing. Plants were grown in 4" high beds with blue plastic mulch and drip irrigation. Plots were laid out in a randomized complete block with four replications. Main heads were harvested from August 27 to September 7 (3 harvests). Side-shoots were harvested from September 16 through October 8 (5 harvests).

At the time of the experiment Maui LCF Syrup was provided. It is 32-fold more dilute than our current product GSPro. Amounts reported below are recalculated to reflect our current formulation. Treatments with GSPro are as follows:

1. No treatment, control
2. GSPro 1 oz/100 gallons of water, applied at time of transplanting. One application only on May 27.
3. GSPro 1 oz/A – foliar every two weeks. Six applications from June 9 through September 3.
4. GSPro 2 oz/A – foliar every three weeks. Five applications from June 16 through September 3).

- GSPro 1oz/100 gallons of water, applied at time of transplanting plus GSPro 1 oz/A – foliar every two weeks. Six applications from June 9 through September 3.

RESULTS AND DISCUSSION

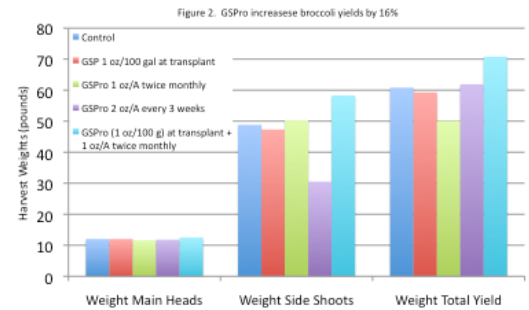
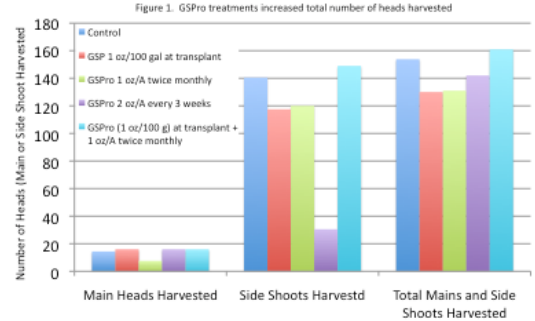
Application of Grower’s Secret Pro at transplant and at two-week intervals increased the number of main and side shoot heads by 5% (Figure 1). This resulted in total marketable yields that were 16% higher than controls (Figure 2). The yield increase was mainly due to the increased size of main heads and side shoots. Other GSPro treatments did not result in significant differences from the controls.

ECONOMIC ANALYSIS

From 2007 through 2010, market prices hovered in the \$37/cwt range. In 2009, average yield for broccoli in the United States was 16,000 pounds/acre. That is equivalent to a gross value of \$5,920 per acre. Production cost in the continental US were approximately \$2,177/acre yielding a net profit of about \$3,743 per acre. Application of Grower’s Secret Pro at transplant and at two-week intervals (a total of 7 applications at \$20/application) would cost \$140. This resulted in a 16% increase in yield (by weight). A 16% increase applied to the 16,000 pound/acre average yield is equal to a 2,560 pounds increase with a value of \$947.20. This work is preliminary but shows a potential 676% ROI with the GSPro input. This warrants further examination and testing to optimize yield with an aggressive fertilization program in combination with GSPro.

CONCLUSIONS

For most crops, a 12-13% increase in yield is required to justify inputs that range from \$20-\$80/acre/month. In this test with broccoli, a modest 16% in overall yield was obtained. A \$140 input of GSPro yielded an additional ton of broccoli at a value that approached \$1,000. With today’s need for increased food output from shrinking agricultural acreage, increased efficiency no longer is desired but is a necessity and Grower’s Secret Pro can be one way to address this need.



Appendix I

2004 Field Evaluation of Maui LCF (Liquid Compost Factor) Effect on Broccoli

M. D. Orzolek

The Pennsylvania State University

Penn State Horticulture Research Farm, Rock Springs, PA

LCF is a California Registered Fertilizer consisting of Hawaiian pineapple juice, sugarcane molasses, papaya puree and mushroom spawn. The mushroom spawn composts the fruit juice slurry and the resulting liquid or Compost Tea is harvested, filtered and heat processed as a liquid fertilizer.

Date Transplanted: June 23, 2004

Variety: Brogan

Spacing: 24" in-the-row and 44" between rows with 10 plants per plot.

Production system: Raised beds (4" high) with blue plastic mulch (18" wide bed) and drip irrigation.

Statistical design: Randomized Complete Block with 4 replications

Harvest dates: Main heads - August 27 through September 7, 2004 for a total of 3 harvests.
Side-shoots - September 16 through October 8, 2004 for a total of 5 harvests.

Treatments:

- 1 - None
- 2 - LCF applied at time of transplanting at 1.0 qt./100 gallons of water.
- 3 - LCF applied as a foliar application every 2 weeks at 1.0 qt./A.
- 4 - LCF applied as a foliar application every 3 weeks at 2.0 qt./A
- 5 - LCF applied at time of transplanting at 1.0 qt./100 gallons of water plus as a foliar application every 2 weeks at 1.0 qt./A.

Number of Applications:

- Treatment 2 - one (May 27).
Treatment 3 - six (June 9 through September 3).
Treatment 4 - five (June 16 through September 3).
Treatment 5 - six (June 9 through September 3).

RESULTS:

The marketable yield of broccoli (both main heads and side shoots) was increased by the application of LCF applied at the time of transplanting at 1.0 qt./100 gallons of water plus as a foliar application every 2 weeks at 1.0 qt./A compared to the no application treatment (Table 1). Foliar application alone of LCF whether at the 1.0 or 2.0 quart/A rate did not

result in any increase in broccoli yield. There was no visual difference in the appearance of the broccoli plants regardless of treatment. Both main head size and side shoot size were larger when broccoli plants were treated with LCF compared to no treatment. The variety Brogan actually produced more side shoots on a weight basis than main heads. Side shoots were of equal or better quality than the main heads.

Table 1. The yield of marketable broccoli heads treated with Liquid Compost Factor grown at the Horticulture Research Farm, Rock Springs, PA – 2004.

Treatment	Heads		Heads	Sideshoots		Sideshoots	Total Mkt		total head
	#	wt.-lbs.	AvgWt. oz	#	wt.-lbs.	Avg. wt. oz	#	wt.-lbs.	Wt. -oz.
1	13.3	12.0	14.4	140.5	48.8	5.6	153.8	60.8	17.6
2	12.5	12.0	16.0	117.5	47.3	6.4	130.0	59.3	22.4
3	11.0	11.6	17.6	120.0	50.3	6.7	131.0	50.1	24.3
4	12.3	11.8	16.0	130.5	50.1	6.2	142.8	61.9	22.2
5	12.8	12.5	16.0	149.0	58.3	6.3	161.8	70.8	22.3