

## **Fall 2023 Takii Cabbage Trial: Black Rot Screening and Performance Assessment**

Theodore McAvoy and Manisha Kumari

University of Georgia, Tifton, GA 31793, USA

### **Objective:**

In accordance with the research collaboration between Takii Seeds and the University of Georgia, this report presents the findings from the fall 2023 Cabbage (*Brassica oleracea* L. var. *capitata*) BR screening trial.

### **Methodology:**

The study was conducted over one year, encompassing the fall season of 2023. The research site was located at Hort Hill, UGA Tifton campus. Nine cabbage cultivars were grown in a randomized block design with four replications. Relevant agronomic practices, such as irrigation, fertilization, and pest management, were implemented uniformly across all plots. A total of four harvests were taken on the dates 11/30/2023, 12/12/2023, 12/20/2023, and 01/03/2024.

### **Statistical Analysis:**

The data analysis was performed using the One-Way ANOVA model in JMP Pro 16, and the mean separation was conducted using the Honest Significant Difference Test (HSD).

### **Results:**

The varieties ‘Cheers’ and ‘Applause’ performed the best in terms of having maximum cabbage total headcounts and total yield, followed closely by ‘Accolade’ ‘Celebrate’, and ‘1488’. In the first harvest ‘Cheers’ and ‘Applause’ had the highest total counts as well as total weights. ‘Applause’ outperformed all the varieties for the average weight (total weight/total counts). Among all the varieties, ‘Melissa’ and ‘Expat’ performed the worst in terms of total counts and weights (Table 1, 2).

‘Cheers’ and ‘Applause’ had maximum average height, while average width was statistically non-significant. On a scale of 1-9 (1 being the least susceptible and 9 the most), ‘Applause’ and ‘Capture’ were found to have the highest resistance to *Xanthomonas campestris* pv. *Campestris*, a causal organism for black rot disease. The variety ‘1488’ was the most susceptible to black rot disease, while all the varieties expressed moderate levels of resistance (Table 3).

**Table 1:** Total count, count harvest I, count harvest II, count harvest III, and count harvest IV of nine cabbage (*Brassica oleracea* L. var. *capitata*) cultivars trial conducted at Hort Hill, UGA Tifton, Georgia, USA during the fall of 2023.

Variety	Total count <sup>i</sup>	Count harvest I <sup>ii</sup>	Count harvest II <sup>ii</sup>	Count harvest III <sup>ii</sup>	Count harvest IV <sup>ii</sup>
1488	9.00 ab <sup>iii</sup>	3.50 ab	2.50 ab	1.75 a	1.25 a
Capture	7.50 ab	1.50 ab	0.75 b	2.00 a	3.25 a
Celebrate	8.75 ab	2.25 ab	3.75 a	1.50 a	1.25 a
Cheers	10.00 a	4.00 a	3.75 a	1.50 a	0.75 a
Expat	4.75 bc	0.00 b	0.50 b	0.50 a	3.75 a
Melissa	2.50 c	0.00 b	0.75 b	0.25 a	1.50 a
Acclaim Improved	5.00 bc	1.50 ab	0.50 b	0.75 a	2.25 a
Accolade	8.50 ab	3.50 ab	1.75 ab	2.50 a	0.75 a
Applause	8.50 ab	4.00 a	3.00 ab	0.25 a	1.25 a
<b>P value</b>	0.0003*	0.0030*	0.0013*	0.1064	0.0680

<sup>i</sup>Count represents the number of cabbage heads.

<sup>ii</sup>Harvest I (11/30/2023), harvest II (12/12/2023), harvest III (12/20/2023), and harvest IV (01/03/2024).

<sup>iii</sup>Means followed by the same letter are not significantly different based on Tukey's honest significant difference test at 95%.

**Table 2:** Total weight, weight harvest I, weight harvest II, weight harvest III, and weight harvest IV of nine cabbage (*Brassica oleracea* L. var. *capitata*) cultivars trial conducted at Hort Hill, UGA Tifton, Georgia, USA during the fall of 2023.

