NEW YORK STATE BERRY GROWERS ASSOCIATION RESEARCH REPORT 2005

Strengthening Integrated Blueberry Disease Management in New York State

Dena Fiacchino, Cathy Heidenreich, Wolfram Koeller

Introduction: The small fruit industry in New York, coming into it's own in the early 1990's, continues to gain dollar value in the NY economy. 2003 blueberry production for New York totaled 650 tons harvested from 700 acres of bearing age. Annual production valued approximately $2.58 US million, an increase of over 1% from $2.25 million in 2002, ranking New York 9th in the nation in blueberry production. Two emerging disease problems in NY blueberry production are mummyberry shoot blight and hard rot of fruit, and ripe rot or anthracnose. These diseases were sporadic in distribution and occurrence in the early history of NY blueberry production, but continue to become more prevalent and persistent problems. Phomopsis twig blight remains an annual problem in plantings. Currently, control strategies for blueberry diseases in NY are relatively limited. Growers continue to express concern about their ability to effectively manage blueberry diseases without additional management tools at their disposal. Additional products, well developed and documented for other larger blueberry production areas, have not been fully explored or documented under NY conditions.

The objective of this project is to strengthen integrated disease management for blueberry production in New York State through the following: 1) Evaluation of new and existing products and control strategies for using these products under NY conditions and 2) Increase grower knowledge and awareness through disease talks, workshops, and fact sheet distribution.

Evaluation and demonstration of disease products under local conditions over the course of 2 growing seasons is anticipated to strengthen integrated blueberry disease management, assisting the NY blueberry growers to remain a viable and growing industry.

Objective 1: *Evaluation of new and existing products and control strategies for using these products under NY conditions.*

Materials and Methods: Two initial trials were set up to look at integrated blueberry disease management. The first trial was an observation trial carried out in a grower/cooperator planting at Stan's Berry Patch in West Monroe, NY (site #1) evaluating the timing control program of Indar 75WSP for the control of mummyberry. The trial was laid out on a 5-acre field, utilizing the most severely infected bushes on site. The study was observed in one plot that consisted of seven treatments. Each treatment contained 10 plants, with a total of 60 plants per plot. The treatments were as follows: 1) control (no application received), 2) green tip, 3) green tip plus 5 days, 4) early flower bud (as scales separate, 5) full bloom, 6) full bloom plus 7 days, and 7) one set that received all treatments. The purpose of the trial was to look at the relationship between application timing and phenology for mummyberry control.

A second trial was carried out in a 0.1-acre research planting of 4-year-old 'Blueray' blueberries at NYSAES Cornell University, Geneva campus (site #2). This relatively new planting already had an established history of blueberry diseases including mummyberry, ripe rot, and Phomopsis twig blight. Treatments consisted of various fungicide programs carried out on application schedules as outlined in Table 1. Each fungicide program was applied to 5 double bush replicates, for a total of 10 bushes per treatment. Treatments were arranged in a randomized complete block design. Leaf and flower bud stage were assessed at regular intervals. Each plant was evaluated for numbers of floral cluster and/or mummyberry shoot strikes per plant, and total number of rotted fruits at harvest. Mummies were cut open to verify infection. Berries were rolled between thumb and forefinger to assess possible Phomopsis infection as Phomopsis-infected berries are soft and split open with even slight pressure. To evaluate post-harvest fruit rots, including ripe rot, 25 apparently healthy ripe fruit were collected from each plant and equidistantly spaced on mesh screens in moist chambers in the lab. Disposable gloves were worn to pick fruit and changed between plots to reduce cross contamination. Berries were incubated at room temperature for 14 days. All fruit with symptoms of ripe rot (salmon to pinkish drops of liquid on the berry surface) or other fruit rots were counted and recorded on day 14.

Table 1: Fungicide products, rates, timings.

Trt No.	Material	Rate/A (100 gal)		Timing*	Label restrictions	Target Disease
1	Bravo Weather Stik	3	pt	1, 3	*42 day PHI	Mummyberry/Phomopsis
	alternating with					
	Pristine 38WG	20	oz	2, 4	**only 2 consecutive sprays	Anthracnose/Botrytis
2	Bravo Weather Stik	3	pt	1, 3	*42 day PHI	Mummyberry/Phomopsis
	alternating with					
	CaptEvate 68WDG	4.7	lb	2, 4		Anthracnose/Botrytis
3	Bravo Weather Stik	3	pt	1, 3	*42 day PHI	Mummyberry/Phomopsis
	alternating with					
	Orbit 3.6EC**	6	fl oz	2, 4		Anthracnose/Botrytis
4	Pristine 38WGWG	20	oz	1, 2	**only 2 consecutive sprays	Mummyberry/Phomopsis
	Abound 2.08 F	6.2	fl oz	3, 4	***only 3 consecutive sprays	Anthracnose/Botrytis
5	CaptEvate 68WDG	4.7	lb	1, 2		Mummyberry/Phomopsis
	Abound 2.08 F	6.2	fl oz	3, 4	***only 3 consecutive sprays	Anthracnose/Botrytis
6	Orbit 3.6EC**	6	fl oz	1, 2		Mummyberry/Phomopsis
	Abound 2.08 F	6.2	fl oz	3, 4	***only 3 consecutive sprays	Anthracnose/Botrytis
7	Pristine 38WG	20	oz	1, 2	**only 2 consecutive sprays	Mummyberry/Phomopsis
	Switch 62.5WG	14	oz	3, 4		Anthracnose/Botrytis
8	Orbit 3.6EC**	6	fl oz	1, 2		Mummyberry/Phomopsis

