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BROCCOLI CULTIVAR PERFORMANCE TRIALS IN WEST-CENTRAL FLORIDA¹

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Materials and Methods

The trials were conducted in the 1982 fall-winter (October-December) and in the 1983 winter-spring (January-March) seasons. The soil, a Myakka fine sand (*Aeric haplaquod*), was prepared similarly to that used in tomato culture (2). Seven raised beds, 30 inches wide and 9 inches high, were formed on 4.5 ft centers between irrigation furrows 40.5 ft apart. Soil tests prior to land preparation indicated low levels of available plant nutrients. Starter fertilizer (bed mix) was of 649 lb. 0-20-0 (with 80 lb./ton F503 oxide micronutrients), 271 lb. of 18-0-25-2 (N-P₂O₅-K₂O-MgO), 774 lb. of lime (90% CaCO₃), and 19.4 lb. of Borax (14.5% H₃BO₃) per acre. Banded fertilizer of 18-0-25-2 at 1074 lb./acre was applied in the bed center in a narrow furrow 1½ to 2 inches deep. The total amount of nutrients in lb./acre were: 242 N, 129 P₂O₅, 336 K₂O, 390 CaO, 27 MgO and 2.81 H₃BO₃. Soil was fumigated with 66% methyl bromide + 33% chloropicrin (Dowfume® MC-33) at 348.5 lb./acre. The beds were covered with a white polyethylene mulch in the fall and black polyethylene mulch in the spring.

Seeds of 35 entries in the fall and 34 entries in the winter trials (Table 1) were sown on September 6 and December 1, respectively, for the 2 seasons, in container trays with 1 sq inch cells (TODD® Planter Flat No. 100A). The cells were filled with a 1:1 (v/v) mix of vermiculite and peat amended with superphosphate (20% P₂O₅) and KNO₃. The superphosphate contained 80 lb./ton of micronutrients (F503 oxide). Seedlings were set in the field on October 14 in 1982 and on January 4 in 1983 in 20 ft long plots, arranged in a randomized complete block with 3 replicates. Plants were set in double rows per bed, 12 inches between and 15 inches within-row spacing (32 plants per plot). Recommended pesticides were applied twice a week for disease and insect control. Despite application of fungicides, downy mildew developed in the winter-spring planting and Horsfall-Barratt ratings (3) for downy mildew were made on the plants. At harvest, the central heads greater than 2.5 inches in diameter were cut to a total length of 7 inches. Stems were closely trimmed of leaves and the weight and diameter of marketable heads were measured (4).

Results and Discussion

Fall-winter 1982. Weather and yield data for the season are summarized in Tables 2 and 3, respectively. The weather was warm and dry, with only 2.88 inches of rain recorded during the 11-wk-long growing season. 'Green Top' had the highest marketable yield with 438 23-lb. crates/acre; however, 3 other cultivars, 'Dandy Early,' 'Early Emerald,' and 'Prominence' had similar yields. The yield of 'Green Top' was equal to the reported average United States yield for broccoli (5). The largest average head, 5.24 inches, was recorded for 'Early Emerald' (Table 3). Nine other entries, 'Cleopatra,' 'Green Comet,' 'Bravo,' 'Green Top,' 'Green Duke,' 'Express Corona,' Experimental Hybrid 45-B, 'Green

Additional index words. *Brassica oleracea* L. Italica group, head production, head size, downy mildew, full bed mulch, seepage irrigation.

Abstract. Thirty-five broccoli (*Brassica oleracea* L. Italica group) cultivars in the fall-winter 1982 season and 34 in the winter-spring 1983 season were grown in replicated trials. Entries were evaluated for marketable yield of main heads, head weight and diameter, proportion of marketable heads, days to harvest and cumulative percent of marketable yield by harvest date. In the winter-spring trial, the cultivars were also evaluated for downy mildew (*Peronospora parasitica* Pers. ex Fr.) damage. The highest yielding entry in both trials was 'Green Top' with 438 23-lb. cartons/acre of marketable heads in the fall-winter and 344 cartons/acre in the winter-spring season. 'Dandy Early,' 'Early Emerald' and 'Prominence' also had high yields in 1982. 'Green Duke,' Experimental Hybrid 45, 'Citation,' 'Prominence,' Experimental Hybrid 45-B, 'Excalibur,' 'Dandy Early,' and 'Premium Crop' had good yields in 1983. All high yielding entries had a light green bud color, small buds with bud clusters all over the head, giving them a knobby appearance. Heads were compact, deep, dome-shaped with wide angle branching. 'Green Top' had the highest head weight and the greatest proportion of marketable heads in both tests. The cultivars required 46 days from transplanting to first cut in the fall-winter and 52 days in the winter-spring seasons. For uniformity of producing mature heads, 'Cleopatra' was best in 1982 and 'Green Comet Hybrid' in 1983. The cultivars 'Shogun' and 'Green Beret' had the highest tolerance to downy mildew.

