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PROCEEDINGS

45th Annual Open House and Trade Show

NORTH CAROLINA BLUEBERRY

COUNCIL

in cooperation with

NORTH CAROLINA STATE

UNIVERSITY

Sampson Agri-Expo Center, Clinton, January 11-12, 2011



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Blueberry Nitrogen Fertilizer Formulations Effects on Plant Growth and Nutrition

2010 — Year 2

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Introduction

A fertilizer study related primarily to nitrogen (N) source was initiated on March 26, 2009, at the Horticultural Crops Research Station in Castle Hayne, NC. The main purpose of the study was to evaluate blueberry response to different N sources. Seven fertilizer treatments were applied to three varieties. The fertilizer treatments are listed below and the varieties are Star, O'Neal, and Duke. Results and more details of the study from the 2009 season are reported in the 2010 Proceedings. The study continued in 2010 with the same treatments.

Materials and Methods

Treatments & dates of application — 2010:

Treatment 1. Grower Standard

- a. 50 lb per acre of 14-28-14 on April 19, 2010
- b. 75 lb per acre of 14-28-14 on May 13, 2010
- c. 75 lb per acre of 18-46-0 on August 9, 2010

Treatment 2- Grower Std. with Liquid Fertilizer

- a. equivalent of Trt. A supplied with 5-10-5 on April 19, 2010
- b. equivalent of Trt. A supplied with 5-10-5 on May 13, 2010
- c. 75 lb per acre of 18-46-0 on August 9, 2010

Treatment 3. Grower Std. with N source as urea

- a. 50 lb per acre of 14-28-14 made with urea on April 19, 2010
- b. 75 lb per acre of 14-28-14 made with urea on May 13, 2010
- c. 75 lb per acre of 18-46-0 on August 9, 2010

Treatment 4. Grower Std. with N source as sulfur-coated urea (SCU)

- a. 50 lb per acre of 14-28-14 made with SCU on April 19, 2010
- b. 75 lb per acre of 14-28-14 made with SCU on May 13, 2010

c. 75 lb per acre of 18-46-0 on August 9, 2010

Treatment 5. Grower Std with Nitamin 30L as N source

- a. 50 lb per acre of 14-28-14 equivalent using Nitamin on April 19, 2010
- b. 75 lb per acre of 14-28-14 equivalent using Nitamin on May 13, 2010
- c. 75 lb per acre of 18-46-0 on August 9, 2010

Treatment 6. Florikan. 13-13-17

- a. applied to supply equivalent rates of nitrogen as in other treatments on April 19 and May 13, 2010
- b. 75 lb per acre of 18-46-0 on August 9, 2010

Treatment 7. Control — no fertilizer

All phosphorus and potassium rates were kept constant by blending fertilizers (0-45-0 & 0-0-60) with the different N sources, except in the case of Florikan.

Measurement & Data Collection: As plants fruited, immature berries were removed to promote vegetative growth. On July 13, 2010, plant tissue and soil samples (0 to 6 and 6 to 12 inch depths) were collected.

On October 21, 2010, plant growth was assessed for each of the four center plants in each plot. Growth index was calculated by the following equation: $\frac{1}{4}R^2H$, where R=average plant diameter, H=average height. Average plant diameter was determined by the average of the widest and narrowest portion of the plant when looking downward. Average high was determined by the average of the two tallest canes of the plant. A meter stick was used for all measurements.

Results & Observations

Soil fertility & plant nutrition: Soil pH at the 0 to 6 and 6 to 12 inch depth averaged 4.7 and 4.9, respectively (data not presented). Some differences in soil characteristics among treatments [pH, phosphorus (P), potassium (K)] were found in the top six inches of soil but it is unclear if this is a treatment effect. These differences may be due to artifacts of sampling in a fertilized soil highly amended with pine bark. Soil P and K levels in the upper 6 inch layer of the control (no fertilizer) were significantly lower than in fertilized treatments.

Plant tissue nutrient levels are found in Table 1. All nutrient levels were within sufficiency ranges of the Agronomic Division- NCDA&CS. No significant differences in N were detected with an average N content across all treatments being 2.12%. For many nutrients, differences were detected among treatments but there is uncertainty as to how differences related to imposed treatments since varying N source was the main component of treatment. There does not appear to be a relationship between soil test levels and nutrient concentrations except for K in the control (no fertilizer) where both soil and plant levels were significantly lower than the fertilized treatments.

Plant growth: As in 2009, visual differences in plant size were again seen in 2010. Confirmation of visual differences is shown in growth index as found in Figure 1. While differences in measurements were detected in 2009, differences were relatively small among treatments. The 2010 year's growth index distinguished treatment effects such that significantly highest growth was seen with the SCUrea (Treatment 4) as compared to other treatments. Other fertilized treatments had similar growth; significantly smallest growth was found in the unfertilized control, treatment 7 (Figure 1).

