

Title: Weed Management Practices used Used in Blueberry Production: A Survey of Blueberry Growers in North Carolina

Progress Report

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Extension Proposal

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Objective: 1) To determine the weed management practices employed by blueberry growers, 2) to obtain information about blueberry production operations in North Carolina (soil type, size, weed control methods, varieties, organic certification status), 3) to track changes in the diversity and occurrence of weed species (most common, most troublesome, most threatening) and 4) to develop weed control strategies (where information on control is available).

Justification and Description: North Carolina is the fourth largest producer of blueberries in the U.S. with approximately 5,000 acres harvested in 2005 (NCDA Agricultural Statistics Division, 2006). Within the state, blueberries are the most lucrative fruit commodity with a value of \$36 million in 2005 (NCDA Agricultural Statistics Division, 2006). Although blueberry production is scattered across North Carolina, the coastal plain accounts for 55% of the state's growers and 96% of the state's total acreage (North Carolina Agricultural Statistics, 2002). Within the coastal plain region, the southern coastal plain dominates production, accounting for 45% of the state's growers and 93% of the state's total acreage (North Carolina Agricultural Statistics, 2002). In order to insure the continued success of blueberry production in North Carolina, research must be conducted to develop control methods for the most important weed species that affect the crop.

Currently, there is limited data available on the weed species and management strategies employed in blueberry production in the Southeast. This survey will fill many of these data gaps by requesting information about several topics including production methods, weed history and current weed control (Table 1). With the cooperation of North Carolina county extension agents, the surveys will be distributed to all conventional and organic commercial blueberry producers across the state. The information garnered from the survey will be used to focus weed science research on the most troublesome weeds resulting in developing weed control strategies that are specific to the needs of blueberry production.

Methodologies: A 41 questions survey was designed by the authors and was mailed to 301 blueberry growers in North Carolina in February 2008. The mailing list was compiled with assistance from the North Carolina Blueberry Council, Inc. Additional

grower contact information was obtained from the publicly accessible Appalachian Sustainable Agriculture Project (www.asapconnections.org) and North Carolina Department of Agriculture and Consumer Services (www.naagr.gov) online grower lists. Blueberry growers on the mailing list represent the majority of commercial blueberry acreage in the southeastern part of the state as well as the smaller operations throughout North Carolina. A second mailing of the survey was completed in April 2008. Of the total surveys mailed, 42 were returned unread due to invalid addresses and 18 were returned without being opened, reducing the number of mailed surveys to 241. Completed surveys were considered valid only if growers reported that they currently grew blueberries. A total of 58 valid responses were returned and were entered into the data set. Respondents represent 24% of the 241 surveys successfully mailed and 19% of the total original survey population.

The survey was divided into six sections that included general farm information, scouting and record keeping, education information, fertilizer information, weed history, and current weed management practices (Table 1).

Due to the effects of the Easter freeze on blueberries in 2007, all questions in the survey refer to yield and production methods in 2006. Questions were designed as multiple choice questions with numerically coded answers or as short answer questions. The responses to short answer questions were grouped by similarity. Unless otherwise stated, data were analyzed by determining answer frequencies relative to the total number of responses.

Preliminary Results: The majority of growers (41.5%) participating in the survey grew rabbiteye blueberries. Growers producing a combination of highbush and rabbiteye blueberries were second most common (38%), while growers producing solely highbush blueberries were in the minority (21%). Approximately 44% of the growers produce blueberries in a sandy or sandy loam soil type, while 42% of the growers produce blueberries in a clay loam soil type. Fewer than 10% produce fruit in clay or loam type soil. Of the responding growers, only 1% are certified organic producers, while 9% are planning to become certified. Roughly 24% of the respondents state that they produce organic blueberries but are neither certified nor plan to become so. The majority of survey respondents (65%) do not produce blueberries organically.

Twenty-nine different row spacing dimensions were provided by responding growers. Survey results suggest that blueberries are most commonly planted on a spacing of 6 x 12 ft (11%). Row spacing of 5 x 10 ft, 6 x 10 ft, and 3 x 9 ft, each accounting for approximately 9%, were the next most common. Row spacing of 8 x 10 ft and 4 x 10 ft were third most common and each accounted for 6% of responding growers. All additional row spacing dimensions were only reported by a single producer.

There were eight initial harvest dates indicated by growers, ranging from the third week of May to the third week of July. In 2006, the third week of June was the most common time period reported for the initial harvest date (31%). The third week of May (19%) and the first week of July (14%) were the second and third most common starting times for harvest. Number of harvested acres ranged from 0.1 to 450 and averaged 37 acres per grower. Of the 42 responding growers who provided harvest information, 76% harvested fewer than 10 acres, 12% harvested between 10 and 100 acres, and 14% harvested greater than 100 acres. Information on total yield was reported by 38 growers.

Yield ranged from 12 to 8200 lb/A and averaged 2786 lb/A. Approximately 14% of responding growers harvested less than 500 lb/A, 34% harvested 1000 to 3000 lb/A, and 36% harvested greater than 3000 lb/A.

Conclusions: Additional data is being analyzed and will be presented in a final report available in 2009.

Impact Statement: Results from this survey will be used to focus weed science research on the most troublesome weeds and to develop weed control strategies that are specific to the needs of blueberry production.

Citations: One article will be submitted to Weed Technology in 2009.

Table 1: Categories included in the survey for weed management practices implemented in blueberry production. Information requested in each category is also provided.

Survey Category	Information Requested
1) General Production Information	Soil type, organic certification status, varieties by age and acreage, yields
2) Scouting and Record Keeping	Frequency of scouting, who scouted, types of record keeping
3) Educational Information	Where is weed management information obtained, how often is the internet used
4) Fertilizer Information	Type of fertilizer, frequency and acreage of application
5) Weed History	Mulching, changes in weed problems, location of ditches in field
6) Current Weed Management	Types of weeds causing greatest losses and interfering with harvest, types of weed control techniques, sanitation strategies, herbicides used, herbicide resistance