

Broccoli Variety Trials 1988/1989

Marvin Butler and Norm Oebker

INTRODUCTION

Consumption of broccoli continues to increase as Americans become aware of the importance of fresh vegetables to a healthful diet. The acreage of broccoli in Yuma reflects this trend with an increase from 320 acres six years ago to near 3,000 acres during the 1988/1989 season. Broccoli is planted in the Yuma area from late August through November and harvested from November through March.

Desirable plant characteristics include a dome-shaped head to shed water, medium to small beads, large enough stalks and branches to provide the weight and support necessary to produce a tight head, uniform maturity, head exertion for ease of harvest, and field-holding capacity.

MATERIALS AND METHODS

Fifty-three varieties from 10 seed companies were included in the following three plantings during the 1988/1989 winter vegetable season: September 14, November 3 and November 11. The broccoli was direct-seeded in double rows on 40-inch beds using an Earthway push planter. The 20-single bed plots were thinned to a 7-inch spacing between plants.

Because varieties vary in their rate of development they were evaluated periodically as they matured, with an indication of their maturity at the time of evaluation to refine further the days to maturity. Varieties indicated as being undermature had heads that averaged a little smaller than normally harvested, while overmaturity indicates slightly larger than average heads.

Plant characteristics evaluated include: plant height, head position and uniformity of maturity. Head characteristics included: head shape, firmness or compactness of the head, bead size, bead color, and starring (opening of the floretes to show the yellow of the petals). Varieties in the September 14 planting were evaluated for tolerance to downy mildew.

Many of the characteristics were rated on a scale from 1 to 5, with 1 being most desirable and 5 unacceptable. An overall rating was then given to each variety. Varieties with an overall rating of 1-2 should perform well for the given planting date and conditions under which the trial was grown. An overall rating of 3 indicates the variety had some problem areas, but may provide an acceptable performance under different conditions, while varieties with an overall rating of 4-5 would be unacceptable for commercial use under these conditions.

RESULTS AND DISCUSSION

A summary of the overall evaluations from the three plantings, and the evaluation for downy mildew tolerance is shown in Table 1. Detailed evaluations of the four trials are provided in Tables 2-4.

The last several winter vegetable seasons have had periods of extreme temperatures, with this season being no exception. High temperatures prevailed during the fall, with average temperatures from the first of October through December running nearly 5° F above normal. In late December, nighttime temperatures dropped into the low to mid 20's causing freeze damage to many of the vegetable crops, and premature head formation on plants in the button stage of development.

The September 14 trial had a lot of side shoots from the base of the plants, with early varieties tending to have stout stalks. Later maturing varieties had more slender stalks with the heads more exerted, some purpling of the heads and less uniformity of maturity. Maturity of the November 4 planting was pushed together by high temperatures following the cold during early February. The plants tended to be short, with more than normal purpling of the heads. The November 11 trial was even more extreme than the November 4 planting with very short plants, large beads, and purpling heads that tended to "blow up" prematurely.

Green Lady (Sunseed) was an early maturing variety that was very impressive in the September planting, but did not look nearly as good in later trials. Another early variety that was rated 1 in September was Midori (Brinker Orsetti) which has a high domed-shaped head.

A medium maturing variety, 86-9 (Sunseed) had a nice looking head in the early trial, but the plant tended to be short, and this characteristic was accentuated in the later planting. Skiff (Royal Sluis) was a consistent performer with a rating of 2 in all three plantings despite problems with sturring. Commander (Northrup King) which has been a widely used variety in the desert southwest performed consistently with a rating of 2 for the first two trials before dropping to a 3 on the last planting.

The late maturing variety, Greenbelt (Sakata, Northrup King), performed very well through the extreme cold followed by warm temperatures near harvest and received a rating of 1 for both November plantings. Marathon (Sakata) ran a close second with a 1 and 2 rating for the late plantings.

