

## 1. Research projects

Objective 2 - Develop practices for small fruit production tailored for climatic and market needs of growers.

### **Effects of weather, farm location and management practices on flavor development in strawberry**

We measured variation in total soluble solids (SSC), titratable acidity (TA), phenolic content, and aroma volatiles in fruit from a single cultivar (Jewel) across three years from up to 22 farms across New York State, and across nine different management practices on the same field site. Management practices varied in intensity and source of inputs. Our goal was to determine the relative contribution of weather, farm location and management practice to flavor variation. We hypothesized that SSC, TA, and the volatile profile would vary when grown at different sites and that management-induced variation in fruit quality would have measurable effects on sensory qualities when grown on the same site. However, we found that management practice was not associated with fruit quality traits; different levels of soil carbon inputs, N rates, and non-fertilizer inputs were not associated with variation in SSC, TA, volatile profile, or phenolic content. A human sensory evaluation found no perceptible differences in flavor or aroma of 'Jewel' grown under different management regimes. Yields were positively correlated with total N application in the form of urea, while organic N rate was not a significant predictor of yield. In contrast, quality attributes varied significantly from farm-to-farm, but year-to-year variation was even greater. Accumulated growing degree days (GDD, base 13.4°C) from 1 April was sometimes weakly correlated with SSC and TA of fruit, but variation in aroma was not associated with local climate data. Our findings suggest that year-to-year variation in chemical composition is sufficiently large to affect sensory perception of flavor. Farm-to-farm variation in TA and SSC is smaller but still potentially detectable, but variation from differing management practices at the same location was not detectable by a human sensory panel nor by statistical analyses.

### **Low tunnel cover effects on day neutral strawberries**

Standard low tunnels are typically covered with various plastics that vary in their light transmission properties. Some exclude U.V. radiation, some diffuse the light, etc. We are testing novel coverings against a standard plastic cover in an 'Albion' planting. The first novel covering is a fabric used as shade cloth in some greenhouse operations. It consists of strips of reflective material throughout a mesh fabric. The mesh size is large enough to not trap heat but small enough to exclude certain insect pests. Three fabrics are being tested that include

different densities of reflective strips. The purpose is to reduce the heat load under the fabric while simultaneously excluding insect pests. A second cover is manufactured in France and actually shifts wavelengths of light into the PAR range (<https://www.lightcascade.com/en/applications/#>). This pink plastic covering has shown potential in France under low light conditions. Our hypothesis is that plants will benefit from this covering later in the growing season.

## 2. Publications

### 1) Extension updates

- a. We are in the process of updating our berry diagnostic tool (<https://blogs.cornell.edu/berrytool/>)
- b. We have revised our high tunnel production guide for raspberries and blackberries (<http://www.hort.cornell.edu/fruit/pdfs/high-tunnel-brambles.pdf>)
- c. We wrote guidelines for PYO farms (<https://smallfarms.cornell.edu/wp-content/uploads/2020/05/Cornell-U-Pick-Best-Practices-COVID-19.pdf>) and agritourism (<https://smallfarms.cornell.edu/wp-content/uploads/2020/09/Cornell-Agritoursim-BMPs-COVID.pdf>) under COVID-19 conditions
- d. The Strawberry Production Guide for the Northeast is being revised

### 2) Refereed Publications:

Osatuke, A. and M. Pritts. 2021. Development of quality attributes in strawberry fruit: A review. J. Amer. Pomol. Soc., in press.

Stockton, D.G., Hesler, S., Wallingford, A.K., Leskey, T.C., McDermott, L., Elsensohn, J.E., Riggs, D. I., Pritts, M., Loeb, G.M. 2020. Factors affecting the implementation of exclusion netting to control *Drosophila suzukii* on primocane raspberry. Accepted for publication, 18 April 2020, *Crop Protection*, article ref no. JCRP\_105191.

Pritts, M.P and T.M. Sjulín. 2019. Strawberries: A case study of how evolving market expectations impact sustainability. In: Lang, G. A. (ed.), *Achieving sustainable cultivation of temperate zone tree fruits and berries Volume 2: Case studies*, Burleigh Dodds Science Publishing, Cambridge, UK.

Gannett, M., M.P. Pritts and J. Lehmann. 2019. Soil amendments affect soil health indicators and crop yield in perennial strawberry. *HortTechnology*: 29: 179–188