



Evaluation of quality characteristics found in Georgia peach (*Prunus persica* L.) cultivars

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Introduction

Peaches are a major agricultural commodity in the Southeastern U.S., particularly in South Carolina and Georgia. Yield (Hg/Ha) of fresh peaches and nectarines has increased by 32% from 2000 to 2010, while area being harvested (Ha) has declined by 23% in that time.¹ Peach consumption per capita has declined gradually from 6.0lb in 1990-1992 to 4.4lb in 2012.² This reduction has been associated with consumer's disapproval of peach fruit quality.

Commonly, fruit quality in peaches is determined by sweetness and acidity. These characteristics are objectively measured by examining the soluble solid concentration (SSC) and total titratable acidity (TTA). In previous studies, SSC with a minimum of 11% and TTA of $\leq 0.7\%$ were found to be determinants of good quality in peach.³

As peach consumption continues to decline, a detailed study into quality characteristics is necessary to determine the primary factors influencing consumption of this beloved fruit.

The main objective of this study was to examine the variation present in sugar and acid content within some commonly grown peach varieties in Georgia. Additionally, profiles of sugars and acids were examined for each variety.

Materials and Methods

Sample Preparation: Flesh from five representative peach fruit from three trees per variety were harvested from 14 varieties grown in Middle Georgia. Samples per tree were stored in freezer bags at -80°C. Frozen bags were thawed at 4°C for 24h before processing.

Extracting Peach Juice: Representative samples were puréed. Thirty-three grams of the peach purée were weighed per tree and centrifuged at 12,100rpm in a ultracentrifuge (Model, Company, City, Country). Three to five replicates were used. Juice supernatant was filtered using cheesecloth and stored at -20°C for later processing in 15mL conical tubes.

Fruit analysis: Approximately, 300μL of thawed peach juice were used to measure SSC (Brix) using a handheld refractometer (Model, Company, City, Country). TTA was measured from 6mL of juice diluted in 50mL of water using a Mettler Toledo autotitrator (Company, City, Country). In addition, three representative samples per variety were quantified for sugars and acids using standards on HPLC.⁴

Data Analyses: Data analyses for mean separations were performed using Tukey test in SAS Software (Cary, NC). Principal component analyses (PCA) were performed using XLSTAT package in excel.

Results

- Lowest sugars and acids were found in 'Blazeprince'
- Highest sucrose and total sugar concentrations were found in 'Early August Prince' and 'Gala'
- SSC values ranged from 8.2 to 13.0 for 'Springprince' and 'Gala'
- Total sugars ranged from 14.9 to 40.2 mg/g for 'Blazeprince' and 'Early August Prince'
- TTA ranged from 0.74 to 1.13 for 'Springprince' and 'Juneprince'
- Total acid values ranged from 4.2 for 'Blazeprince' to 34.1 mg/g for 'Redglobe'

Variety	SSC (%)	TA (%)	SSC:TA	Total Sugars (mg/g)	Total Acids (mg/g)					
Blazeprince	10.07	EF ²	0.90	ABC	11.23	CD	14.90	D	4.15	B
EAPLane	10.93	CDEF	0.92	ABC	12.23	ABCD	30.67	ABC	6.28	B
EAPPearson	11.20	BCDEF	0.82	BC	13.80	ABC	40.17	A	7.80	B
Flavorich	9.83	FG	1.12	A	8.83	D	25.53	BCD	7.81	B
Gala	13.03	A	0.90	ABC	14.47	ABC	39.80	A	8.54	B
Harvester	11.10	BCDEF	0.85	BC	13.13	ABC	24.87	BCD	6.74	B
Juneprince	10.23	DEF	1.13	A	9.00	D	33.70	AB	8.63	B
Red Globe	11.80	ABCD	0.89	ABC	13.23	ABC	25.77	BCD	34.15	A
Rich Lady	12.67	AB	0.91	ABC	13.87	ABC	22.60	BCD	8.45	B
Rubyprince	9.87	FG	1.06	AB	9.44	D	22.60	BCD	6.81	B
Ruston Red	11.63	ABCDE	0.75	C	15.70	A	26.07	BC	5.29	B
Scarlet Prince	10.50	CDEF	0.75	C	14.10	ABC	19.93	CD	7.22	B
Sierra Rich	12.10	ABC	0.81	BC	14.91	AB	24.53	BCD	9.23	B
Springprince	8.23	G	0.74	C	11.16	CD	21.97	CD	8.11	B
Sureprince	11.00	BCDEF	0.91	ABC	12.07	BCD	23.10	BCD	10.68	AB

²Similar letters within columns are not significantly different, Tukey test, $\alpha=0.05$.