Broccoli, a nutritious green vegetable, has grown in popularity within recent years and its consumption in Florida has increased from 5.76 million pounds in 1970 to 28.29 million pounds in 1980. As a consequence of the increase in consumer demand for broccoli, Florida growers may increase production of this crop in coming years. In crop production, the selection of best cultivar for the local conditions is 1 of the most important decisions. New broccoli cultivars are being released by seed companies and need to be evaluated in Florida with currently planted cultivars. For these reasons, replicated variety trials were conducted at the Agricultural Research and Education Center (AREC) in Bradenton to evaluate the production potential of a number of broccoli cultivars. The results of this work are reported here.

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Table 1. Entries and their source for the broccoli trials at AREC-Bradenton.

Cultivar	Source
'Apollo'	Asgrow
'Bravo'	Northrup King
'Cape Queen'	Takii
'Citation'	Moran
'Cleopatra'	Parkseed
'Corsair'	Moran
'Dandy Early'	Gloeckner
'De Cicco'	Takii
'Early Emerald'	Parkseed
'Emerald Corona'	Takii
'Emperor'	Northrup King
Excalibur Hybrid	Moran
Experimental Hybrid 45	Moran
Experimental Hybrid 45-B	Moran
'Express Corona'	Takii
'Futura'	Asgrow
'Gem'	Asgrow
'Green Beret'	Ferry Morse
'Green Comet'	Herbst, Takii
'Green Duke'	Northrup King, Parkseed
'Green Hornet'	Stokes
'Green Valiant'	Abbot & Cobb, Northrup King
'Late Corona'	Takii
'Medium'	Takii
'Green Top' ^z	Takii
'Orion'	Asgrow
'Premium Crop'	Herbst, Parkseed, Takii
'Prominence'	Gloeckner, Takii
'Rex'	Ferry Morse
'Shogun'	Northrup King
SG-1	Sluis & Groot
SG-706	Sluis & Groot
'Southern Comet'	Gloeckner, Takii
'Spartan Early'	Agri genetics, Herbst
'Waltham 29' ^z	Herbst

^zNot planted in winter-spring 1983.
^yTested as "No. 14" prior to release.

Beret,' and 'Excalibur' had similarly large heads. The heaviest heads were produced by 'Green Top' (10.7 oz) and 'Cleopatra' (9.6 oz). There was no significant difference among the cultivars in the proportion of marketable heads of the total heads harvested, although the percentage ranged from 64% for 'Rex' to 100% for 'Green Top,' 'Dandy Early,' and 'Early Emerald.' The number of days required from field setting to first cut, date of the first and last cut and the cumulative percent of marketable yield at each of the 3 cuts of the harvest season are in Table 4. There was a range from 46 to 57 days in the number of days to first cut. Uniformity of the cultivars is reflected in the number of cuts necessary during the season to harvest all heads. The cultivars 'Cleopatra,' 'Green Valiant,' and 'Green Comet' yielded over 80% of their marketable total yield at the first cut, while the cultivars 'Shogun,' 'Apollo,' and 'Waltham 29' yielded 20% or less of their total yield at the first cut.

Table 2. Average monthly maximum and minimum temperatures and rainfall during fall-winter 1982 and winter-spring 1983 seasons at AREC-Bradenton.

	Oct. (14-31)	Nov. (1-30)	Dec. (1-28)	Jan. (4-31)	Feb. (1-28)	Mar. (1-25)
	°F					
Avg max	82.7	81.7	77.4	69.6	71.0	72.6
Avg min	60.8	60.1	56.1	45.5	51.2	51.7
	Inches					
Rainfall	0.94	1.18	0.86	2.32	10.16	6.99

Table 3. Marketable yield and performance of broccoli entries in fall-winter 1982 trial.