	Switch 62.5WG	14	oz	3, 4	Anthracnose/Botrytis
9	CaptEvate 68WDG	4.7	lb	1, 2	Mummyberry/Phomopsis
	Switch 62.5WG	14	oz	3, 4	Anthracnose/Botrytis

* Timings: 1 = green tip to pink bud; 2 = early bloom to full bloom; 3 = petal fall to green fruit; 4 = green fruit to harvest.

**NOTE: Orbit 3.6EC is NOT currently labeled in New York for use on blueberries. All other products in the trial have New York registration on blueberry.

Results and Discussion: Unfortunately the 2005 growing season was not conducive for blueberry disease development. No significant rain events occurred during the trial period when plants were susceptible to infection by mummy berry and/or inoculum was present at site #1. While mummies were present at both sites and sufficient rain and soil moisture occurred for apothecia to develop at site #1, hot and dry weather conditions did not favor infection. Little or no mummyberry shoot or fruit infections were observed on any bushes at the West Monroe site, including untreated control plants (data not shown).

The same was unfortunately true for site #2 in Geneva. Although preventative applications were made each time prior to predicted rain events, wetting periods did not occur. Additional inoculum (mummies with fully developed apothecia) was brought in from the West Monroe site twice during the trial prior to predicted rain events in the hopes of generating late infections-all to no avail. Incidence of other disease was also very low for the plot; few incidences of shoot or blossom blight were recorded. No significant differences in fruit disease at harvest were observed between treated and untreated fruit (data not shown). Post harvest disease results were similar except with respect to Botrytis fruit rot. Control fruits developed significantly *less* postharvest botrytis fruit rot in comparison to treated fruit. A possible explanation for this is that the wetting events (spray applications) made on treated plants were sufficient to allow development of latent botrytis infections on fruit. These latent infections then may have continued development under the high humidity conditions in the moist chambers post harvest. Untreated plants received no wetting events (sprays); significantly fewer botrytis infections occurred on these fruit post harvest. (data not shown).

The Geneva site has the potential to install overhead sprinklers as part of the existing irrigation system. This would ensure predictable wetting events for future disease trials at this location.

Objective 2: *Increase grower knowledge and awareness through disease talks, workshops, and fact sheet distribution.*

Articles on blueberry diseases and their control were featured through the New York Berry News, an online berry newsletter: www.nysaes.cornell.edu/pp/extension/tfabp/newslett.shtml. Five articles on blueberry diseases appeared in Volume 4 of the newsletter: disease fast facts on mummy berry and Phomopsis canker in the April 14,

2005 issue, a report on cane anthracnose being found in some blueberry fields in the May 13, 2005 issue, an article on prevention of pre- and post-harvest rots in blueberries in the July 15, 2005 issue, disease fast facts on blueberry leaf rust and powdery mildew in the September 30, 2005 issue, and an article on control of Phomopsis canker and cane blight in the November 15, 2005 issue.

Summer twilight meetings were to be planned in conjunction with the disease control trials which would have served as demonstration plots. In the absence of disease development, no meetings of that type were held.

A talk on blueberry disease diagnosis and prevention was given in conjunction with an organic berry production school held in Delaware County in September 2005. Included as a part of this program was a trip to a local blueberry planting where attendees had the opportunity to scout for and begin to identify blueberry diseases and pests.

Grower visits occurred throughout the summer to blueberry operations throughout Oswego and Onondaga counties. Additional visits were made to blueberry operations in Tioga, Tompkins, and Chemung counties during September and October of 2005 to discuss planting health and disease issues.

Three disease fast fact sheets were prepared for distribution at the 2005 Empire Fruit and Vegetable Expo on mummy berry, anthracnose and canker diseases of blueberry. These one-page disease information sheets include color pictures of various stages of the featured disease, information on disease identification, conditions needed for infection, and disease control strategies.