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To

American Takii, Inc
301 Natividad Rd
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Subject: Report on Fall 2023 Takii Cabbage BR Screening Trial

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. Total four harvests were taken on the dates 11/30/2023, 12/12/2023, 12/20/2023, and 01/03/2023.

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 ‘TCA-607(20-1031)’ performed the best in terms of having maximum cabbage total headcounts and total yield followed closely by ‘TCA-606(17-1125)’, ‘Celebrate’, and ‘1488’. In the first harvest ‘Cheers’ and ‘TCA-607(20-1031)’ had the highest total counts as well as total weights. ‘TCA-607(20-1031)’ 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 ‘TCA-607(20-1031)’ had maximum average height, while average width was statistically non-significant. On a scale of 1-9 (1 being least susceptible and 9 the most), ‘TCA-607(20-1031)’ and ‘Capture’ were found with 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.

Treatment	Total countⁱ	Count harvest Iⁱⁱ	Count harvest IIⁱⁱ	Count harvest IIIⁱⁱ	Count harvest IVⁱⁱ
1488	9.00 ab ⁱⁱⁱ	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
TCA-576	5.00 bc	1.50 ab	0.50 b	0.75 a	2.25 a
TCA-606(17-1125)	8.50 ab	3.50 ab	1.75 ab	2.50 a	0.75 a
TCA-607(20-1031)	8.50 ab	4.00 a	3.00 ab	0.25 a	1.25 a
P value	0.0003*	0.0030*	0.0013*	0.1064	0.0680

ⁱCount represents the number of cabbage heads.

ⁱⁱHarvest I (11/30/2023), harvest II (12/12/2023), harvest III (12/20/2023), and harvest IV (01/03/2024).

ⁱⁱⁱMeans 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.

Treatment	Total weightⁱ	Weight harvest Iⁱⁱ	Weight harvest IIⁱⁱ	Weight harvest IIIⁱⁱ	Weight harvest IVⁱⁱ	Avg. weightⁱⁱⁱ
1488	19.76 ab ^{iv}	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
TCA-576	12.79 bc	4.38 ab	1.21 b	1.53 a	5.67 a	2.61 ab
TCA-606(17-1125)	22.8 ab	10.38 ab	4.9 ab	5.76 a	1.77 a	2.67 ab
TCA-607(20-1031)	24.11 a	12.26 a	8.13 ab	0.66 a	3.07 a	2.83 a
P value	<.0001	0.0035*	0.0003*	0.1510	0.0311*	<.0001

ⁱWeight was measured in lbs.

ⁱⁱHarvest I (11/30/2023), harvest II (12/12/2023), harvest III (12/20/2023), and harvest IV (01/03/2024).

ⁱⁱⁱAverage weight = total weight/total count.

^{iv}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.

Treatment	Avg. height ⁱ	Avg. width ⁱ	Avg. core height ⁱⁱ	Avg. core width ⁱⁱ	Height/width ratio ⁱⁱⁱ	Black rot rating ^{iv}
1488	5.09 bc ^v	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 ab	1.19 abcd	0.78 cde	5.5 ab
TCA-576	5.25 abc	6.1 a	1.79 b	0.96 d	0.86 abcd	5.5 ab
TCA-606(17-1125)	5.71 ab	6.19 a	1.9 ab	1.04 d	0.92 a	4 ab
TCA-607(20-1031)	5.76 a	6.44 a	2.13 ab	1.16 bcd	0.9 ab	2 a
P value	0.0003*	0.2694	0.0106*	<.0001*	<.0001*	0.0166*

ⁱAverage height and width represent the average height and width of five cabbage heads.

ⁱⁱAverage core height and core width represent the average core height and core width of five cabbage heads.

ⁱⁱⁱHeight/width ratio = Average height/ average width.

^{iv}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).

^vMeans followed by the same letter are not significantly different based on Tukey's honest significant difference test at 95%.

Acknowledgments

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