Cultivar	Yield (23 lb. crates/ acre)	Avg head diam (inches)	Avg wt of head (oz)	Marketable heads of total harvested (%)
Green Top	438 a ^z	4.78 a-d ^z	10.7 a ^z	100
Dandy Early	369 ab	4.49 b-e	8.9 bc	100
Early Emerald	364 a-c	5.24 a	8.8 b-d	100
Prominence	346 a-d	4.54 b-d	8.7 b-d	95
Experimental Hybrid 45-B	336 b-e	4.73 a-d	8.3 b-e	97
Green Duke	328 b-f	4.77 a-d	8.7 b-d	94
Emperor	312 b-g	4.43 b-e	7.7 b-h	97
Gem	310 b-g	4.24 c-g	7.8 b-g	96
Green Beret	295 b-h	4.67 a-d	8.1 b-f	88
Excalibur (Hybrid)	295 b-h	4.61 a-d	7.9 b-g	93
Green Hornet	288 b-g	4.43 b-c	7.4 c-i	96
Citation	285 b-h	4.21 c-g	7.4 c-i	94
Express Corona	282 b-h	4.77 a-d	8.9 bc	77
Bravo	279 b-h	4.79 a-d	7.6 b-h	88
Green Comet Hybrid	279 b-h	4.85 a-c	8.7 b-d	81
Green Valiant	273 b-h	4.21 c-g	7.8 b-g	88
Orion	268 b-h	3.78 f-h	7.2 c-i	90
Premium Crop	262 c-i	4.24 c-g	7.7 b-h	84
SG-1	255 d-j	4.38 c-f	7.3 c-i	86
Cleopatra	255 d-j	5.09 ab	9.6 ab	68
Experimental Hybrid 45	255 d-j	4.56 b-d	7.7 b-h	81
Apollo	253 d-j	4.17 d-g	7.0 c-j	89
Corsair	242 e-k	4.55 b-d	7.2 c-i	83
SG-706	232 e-l	4.53 b-d	7.8 b-g	81
Cape Queen	229 f-1	4.23 c-g	6.6 e-j	89
Southern Comet	229 f-1	4.33 c-f	6.9 c-j	82
Spartan Early-1	227 f-1	4.34 c-f	6.8 d-j	81
Medium	226 f-1		6.1 f-k	92
Futura	221 g-1	3.40 h	6.0 g-k	88
Shogun	200 h-1	3.73 f-h	7.1 c-j	73
Emerald Corona	192 h-1	3.27 h	5.9 g-k	82
Waltham 29	160 i-1	3.30 h	5.0 j-k	78
Late Corona	154 j-1	3.28 h	5.3 i-k	71
Rex	149 k-1	3.58 g-h	5.7 h-k	64
De Cicco	133 l	3.15 h	4.2 k	78
Avg	264 crates	4.27 inches	7.4 oz	86%

^zMean separation within columns by Duncan's multiple range test, 1% level.

Overall, in the fall-winter 1982 season, the best yield, highest average weight per head and the greatest percent of marketable heads of the total harvested came from 'Green Top.' The cultivars 'Dandy Early,' 'Early Emerald,' and 'Prominence' had similar yields and percentage of marketable heads of the total harvested.

Winter-spring 1983. Temperatures during the growing period were below average and rainfall was above average (Table 2). Freezing temperature (32°F) occurred only once, on January 14. 'Green Top' had the highest marketable yield, 344 23-lb. crates/acre. Marketable yields of 8 other entries, 'Green Duke,' Experimental Hybrid 45, 'Citation,' 'Prominence,' Experimental Hybrid 45-B, 'Excalibur,' 'Dandy Early,' and 'Premium Crop' were not significantly lower than the yield of 'Green Top' (Table 5). Experimental Hybrid-45 produced the largest heads, averaging 4.85 inches in diameter. Nine other entries, 'Green Duke,' 'Green Top,' 'Excalibur,' 'Southern Comet,' Experimental Hybrid 45-B, 'Dandy Early,' 'Early Emerald,' 'Green Beret,' and 'Citation' had similarly large heads. The greatest average head weight of 8.4 oz was recorded for 'Green Top;' however, 11 other entries, 'Green Duke,' 'Dandy Early,' Experimental Hybrid 45, 'Citation,' 'Shogun,' 'Prominence,' 'Excalibur,' 'Green Valiant,' 'Premium Crop,' Experimental Hybrid 45-B, and 'Southern Comet' had similar average head weight. Only 1 entry, 'Bravo,' had 100% marketable heads/number of

Table 4. Cumulative percent of marketable yield in fall-winter 1982 broccoli trial by harvest^z.

