EVALUATION OF OVERWINTERING ONION FOR PRODUCTION IN THE TREASURE VALLEY, 2003-2004 TRIAL

Clinton C. Shock, Erik B. G. Feibert, and Lamont D. Saunders
Malheur Experiment Station
Oregon State University
Ontario, OR

Introduction

The objective of this trial was to evaluate yellow and red onion varieties for overwintering production in the Treasure Valley. Bulb yield, grade, and pungency were evaluated. Seven yellow varieties and three red varieties were planted in August 2003 and were harvested and graded in June 2004.

Methods

The onions were grown on a field of Owyhee silt loam located northeast of the Malheur Experiment Station on Railroad Ave. between Highway 201 and Alameda Drive. Seed of 10 varieties was planted in double rows spaced 3 inches apart at 9 seeds/ft of single row on August 25, 2003. Each double row was planted on beds spaced 20 inches apart with a customized planter using John Deere Flexi Planter units equipped with disc openers. On October 21, 2003, alleys 4 ft wide were cut between plots, leaving plots 23 ft long. On October 22 the seedlings were hand thinned to a plant population of 95,000 plants/acre (6.6-inch spacing between individual onion plants). All cultural practices were performed by the grower. The experimental design was a randomized complete block with five replicates.

Onions in each plot were evaluated subjectively for maturity on June 14, 2004 by visually rating the percentage of onions with the tops down and the percent dryness of the foliage. The percent maturity was calculated as the average of the percentage of onion with tops down and the percent dryness. The number of bolted onion plants in each plot was counted.

Onions from the middle two rows in each plot were lifted, topped by hand, and bagged on June 21, 2004. The onion bags were transported to a shed at the Malheur Experiment Station. On June 23 the onions were graded.

Before grading, all bulbs from each plot were counted to determine actual plant populations at harvest. During grading, bulbs were separated according to quality: bulbs without blemishes (No. 1s), split bulbs (No. 2s), neck rot (bulbs infected with the fungus Botrytis allii in the neck or side), plate rot (bulbs infected with the fungus Fusarium oxysporum), and black mold (bulbs infected with the fungus Aspergillus niger). The No. 1 bulbs were graded according to diameter: small (<2.25 inch), medium (2.25-3 inch), jumbo (3-4 inch), colossal (4-4.25 inch), and supercolossal (>4.25 inch). Bulb counts/50 lb of supercolossal onions were determined for each plot of every variety by weighing and counting all supercolossal bulbs during grading.

Ten randomly chosen bulbs from each plot were shipped on June 25 via UPS ground to Vidalia Labs International (Collins, GA). The bulb samples were analyzed for pyruvic acid content on July 2. Bulb pyruvic acid content is a measure of pungency with the unit being micromoles pyruvic acid/g of fresh

weight (µmole/g FW). Onion bulbs having a pyruvate concentration of 5.5 or less are considered sweet according to Vidalia Labs sweet onion certification specifications.

On July 6, bulbs from each plot were rated subjectively for exterior quality. Bulbs were rated for skin retention, exterior thrips damage, and rot.

Varietal differences were compared using ANOVA and least significant differences at the 5 percent probability level, LSD (0.05). Varieties were listed by company in alphabetical order. The LSD (0.05) values should be considered when comparisons are made between varieties for significant differences in performance characteristics. Differences between varieties equal to or greater than the LSD (0.05) value for a characteristic should exist before any variety is considered different from any other variety in that characteristic.

Results

Grower practices adequately controlled thrips during seedling emergence and early plant growth, critical phases for successful overwintering onion production in the Treasure Valley. The winter of 2003-2004 in the Treasure Valley was mild, with the lowest temperature of -1°F on January 5, 2004. In spite of that, plant populations were below the target of 95,000 plants/acre for all varieties, suggesting that a higher population should have been left after thinning. Plant populations ranged from 38,863 plants/acre for 'Musica' to 71,362 plants/acre for 'T-420' (Table 1).

Total yield averaged 440 cwt/acre and ranged from 360 cwt/acre for 'Electric' to 606 cwt/acre for 'Stansa' (Table 1). Stansa and T-420 had the highest total yield. Marketable yield averaged 391 cwt/acre and ranged from 291 cwt/acre for 'XON-305Y' to 545 cwt/acre for Stansa. Supercolossal-size onion yield averaged 18 cwt/acre and ranged from 2 cwt/acre for 'MKS-816' to 79 cwt/acre for Stansa. Stansa had the highest yield of supercolossal bulbs. Not counting supercolossals, colossal-size onion yield averaged 179 cwt/acre and ranged from 14.4 cwt/acre for 'Desert Sunrise' to 179 cwt/acre for Stansa. Stansa had the highest colossal bulb yields.

Maturity on June 14 ranged from 0 percent for 'Garnet' to 79 percent for 'MKS-801' (Table 2). Varieties T-420, XON-305Y, MKS-801, and MKS-816 had bulb pyruvate concentrations low enough (<5.5 µmoles/g FW) to be classified as sweet onions. MKS-801 had the lowest pyruvate concentration. Subjective evaluation of skin retention ranged from 1.6 (worst = 0) for MKS-801 to 4.4 (best = 10) for T-420. Subjective evaluation of thrips damage ranged from 5.8 (most thrips = 10) for Desert Sunrise to 1.4 (fewest thrips = 0) for 'Hi Keeper'.

Table 1. Performance data for onion varieties planted in August 2003 and harvested in June 2004, Malheur Experiment Station, Oregon State University, Ontario, OR.

Table 2. Maturity, pyruvate concentration, and subjective rating of exterior bulb quality: 0 = fewest and 10 = most for thrips damage and rot, 0 = worst and 10 = best for skin retention, Malheur Experiment Station, Oregon State University, Ontario, OR, 2004.