Variety	Total weight <sup>i</sup>	Weight harvest I <sup>ii</sup>	Weight harvest II <sup>ii</sup>	Weight harvest III <sup>ii</sup>	Weight harvest IV <sup>ii</sup>	Avg. weight <sup>iii</sup>
1488	19.76 ab <sup>iv</sup>	8.3 ab	5.68 ab	3.32 a	2.46 a	2.18 b
Capture	16.67 ab	3.32 ab	1.61 b	4.12 a	7.63 a	2.18 b
Celebrate	21.15 ab	6.21 ab	9.53 a	2.97 a	2.45 a	2.35 ab

Cheers	25.53 a	10.47 ab	9.62 a	3.77 a	1.69 a	2.56 ab
Expat	12.13 bc	0 b	1.36 b	1.22 a	9.55 a	2.63 ab
Melissa	3.3 c	0 b	0.88 b	0.32 a	2.11 a	1.37 c
Acclaim Improved	12.79 bc	4.38 ab	1.21 b	1.53 a	5.67 a	2.61 ab
Accolade	22.8 ab	10.38 ab	4.9 ab	5.76 a	1.77 a	2.67 ab
Applause	24.11 a	12.26 a	8.13 ab	0.66 a	3.07 a	2.83 a
<b>P value</b>	<.0001	0.0035*	0.0003*	0.1510	0.0311*	<.0001

<sup>i</sup>Weight was measured in lbs.

<sup>ii</sup>Harvest I (11/30/2023), harvest II (12/12/2023), harvest III (12/20/2023), and harvest IV (01/03/2024).

<sup>iii</sup>Average weight = total weight/total count.

<sup>iv</sup>Means followed by the same letter are not significantly different based on Tukey's honest significant difference test at 95%.

**Table 3:** Average height, average weight, average core height, average core width, height/width ratio, and black rot rating of nine cabbage (*Brassica oleracea* L. var. *capitata*) cultivars trial conducted at Hort Hill, UGA Tifton, Georgia, USA during the fall of 2023.

<b>Variety</b>	<b>Average height<sup>i</sup></b>	<b>Average width<sup>i</sup></b>	<b>Average core height<sup>ii</sup></b>	<b>Average core width<sup>ii</sup></b>	<b>Height/width ratio<sup>iii</sup></b>	<b>Black rot rating<sup>iv</sup></b>
1488	5.09 bc <sup>v</sup>	6.59 a	2.11 ab	1.05 cd	0.77 de	8.75 b
Capture	4.91 c	6.41 a	2.06 ab	1.3 ab	0.77 e	2 a
Celebrate	5.31 abc	6.49 a	2.36 a	1.26 abc	0.82 bcde	6.75 ab
Cheers	5.75 a	6.51 a	2.11 ab	1.11 bcd	0.88 abc	6.5 ab
Expat	5.28 abc	6.13 a	2.3 a	1.44 a	0.86 abcd	5.25 ab
Melissa	4.95 c	6.39 a	2.39 a	1.19 abcd	0.78 cde	5.5 ab
Acclaim Improved	5.25 abc	6.1 a	1.79 b	0.96 d	0.86 abcd	5.5 ab
Accolade	5.71 ab	6.19 a	1.9 ab	1.04 d	0.92 a	4 ab
Applause	5.76 a	6.44 a	2.13 ab	1.16 bcd	0.9 ab	2 a

<b>P value</b>	0.0003*	0.2694	0.0106*	<.0001*	<.0001*	0.0166*
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<sup>i</sup>Average height and width represent the average height and width of five cabbage heads.

<sup>ii</sup>Average core height and core width represent the average core height and core width of five cabbage heads.

<sup>iii</sup>Height/width ratio = Average height/average width.

<sup>iv</sup>Black rot rating scale was 1-9, where 1 indicates the highest resistance (no visible symptoms) from *Xanthomonas campestris* pv. *Campestris*, while 9 was the least resistant (lesions reaching the middle vein).

<sup>v</sup>Means followed by the same letter are not significantly different based on Tukey's honest significant difference test at 95%.

### **Acknowledgments**

We sincerely thank Takii Seeds for their invaluable support and collaboration throughout this research project. Their expertise and dedication to advancing agricultural practices have played a key role in the success of this study.