

**SOUTHERN REGION SMALL FRUIT CONSORTIUM RESEARCH PROJECT**  
**Progress Report for 2005 Grant**

**TITLE** Evaluation of Fruit Cracking in Rabbiteye Blueberry Germplasm

**INVESTIGATOR**

D. Scott NeSmith, Professor  
Department of Horticulture, University of Georgia, 1109 Experiment Street  
Griffin, GA 30223  
Phone: 770 228 7358; e-mail: snesmith@griffin.uga.edu

**OBJECTIVE**

To evaluate existing rabbiteye blueberry cultivars and new selections for fruit cracking differences

**JUSTIFICATION**

Rabbiteye blueberries (*Vaccinium ashei* Reade) are well suited for conditions in the Southeast, since these grow well on most acid soils, including those with low organic matter, and because they generally are more tolerant to diseases (Krewer and NeSmith, 2000). However, problems of fruit cracking or splitting in response to excess rainfall during harvest often occur, rendering fresh fruit potential poor, especially for those cultivars harvested later in the season when rainfall is more frequent. Fruit splitting has been studied rather extensively in cherries, grapes, and tomatoes, but the problem in blueberry has received little attention (Marshall et al., 2002).

Fruit splitting has been correlated to soil water content, water uptake and berry osmotic potential in cherries (Anderson, 1982; Sekse, 1995 and 1998), however, recent research with blueberries indicated little correlation with various fruit physiological parameters and incidence of fruit cracking (Marshall et al., 2002). Apparently, fruit cracking in rabbiteye blueberry is cultivar specific, and the incidence of splitting needs to be determined for current cultivars and germplasm being used to advance breeding (Marshall et al., 2002). Therefore, the objective of this research was to survey current rabbiteye cultivars along with selections in the University of Georgia Blueberry Breeding Program for incidence of fruit cracking in response to a standard screening protocol.

**METHODS**

The UGA Blueberry Breeding Program has numerous standard rabbiteye cultivars readily growing, along with a number of selections at locations in south and middle Georgia (NeSmith, 2004). Thus, germplasm for this study was readily available. In order to assess variation in fruit cracking, the method designated by Marshall et al. (2002) was

employed. Briefly, berries from each blueberry line of interest were harvested at commercial maturity and were submerged in distilled tap water overnight (14 to 16 hours). The following day, individual berries were examined from each line, and the number of berries with observable splits was recorded. Berries were obtained for each line at multiple harvests dates. Cultivar standards included Austin, Alapaha, Brightwell, Climax, Columbus, Premier, Powderblue, and Ochlockonee. Additional lines included advanced selections from the UGA Breeding Program.

## **RESULTS**

The fruit cracking assay worked well, yielding a range of results for various cultivars and selections (Table 1). The standard cultivars with the lowest degree of fruit cracking were Premier, Alapaha, and Austin. These cultivars generally ripen during the early season in south Georgia when rains are less frequent. Late season cultivars are usually those exposed to the greatest danger of fruit cracking in response to rainfall. For the late season, the cultivars Columbus, Ochlockonee, and Powderblue displayed only a mild cracking response. Thus, these would be favorable cultivars for production during wet periods. With regards to new selections, several displayed a high degree of cracking, while some selections cracked only a small amount. These selections will be evaluated carefully for their potential use in fresh market rabbiteye fruit production.

The protocol used only evaluated if cracks were present in response to the overnight soaking. There was no quantification of cracking severity, although a range in degree of cracking was present (Figure 1). However, observations suggested that those cultivars and selections with a low degree of splits were also ones with less severe cracking. An exception was 'Brightwell'. While this cultivar only had a medium number of splits, observations indicated the splits were very severe, especially as compared to a cultivar with a low degree of cracking such as 'Alapaha' (Figure 2). Thus, in future evaluations, the degree of splitting severity should be assessed as well as the amount of splitting.

