

## Research Report: Variety Trials for Overwintered Onions

### INTRODUCTION

The goal of this research was to evaluate the viability and efficacy of overwintering onions in low tunnels and to determine which varieties would produce the highest quality and yield for spring markets. We compared eight onion varieties over two winters 2011-12 and 2012-13 and found significant differences in bulb number, size, and weight as well as premature bolting. This research was done in collaboration with UNH extension researchers and with support from Northeast-SARE and UMass Extension.

### METHODS

Trials were conducted in certified organic fields at the UMass Crops Research and Education Center, South Deerfield, MA. Plots were managed according to organic standards, and only certified organic seed was used. In both years, onions were seeded in the greenhouse and then transplanted at 6 in. spacing into 2.5 ft. raised beds covered with black plastic. A randomized complete block design was used with 4 replicates of 10 ft. (60 onion plants) for each treatment. Low tunnels were constructed of metal conduit hoops placed 5 feet apart, covered with row cover (1.25 oz/sq yd) followed by an additional layer of 6 mil greenhouse plastic. Dates for seeding, transplanting, cover placement and removal and harvest are listed in Table 1. In spring 2012, scallions were harvested on April 10 and bulb onions on April 19. In the 2012-13 trial, onions were seeded August 19 and transplanted on October 9. Note that in fall 2012, row cover and plastic were applied on the same day, in anticipation of a hurricane. In spring 2013, onions were allowed to grow longer in the spring, to compensate for less growth during a colder winter, and to allow for more bulb formation. At harvest, onion survival and bolting were recorded. Thirty onions were harvested from the center of each replicate plot and total and marketable weight was taken. Bulb size (mm) was measured for ten onions per replicate. In spring 2012, thrips were counted and the % of plants over the economic threshold of 1 thrips/leaf were calculated. Varieties evaluated were Bridger, Candy, Top Keeper, Keepsake and Winter White Bunching (scallion type) in 2011-12 and Bridger, Copra, Patterson and Pontiac in 2012-13. We attempted to evaluate several varieties for a second year, but were only able to obtain organic seed and get adequate germination for one variety, Bridger.

	<b>2011-12</b>	<b>2012-13</b>
Seeding date (GH)	18-Aug	16-Aug
Transplant date (Field)	11-Oct	9-Oct
Row cover on	27-Oct	26-Oct
Plastic cover on	17-Nov	26-Oct
Plastic off	21-Mar	5-Mar
Cover off	21-Mar	17-Apr
Harvest sample	19-Apr	22-May

## RESULTS

**Plant survival was high for all varieties in both years**, with 96-100% survival in bulb varieties and 89% in WWB scallion in 2011-12, and 89-98% survival in 2012-13. In 2012-2013, survival was lowest in Pontiac, at 89%. Survival for Bridger was over 95% in both years.

**Bolting was strongly correlated with variety.** In 2011-12, we saw no bolting in the Winter White Bunching, Bridger, Keepsake or Top Keeper onions at the April 19 harvest; however, 28% of the Candy had bolted. At the time of harvest, most of the bolted Candy onions were still considered marketable because they had just begun to bolt. Based on observation of the remaining plants, if our harvest had been a week or so later, fewer of the Candy onions would have been marketable. In 2012-13, we harvested a month later (May 22) to allow for bulb development, and saw higher levels of bolting in the new varieties we tested: 79% in Patterson, 73% in Copra, and 55% in Pontiac. However, bolting in Bridger was similar to 2011, at 3%. Because of high levels of bolting, greens were cut before measuring marketable weight.

**Most of the onions harvested were marketable**, across all varieties. This was true for all varieties. In 2011-12, 100% of Keepsake and Top Keeper were marketable, while Candy and Bridger were 85% marketable (Figure 1). Plants were recorded as unmarketable due to animal damage or very small size. A thrips population that established in the fall, overwintered in the tunnel and built up in early spring caused minor thrips damage on the leaves of all varieties; however damage did not reduce marketability. Thrips were not a problem in the 2012-13 season.

**Significant differences in yield were found between varieties.** In 2011-12, Keepsake and Top Keeper the largest bulb sizes and highest marketable weights, with 100% of bulbs recorded as marketable (see Figures 1,3). In 2012-13, Bridger was the clear winner, with significantly higher bulb diameter and marketable weight than the other varieties.

