Title: Determining the Optimum Neck Length to Improve Storability in Onions

by Ross Greene

Photo: [Can upload two JPGs and caption each]

Figure 1. Onion neck clipped at 2-inch length

Figure 2. Onion infected with bacterial center rot.

Geographic Scope: __County _X_Multi-County __District/Dept __College __University __State __Muti-State/Regional __National __International

County: Candler and Evans County

Location or Facility: (if applicable) 4-H Center_____ REC__X_____UGA Campus_____

Vidalia Onion and Vegetable Research Center

Your Unit/Department/Group:

UGA Extension/Southeast District/ Agriculture and Natural Resources

Summary:

Vidalia onions are traditionally harvested with hand labor using a pair of onion clipping shears vs a mechanical harvester because they are softer than other onions and more susceptible to bruising. This harvesting method handles the onion more carefully but has one downside and that is transferring bacterial inoculum by means of the clipping shears. A two-year study was conducted comparing clipping onions at different neck lengths to reduce the rate of internal bacterial rot.

Situation:

Vidalia onions are an especially important crop for Evans and Candler counties with just over 1,000 acres in 2021 that comprised around 19.4 % of the total farm gate value for these two counties. Onions are also an important part of the economy for Evans and Candler counties that directly create jobs for workers at the farm and supports local businesses that sell inputs to support these farms. Assisting our growers to remain profitable and sustainable helps them and the community. This is why choosing to conduct this research project on onions was particularly important. Candler and Evans County growers were interviewed to learn about some of the challenges they were facing. The feedback was unanimous, the bacterial pathogen *Pantoea* spp. *(Pantoea ananatis, Pantoea agglomerans, Pantoea alli and Pantoea stewartii* subsp. *indologenes)* that causes bulb rot commonly referred to as center rot of onion was their main concern (Agarwal et al., 2019). This is a tricky pathogen because it can be a pre- or post-harvest pathogen that can decrease the percentage of marketable onions before and after they are placed in storage.

Response:

A two-year trial consisted of four treatments with four replications of each treatment totaling 16 individual plots. The onions were clipped at specific neck lengths which formed the treatments of our research; 0-inch, one inch, two inches, and three inches. The treatments were replicated four times ending with a total of 200 bulbs per treatment and a total of 800 bulbs were evaluated after storage for 47 days. After being removed from storage each replication was evaluated by slicing open each bulb and visually inspecting it for a *Pantoea* spp. infection. The number of infected bulbs were recorded for each replication of the trial.

Results/Impact:

In 2021 weather conditions were favorable during harvest which created low disease pressure during harvest vs 2022 where high humidity and rain caused disease pressure to be extremely high. In year one of the study, clipping onions to a neck length of two inches or greater reduced internal rot in stored onions by five percent when compared to onions clipped flush with the top of the onion. In year two onion storage rot were more prevalent and the onions clipped with a neck length of two inches or greater reduced bacterial rots by 9 percent when compared to the onions clipped flush with the top of the onion. This research has shown a two-year average reduction in bacterial storage rot of 7 % by clipping onions with a 2-inch neck as opposed to cutting them flush with the top of the onion. If a grower averages 700 boxes per acre and boxes weigh 50 lbs., then that acre yields 35,000 lbs. of onions per acre. Onion growers place around 65 percent of their onion crop into storage, so 35,000 x 65 % is 22,750 lbs. of stored onions per acre. If they have an 18 % infection rate, they will lose 4,095 lbs. per acre which estimates to 82 boxes valued at $22 per box that gives a total revenue loss of $1,800 per acre. The results of this study showed a two-year average of 7 % total reduction in storage losses which would increase marketable onions by 1593 lbs. or an estimated 32 boxes per acre that gives you an increase in revenue of $704 per acre. The total acres of onions planted in Evans and Candler County in the 2022 crop year was 1,518 acres. This means the total economic impact from this study could increase revenue for just

Candler and Evans County growers by $1,068,672. Based on the information from the example scenario, the economic impact for the entire Vidalia Onion crop, which usually averages around 10,000 acres, would be $7,040,000. In a recent survey of onion growers conducted by Chris Tyson Area Onion Agent, 46% of the survey participants said they were harvesting onions with longer neck lengths because they believe it is beneficial. This survey was conducted at the 2023 Vidalia Onion Grower Meeting on September 6, 2023.

Program Function(s): __Instruction __Research _X_Extension

Program Area(s): _X_ANR __ FACS __4-H __Support __Admin