Title: **Nitrogen Fertilization Strategies for Blackberry**

Final Report

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Extension Proposal

Name, Mailing and E-mail Address of Principal Investigator(s):

David W. Lockwood
Dept. of Plant Sciences
University of Tennessee
252 EPS, 2431 Joe Johnson Dr.
Knoxville, TN 37996-4561
dlockwood@utk.edu

John Walter Hitch
Research Center Director
Plateau Research & Education Center
Crossville, TN 38571-2133
jhitch@utk.edu

Debbie Joines
Manager, UT Soil, Plant & Pest Center
5201 Marchant Dr.
Nashville, TN 37211-5112
djoines@utk.edu

Objectives:

1. to evaluate the effect of timing of nitrogen application in blackberry growth and fruiting.
2. To compare the effect of ground application, fertigation and foliar application of nitrogen in blackberry growth and fruiting.

Justification and Description:

Ground (broadcast) application is the most common method of applying nitrogen in blackberry plantings. The number and timing of applications will vary from putting it all down at bloom to a split application with 2/3 of the nitrogen being applied at bloom and 1/3 being applied immediately postharvest. The latter is the suggested application procedure stated in the Southeast Regional Bramble Production Guide listed on the SRSFC web site. No mention is made of application method in this guide.

Ground (broadcast) application is dependent on rainfall or timely irrigation to assure that nitrogen is carried into the root zone of the plant. While this is generally not a problem at bloom when spring rains tend to occur frequently, it can be an issue later in the growing season. Lack of timely rainfall following harvest when nitrogen application is directed to primocanes can be a problem. Applying nitrogen through the irrigation system (fertigation)

assures the presence of adequate water to move the nitrogen into the root zone of the plant. Trickle or microsprinkler systems have proven to be much more efficient in supplying water and fertilizer materials where needed. In addition, plant responses in some crops to fertigation through low-volume irrigation systems have been shown to be equivalent to ground application while only using about 60 percent of the ground application rate. Fertigation could offer a substantial savings in nitrogen costs plus a more controlled response to its application. Losses of nitrogen through volatilization, surface runoff or leaching can be greatly reduced through proper fertigation techniques.

Methodologies:

Treatments will be applied to a six-year-old planting of Apache blackberry located at the Plateau Research and Education Center in Crossville, TN. This will be a nonreplicated demonstration project.

Suggested Treatments:

A. Ground application when new primocanes begin to emerge
(60# actual N per acre broadcast on soil surface in a 3 ft. wide band down the row)

B. Ground application: 30# actual N when new primocanes begin to emerge, 30# actual N immediately post-harvest (broadcast in a 3 ft. wide band down the row)

C. Fertigation using the same rate and timing as treatment B |

D. Fertigation at weekly intervals from the time of first primocane emergence until Sept. 1
(rate – 5# actual N/acre/week)

E. Weekly fertigation as follows:
- 5# actual N/acre/week beginning when new primocanes begin to emerge until 1 week before harvest
- 2# actual N/acre/week from 1 week before first harvest and weekly through harvest
- 5# actual N/acre/week following harvest through Sept. 1

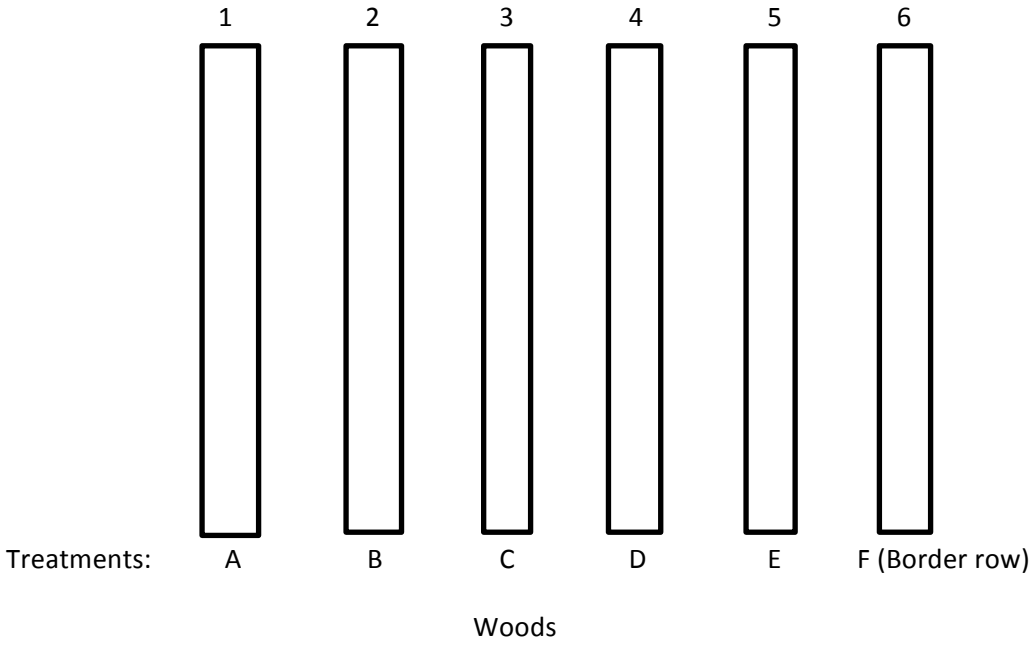
F. Treatment F is a repeat of treatment A and is a border row.