Table 1. Summary of Overall Evaluations for the Three Planting Dates, and Ratings for Downy Mildew Tolerance taken December 14, 1988.

Variety	Irrigation Dates			Downy Mildew Tolerance
	Sept. 14	Nov. 4	Nov. 11	
Galaxy (Asgrow)		4	3	
Fieldcrest #71 (Brinker Orsetti)	3			3
Midori (Brinker Orsetti)	1			2
Commander (Northrup King)	2	2	3	2
Emperor (Northrup King)	2	3	3	3
Greenbelt (Northrup King)		1		4
Green Duke (Northrup King)	3	4	3	2
Buccaneer (Petoseed)		3	3	
Packman (Petoseed)	3			2
Pirate (Petoseed)		2	3	
Clipper (Royal Sluis)	4			3
Cruiser (Royal Sluis)	2			2
Schooner (Royal Sluis)		4		3
Skiff (Royal Sluis)	2	2	2	2
Arcadia (Sakata)		3	2	
Greenbelt (Sakata)		1	1	
Marathon (Sakata)		1	2	3
Sprinter (Sakata)	2			3
Green Lady (Sunseed)	1	4	3	2
Silvia (Sunseed)	4	3	3	3
Vantage (Sunseed)	2			2
Pinnacle (Takii)	2	1	3	3
Premium Crop (Takii)	3			3
Southern Comet (Takii)	3			2
Zeus (Takii)	3			2
FMX 94 (Ferry Morse)			3	
FMX 117 (Ferry Morse)		3		
FMX 122 (Ferry Morse)		4		
PSR 16284 (Petoseed)	3	3	3	2
Exp. #12 (Sakata)		3	2	
Exp. #91 (Sakata)		4	3	
83-1 (Sakata)	2	4		2
86-3 (Sakata)		3		
86-4 (Sakata)		3		
86-9 (Sakata)		4		2
87-11 (Sakata)	2	1		2
87-16 (Sakata)	3	3		3
Sunre 8010 (Sunseed)		4		
Sy 2804 (Synergene)	3	2		3
Sy 6099 (Synergene)	3	1		2
Sy 6181 (Synergene)	2	3		2
Sy 6236 (Synergene)		3		3
Sy 6241 (Synergene)		3		2
Sy 6466 (Synergene)	2	1		2
Sy 6517 (Synergene)	3	3		3
ATX-368 (Takii)	2	3		4
ATX-386 (Takii)	4	3		3
ATX-392 (Takii)	4	3		3
ATX-411 (Takii)	2	3		3
ATX-528 (Takii)	4	4		2
ATX-580 (Takii)	3	3	3	3
ATX-697 (Takii)	4	2		2

Key

1 = most desirable, 5 = undesirable

Table 2. Broccoli Variety Evaluations for the September 14, 1988, Planting with Waymon Farms, Inc. in the South Yuma Valley.

