

BROCCOLI VARIETY TRIALS 1994/1995

*Mark Wilcox, University of Arizona Extension Agent, Yuma County
The Barkley Company*

Introduction

In an effort to assist seed companies and growers in evaluating new and numbered varieties and comparisons of commercial varieties, the University of Arizona has been conducting annual broccoli trials. Every effort is made to duplicate the typical commercial practices used in Yuma county including planting throughout the standard planting windows. This practice allows data to be collected during the various weather conditions experienced from early fall through spring.

Desirable characteristics for broccoli include a dome shaped head with small to medium beads, sturdy stalks and branches for support of the heads, uniformity of maturity and stand, a somewhat exerted head for ease at harvest, medium trim, disease resistance and sound field holding characteristics.

Methods and Materials

Thirty-five entries from numerous seed producers were evaluated during the 1994/1995 season. Plantings were made in cooperation with the Barkley Company in commercial fields in the Yuma Valley and irrigated on the following dates: September 15, October 9, and November 10, 1994. All of the broccoli was direct seeded in double rows on north-south oriented 42" beds using an Earthway push planter. A minimum of 50 foot rows was planted in each plot. All were thinned to approximately 6" to 8" at the appropriate time. Heads are evaluated as crowns. Standard cultural and IPM practices were utilized throughout the growing season by the Barkley Company.

Since many of the varieties vary in rates of development, the trials were evaluated over a period of time as they matured. Plant characteristics were evaluated continuously throughout the season with head and field holding characteristics being evaluated as near to maturity as possible. Plant characteristics evaluated included plant height, stand uniformity, uniformity of maturity, stalk, plant habit, head position and field holding characteristics. Head characteristics included shape, color, compactness, bead size, incidence of disease, bracting and starring.

Many of the characteristics were rated using a scale of 1 to 5, with 5 being the most desirable and 1 being least desirable. For those characteristics rated by other means, there is a key provided for explanation. Each variety was given an overall rating and additional comments were provided as well. Varieties with an overall rating of 3 to 5 should perform well for the given planting date and conditions under which they were grown. An overall rating of 3 may be commercially acceptable, however the variety may experience some specific problem areas when grown under similar conditions to those of this trial. Varieties rated at 1 to 2 should be considered unacceptable for commercial use under similar conditions to those of these trials.

Results and Discussion

Table 1 is a summary of the overall evaluations for each variety in the three plantings. Detailed evaluations for each of the three trials are provided in tables 2 through 4. Addendum 1 provides the AZMET (Arizona Meteorological Network) monthly summary data for the Yuma Valley for the entire growing period.

For the September planting, environmental conditions throughout the growing period were very warm for the months of September and October with daytime temperatures ranging from the low hundreds to the high eighties until early November. Only .58" precipitation was recorded during this slot so predominantly dry conditions existed throughout.

Generally speaking, the September trial produced strong stands overall with only two varieties receiving ratings of 3. Of the varieties planted, all except Ninja, Gallant SBC 3306 and Kermit were mature the week of Christmas. In this early group Legend and Major were rated at 4 followed by Everest, Captain, Packman and Galleon at 3.5. NVH 524 was rated at an even 3 based mainly on overall uniformity and starrng. In the later group, Gallant was rated at 4 followed by Ninja and Kermit at 3.5 and SBC 3306 was given a 3 based on uniformity of maturity, overall uniformity and starrng.

Weather conditions for the October planting were much cooler and damper. Slightly more than 2 and one-half inches of precipitation were recorded during this slot which may account for the incidence of downy mildew in some of the varieties. Temperatures cooled from high eighties in the month of October to the middle sixties for the months of December and January. This trial produced several outstanding entries including a numbered variety from Petoseed (PS 21290) which was rated at 4.5. Closely following were Sultan, Ninja, Arcadia, Shogun and Kermit all rated at 4. The remainder of the entries, Everest, SCC 5275, Pinnacle, Headline, PS 19590 and Landmark all received a rating of 3.5. This slot produced the best overall results from the entries provided.

Abnormally warm temperatures in late February and early March were experienced in the November planting and may be associated with some late quality problems throughout the growing area. Kermit, Fiesta and Liberty all were rated at 4 based on overall performance. SSC 5272 was the earliest maturing in this slot but was rated at 3.5 based on compactness and bead size. Greenbelt, PS 19590, Arcadia, Shogun, Climax, Headline and Republic were also rated at 3.5. SSC 5275 was early in this slot but was rated at 3 based upon head compactness and head size suggesting that this variety may be more suited as a bunching type.

