



Flat Head Cabbage Variety Trial

Preliminary Observations

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INTRODUCTION

Head cabbage is an important vegetable crop in Hawaii, reported as the top volume-producing vegetable in 2015 producing about 7.44 million pounds (Statistics of Hawaii Agriculture 2016). It is also ranked third in farm gate value at \$3.81 million dollars, just behind cucumbers and leaf lettuce. Most of the cabbage production is done during cooler times of the year or at higher elevations, as heat stress may adversely affect the cabbages ability to form tight (dense) heads. Heat tolerance can play a pivotal role in the adaptability of head cabbage production in warmer seasons as well as lower elevations. A primary objective of this trial was to evaluate the yield and quality of 4 early, tropical-adapted varieties from Tainong seed company in comparison with an industry standard, 'KK Cross'. 'KK Cross' is preferred for its high yield, earliness, and tenderness.

METHODS

This trial evaluated five flat head cabbage varieties for their potential production in Hawaii (Table 1). Varieties were seeded into seedling trays August 2016. Seedlings were transplanted at the Poamoho Research Station (500ft Elev.) and Whitmore Research Field (1000ft Elev.) on September 2016. We also compared no till vs conventional tillage at the Whitmore location. Seedlings were spaced 18 inches between plants within the row and four feet between rows



with eight plants per plot. Each variety plot was replicated three times. The field was fertilized with 50lbs of nitrogen as 16-16-16 plus minors pre-plant and fertigated with a total of 50lbs of nitrogen as 20-20-20 plus urea weekly after transplanting. Diamond back moth and imported cabbage butterfly was the primary pests and was treated with Verimark preplant and Crymax as needed. Five plants were harvested per plot on November 2016, approximately 65 days after transplanting and evaluated for head fresh weight, polar diameter, equatorial diameter, diameter ratio, volume, density, core volume and core volume as a percent of head volume. Tenderness and flavor acceptability, two important quality traits, were also evaluated on shredded cabbage heads (Radovich, 2010).

RESULTS AND DISCUSSION

Mean head weight of the Tainong varieties were generally the same as or greater than KK Cross with the exception of 'Shoshundori' in the Whitmore Till plots (Figure 5). Of all the varieties, 'Prime Top' had the highest density values (Figure 6), and this corresponded with greatest head fill in 'Prime Top,' which is an important quality characteristic (Figure 6). Another important quality is the proportion of head volume that is occupied by the core (Kleinhenz & Wszelaki, 2003). This is important because it influences the amount of usable cabbage obtained from each head. 'KK Cross' had the largest cores relative to head volume; all the Tainong varieties had smaller core sizes relative to 'KK Cross' (Figure 7). Finally, all the varieties were comparable in tenderness and flavor to 'KK Cross' with the exception of 'Super Top' which had less favorable scores (Figure 8).

CONCLUSION

Of the four varieties evaluated, only 'Prime Top' consistently met or exceeded quality characteristics when compared to the industry standard 'KK Cross.' Yield, flavor acceptability and tenderness were similar between the two varieties, but core size and, most importantly, head density was greater in 'Prime Top' compared to 'KK Cross.' The data suggests that 'Prime Top' has the potential to be an alternate variety to existing standards and we recommend that 'Prime Top' continue to be evaluated in multiple environments in Hawaii.

REFERENCES

- USDA NASS. Hawaii Vegetable and Melon Crop Report. Statistics of Hawaii Agriculture 2016.
- Kleinhenz, M. D., & Wszelaki, A. (2003). Yield and relationships among head traits in cabbage as influenced by planting date and cultivar. I. Fresh market. *Hortscience*, 38(7), 1349-1354.
- Radovich, T. J. (2010). Cabbage Flavor. *Handbook of Fruit and Vegetable Flavors*, 741.



Table 1. Flat head cabbage varieties evaluated.

	<u>Variety</u>	<u>Seed Company</u>
1	KK Cross	Takii Seed/ Holmes Seed
2	Prime Top	Tainong Seed
3	Shoshudori	Tainong Seed
4	Super Top	Tainong Seed
5	Summer Jewel	Tainong Seed

Figure 1. Equatorial diameter being measured on head cabbage harvested November 2016.





Figure 2. Sensory evaluations of head cabbage harvested November 2016.





Figure 3. Images of head cabbage varieties in the field harvested November 15, 2016 (65 DAT). A) 'KK Cross'; B) 'Prime Top'; C) 'Shoshudori'; D) 'Summer Jewel'; E) 'Super Top'.





Figure 4. Images of well as marketable head size and cross section of head cabbage varieties harvested November 15, 2016 (65 DAT). A) 'KK Cross'; B) 'Prime Top'; C) 'Shoshudori'; D) 'Summer Jewel'; E) 'Super Top'.

