Planting method and date of transplanting impact on Vidalia onion production

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Introduction

The use of a mechanical planter for Vidalia onion production is an alternative for the intense labor required for onion planting time. However, the performance of an onion bulb planter require investigation under the onion production conditions of Georgia. The objective of this study was to determine the impact of bulb set size used in a mechanical planter on Vidalia onion for total and marketable yield, and bulb size distribution.

Material and methods

A field experiment was conducted in the 2018/2019 Vidalia onion season at the University of Georgia – Vidalia Onion and Vegetable Research Center located in Lyons, GA. A randomized complete block design (r = 3) was used to compare three sizes of bulb sets for mechanical planting using a onion bulb planter (J.J. Broach, Madrid, Spain). Bulb sets (c.v. Pirate) were separated in A (<3/4 in), B (3/4 to 1-1/2 in), and C (>1-1/2 in) (Fig. 1), and planted in 9 January, 2019, which was considered 0 days after planting (DAP). A total of 9 adjacent onion beds with 230 ft. long and 6 ft. center spaced were used. Each panel (plot) was comprised by an onion bed that contained four rows of onion. Onion rows within each bed were 12 inches spaced with a 4 inches space between onion plants, and bulb sets were planted 1/3-inch deep in the soil using a 4 rows suction onion bulb planter (J.J. Broach, Madrid, Spain). Crop and pest management practices followed the University of Georgia recommendations, excepted by herbicide application, which the experimental field received two applications of Gold 2XL and Prowl at a rate of 16 oz/acre each at 2 and 6 weeks after planting. This management was used to avoid bulb set mortality. Particularly, all treatments received 4 fertilize application: 1) 400 lbs/ac of 5-10-15 at planting, 2) 300 lbs/ac of 5-10-15 at 34 days after planting (DAP), 3) 200 lbs/ac of 5-10-15 at 58 DAP, and 4) 320 lbs/ac of 15.5-0-0 at 92 DAP.

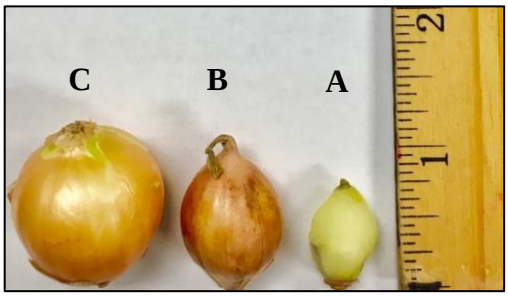

Figure 1. Bulb set size distribution: A (<3/4 in), B (3/4 to 1-1/2 in), and C (>1-1/2 in).

Vidalia onions were harvested on 25 April 2019 (127 DAT), cured for a week and graded according to the Georgia Department of Agriculture in Colossal (> $3^{3/4}$ inches), Jumbo ($3^{3/4}$ to $3^{1/4}$ inches), Medium (2 to $3^{1/4}$ inches), and Culls (< 2 inches). Marketable yield was determined a sum of Colossal, Jumbo, and Medium onions.

Statistical analyses were performed using the software RStudio Version 3.5.1 (RStudio Team, 2018) to compare total and marketable yield and bulb size distribution among treatments. When

the *F* value was significant, multiple mean comparisons were performed using the Tukey-Kramer at a *p value* of 0.05.

Results and Discussion

There was a higher total yield for Vidalia onion for the biggest size of bulb sets, size C, compared to sizes B and A. However, the highest total yield of bulb set sizes C did not reflected in higher marketable onions and there was no significant difference between treatments for marketable yield (Fig. 2). The lack of significant difference among treatments for marketable yield was mostly due to the higher yield of cull onions for bulb sets size C compared to B and A (Table 1), indicating that growers using mechanical planting method for Vidalia onion production do not necessarily need the biggest bulb set size (C) to increase marketable yield.

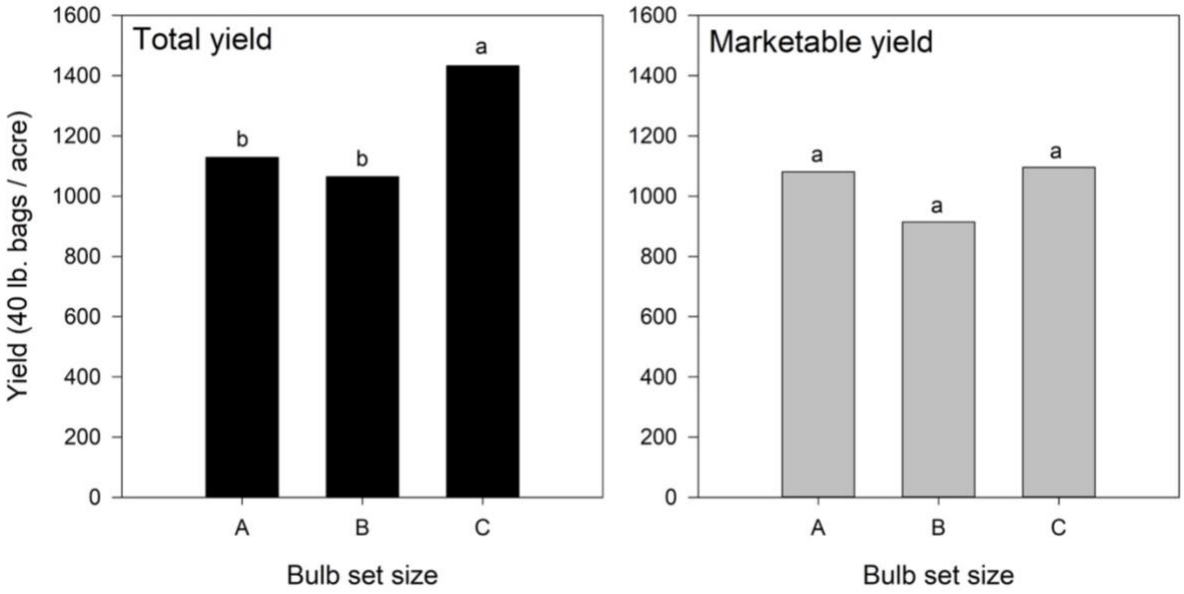

Figure 2. Difference on total and marketable yield for Vidalia onion among bulb set sizes A (<3/4 in), B (3/4 to 1-1/2 in), and C (>1-1/2 in).

Vidalia onions classified as Jumbo had a higher yield for bulb set sizes C and B, compared to the bulb set size A. Therefore, bulb sets size B were enough to maintain yield for Jumbo onion. Contrarily, bulb sets sizes A had a higher yield for Medium onions, compared to B and C.

Table 1. Difference on bulb size distribution for Vidalia onion among bulb set sizes A (<3/4 in), B (3/4 to 1-1/2 in), and C (>1-1/2 in).

Bulb set size	**Jumbo**		**Medium**		**Culls**	
	40 lb. bags /acre					
A (<3/4 in)	484	b	597	a	48	b
B (3/4 to 1-1/2 in)	697	a	218	b	150	b
C (>1-1/2 in)	857	a	239	b	337	a

† Values followed by similar letters indicate no significant difference ($p < 0.05$) among planting date or planting method according to Holm-Tukey adjust.

Conclusion

Bulb set size C had the highest Vidalia onion total yield, but it did not reflected in higher marketable yield compared to bulb sets size B and A. Bulb set size B was enough to maintain Vidalia onion marketable yield and increase the number of Jumbo onions, while bulb set size A was also enough to maintain Vidalia onion marketable yield and increase Medium onion. A second year of experiment will be conducted in the Vidalia onion season of 2019/20.