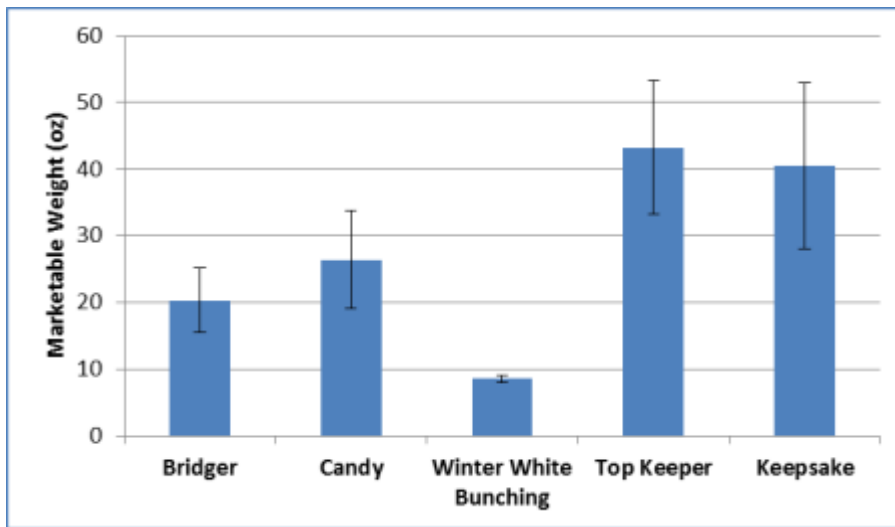


Figure 1. Marketable weight of onions at harvest in 2011-12 trial.

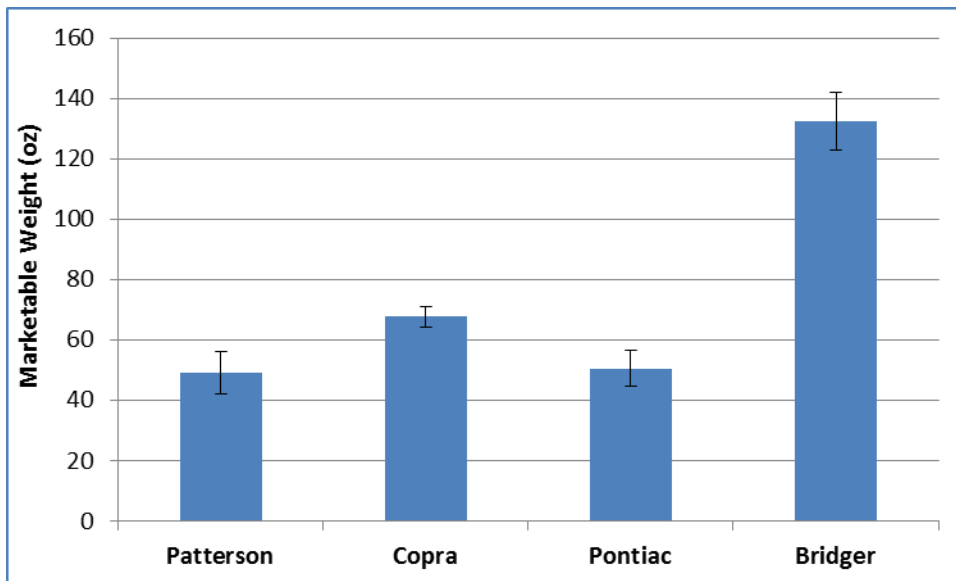


Figure 2. Marketable bulb weight of onions (after greens were removed) at harvest in 2012-23 trial.