Notes:
- irrigate all rows as needed
- for fertigated treatments, apply nitrogen 3 days after the normal irrigation using ⅓ of the amount of water used in a normal irrigation
- collect leaf samples (most recently matured leaf on primocanes on 7/23/13)
- yield data will be taken by total yield per treatment row

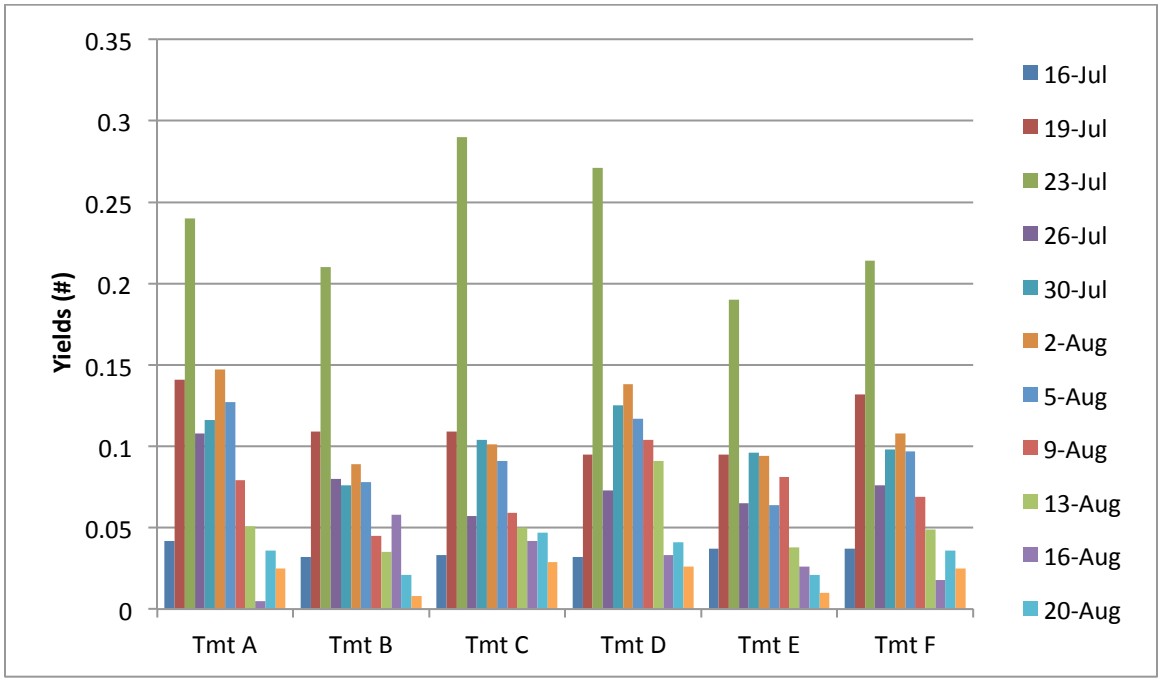
Fruits were harvested and weighed at 3 to 4-day intervals beginning on July 16 and continued through August 23. Average yield per cane was calculated for each harvest.

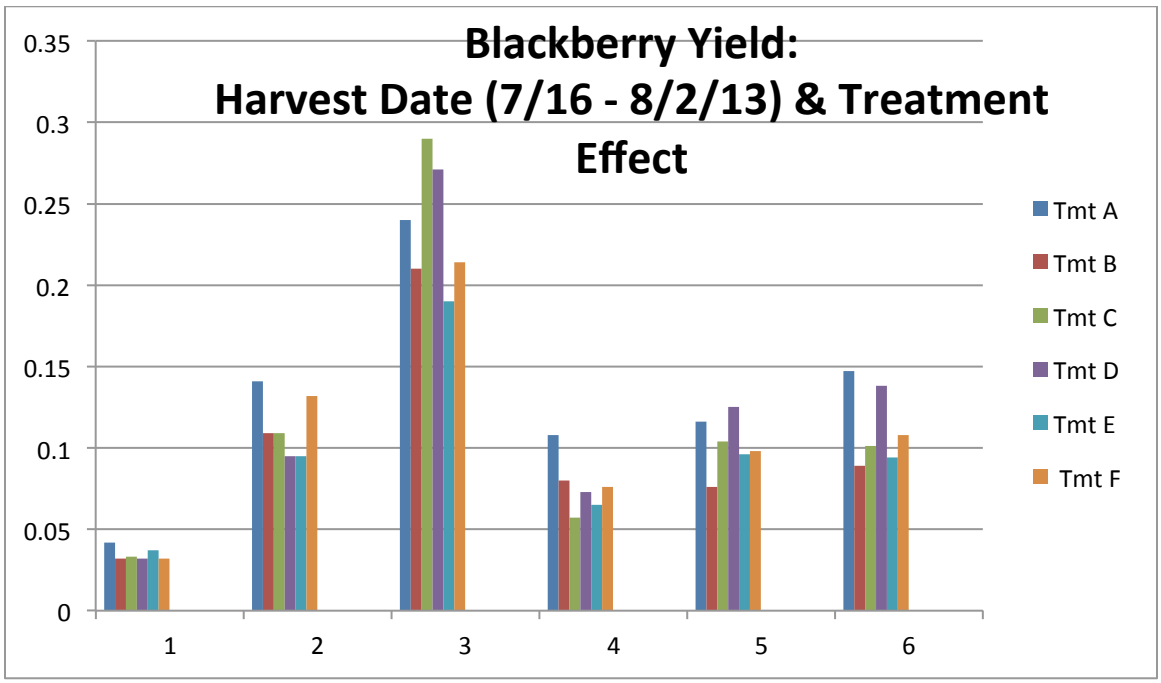
Results:

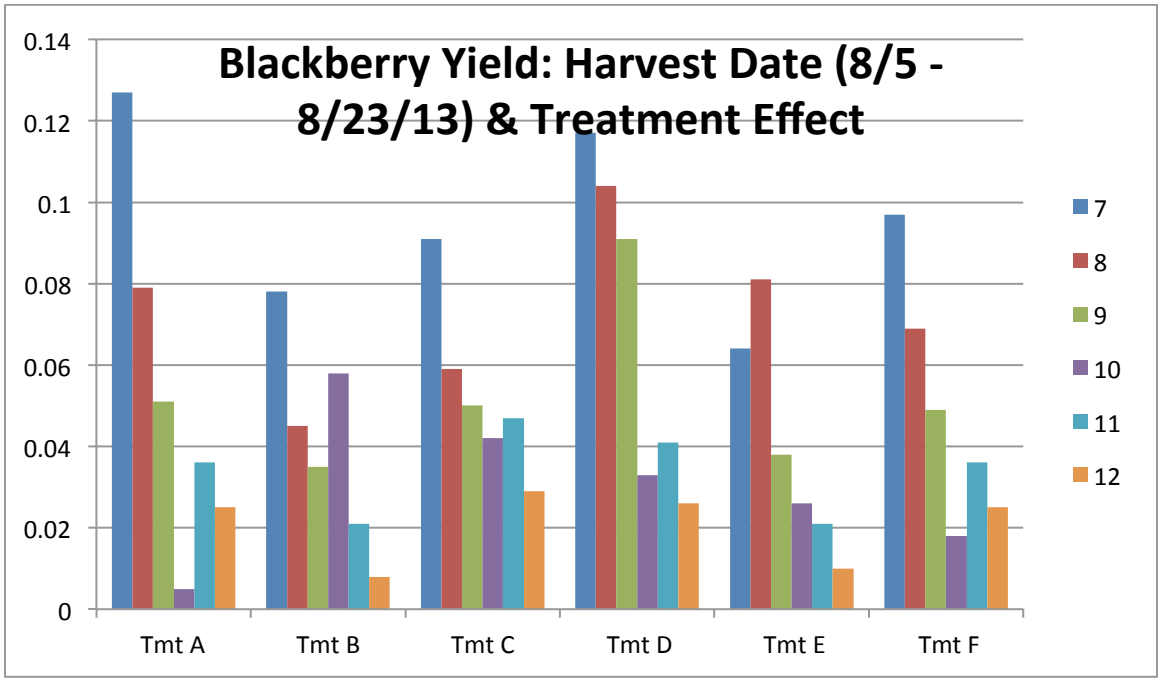
Map of planting:



Effect of Harvest Dates and Treatments on Yields







Harvest began on July 16 and peaked about one week later on July 23. This was by far the heaviest harvest of the season. Yields declined rapidly after that time.

The single nitrogen application when primocanes were just starting to emerge appeared to give the best yields. Weekly fertigation appeared to be promising as did the split application nitrogen treatment. Results were inconsistent throughout much of the season.

Conclusions:

Several factors negatively impacted this trial. Perhaps the first was the loss of a crop due to a very warm March followed by a late frost/freeze event in mid-April of 2012. As a result of this event, cropping was almost completely destroyed. Primocane growth was very strong during the summer of as a result. Spring of 2013 was very wet, cool and cloudy. Bud break occurred about 3 weeks later than normal. The cooler and wetter normal conditions continued into mid-summer. Irrigation was not needed throughout the growing season as a result of the high precipitation.

Based on this year's yield data, it would appear that a single application of nitrogen early in the growing season about the time that the first primocanes began to emerge would be superior to either split applications on nitrogen or fertigation. In a normal situation where regular cropping and less rainfall occurred may give a different response in regards to the various treatments used. With that in mind, it is our intent to continue the same treatments and data collection in 2014.