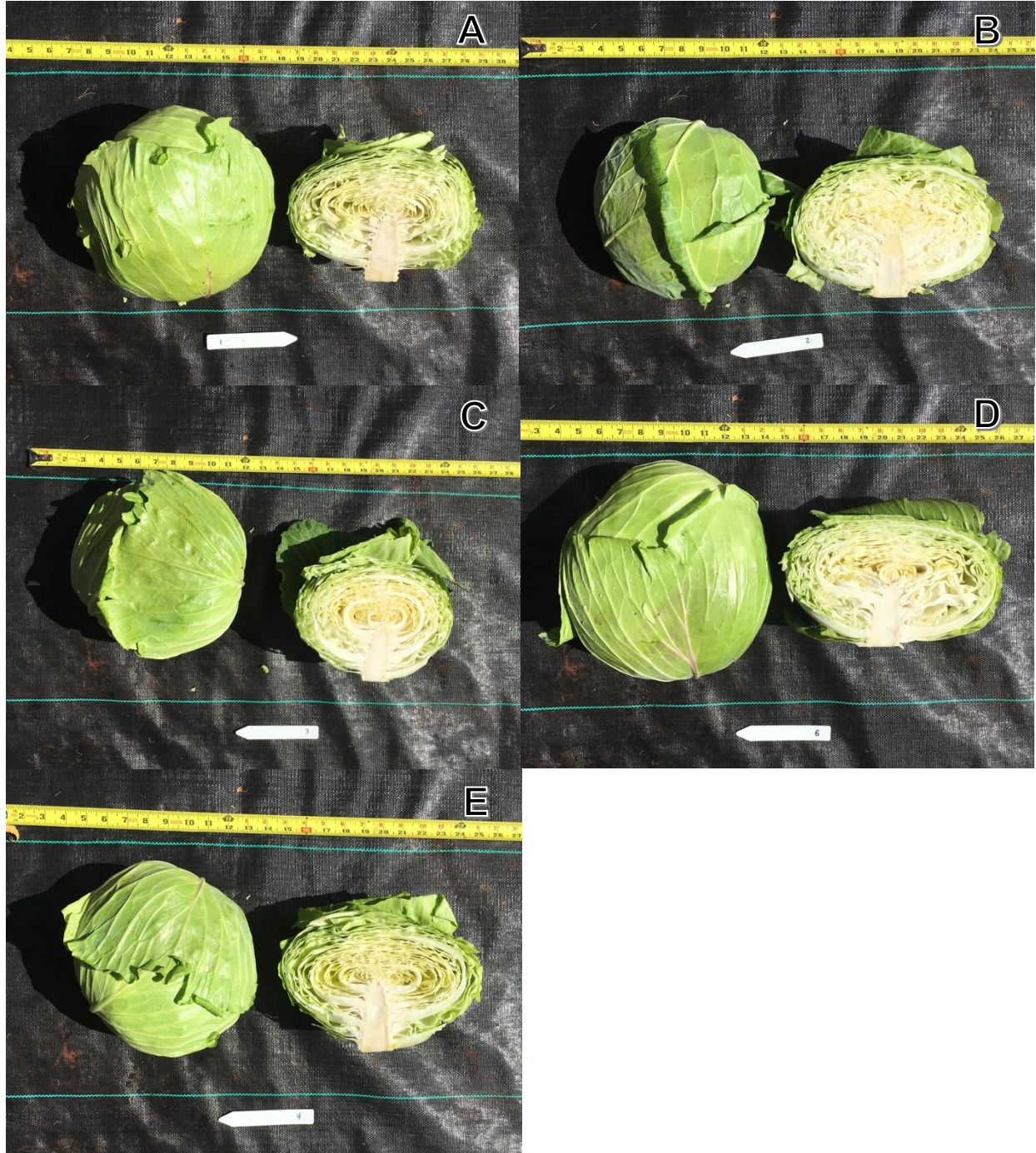




Figure 5. Mean fresh head weights for head cabbage varieties harvested November 15, 2016. Means within the same location with the same letter were not significantly different.

