Potatoes grown in Florida are commonly known as ‘immature’ or ‘new’ potatoes. They are characterized by a thin tuber skin, which easily slips off during harvest and handling. Currently, there is limited research on preharvest and postharvest factors affecting the storage quality of these new potatoes. Therefore, over the last few years, we have conducted studies in two main areas in the Tri-County Region.

1. **Evaluating the effect of harvest time and storage conditions on the development of lenticel disorders in potato tubers.** (2009-2010)

Enlarged lenticel is a physiological disorder affecting tuber skin and is known to be caused by excessive moisture conditions. In storage, the lenticel cells expand, forcing the aperture to increase in size. The area immediately surrounding the lenticel aperture may also be raised or become darkened, forming a ‘halo’ around the lenticel aperture (Fig 1A, B). The objective of this research was to evaluate the effects of harvest time, storage temperature and relative humidity (RH) on the development of enlarged lenticel and halo disorder in two widely grown, fresh-market potato cultivars, ‘Fabula’, (yellow-flesh/tan skin) and ‘Red LaSoda’ (white flesh/red skin).

Potato tubers were hand-harvested at four intervals: prior to vine kill and weekly for 3 weeks after vine kill. The freshly harvested tubers were stored for 12 days under simulated commercial conditions: 10°C or 20°C (50 °F or 68 °F), and low (65%) or high (95%) relative humidity (RH). Incidence and severity of the enlarged lenticel and halo disorders were rated by the average diameter of each.

Our results showed that:

- In ‘Fabula”, an interaction of high storage temperature and high relative humidity (20°C, 95% RH) triggered development of the lenticel disorder. Incidence of halos increased when tubers were stored at low humidity (10 and 20 °C, 65% RH).
- ‘Red LaSoda’ tubers developed enlarged lenticels under all four storage conditions, with the disorder being more apparent at high humidity conditions. The highest severity of the raised halo disorder was observed under warmer, more humid conditions, 20°C, 95% RH.
- Therefore, to avoid severe incidence of enlarged lenticels, and to minimize weight and moisture loss, ‘Fabula’ tubers should be stored at 10°C, 95% RH, while ‘Red LaSoda’ can be stored at 10°C, 65% RH since the variety is still able to maintain tuber quality under these conditions.

![Figure 1: Potato lenticel disorders. A) Proliferated lenticels. B) Enlarged lenticels with halos.](image-url)
2. **Evaluating the effect of irrigation method and harvest time on compositional, nutritional and skin quality of potato tubers at harvest and during postharvest storage.** (2011 – Present)

Increased understanding of how Best Management Practices (BMPs) help optimize crop production while conserving the environment and water resources has triggered growing interest in both growers and researchers to fully explore the potential of more efficient irrigation methods, such as drip, in spring potato production in Florida.

The objective of this research is to compare three irrigation methods (seepage, surface drip and sub-surface drip) and harvest time on the compositional, nutritional, and skin quality of two tablestock potato cultivars. We are evaluating what we have termed ‘rapid curing’ as a means of reducing quality loss of new potatoes during storage. This procedure involves storing tubers for a shorter duration under higher temperatures and RH compared to standard curing conditions. During curing, suberin is deposited on the tuber skin (Fig 2), minimizing weight loss and rots during storage; rapid curing might promote faster wound healing.

A total of three harvests were carried out at one, two, and three weeks after vine kill. Freshly dug tubers were evaluated for potato skin maturity, specific gravity, total and marketable yield. Tubers were stored in simulated commercial storage conditions at 10°C, 90-95% RH for 14 days. Dry matter content, fresh weight loss, firmness, vitamin C content was evaluated every 7 days in storage. For rapid curing tests – tubers were first wounded, then stored at 20°C, 90-95% RH for four days to promote wound-healing and skin set.

To date, our results indicate that:

- Surface drip and seepage irrigation resulted in higher total and marketable yields in both varieties than sub-surface drip irrigation
- During storage, there were generally no significant differences between the irrigation methods in the tuber quality. This suggests that substituting seepage with drip irrigation would help maintain postharvest tuber quality, while minimizing water usage prior to harvest.

Over the next two years, we will use surface drip irrigation to fertigate tablestock varieties at different nitrogen rates and determine effects on the tuber yield and postharvest quality.

![Suberized cells](image)

**Figure 2:** Cross-section showing potato skin and underlying cells. Suberized cells on the skin are stained dark red (magnification 10X).