Fieldplot #71 (P708-B) (Bunker Orsetti)	Overall Eval. (a)	Head Shape (d)	Head Size (b)	Head Color (e)	Head Compactness (a)	Uniformity (a)	Field-Holding (a)	Plant Height (b)	Head Position (c)	Stalk Diameter (b)	Scarring (a)	Date Evaluation (f)	Harvest at (f)	Comments:
Fieldcrest #71 (P708-B) (Bunker Orsetti)	3	S, K	S-H	IG, P, HT	2	2	2	S	M	M-L	1	12/14	0	Tight heads with white head tips, non uniform maturity
Midori (Bunker Orsetti)	3	S	M	IG, P	2	2	2	S	M	M-L	1	12/14	0	Very dome-shaped head with small beads
Comanor (Northrup King)	3	S	M	IG, P	2	2	2	S	M	M-L	1	1/8	0	Fairly nice head, some curling, irregular maturity
Emercor (Northrup King)	3	S, K	M	IG	2	2	2	S	M	M-L	1	12/26	0	More separation and knuckling than usual, not uniform in maturity
Green Blue (Northrup King)	3	S	M	IG	2	2	2	S	M	M-L	1	12/14	0	Some very nice heads, others a bit loose and flat
Packman (Petoseed)	3	S	M	IG, P	2	2	2	S	M	M-L	1	12/14	0	Not bad for very early variety, but only acceptable when compared to later varieties
PSR 16284 (Petoseed)	3	S	M	IG, P	2	2	2	S	M	M-L	1	1/8	0	A lot of purple, beads a bit large, side branches on head
Clipper (Royal Sluis)	3	S, K	M	IG	2	2	2	S	M	M-L	1	12/26	0	Loose knuckled head with larger than desirable beads
Cruiser (Royal Sluis)	3	S	M	IG	2	2	2	S	M	M-L	1	12/26	0	Uniform heads, slimmer clean stalks, heads not compact with long branches
Skiff (Royal Sluis)	3	S	M	IG	2	2	2	S	M	M-L	1	12/14	0	Nice compact head, slight scarring, some hollow stem, lacking uniform maturity
Sprinter (Sakata)	3	S	M-L	IG	2	2	2	S	M	M-L	1	12/14	0	Small smooth semi-dome head
B-7 (Sakata)	3	S	M-L	IG	2	2	2	S	M	M-L	1	12/26	0	Nice shaped head, very compact, beads a bit large
B-11 (Sakata)	3	S	M	IG	2	2	2	S	M	M-L	1	12/14	0	Nice loose compact head with small beads, plant only a bit short
B-16 (Sakata)	3	S	M	IG	2	2	2	S	M	M-L	1	12/14	0	Nice loose compact head with small beads, lacking in uniformity
Green Luv (Sunseed)	3	S	M	IG	2	2	2	S	M	M-L	1	12/26	0	Very compact and nice shape with good holding capacity
Silvia (Sunseed)	3	S	M-L	IG	2	2	2	S	M	M-L	1	12/26	0	Very impressive nice head with good holding capacity
Vantage (Sunseed)	3	S	M-L	IG, P	2	2	2	S	M	M-L	1	1/8	0	Smooth stalk with slightly large heads, extreme hollow stem
S-508 (SynGene Seed)	3	S	M	IG, P	2	2	2	S	M	M-L	1	12/26	0	Very nice smooth compact head with smooth moderate stalk
S-939 (SynGene Seed)	3	S	M	IG, P	2	2	2	S	M	M-L	1	12/26	0	Moderately nice head, non-uniform maturity
S-941 (SynGene Seed)	3	S	M	IG, P	2	2	2	S	M	M-L	1	12/26	0	Nice head but very short plant with heavy leaf scarring
S-946 (SynGene Seed)	3	S	M	IG	2	2	2	S	M	M-L	1	1/8	0	Nice heads, a lot of side branches at base of plant
S-957 (SynGene Seed)	3	S	M	IG	2	2	2	S	M	M-L	1	1/8	0	Nice heads, a lot of side branches
S-959 (SynGene Seed)	3	S	M	IG, P, HT	2	2	2	S	M	M-L	1	1/8	0	Head not impressive, non-uniform maturity, freeze damage to some stalks
Pinnacle (Takii)	3	S	S-V	IG, P, HT	2	2	2	S	M	M-L	1	1/8	0	Variable head size, some scarring and hollow stem
Premium Crop (Takii)	3	S	S-V	IG, P, HT	2	2	2	S	M	M-L	1	1/8	0	Nice head, curling, non-uniform maturity
Southern Comet (Takii)	3	S	M	IG	2	2	2	S	M	M-L	1	12/26	0	Clean stalk but some knuckled and irregular shaped heads
Zeus (Takii)	3	S	M	IG	2	2	2	S	M	M-L	1	12/14	0	Heads a bit flat, loose
ATF-368 (Takii)	3	S	M	IG	2	2	2	S	M	M-L	1	12/14	0	Flatish looser head with uniform S-H beads
ATF-366 (Takii)	3	S	M	IG, P	2	2	2	S	M	M-L	1	1/8	0	Nice compact head, some scarring and uniformity problems
ATF-392 (Takii)	3	S	M	IG, P	2	2	2	S	M	M-L	1	1/8	0	Nice shaped head but large heads and side branching on stalk, scarring
ATF-311 (Takii)	3	S	M	IG	2	2	2	S	M	M-L	1	12/26	0	Nice shaping head except for scarring, maturity extremely variable
ATF-528 (Takii)	3	S	M	IG	2	2	2	S	M	M-L	1	12/26	0	Smooth stalk, small heads, moderately compact, scarring head
ATF-550 (Takii)	3	S	M	IG, HT	2	2	2	S	M	M-L	1	1/8	0	Head branching with small heads, hollow stem
ATF-697 (Takii)	3	S	M	IG, P, HT	2	2	2	S	M	M-L	1	1/8	0	Head branching with small heads, scarring head size, often a bit large