Cultivar	Yield (% of total)			Days to 1st cut	Date	
	1st cut	2nd cut	3rd cut		1st cut	3rd cut
Cleopatra	89	100	—	46	Nov. 29	Dec. 2
Green Valiant	86	97	100	53	Dec. 6	Dec. 14
Green Comet Hybrid	81	96	100	48	Dec. 1	Dec. 10
Bravo	78	99	100	46	Nov. 29	Dec. 6
Early Emerald	74	91	100	46	Nov. 19	Dec. 6
Express Corona	73	96	100	46	Nov. 29	Dec. 6
SG-1	71	92	100	47	Nov. 30	Dec. 6
Green Beret	69	91	100	47	Nov. 30	Dec. 6
Experimental Hybrid 45-B	68	86	100	46	Nov. 29	Dec. 10
Dandy Early	64	90	100	48	Dec. 1	Dec. 10
Green Duke	61	92	100	46	Nov. 29	Dec. 6
SG-706	59	92	100	47	Nov. 30	Dec. 10
Gem	58	95	100	49	Dec. 2	Dec. 8
Excalibur (Hybrid)	57	95	100	48	Dec. 1	Dec. 8
Cape Queen	57	91	100	47	Nov. 30	Dec. 10
Prominence	50	94	100	46	Nov. 29	Dec. 6
Spartan Early-1	50	91	100	47	Nov. 30	Dec. 3
Futura	47	71	100	53	Dec. 6	Dec. 14
Medium	47	67	100	50	Dec. 3	Dec. 21
Southern Comet	46	84	100	48	Dec. 1	Dec. 14
Green Hornet	43	94	100	48	Dec. 1	Dec. 10
Emperor	43	90	100	48	Dec. 1	Dec. 14
Citation	31	82	100	50	Dec. 3	Dec. 10
Premium Crop	40	72	100	47	Nov. 30	Dec. 14
Experimental Hybrid 45	36	67	100	46	Nov. 29	Dec. 10
Emerald Corona	36	66	100	55	Dec. 8	Dec. 14
Green Top	35	80	100	46	Nov. 29	Dec. 3
Corsair	34	73	100	47	Nov. 30	Dec. 6
Orion	32	72	100	53	Dec. 6	Dec. 10
De Cicco	27	48	100	53	Dec. 6	Dec. 21
Rex	26	48	100	53	Dec. 6	Dec. 21
Late Corona	24	64	100	57	Dec. 10	Dec. 28
Shogun	20	47	100	55	Dec. 8	Dec. 28
Apollo	16	86	100	50	Dec. 3	Dec. 10
Waltham 29	14	26	100	55	Dec. 8	Dec. 28

^zSeeds sown on Sept. 6 and seedlings set in the field on Oct. 14.

Table 5. Marketable yield and performance of broccoli entries in winter-spring 1983 trial.