** It should be noted that many of the varieties trialed are not necessarily adapted to the planting window in which they are trialed. Occasionally favorable or undesirable results may occur in such instances. In any case, these results are generally associated with environmental conditions rather than varietal characteristics.

Table 1. Summary of Overall Evaluations for the Three Broccoli Planting Dates

<u>Variety</u>	<u>Wet Dates</u>		
	<u>September 15</u>	<u>October 9</u>	<u>November 10</u>
Legend - Sakata	4		
Captain - Royal Sluis	3.5		
Packman - Petoseed	3.5		
Major - Royal Sluis	4		
Everest - Rogers N K	3.5	3.5	
Galleon - Petoseed	3.5		
NVH 524 - Rogers N K	3		
Ninja Sakata	3.5	4	
Gallant - Sakata	4		
SBC 3306 - Sakata	3		
Kermit - Bejo	3.5	4	4
Landmark - Am. Takii		3.5	
Pinnacle - Am. Takii		3.5	
Headline - Am. Takii		3.5	3.5
SSC 5275 - Shamrock		3.5	3
PS 21290 - Petoseed		4.5	
19590 - Petoseed		3.5	3.5
Sultan - Sakata		4	
Arcadia - Sakata		4	3.5
Shogun - Sakata		4	3.5
Emerald City - Sakata			4
Arcadia - Sakata			3.5
SSC 5272 - Shamrock			3.5
Climax - Am. Takii			3.5
Green Belt - Rogers N K			3.5
Liberty - Petoseed			4
Fiesta - Bejo			4
Republic - Petoseed			3.5

BROCCOLI VARIETY TRIAL RESULTS
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Table 2

Variety	Overall Evaluation (a)	Head Shape (d)	Head Size (b)	Head Color (c)	Head Compactness (a)	Head Diameter (Inches)	Head Weight (lbs)	Uniformity (a)	Field Holding (a)	Plant Height (b)	Head Position (c)	Habit (g)	Stalk (b)	Incidence of Discase (a)	Starring (a)	Bracting (a)	Evaluation Date	Maturity at Harvest (f)	KEY
Barkley Company Plant date: 9-14-94 Wet date: 9-15-94																			(a) 5 = most desirable, 1 = undesirable (b) S = small, M = medium, L = large, V = variable (c) E = exerted, M = medium, L = low (d) D = domed, S = semi-domed, F = flat, K = knuckled, V = variable (e) BG = blue-green, G = green, P = purple, WT = white tip, V = very (f) M = mature, O = over, U = under, V = very (g) 5 = erect, 1 = wide Comments:
Legend - Sakata	4.0	D	M-L	G	3.5	5.5	1.4	3.5	5.0	L	M-E	4.0	M	5	4.0	5	12-28 1-6	M	Good overall uniformity of maturity, moderate trim, excellent field holding, no incidence of disease.
Everest - Rogers NK	3.5	SD	M-L	G	3	5.0	1.1	4.0	4.0	M-L	E	4.0	S-M	5	3.0	5	12-28 1-6	M	Good uniformity of maturity, moderate trim, stalky late starring but otherwise good field holding.
Captain - Royal Sluis	3.5	SD	M-L	G	3	6.0	1.1	4.5	4.0	M	M	4.0	M-L	5	4.0	5	12-28 1-6	M	Excellent overall uniformity, somewhat excessive trim, good field holding capacity.
Major - Royal Sluis	4.0	SD	M-L	G	3.5	6.0	1.3	4.5	4.0	M-L	M-E	4.0	M-L	5	4.0	5	12-28 1-8	M	Excellent uniformity of maturity, moderate to excessive trim, somewhat stalky late but excellent field holding.
Packman - Petoseed	3.5	SD	M-L	G	3	5.5	1.0	4.0	3.5	L	M-E	4.0	M	5	3.5	5	12-28 1-8	M	Good uniformity, nice slender stalk with minimum trim, good field holding capacity, late starring.
Galleon - Petoseed	3.5	SD	M-L	G	3	6.0	1.1	4.0	4.0	M	M-E	4.0	M-L	5	4.0	5	12-28 1-8	M	Good uniformity of maturity, moderate trim, somewhat stalky with good field holding.
NVH 524 - Rogers NK	3.0	D	S-M	G	3	6.0	1.2	3.0	3.5	M-L	M-E	4.0	M-L	5	3.0	5	12-28 1-8	M	Good overall uniformity, nice slender stalk with little trim, late starring but good field holding.
Ninja - Sakata	3.5	D	S-M	G	4	4.5	1.0	3.0	4.0	S	M	4.0	S-M	5	3.5	5	1-6 1-16	M	Good overall uniformity, slender stalks with good compact head, good field holding.
Gallant - Sakata	4.0	D	S	G	4	5.0	1.1	4.0	4.0	M-L	M-E	4.5	M	5	3.5	5	1-6 1-16	M	Good uniformity & compactness of heads, somewhat stalky, smallest in habit at maturity.
SBC 3306 - Sakata	3.0	D	S-M	G	3.5	4.0	1.1	3.5	4.0	M-L	E	4.0	S-M	5	3.5	5	1-6 1-16	M	Variable uniformity of maturity but good uniformity of stand, moderate trim, heads exerted at maturity.
Kermit - Bejo	3.5	D	M-L	G	4	5.0	1.1	3.0	4.0	L	M	3.5	M-L	5	3.5	5	1-6 1-16	M	Somewhat variable in uniformity, good firm compact head, late starring but otherwise excellent field holding.