KEY
 (a) 1 = most desirable, 5 = 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) IG = blue-green, G = green, P = purple, HT = white tip, V = very
 (f) M = mature, D = over, U = under, V = very

Table 3. Broccoli Variety Evaluations for the November 4, 1988, Planting at the Yuma Valley Agricultural Center.

Variety	Overall Eval.	Head Shape (d)	Head Size (b)	Head Color (e)	Head Compactness (a)	Uniformity (a)	Field-Holding (a)	Plant Height (b)	Head Position (c)	Stalk Diameter (b)	Starring (a)	Evaluation Date	Maturity at Harvest (f)	Comments:
Galaxy (Asatom)	1	S	M	BG	3	3	3	M	E	S	1/2/24	0	Irregular shaped loose heads, slender stalk	
Galaxy (Ferry Morse)	3	S-M	S	G	2	2	2	M	M	M	1/2/24	M	Lumpy loose heads, side branching	
Galaxy (Ferry Morse)	4	S	S-M	BG	3	3	3	M	M	M	1/2/24	M	Long branches, knuckled loose head	
Commander (Northrup King)	2	S	M	BG	3	3	3	M	M	M	1/2/24	M	Okav head, medium stalk, branches a bit long	
Emerald (Northrup King)	1	S	M	P	3	3	3	M	M	M	1/2/24	M	Long branches, loose head, slender stalk	
Green Belt (Northrup King)	1	S	S-M	BG	3	3	3	M	M	M	1/2/24	M	Nice compact head, large stalk	
Green Duke (Northrup King)	1	S	M	BG	3	3	3	M	M	M	1/2/24	M	Loose knuckled head, slender stalk, some heads blown	
Buccanier (Parosseed)	2	S	M-L	P	2	2	2	M	M	M	1/2/24	M	Fairly compact, but loose looking head with larger than desirable beads	
Pirate (Parosseed)	2	S	M-L	P	2	2	2	M	M	M	1/2/24	M	Head a bit large, leaf scarring, branches larger than normal	
PSR 15288 (Parosseed)	2	S	M-L	P	2	2	2	M	M	M	1/2/24	M	Loose large beaded heads, irregular shaped heads	
Schooner (Royal Sluis)	2	S	S-M	BG	3	3	3	M	M	M	1/2/24	M	Slender stalk, long branches, starring	
Skiff (Royal Sluis)	2	S	S-M	BG	3	3	3	M	M	M	1/2/24	M	Nice head except starring	
Green Jet (Sakata)	3	OK	S-M	P	1	1	1	M	M	M	1/2/24	M	Very tight, lumpy head, excessive starring purpling in leaf axils	
Marathon (Sakata)	1	M	S-M	P	1	1	1	M	M	M	1/2/24	M	Some slumped compact head, purple	
EXP #12 (Sakata)	1	M	M	P	3	3	3	M	M	M	1/2/24	M	Very nice looking head, leaf scarring, short plant	
EXP #91 (Sakata)	1	M	M	BG,G	3	3	3	M	M	M	1/2/24	M	Long branches, loose, flat heads	
36-1 (Sakata)	3	S	M-V	P	2	2	2	M	M	M	1/2/24	M	Loose bi-colored head, very slender stalk	
36-3 (Sakata)	3	S	S-M	P	2	2	2	M	M	M	1/2/24	M	Variable head size, long branches, very slender stalk	
36-4 (Sakata)	3	S	M	BG	3	3	3	M	M	M	1/2/24	M	Fairly nice head, good uniformity	
36-9 (Sakata)	4	G	S	P	1	1	1	L	L	L	1/2/24	M	Irregular shaped heads, slender stalk, some starring problems	