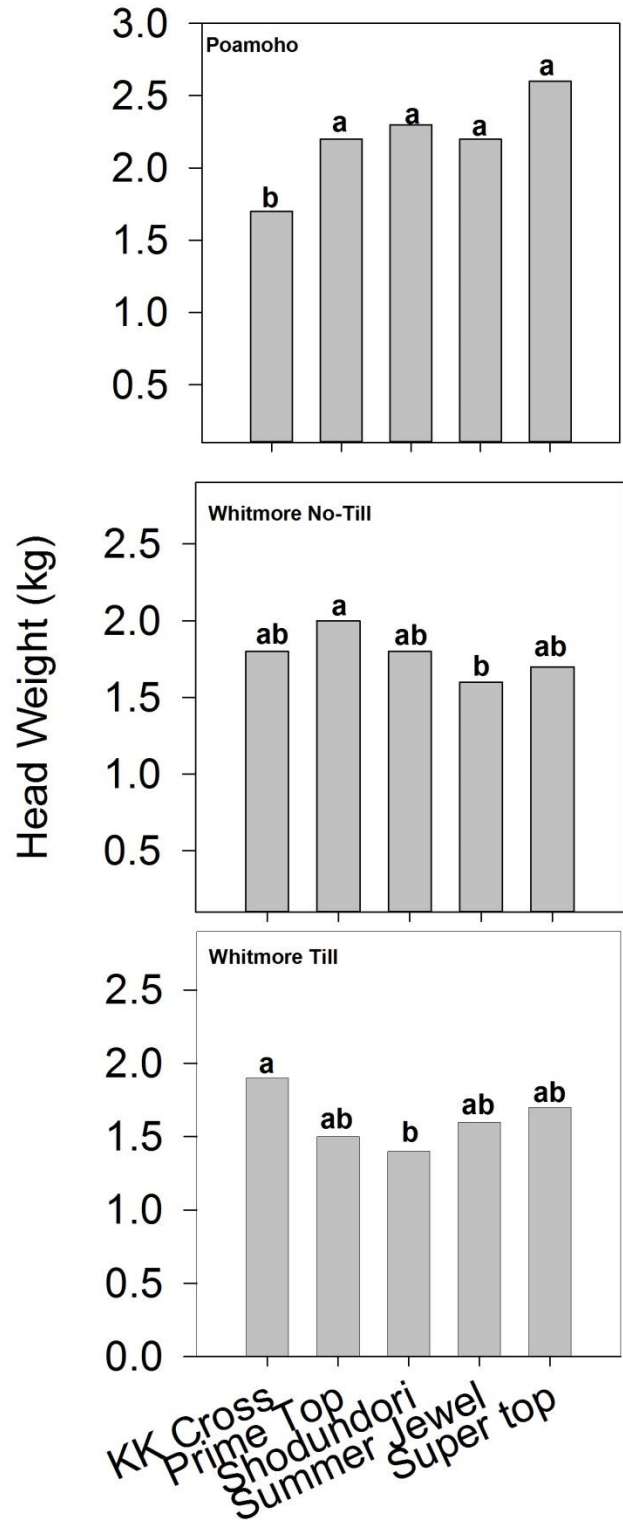




Figure 6. Mean density for head cabbage varieties harvested November 15, 2016. Means within the same location with the same letter were not significantly different