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Barkley Company	Overall Evaluation (a)	Head Shape (d)	Bead Size (b)	Bead Color (c)	Head Compactness (a)	Head Diameter (Inches)	Uniformity (a)	Field Holding (a)	Plant Height (b)	Head Position (c)	Habit (g)	Stalk (b)	Incidence of Disease (a)	Starring (a)	Bracting (a)	Evaluation Date	Maturity at Harvest (f)	KEY
Everest - Northrup King	3.5	D	M	B-G	3.0	5.0	3.5	4.0	M	E	4.5	S-M	5.0	4.0	5	1-17 1-27	M	(a) 5 = most desirable, 1 = undesirable (b) S = small, M = medium, L = large, V = variable (c) E = exerted, M = medium, L = low (d) D = domed, S = semi-domed, F = flat, K = knuckled, V = variable (e) BG = blue-green, G = green, P = purple, WT = white tip, V = very (f) M = mature, O = over, U = under, V = very (g) S = erect, I = wide
SCC 5275 - Shamrock	3.5	D	M	B-G	3.0	4.5	3.5	4.0	M-L	M-E	4.0	M	5.0	3.5	5	1-25 1-31	M	Comments: Somewhat stemmy, moderate trim with good habit. Earliest maturing - good field holding - no late downy.
Sultan - Sakata	4.0	D	S-M	G	3.5	5.0	4.0	4.0	L	M-E	3.5	M	5.0	4.5	5	1-25 1-31	M	Moderate trim with good overall uniformity - excellent vigor w/little to no late downy mildew.
Pinnacle - American Takii	3.5	D	M	G	4.0	5.0	3.0	3.5	L	M-E	3.0	M-L	3.5	4.0	5	1-25 1-31	M	Nice, compact head with small bead size - moderate trim. Habit somewhat spreading late - no downy late.
PS 21290 - Petoseed	4.5	D	S	G	4.0	4.5	4.0	4.0	M-L	M-E	4.0	M-L	5.0	4.5	5	1-25 1-31	M	Large compact head with medium bead size - habit is somewhat leggy and spreading - evidence of downy at maturity.
Ninja - Sakata	4.0	D	S	B-G	4.0	4.5	4.0	3.5	L	M-E	4.0	S-M	5.0	3.5	5	1-25 1-31	M	Nice firm, compact head with small bead size - good late vigor with no downy present.
Arcadia - Sakata	4.0	D	S-M	G	4.0	5.5	4.0	3.5	M-T	M	4.0	M-L	3.5	4.0	5	1-27 2-3	M	Good small beads with nice slender stalk - minimal trim and good overall uniformity - some late starring.
Headline - American Takii	3.5	D	M	G	4.0	5.0	3.5	3.5	T	M-E	3.5	M-L	5.0	3.5	5	1-27 2-3	M	Nice erect habit with good position - moderate trim but not to stemmy - some downy present at maturity.
19590 - Petoseed	3.5	D	S	G	4.0	4.5	4.0	4.0	M	M-E	3.5	M	4.0	4.5	5	1-27 2-3	M	Quite tall in comparison with some variation in head position - moderate trim but shows starring at maturity.
Kermat - Bejo	4.0	D	M	B-G	4.0	4.5	4.0	4.0	M-L	M-E	4.0	M-L	4.0	4.0	5	1-25 2-3	M	Slightly spreading in habit with good overall uniformity - slender stalks but somewhat stemmy - some late downy.
Shogun - Sakata	4.0	D	S-M	B-G	4.0	4.0	3.5	4.0	M-T	M-E	4.0	S-M	5.0	5.0	5	1-27 2-3	M	Somewhat stemmy with moderate to excessive trim - nice firm head with good uniformity throughout - late starring.
Landmark - American Takii	3.5	D	M-L	B-G	4.0	4.5	3.5	4.0	M	M-E	3.5	M	5.0	5.0	5	1-27 2-3	M	Somewhat tall but erect in habit - slender stalks with moderate trim - good field holding, no signs of downy.
																		Some variation in head position other wise generally good habit - starring at maturity with no sign of downy.

