

Bok Choy Cultivars for High Tunnel Production

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Introduction

Bok choy is a cool-season annual vegetable that is a popular cooking salad green and its production is increasing in the state. A number of local grocery chains carry the product in Iowa. Based on feedback from growers in the state, this study evaluated the performance of nine bok choy cultivars under high tunnel production. Cultivars evaluated included Black Summer, Feng Qing, Joy Choi, Mei Qing, Red Choi, Shiro, Toy Choy, White Flash, and Win-win Choi (Figure 1).

Materials and Methods

The study was conducted in a 30 ft by 96 ft high tunnel at the Armstrong Research Farm, Lewis, Iowa. A pre-plant nitrogen fertilizer application of 50 lb/acre was made in April 2015. Bok choy cultivars were seeded in 72 celled trays on March 26, 2014, and grown inside a greenhouse for four weeks. Plants were acclimated for a week under a lath house and later transplanted to raised beds with white-on-black plastic mulch on May 5, 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.

Crop was harvested on June 10, 2014. Before harvest, observations were made on plant characteristics and quality. Crop was graded and separated into marketable and non-marketable categories.

Results and Discussion

The tunnel was side ventilated throughout the growing period to keep air temperature optimum for bok choy growth. Treatment differences were observed between cultivars for marketable and non-marketable number and weight. Black Summer, Feng Qing, and White Flash produced higher number marketable heads than Red Choi, Shiro, and Toy Choy (Table 1). Two cultivars that produced higher yields than all other cultivars were Joy Choi and White Flash. The next best cultivars were Black Summer, Feng Qing, Mein Qing, and Win-win Choi. Shiro and Toy Choy did not produce any marketable heads. Red Choi also did not produce good yields. Non-marketable head weights were higher for Shiro and Toy Choy than any other cultivar.

Low yield and poor performance of Red Choi, Shiro, and Toy Choy cultivars can be attributed to premature bolting. All 14 Shiro and Toy Choy plants were bolting at the time of harvest. Higher temperatures led to soft and bitter heads and often led to bolting. Based on results from this study, growers should avoid planting Red Choi, Shiro, and Toy Choy cultivars later in the spring as it can lead to poor yields. It is evident these cultivars do not handle heat well, so it would be appropriate to plant these cultivars early in the growing season to escape high temperatures at the time of harvest. Given the increase in direct market sales of vegetables through Community Supported Agriculture, farmers markets, farm stands, etc., there is huge potential for growers to diversify leafy green production. Bok choy cultivars tested in this study, such as Joy Choi and White Flash, can produce high yields and increase profitability of the high tunnel enterprise.

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Table 1. Yield response of bok choy cultivars grown at the Armstrong Research Farm, Lewis, IA in 2014. Each treatment was replicated four times and had 14 plants/replication.

Treatment	Marketable		Non-marketable	
	Number	Weight (kg)	Number	Weight (kg)
Black Summer	13 a*	5.3 b	1 b	0.7 bc
Fen Qing	13 a	5.1 b	1 b	0.2 c
Joy Choi	13 b	6.9 a	1 b	0.4 bc
Mei Qing	12 a	5.0 b	2 b	0.7 bc
Red Choi	4 a	0.5 c	10 a	1.2 b
Shiro	0 c	0 c	14 a	2.8 a
Toy Choi	0 c	0 c	14 a	2.5 a
White Flash	13 a	6.5 a	1 b	0.4 bc
Win-win Choi	11 b	5.6 b	3 b	1.1 b

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



- ▣ Mei Qing Choi: Vase shaped; large leaves; greenish petiole.



- ▣ Shiro: small; flat head, susceptible to bolting.



- ▣ Toy Choy: Compact, dark green leaves, white petiole, susceptible to bolting.



- ▣ Fen Qing: vase shaped; large leaves.

Figure 1. Characteristics of bok choy cultivars tested in this study. Pictures of Mei Qing and Shiro from Johnny's Seeds website. Toy Choy and Fen Qing pictures from Sakata Seeds website.