Clippings from fall / winter pruning have been collected but data have not been analyzed. Photos of plants representative of each treatment were taken in winter of 2010 to document growth differences (not presented here).

Future Study

At this site, the study is to be continued in 2011. To expand this effort, additional plots were established in the spring of 2010 at this same site and at the Ideal Farm; treatments were not imposed on additional plots at these additional sites due undesirable plant quality. Plants were pruned extensively after planting to allow for root systems to develop before treatment establishment which is expected in 2011.

Acknowledgement

The study is funded by the NC Blueberry Council. Researchers appreciate their support and continued interest.

Table 1. Plant tissue levels in blueberry as found in treatments.

Treatment	N	P	K	Ca	Mg	S
	%					
1. Grower Std- 14-28-14	2.20 a	0.11 ab	0.83 a	0.53 cd	0.17 cb	0.13 b
2. 5-10-5 Liquid	2.12 a	0.11 ab	0.60 c	0.60 b	0.19 b	0.12 bc
3. Urea-N equiv to 14-28-14	2.12 a	0.10 b	0.79 ab	0.50 d	0.16 c	0.11 c
4. SCUrea equiv to 14-28-14	2.14 a	0.11 ab	0.70 bc	0.50 d	0.15 c	0.13 b
5. Nitamin	2.08 a	0.12 a	0.71 bc	0.59 cb	0.19 b	0.13 b
6. 13-13-17 Florikan	2.17 a	0.12 a	0.66 c	0.60 b	0.19 b	0.14 a
7. Control	2.07 a	0.12 a	0.49 d	0.80 a	0.24 a	0.15 a
P value	0.4518	0.0155	< 0.0001	< 0.0001	< 0.0001	< 0.0001
CV	5.4	8.9	12.9	8.8	8.0	7.9

Means separation by Duncan's Multiple Range Test (DMRT) if $P \leq 0.05$. Means followed by same letter are not significantly different as determined by DMRT.

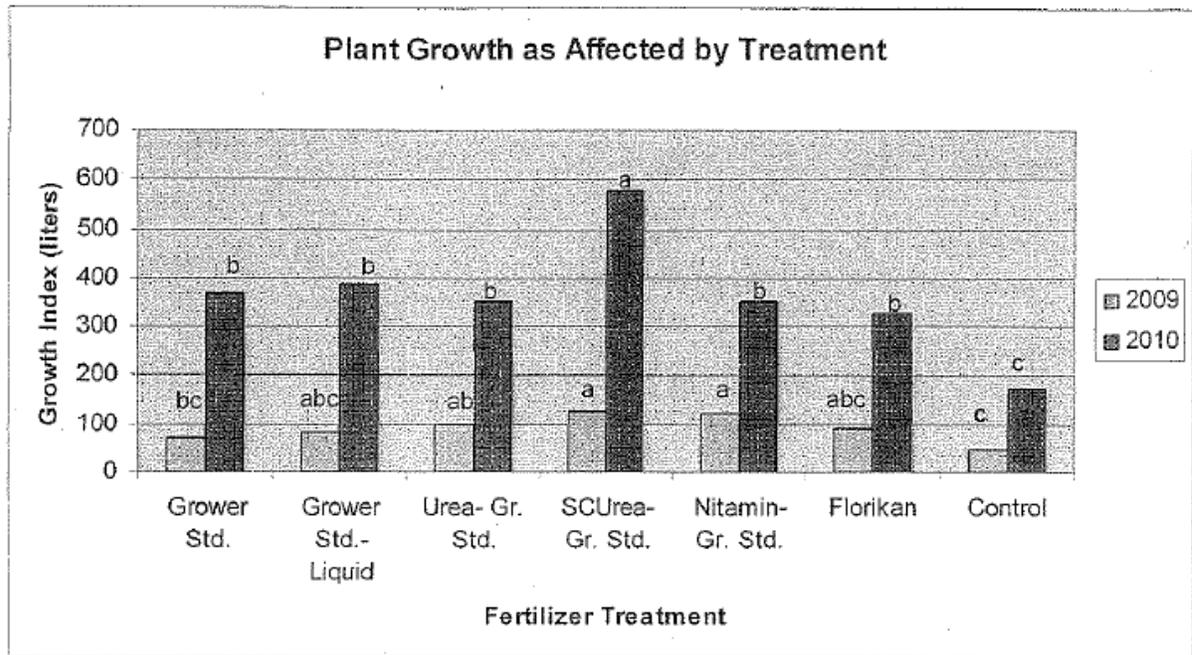


Figure 1. Plant growth index as affected by fertilizer treatments in 2009 and 2010. For a given year, means followed by same letter are not significantly different as determined by DMRT. **Note:** A minor error was found in plant growth data analysis for 2009. The data reported here have been corrected.