Table 3

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Table 4

Variety	Overall Evaluation (a)	Head Shape (d)	Bead Size (b)	Bead Color (c)	Head Compactness (a)	Head Diameter (Inches)	Uniformity (a)	Field Holding (a)	Plant Height (b)	Head Position (c)	Habit (g)	Stalk (b)	Incidence of Disease (a)	Starring (a)	Bracing (a)	Evaluation Date	Maturity at Harvest (f)	KEY
SSC-5272 - Shamrock	3.5	S	L	G	3	5.5	4	4	M	B	4	S	5	4	5	3-3 3-10	M-O	(a) 5 = most desirable, 1 = undesirable (b) S = small, M = medium, L = large, V = variable (c) E = erect, M = medium, L = low (d) D = domed, S = semi-domed, F = flat, K = knuckled, V = variable (e) BG = blue-green, G = green, YG = Yellow Green, P = purple, WT = white tip, V = very (f) M = mature, O = over, U = under, V = very (g) 5 = erect, 1 = wide Comments:
Kermitt - Bejo	4	D	M	BG	4	6.0	4	5	L-M	M	4	L	4	4	5	3-3 3-10	M	Earliest maturing with good habit and overall uniformity - slightly stemmy late.
Green Belt - Rogers Northrup King	3.5	D-K	S	G	4.5	5.5	3	4	M	L-M	3	M-L	4	5	5	3-3 3-10	M	Nice compact head - good overall uniformity slightly excessive trim - good field holding.
19590 - Petoseed	3.5	D-K	S	YG	3.5	5.0	3.5	5	M	M	3	M	5	5	5	3-7 3-12	M	Some overall variability and spreading in habit - some late downy.
Liberty - Petoseed	4	D	S	G	4	5.5	4	4	M	M	3.5	M	4	5	5	3-7 3-12	M	Heads somewhat off color (yellowish) - somewhat stemmy with moderate trim - good field holding.
Arcadia - Sakata	3.5	D	S-M	G	3	5.0	3.5	4	M-T	M	3.5	M	4	5	5	3-7 3-12	M	Nice compact domed head with good uniformity - excellent habit with moderate trim.
Shogun - Sakata	3.5	D	S-M	G	4	4.5	3	4	T	M	3	M	3.5	5	5	3-7 3-12	M	Good uniformity but somewhat lacking in head density - slightly stemmy with moderate trim - tall and spreading in habit.
SSC-5275 - Shamrock	3	D	M	G	3	3.5	3.5	4	T	M-E	3.5	S	5	4	5	3-7 3-12	M	Nice tight and compact head - moderate trim and good habit - some incidence of downy at maturity.
Fiesta - Bejo	4	D	S-M	G	4	4.5	3.5	4	M	M	3.5	M-L	5	5	5	3-7 3-12	M	Nice and erect in habit - small crowns somewhat lacking in density - light trim - very early in maturity.
Climax - American Takii	3.5	D-K	S-M	G	3.5	5.0	4	4	M	M	3.5	M	5	4.5	3	3-7 3-12	M	Excellent dense tight heads - good habit and head position - moderate to excessive trim with good field holding.
Headline - American Takii	3.5	D	M-L	G	3.5	5.0	3	4	T	M	3.5	S	4	5	5	3-7 3-12	M	Good overall uniformity - moderate to excessive trim - somewhat late in maturity - showing bracing at maturity.
Republic - Petoseed	3.5	D	S-M	G	4	5.0	4	4	L	M	4	M-L	4	5	5	3-7 3-12	M	Nice compact head - low habit with moderate trim - good field holding characteristics.
																		Good overall uniformity - somewhat excessive trim with some late downy.