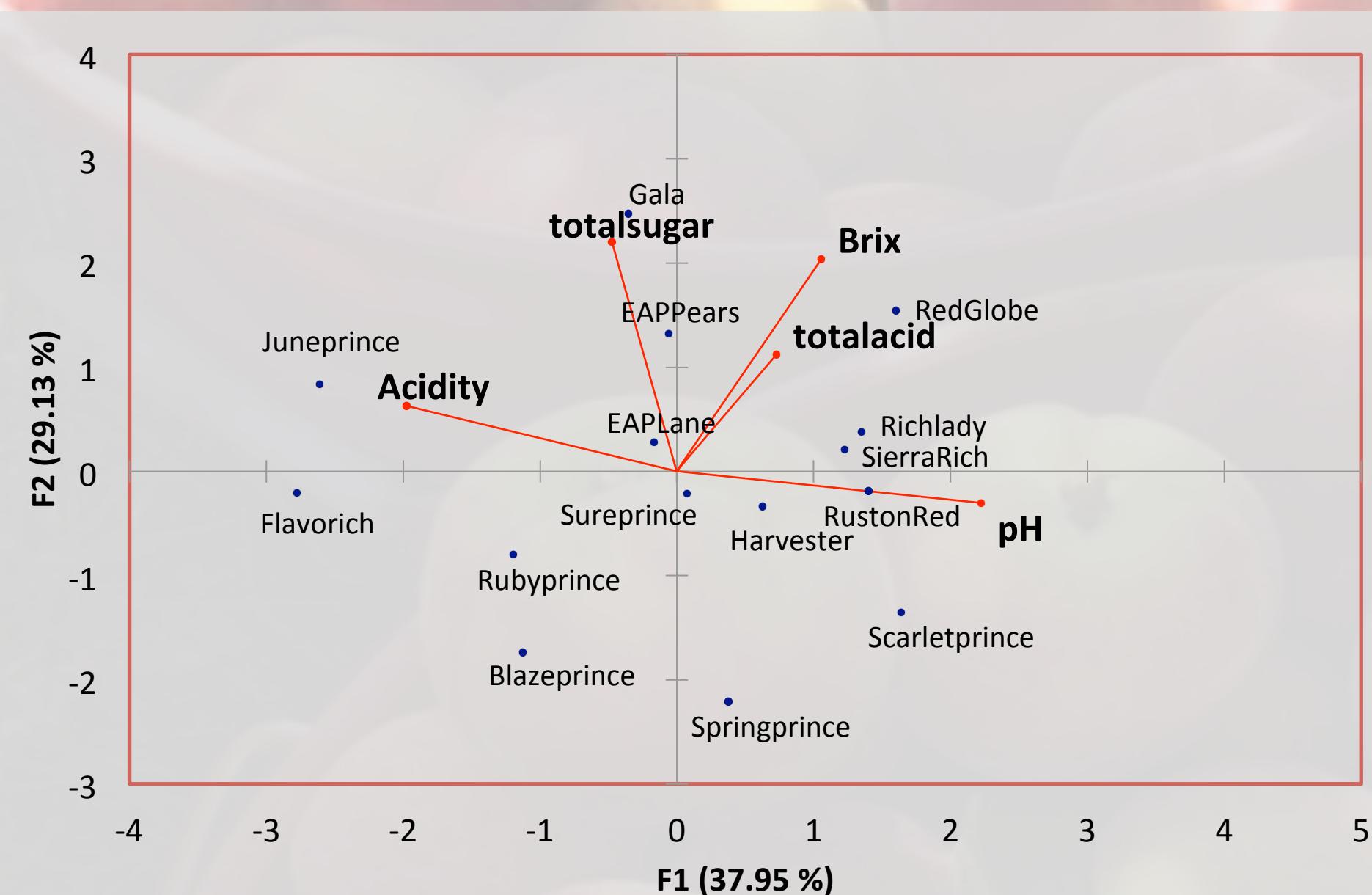


Figure 1. Principal Components Analysis Biplot: Flavor composition of peach cultivars

