

Southern Region Small Fruit Consortium Grant Progress Report Outreach E-02

Proposal Template. (Complete all sections)

Proposal Category: ___ Research Outreach

Proposal Status: ___ New Proposal Previously funded by SRSFC; has been previously funded for ___1___ years

Title: Developing a Postharvest Guide for U.S. Southern Region Fresh-market Small Fruits

Name, Mailing, and Email Address of Principal Investigator(s):

| Principal Investigator | Co-Investigator #1 | Co-Investigator #2 | Co-Investigator #3 | Co-Investigator #4 |
|--|---|--|--|--|
| Penelope Perkins-Veazie N.C. State University 600 Laureate Way Kannapolis, NC 28081 penelope_perkins@ncsu.edu | Renee Threlfall Univ. Arkansas 2650 N. Young Ave. Fayetteville, AR 72704 rthrelf@uark.edu | Angelos Deltsidis Univ. Georgia 2360 Rainwater Rd, Hort. Bldg. 123, Tifton, GA 31793-5766 adeltsidis@uga.edu | Amanda McWhirt Univ. Arkansas almcwhir@uark.edu | Mark Hoffmann N.C. State University 2721 Founders Dr. Raleigh, NC 27695-7609 Mark.hoffmann@ncsu.edu |

Public Abstract:

Fresh market small fruit must be free of decay or injury, and appear neither under or overripe to ensure consumer purchase. Many of the small fruits have to be harvested at or near ripeness in order to be sweet, and lack a protective rind or peel, making them prone to bruising and shortening storage life. Small fruit production has expanded greatly in the southern US, and a need exists for standardized methods to extend storage life and/or for evaluation of the storage of new germplasm. In 2024, a collation of the more common methods routinely used in postharvest and food science

labs for small fruit evaluation was developed. In 2025, we prepared a prototype for a small fruits guide for postharvest evaluation for use by researchers, growers and extension agents.

Introduction

The popularity of small fruits, especially for fresh-market consumption, has increased tremendously with all-season access and interest in human health properties. Often, consumers purchase based on visual appearance (color, gloss, lack of decay/injury) and make repeat buys based on sensory qualities such as firmness/texture, sweetness, flavor. A large amount of fruit quality data for research has been generated over the years as small fruit interest grows. However, methods vary in thoroughness and approach. Defined methods for small fruit quality postharvest assessment would be especially useful for new personnel in extension and research. Additionally, the release of new small fruit cultivars with improved shelf life and other quality attributes, and availability of rapid methods and equipment requires adaptation and refinement of methods of analysis.

Fruit quality can be divided into multiple areas, such as visual appearance and appeal, flavor and sensory attributes, and phytonutrient and nutrient content. Assays for destructive aspects of quality, such as sweetness, acidity, and phytonutrients, have prompted questions about sample size and uniformity, preparation of the fruit, and availability of simple and less laborious methods for analysis. In some cases, questions arise about the value of juice vs puree for assays, or how to dilute samples for titratable acidity, or best methods to measure titratable acidity. In other cases, a guide for minimum/maximum values is needed to determine if methodology is being done correctly, such as amounts of total anthocyanins or ascorbic acid values reported for a fruit. Additionally, setting up experiments for postharvest measures such as respiration and ethylene benefits in knowledge of formulas to calculate void space, addition of gases, and rates of gas production by fruit.

Description of Outreach Activity:

Research methods were outlined in year 1. This year, we have assembled a guide of methods. A sample audience hands on trial to compare soluble solids content and titratable acidity of strawberries was done at the North Carolina Strawberry Association meeting. Teachers at the School Garden Institute held at Catawba College, NC also did hands-on training to learn how fruits can differ in sweetness and to stimulate STEM projects for students to teach how scientific questions or hypothesis can be used to evaluate fruit flavor relative to soluble solids content.

A draft of written content for postharvest evaluation is about 2/3 complete and a virtual workshop will be held in February to assess need for other content, such as the need for logistical information such as types and uses of freezers (-20 vs -80C), processes most needed or standardized evaluation systems that can be used, randomization of harvests and number and size of replicates, etc.