37-11 (Sakata)	3	S	M	P	1	1	1	L	L	L	1/2/24	M	Very short plant, leaf scarring, some nice heads, others blew up	
87-16 (Sakata)	3	S	S-M	BG	3	3	3	M	M	M	1/2/24	M	Nice head, smooth stalk	
Green Lady (Sunseed)	3	S	M	BG,G	3	3	3	M	M	M	1/2/24	M	Nice heads with starring	
Illivia (Sunseed)	3	D	M-L	BG	3	3	3	M	M	M	1/2/24	M	Loose bi-color head with long branches and slender stalk	
Sunre 3010 (Sunseed)	2	S	M	BG	3	3	3	M	M	M	1/2/24	M	Irregular shaped loose head, excessive side branching	
Sy 2804 (Synergene)	2	S	M	P	1	1	1	L	L	L	1/2/24	M	Nice compact head, starring	
Sy 6099 (Synergene)	3	S	M-L	BG	2	2	2	M	M	M	1/2/24	M	Compact head, short plant, uniform maturity	
Sy 6181 (Synergene)	3	S	M-L	BG	2	2	2	M	M	M	1/2/24	M	Okav head, leaf scarring, side branching, heads a bit large	
Sy 6236 (Synergene)	3	S	M-L	P	2	2	2	M	M	M	1/2/24	M	Slender stalk, heads a bit dark, otherwise nice head	
Sy 6466 (Synergene)	3	S	M-L	P	2	2	2	M	M	M	1/2/24	M	Long branches, slender stalk	
Sy 6617 (Synergene)	3	S	M-L	P	2	2	2	M	M	M	1/2/24	M	Nice head and stalk, non-uniform maturity	
Pinnacle (Takii)	3	S	L	BG	3	3	3	M	M	M	1/2/24	M	Large heads, excessive small leaves at base of head	
ATV-368 (Takii)	3	S	S-M	BG	2	2	2	M	M	M	1/2/24	M	Nice head, uniform maturity, good stalk and plant size	
ATV-386 (Takii)	3	D	M-L	BG	1	1	1	S	S	S	1/2/24	M	Fairly nice head but starring and heads a bit large	
ATV-392 (Takii)	3	D	M-L	BG	1	1	1	S	S	S	1/2/24	M	Variable size of bi-color heads with starring, otherwise compact and nice shape	
ATV-411 (Takii)	3	D	M-L	BG	1	1	1	S	S	S	1/2/24	M	Compact head with large beads, starring, side branching	
ATV-411 (Takii)	3	D	S-M	BG	2	2	2	M	M	M	1/2/24	M	Somewhat lumpy head, side branching and ear scarring	
ATV-528 (Takii)	3	D	S-M	V	2	2	2	M	M	M	1/2/24	M	Slender stalk with side shoot, variable size beads on loose head with long branches	
ATV-580 (Takii)	3	D	L-L	U,P	2	2	2	M	M	M	1/2/24	M	Loose variable sized large beads, side branching but fairly short branches	
ATV-697 (Takii)	2	S	S	P	2	2	2	M	M	M	1/2/24	M	Irregular shaped compact heads with small heads, leaf scarring	

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 (c) E = exerted, M = medium, L = low
 (d) D = domed, S = semi-domed, F = flat, K = knuckled, Y = variable
 (e) BG = blue-green, G = green, P = purple, W = white tip, V = very
 (f) M = mature, O = over, U = under, Y = very

Table 4. Broccoli Variety Evaluations for the November 11, 1988, Planting with Griffin Ranches, Inc. in the South Yuma Valley.