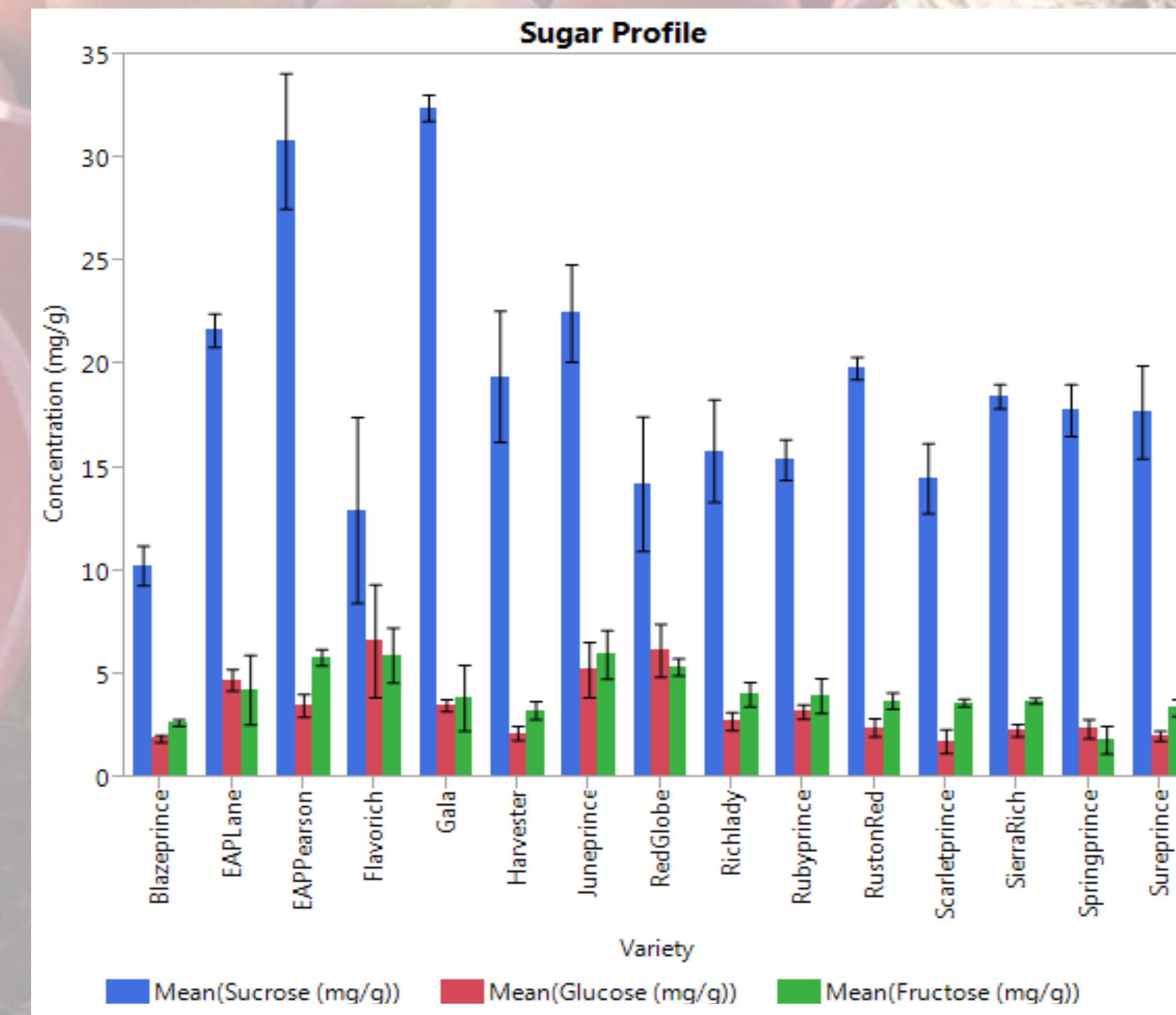


Fig. 2. Sugar profile of peach cultivars

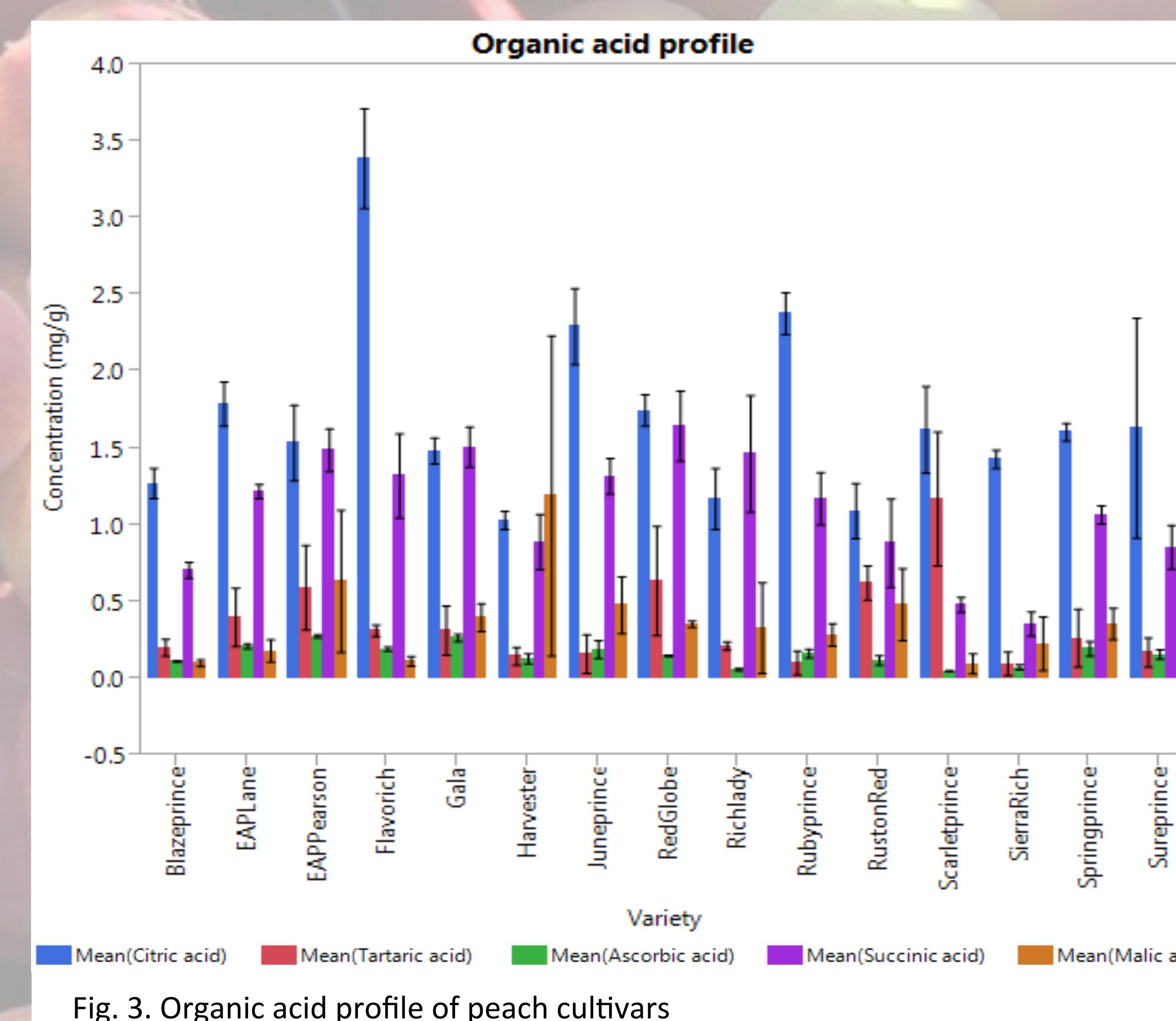


Fig. 3. Organic acid profile of peach cultivars

References:

¹USDA, ERA.; ²FAOSTAT.. 2013.

³Crisosto & Valero. 2008. *The peach. Botany, Production and Uses.*, Chapter 22.

⁴Burbage. 2014. *Organic Acids: Method Development.* UGA.

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