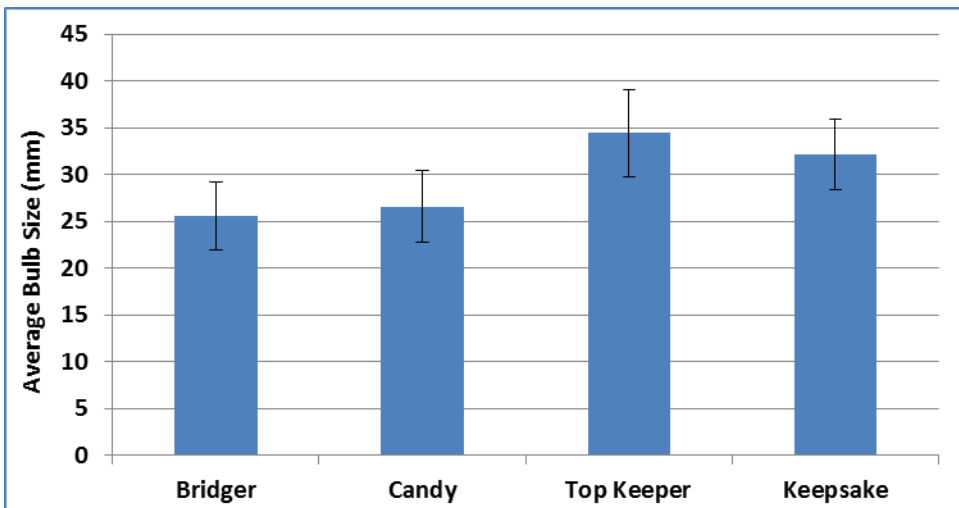


Figure 3. Average bulb size (mm) on April 19, 2012 in 2011-12 trial.

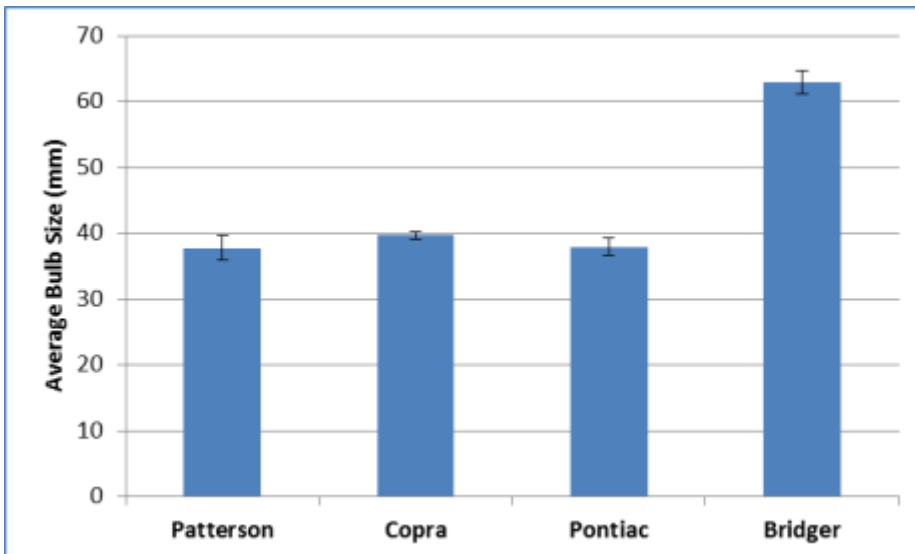


Figure 4. Average bulb size (mm) on May 22 2013, for 2012-13 trial.

## CONCLUSIONS

Based on these trials, Keepsake, Top Keeper and Bridger varieties performed best and would be recommended for overwintering in low tunnels in MA. These varieties produced large bulbs, high marketable weights, and were not susceptible to bolting in our trials. These results are consistent with low tunnel trials conducted at University of New Hampshire, in which all varieties showed good yields and low bolting when grown for mature bulb onions. This research report can be found at <http://extension.umass.edu/vegetable/sites/vegetable/files/pdf-doc-ppt/UNH%20Onion%20Trial.pdf>. Candy in 2012, Patterson, Copra and Pontiac in 2013 all showed bolting at levels that would preclude successful bulb production. The seeding date in mid August and transplant date in the second week of October seem well suited to the conditions in central New England but may need to be adjusted

for more southern or northern conditions. Use of black plastic greatly reduced the challenges of weed management but did require clearing weeds from the plant holes and on the sides of the bed once in spring. Scouting for thrips prior to covering the tunnel, and cleaning up populations prior to winter is recommended, as thrips were able to overwinter under tunnel conditions. While onions were not as sensitive to wind injury after tunnels were removed as greens, it is advisable to remove covers in stages, and remove covers for harvest or crop care on sunny, calm days.

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