SOUTHERN REGION SMALL FRUIT CONSORTIUM RESEARCH PROPOSAL

Progress Report for SRSFC Research Project No. 2007-10

TITLE Evaluation of Southern Highbush Blueberry Advanced Selections for Mechanical Harvesting for Fresh Market Sales

INVESTIGATOR

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OBJECTIVE

To evaluate southern highbush blueberry advanced selections for their potential to be mechanically harvested for the fresh market.

JUSTIFICATION

Southern highbush blueberry production has rapidly expanded in Georgia in the past decade. The attractiveness of this blueberry species for growers has largely been related to the high prices received in the early market windows of late April and early May. While prices have remained good, expectations are that market prices for fresh fruit will decline as acreage expands and production supply increases. Currently, almost 100% of the early ripening southern highbush grown in the lower Southeast (Ga., Fla., Miss.) are harvested by hand. Hand-harvesting expense is considerably greater than the cost of mechanical harvesting; although, fresh fruit quality can be greatly diminished when harvesting with a machine (Brown et al., 1996). The higher harvesting costs associated with hand-harvesting, coupled with troublesome labor issues growers face has elevated the interest in mechanical harvesting of southern highbush. Thus, cultivars suitable for machine harvesting are needed.

The current industry standard southern highbush cultivars grown in Georgia were released with hand-harvesting operations in mind. However, due to the reasoning presented above, there is a great need for blueberries that can be adapted to machine harvesting of fruit for the fresh market. While a number of traits render a blueberry selection suitable for mechanical harvesting, one of the more important aspects is berry firmness. Over the past 5 years, we have identified several southern highbush selections in the University of Georgia Blueberry Breeding Program that have very firm fruit (NeSmith, 2006). Therefore, the objective of this project is to establish plantings of these advance selections to determine their potential for mechanical harvesting.

METHODS

This research project is being conducted at the UGA Blueberry Research Farm near Alapaha, Ga. Five UGA advanced selections were identified as those with potential to be harvested mechanically due to their berry firmness, fruit quality, and plant vigor (NeSmith, 2006). These selections (TH-653, TH-662, TH-664, TH-665, TH-667) along with two standard cultivars (Star and Palmetto) were established in the winter of 2007 in large field plots. Whole rows of each selection containing 40 plants each were planted so that the entire row can be harvested with a machine. There are three replications for each selection. Pine bark mulch was used in the highbush planting since soils at the site are not typical of those used to grow the species. The plants will be grown for two years to achieve reasonable size to begin the harvesting evaluation. Annual pruning to shape plants for mechanical harvesting will be conducted. The study is expected to last a minimum of 5 years.

The UGA research farm is equipped with a LBT tractor pulled mechanical harvester (provided by BEI). Beginning the third year, each selection will be harvested 2 to 3 times annually using the machine. The first harvest will begin when 30 to 40% of the berries of a selection are ripe. The harvested fruit will be taken through sorting and

packaging procedures that simulate commercial operations. There is a small packing line at the UGA Blueberry Farm (also provided by BEI). The machine-harvested fruit will be compared to hand-harvested fruit of each of the selections with regards to postharvest quality. Quality assessment will include measurement of fruit firmness using a FirmTech II assessment device (NeSmith et al., 2002; NeSmith et al., 2005; Tetteh et al., 2004). A protocol will be used that measures initial firmness at harvest, followed by firmness measurements after 72 h of storage at room temperature (25 C). This effort will reveal not only firmness at harvest, but firmness losses in response to elevated temperature. Overall visual assessment of fruit will be made as well to determine suitability for fresh market usage.

RESULTS

Plots for this project were established at the UGA Blueberry Research Farm near Alapaha, Ga. in 2007. Routine field maintenance was conducted throughout 2007, and will continue for the next 5 years. This first year of the project is simply an establishment year. Data concerning machine harvesting cannot be taken until the 2009 growing season.

IMPACT

There is great interest in blueberry cultivars that can be mechanically harvested for fresh market sales among growers. This trial will be on display at the UGA Blueberry Research Farm which is open to visits by growers. Also, an annual Blueberry Field Day is held each spring, and the test plots will be shown to growers in attendance. Development of blueberry varieties than can be mechanically harvested can reduce harvesting costs from over $0.55/lb to less than $0.10/lb. This is a savings of more than $4.5 million per 10 million lbs of fruit. Georgia alone currently produces more than 25 million lbs annually. In addition to harvest cost savings, development of mechanical harvested blueberry cultivars would substantially reduce reliance on migrant labor for the blueberry industry.

LIST OF REFERENCES

Brown, G.K, N.L. Schulte, E.J. Timm, R.M. Beaudry, D.L. Peterson, J.F. Hancock, and F. Takeda. 1996. Estimates of mechanization effects on fresh blueberry quality. Appl. Eng. Agric. 12: 21-26.

NeSmith, D.S. 2006. Blueberry cultivar development at the University of Georgia. A progress report for 2005. Posted at www.smallfruits.org/Blueberries/production/alap05Report.pdf .

NeSmith, D.S., A. Nunez-Barrios, S.E. Prussia, and A. Aggarwal. 2005. Postharvest berry quality of six rabbiteye blueberry cultivars in response to temperature. J. Amer. Pomol. Soc. 59: 13-17.

NeSmith, D.S., S.E. Prussia, M. Tetteh, G. Krewer. 2002. Firmness losses of rabbiteye blueberries (*Vaccinium ashei* Reade) during harvesting and handling. Acta Hort. 574: 287-293.

Tetteh, M.K., S.E. Prussia, D.S. NeSmith, B.P. Verma, and D. Aggarwal. 2004. Modeling blueberry firmness and mass loss during cooling delays and storage. Trans. Amer. Soc. Agri. Engin. 47: 1121-1127.