## **IMPACT**

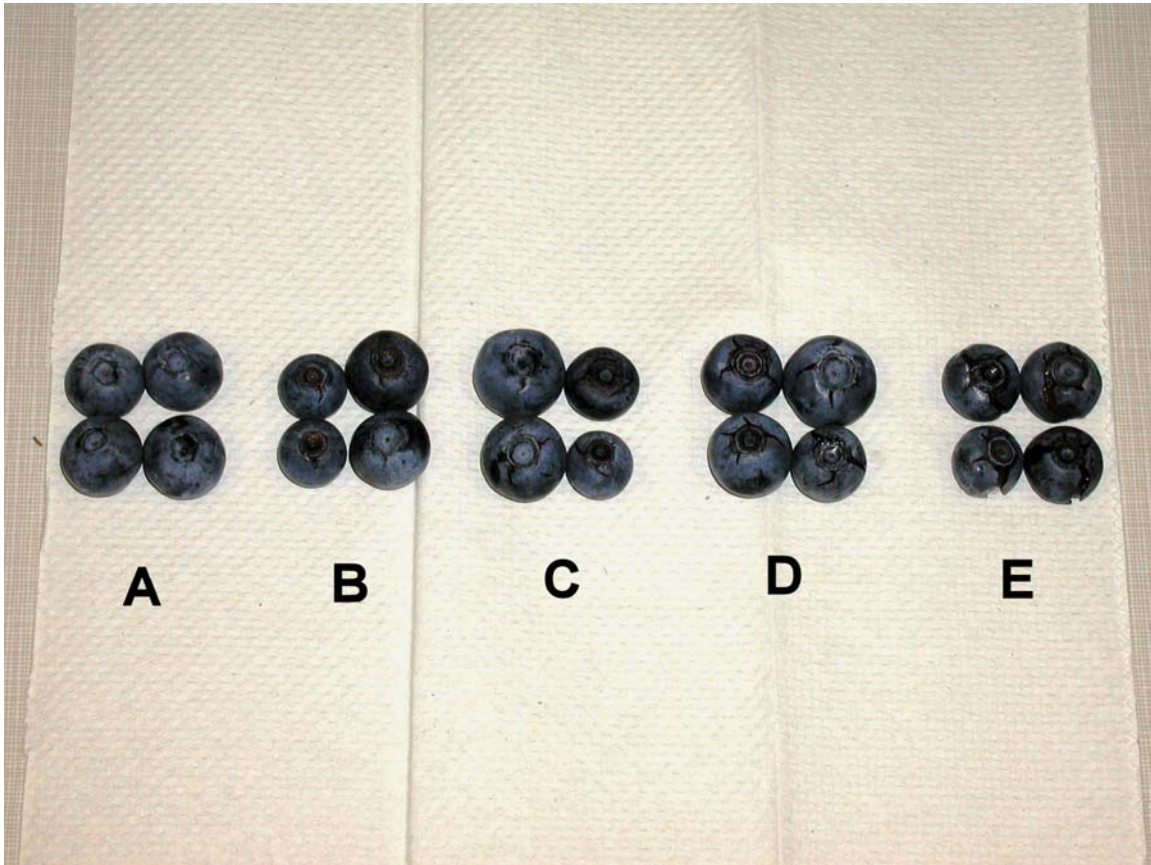
These initial data indicate that the protocol used in this experiment is valuable in identifying rabbiteye blueberry cultivars and selections that may be pronged to fruit cracking in response to heavy rainfall during ripening. The amount of cracking was greater than was actually observed under field conditions, but the relative ranking of the germplasm was similar. The results are useful for growers as they contemplate which cultivars to grow in humid regions.

## LIST OF REFERENCES

- Anderson, P.C. and D.G. Richardson. 1982. A rapid method to estimate fruit water status with special reference to rain cracking of sweet cherries. *J. Amer. Soc. Hort. Sci.* 107: 441-444.
- Krewer, G. and D.S. NeSmith. 2000. Blueberry cultivars for Georgia. University of Georgia Fruit Publication 00-2.
- Marshall, D.A., J.M. Spiers, K.J. Curry. 2002. Incidence of splitting in 'Premier' and 'Tifblue' rabbiteye blueberries. *Acta Hort.* 574: 295-303.
- NeSmith, D.S. 2004. Blueberry cultivar development at the University of Georgia. A progress report for 2003. Posted at [www.smallfruits.org/Blueberries/production/alap03Report.pdf](http://www.smallfruits.org/Blueberries/production/alap03Report.pdf).
- Sekse, L. 1995. Fruit cracking in sweet cherry (*Prunus avium* L.). Some physiological aspects – A mini review. *Scientia Hort.* 63: 135-142.
- Sekse, L. 1998. Fruit cracking mechanisms in sweet cherries (*Prunus avium* L.). A review. *Acta Hort.* 468: 637-648.

**Table 1.** Percent of fruit that split in response to overnight soaking for several rabbiteye blueberry cultivars and advanced selections. Estimated dates of 50% ripening are also included.

<b>Cultivars and selections</b>	<b>Percent of berries with splits</b>	<b>Date of 50% ripening</b>
Alapaha	8.0	June 13
Austin	9.0	June 22
Brightwell	20.0	June 27
Climax	26.0	June 19
Columbus	11.0	June 24
Ochlockonee	14.0	July 19
Powderblue	13.0	July 12
Premier	6.0	June 24
Tifblue	45.0	July 10
Vernon	15.0	June 17
T-451	66.0	July 9
T-459	67.0	July 12
T-630	15.0	June 18
T-655	19.0	June 28
T-670	28.0	June 30
T-671	52.0	June 25
T-672	17.0	June 27
T-674	11.0	June 27
T-675	66.0	June 30
<b>LSD<sub>0.05</sub></b>	<b>19.5</b>	---



**Figure 1.** Range in cracking severity in response to soaking treatment. (A) no visible cracking, (B) 1 or more small hair-line cracks, (C) more prominent cracks, (D) frequent cracks observed, some leakage present, (E) severe cracks and rupturing of the berry skin observed, with considerable leakage.



**Figure 2.** Brightwell rabbiteye blueberry showing severe fruit cracking in response to rainfall in the field (upper photo), and Alapaha rabbiteye blueberry showing little fruit cracking (lower photo).