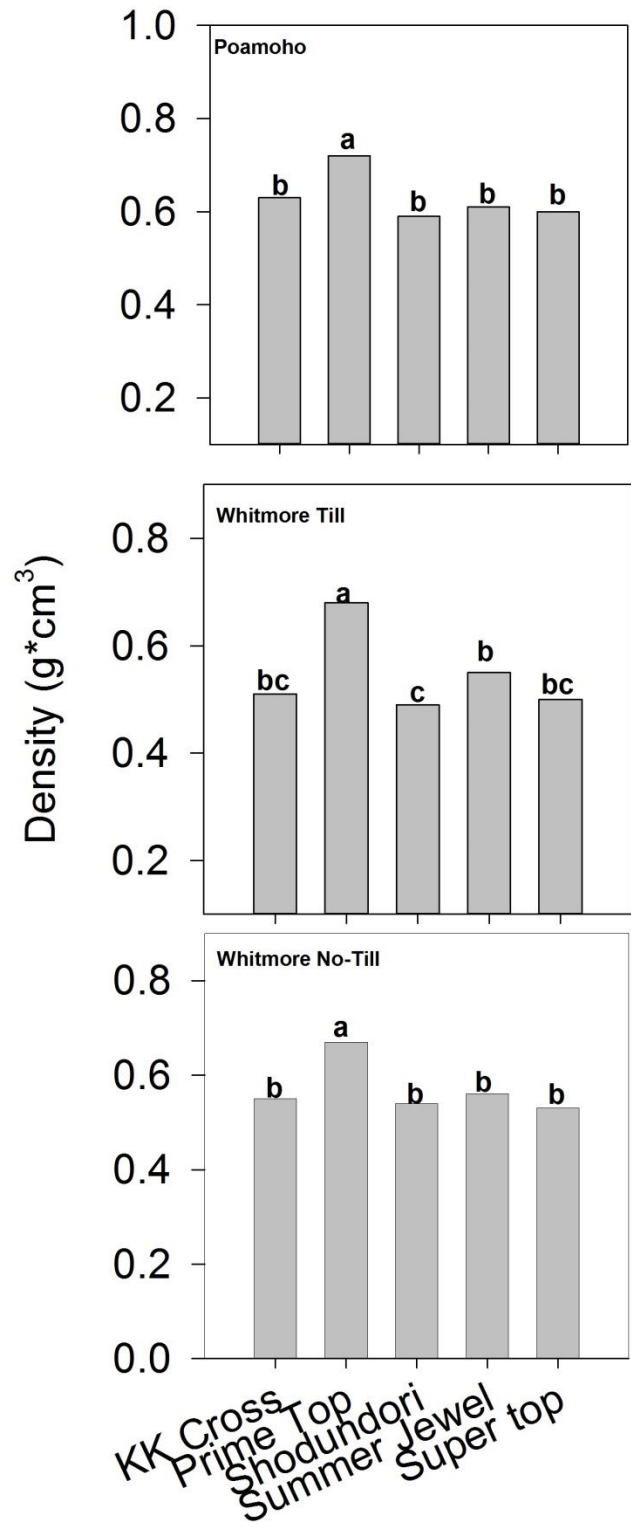




Figure 7. Mean core volume for head cabbage varieties harvested November 15, 2016. Means within the same location with the same letter were not significantly different.

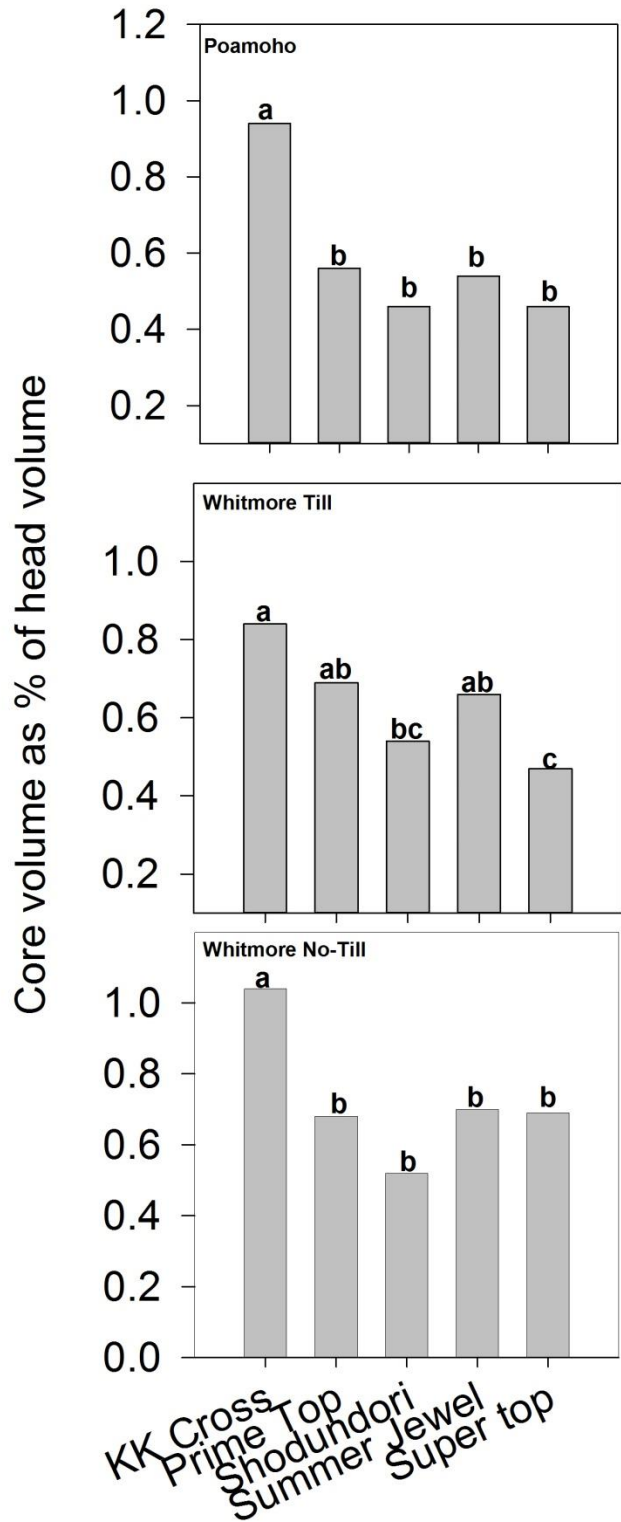




Figure 8. Mean sensory values for head cabbage varieties harvested November 15, 2016. Means within each evaluation with the same letter were not significantly different. (n=17)