Cultivar	Yield (23-lb. crates/acre)	Avg head diam (inches)	Avg wt of head (oz)	Marketable heads of total harvested (%)
Green Top	344 az	4.47 ab ^z	8.4 az	99 az
Green Duke	314 ab	4.50 ab	8.1 ab	96 ab
Expt. Hybrid 45	313 ab	4.85 a	7.8 a-d	97 ab
Citation	308 a-c	4.15 a-d	7.8 a-d	96 ab
Prominence	281 a-d	3.76 b-f	7.0 a-f	96 ab
Expt. Hybrid 45-B	274 a-d	4.32 a-c	6.7 a-h	99 a
Excalibur	271 a-e	4.39 a-c	6.8 a-g	95 ab
Dandy Early	269 a-e	4.20 a-d	8.0 a-c	89 a-c
Premium Crop	268 a-e	3.91 b-f	6.9 a-f	93 a-c
SG-1	259 b-f	3.92 b-f	6.4 b-i	99 a
Southern Comet	254 b-f	4.36 a-c	6.6 a-h	94 a-c
Green Beret	247 b-f	4.17 a-d	6.4 b-i	94 a-c
Green Comet	244 b-f	3.91 b-f	6.3 c-j	94 a-c
Shogun	240 b-f	3.83 b-f	7.2 a-e	78 c-e
Gem	240 b-f	4.07 b-e	6.2 d-j	96 ab
Early Emerald	238 b-f	4.18 a-d	5.8 e-k	99 a
Orion	237 b-f	3.50 d-g	6.0 d-j	94 a-c
Futura	228 c-g	3.72 c-f	5.7 e-k	95 ab
SG-706	217 d-g	3.67 c-f	5.6 e-k	93 a-c
Apollo	217 d-g	3.77 b-f	5.8 e-k	92 a-c
Bravo	217 d-g	3.98 b-e	5.1 g-l	100 a
Green Hornet	214 d-g	3.92 b-f	5.7 e-k	93 a-c
Green Valiant	206 d-g	3.64 c-f	6.8 a-h	82 b-e
Corsair	205 d-g	3.52 d-g	5.0 h-l	99 a
Cleopatra	200 d-g	3.71 c-f	5.4 e-k	93 a-c
Emerald Corona	190 e-g	3.37 e-f	6.1 d-j	77 c-e
Spartan Early	188 e-g	3.97 b-e	5.9 e-k	84 a-d
Cape Queen	183 f-h	3.49 d-g	4.8 i-l	93 a-c
Express Corona	182 f-h	3.34 e-f	4.5 j-l	97 ab
Late Corona	182 f-h	2.80 g	5.3 f-l	85 a-d
Rex	153 gh	3.18 fg	5.1 g-l	71 d-e
Medium	146 gh	2.83 g	4.1 k-l	87 a-d
De Cicco	101 h	2.77 g	3.6 l	66 e
Average	231 crates	3.82 inches	6.2 oz	91%

^zMean separation within columns by Duncan's multiple range test, 5% level.

plants set; however, 5 other entries, 'Green Top,' Experimental Hybrid 45-B, 'SG-1,' 'Early Emerald,' and 'Corsair' had 99% marketable heads and 19 other entries had more than 90% marketable heads.

Days required from field set to first cut ranged from 52 for 'Early Emerald' and 'Cleopatra' to 69 for 'Late Corona' and 'Shogun' (Table 6). The number of cuts required to harvest all the marketable heads ranged from 1 for 'Green Comet' to 5 for 'Shogun' (Table 6). Thus, 'Green Comet' yielded 100% and 6 other entries yielded 93% or more of their marketable total at the first cut. On the other end, 'Futura' yielded only 4% and 5 other entries had 20% or less of their total at the first cut. Despite a regular weekly fungicide spray, downy mildew developed on the plants. Differences in downy mildew tolerance were observed among the 34 entries and a survey was made (Table 7). 'Shogun' and 'Green Beret' and 17 other entrants had from 0-3% leaf damage according to a Horsfall-Barratt rating (3). 'Green Duke' had the highest proportion of damaged leaves among the entries. The disease was brought under control within a week and had no apparent effect on yields.

Overall, in the winter-spring season, the best yield and highest average weight per head came from 'Green Top.' This cultivar also had 99% marketable heads of the total harvested. Either other entries had similar high yields and average weight/head. Yields and average head weight was lower in the winter-spring than in the fall-winter season, although the proportion of marketable heads in the total harvest for all entries increased from 86 to 91%.

In both plantings the highest yielding entries had light green head color, small buds with bud clusters all over the heads, giving the cultivars a "knobby" appearance (1). Bud clusters developed on short, wide-angled branches, resulting in compact, hard heads. The heads of the high-yielding entries, 'Green Top,' 'Green Duke,' 'Dandy Early,' and 'Prominence' were not suitable for bunching because the

Table 6. Cumulative percent of marketable yield in winter-spring 1983 broccoli trial^z.