Variety	Overall Eval. (a)	Head Shape (d)	Head Size (b)	Head Color (e)	Head Compactness (a)	Uniformity (a)	Field-Holding (a)	Plant Height (b)	Head Position (c)	Stalk Diameter (b)	Starring (a)	Evaluation Date	Harvest at	Comments:
Galaxy (Asgrow)	3	S	L	BG,G	3	2	3	M	3	S	3	2/28	M	Loose head with bi-color large beads, starring and extensive side branching
Flix 34 (Ferry Morse)	3	S	M-L	BG,G	3	2	3	S	3	S	3	2/28	M	Medium large heads with starring, light weight, side branching
Commander (Northrup King)	3	S	L	BG,G	2	4	2	M	3	M	3	3/3	M	Large bi-color heads with some starring, light weight, side branching
Emperor (Northrup King)	3	S	L	BG	2	4	2	M	3	M	2	3/3	M	Variable sized large heads with starring
Green Duke (Northrup King)	3	S	L	BG	2	3	3	M	3	M	3	3/3	M	Irregular shaped heads with large beads and starring
Buccaneer (Petoseed)	3	S	L	BG,P	2	3	3	M	3	S	3	2/28	M	Large beaded fairly compact head
Pirate (Petoseed)	3	S	L	BG	2	3	3	M	3	S	3	2/28	M	Very large beaded, purplish compact head with large stalk
PSA 16294 (Petoseed)	3	S	L	BG,P	2	3	3	M	3	S	3	2/28	M	Compact purplish head with very large beads, heavy stalk and side branching
Skiff (Sval Silus)	3	S	M-L	BG,G	2	3	3	M	3	S	3	2/28	M	Compact head, nice stalk, medium large beads with starring
Arcadia (Sakata)	3	S	M-L	BG,G	2	3	3	M	3	S	3	2/28	M	Small beads on compact head, starring, hollow stem, leaf scarring
Greenbelt (Sakata)	3	S	M-L	BG,G	2	3	3	M	3	S	3	3/3	M	Medium to large beads on compact head with nice stalk
Marathon (Sakata)	3	S	M-L	BG,G	2	3	3	M	3	S	3	3/3	M	Compact head with very heavy stalk
EXP 41 (Sakata)	3	S	M-L	BG,G	2	3	3	M	3	S	3	3/7	M	Fairly nice head but low in plant with side branching
EXP 49 (Sakata)	3	S	M-L	BG,G	2	3	3	M	3	S	3	2/28	M	Loose head with medium large bi-color beads, slender stalk with side branching
Green Lady (Sunseed)	3	S	M-L	BG	2	3	3	M	3	S	3	2/28	M	Irregular shaped heads with medium large beads with starring, side branching
Silvia (Sunseed)	3	S	M-L	BG,G	2	3	3	M	3	S	3	2/28	M	Bi-color large beaded head with starring, moderate stalk with hollow stem
Pinnacle (Takii)	3	D	L,V	BG,G	2	4	3	M	3	S	3	3/3	M	Variable sized bi-color beads with starring on heavy stalk
ATX-880 (Takii)	3	D	L,V	BG,G	2	4	3	M	3	S	3	3/3	M	Bi-color variable sized bead on compact head, non-uniform maturity

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- (e) BG = blue-green, G = green, P = purple, WT = white tip, V = very
- (f) M = mature, D = over, U = under, V = very