

Bok Choy Cultivar Trial for Spring High Tunnel Production

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Introduction

Bok choy, also known as pak choy or pac choy, is a leafy vegetable that belongs to the mustard family. It is commonly referred to as 'chinese cabbage.' Bok choy is a non-heading form of Chinese cabbage and has thick white or pale green leafstalks (petioles). Leaves are dark green in color but there are cultivars with red leaves as well. Chinese cabbage is a cool-season annual vegetable and is grown by a number of vegetable growers in the state. The crop grows best with short days and moderate to cool temperatures (60 to 70°F mean temperature). Higher temperatures lead to soft and bitter heads and often lead to seed stalk formation (bolting).

In Iowa, growers plant bok choy in high tunnels during early spring. The crop is established using transplants and takes anywhere from 45 days to 60 days depending on the cultivar. Growers at the 2013 Practical Farmers of Iowa Annual Conference expressed interest in learning more about bok choy cultivars that would perform well inside Iowa high tunnels. This study was designed to compare five bok choy cultivars within high tunnels for spring crop production. Based on the feedback from growers, five cultivars were evaluated: Black Summer, Joy Choi, Red Choi, White Flash, and Win-Win Choi (Table 1).

Materials and Methods

The study was conducted in a 16 ft × 50 ft high tunnel at the ISU Horticulture Research Station, Ames, Iowa. Bok choy plants were transplanted on raised beds with white-on-black plastic mulch on April 28, 2014. Each cultivar had 14 plants/bed (two rows with 7 plants in each row). Distance between plants within row and between rows was 12 in. Rows were staggered to provide maximum space for growth. Experimental design was a randomized complete block design with four replications.

Fertigation was applied using 21-5-20 fertilizer to achieve a goal of 50 lb of nitrogen/acre of irrigated bed space. An additional 50 lb was present as residual N from the previous year. Crop was harvested on May 30, 2014. Before harvest, observations were made on plant quality. Crop was graded and separated into marketable and non-marketable categories.

Results and Discussion

All cultivars grew well in the high tunnel. The tunnel was side ventilated throughout the growing period to keep air temperature optimum for bok choy growth. There were treatment differences between cultivars for marketable and non-marketable number and weight. Black Summer, Joy Choi, White Flash, and Win-win produced higher numbers of marketable heads than Red Choi cultivar, however, there were no differences among them (Table 2). Joy Choi, White Flash, and Win-Win Choi produced higher marketable yields than Red Choi or Black Summer. Red Choi produced the lowest marketable yield. There were no non-marketable heads from any treatment except Red Choi.

Low yield and poor performance of Red Choi cultivar can be attributed to smaller heads,

tendency to bolt, and susceptibility to insect pests. Almost 15 percent of Red Choi plants were bolting at the time of harvest. This reduces marketability and has the potential to affect eating quality. The Red Choi plants had the tendency to wilt at a faster pace than other cultivars tested in this study. Black Summer and Red Choi had pale green petioles and the rest had white petioles. Petioles were widest in Win-Win Choi cultivar. Given the increase in direct market sales of vegetables through Community Supported Agriculture, farmers

markets, and farm stands, there is huge potential for growers to diversify leafy green production. Crops such as bok choy are easy to grow and manage, and can be a valuable addition to the limited number of leafy greens grown in Iowa.

Acknowledgements

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Table 1. Yield response of bok choy cultivars grown at the Horticulture Research Station, Ames, IA in 2014.*

Treatment	Marketable		Non-marketable	
	Number	Weight (kg)	Number	Weight (kg)
Black Summer	14 a**	3.56 b	0	0
Joy Choi	14 a	4.95 a	0	0
Red Choi	11 b	1.78 c	3	2.33
White Flash	14 a	4.74 a	0	0
Win-Win Choi	14 a	4.45 a	0	0

*Each treatment was replicated four times and had 14 plants/replication.

**Mean separation within columns by Fisher's protected LSD ($P \leq 0.05$). Means followed by different alphabets are statistically significant.



- Black Summer: Broad, vase shaped head, dark green leaves; light green petioles.



- Joy Choi: Dark green leaves; thick flattened white petioles. Leaves have crinkled appearance.



- Red Choi: Dark maroon leaves; greenish petioles; small plant; tendency to bolt under heat; tendency to wilt sooner after harvest.



- White Flash: Upright; compact heads; large leaves; white petiole.



- Win-Win Choi: Vase shaped; large leaves; white petiole.

Figure 1. Bok choy cultivars and their characteristics.