Entry	Yield (% of total)					Days to 1st cut	Date	
	1st cut	2nd cut	3rd cut	4th cut	5th cut		1st cut	Last cut
Green Comet	100	—	—	—	—	59	Mar 4	—
Expt. Hybrid 45-B	97	100	—	—	—	62	Mar. 7	Mar. 14
Corsair	97	99	100	—	—	59	Mar. 4	Mar. 14
Expt. Hybrid 45	97	99	100	—	—	62	Mar. 7	Mar. 14
Premium Crop	95	100	—	—	—	62	Mar. 7	Mar. 14
Southern Comet	93	100	—	—	—	59	Mar. 4	Mar. 8
Express Corona	93	100	—	—	—	59	Mar. 4	Mar. 7
Emperor	88	100	—	—	—	62	Mar. 7	Mar. 14
Prominence	85	100	—	—	—	59	Mar. 4	Mar. 9
Emerald Corona	84	97	100	—	—	64	Mar. 9	Mar. 21
Bravo	76	94	100	—	—	59	Mar. 4	Mar. 14
SG-1	75	99	100	—	—	57	Mar. 2	Mar. 14
Green Duke	73	100	—	—	—	59	Mar. 4	Mar. 7
SG-706	71	100	—	—	—	59	Mar. 4	Mar. 7
Green Hornet	64	100	—	—	—	59	Mar. 4	Mar. 7
Cape Queen	61	91	96	100	—	59	Mar. 4	Mar. 18
Gem	60	99	100	—	—	59	Mar. 4	Mar. 9
Apollo	59	100	—	—	—	59	Mar. 4	Mar. 7
De Cicco	56	91	100	—	—	62	Mar. 7	Mar. 14
Dandy Early	56	90	94	100	—	59	Mar. 4	Mar. 18
Green Valiant	55	82	100	—	—	63	Mar. 8	Mar. 14
Orion	50	92	100	—	—	59	Mar. 4	Mar. 21
Green Top	48	95	100	—	—	59	Mar. 4	Mar. 14
Citation	44	97	100	—	—	59	Mar. 4	Mar. 14
Early Emerald	44	94	100	—	—	52	Feb. 25	Mar. 4
Spartan Early 1	43	76	100	—	—	57	Mar. 2	Mar. 7
Medium	40	83	91	100	—	59	Mar. 4	Mar. 18
Rex	28	78	100	—	—	59	Mar. 4	Mar. 16
Late Corona	20	46	87	100	—	69	Mar. 14	Mar. 25
Green Beret	18	96	100	—	—	57	Mar. 2	Mar. 14
Shogun	14	26	57	89	100	69	Mar. 14	Mar. 25
Cleopatra	13	64	93	100	—	52	Feb. 25	Mar. 7
Excalibur	11	99	100	—	—	59	Mar. 4	Mar. 14
Futura	4	96	100	—	—	59	Mar. 4	Mar. 14

^zSeeds sown on Dec. 1, 1982 and seedlings set in the field on Jan. 4, 1983.

Table 7. Downy mildew damage on broccoli. Winter-spring 1983.

Entry	Downy mildew ^z
Shogun	2.00 a ^y
Green Beret	2.07 a
Green Valiant	2.33 ab
Experimental Hybrid 45	2.37 a-c
Early Emerald	2.43 a-c
Gem	2.47 a-d
Prominence	2.47 a-d
Citation	2.50 a-d
Spartan Early 1	2.53 a-d
De Cicco	2.67 a-e
Emerald Corona	2.73 a-f
Green Top	2.73 a-f
Express Corona	2.77 a-f
Futura	2.77 a-f
Southern Comfort	2.77 a-f
Cleopatra	2.80 a-f
Corsair	2.80 a-f
Experimental Hybrid 45-B	2.80 a-f
Excalibur	2.83 a-f
Green Hornet	3.00 b-g
Orion	3.10 b-h
Dandy Early	3.13 b-h
Late Corona	3.13 b-h
SG-1	3.17 b-h
Cape Queen	3.23 c-h
Emperor	3.23 c-h
Green Comet	3.33 d-h
Premium Crop	3.33 d-h
Rex	3.43 e-h
SG-706	3.47 e-h
Medium	3.57 f-h
Bravo	3.70 g-h
Apollo	3.77 g-h
Green Duke	3.93 h

^zHorsfall-Barratt Rating where 1 = 0 percent damage, 2 = 0-3, 3 = 3-6, 4 = 6-12, 5 = 12-25, 6 = 25-50 and 7-12 is reciprocal. Data average of 3 replications.

^yMean separation by Duncan's multiple range test, 5% level.

bud clusters would have been damaged during the unit operation. Growers should consider the above points when selecting cultivars for large scale production.

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