

Broccoli Variety Trials 1990/1991

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Introduction

Broccoli variety trials are conducted yearly in an effort to improve the efficiency of vegetable production through use of the best varieties available. The performance of new varieties and numbered lines are evaluated under growing conditions in the Yuma area, with several trials conducted through the planting season which begins in August and continues through November. This allows evaluations to be made under the various weather regimes experienced through the growing season.

Desirable varietal characteristics include a plant which places the head high enough for ease of harvesting, tolerance to downy mildew, uniform maturity for harvest, dome-shaped head to shed water, small to medium-sized beads with uniform color on compact heads for good appearance, medium-sized stalk, and field-holding ability.

Methods and Materials

Broccoli variety trials conducted during the 1990/1991 season included 49 varieties from 12 seed companies. Plantings were made with grower cooperators on September 11 and October 11, while the November 15 trial was conducted at the Yuma Valley Agricultural Center. The broccoli was direct-seeded in double rows on 40 inch beds using an Earthway push planter. The 20 foot single-bed plots were thinned to a 7 inch spacing between plants.

Because the varieties vary in their rate of development, the trials were evaluated periodically as they matured. Evaluation of plant characteristics included plant height, head position, uniform maturity, and field-holding ability. Head characteristics evaluated were shape, compactness, bead size and color, incidence of starring or cat eye, and stalk size.

Each variety received an overall rating as well as comments. A rating scale from 1 to 5 was used, with 5 being most desirable and 1 unacceptable. Varieties with an overall rating of 4-5 performed well for the planting date and conditions of the trial. An overall rating of 3 indicates some weakness in the variety's performance, while a 1-2 would be unacceptable for commercial production.

Results and Discussion

A summary of the overall evaluations for each variety in the three plantings is shown in Table 1. Detailed evaluations of the three trials are provided in Tables 2-4, with weekly weather summaries for the growing period listed in Table 5.

Varieties in the September 11 planting tended to have mostly smaller-sized heads with some freeze injury. This was a result of low temperatures during late December as indicated in Table 5. The earliest maturing variety was Galaxy which produced a flat head, larger-sized beads, and good-sized stalk. It was followed in maturity by Packman with smaller beads than Galaxy but a similar flat head and large stalk. NS 649

matured later than normal in this trial with a small-sized exerted head and slender stalk. Maturing at the same time was Midori which produced a high-domed compact head, and two numbered varieties S 89016 and S 89020 which shared good quality characteristics. However, S 89016 produced a smaller plant, smaller beads and a more compact head than S 89020. Later maturing varieties which rated well include Commander, Legend, Mariner, Sprinter, Sultan, SBC 7202, Sunex 8019, XPH 5608, 6099 and 7202.

In the October 11 trial the early maturing Galaxy was followed a week later by Everest. Everest was characterized by a uniform-maturing, high dome-shaped, compact head and somewhat slender stalk. Mid maturing varieties which also received a high rating were Commander with uniform maturity; Ninja having a smooth, compact, domed head and good-sized stalk; Sultan which produced a shorter plant with a small beaded head on a slender stalk; FMX 144 with a uniform maturing head on a small plant; and SBC 7202 characterized by a high domed head with a slender stalk. The best late maturing varieties were Greenbelt with a compact uniform maturing small-beaded head and Marathon which also produced a compact head with slightly larger beads.

Plants in the November 15 trial tended to be short, having slender stalks with exerted loose heads and large beads. Arcadia and Skiff were two mid maturing varieties, with Arcadia producing a compact head with medium-sized beads and good stalk size, while Skiff had uniform maturity. The late maturing varieties, Greenbelt and Marathon produced the highest quality with smaller beads on domed heads. Marathon produced a larger plant, while Greenbelt had greater stalk size.

Table 1. Summary of overall evaluations for the three broccoli planting dates for 1990.

Variety	Irrigation Dates		
	September 11	October 11	November 15
Arcadia (Sakata)	-	3	5
Beaufort (Bejo)	3	-	-
Buccaneer (Petoseed)	-	3	-
Claudia (Ferry Morse)	3	3	2
Commander (Northrup King)	4	4	-
Cruiser (Royal Sluis)	3	-	-
Emerald City (Sakata)	3	3	3
Emperor (Northrup King)	-	3	-
Esquire (Harris Moran)	-	3	2
Everest (Northrup King)	-	4	-
Excelsior (Harris Moran)	-	3	2
Galaxy (Asgrow)	4	3	-
Galleon (Petoseed)	3	-	-
Greenbelt (Northrup King)	-	5	5
Green Duke (Northrup King)	3	-	-
Headline (American Takii)	-	3	-
Legend (Sakata)	4	3	-
Marathon (Sakata)	-	5	5
Mariner (Petoseed)	4	-	-
Midori (Brinker Orsetti)	4	3	-
Ninja (Sakata)	3	4	-
Packman (Petoseed)	4	-	-
Pinnacle (American Takii)	-	3	-
Pirate (Petoseed)	-	4	3
Schooner (Royal Sluis)	-	3	3
Skiff (Royal Sluis)	-	4	4
Sprinter (Sakata)	4	-	-
Sultan (Sakata)	4	4	-
Tribute (Bejo)	3	-	3
Zeus (American Takii)	-	3	-
FMX 143 (Ferry Morse)	-	3	-
FMX 144 (Ferry Morse)	-	4	-
FMX 145 (Ferry Morse)	-	4	-
NS 649 (Neuman)	3	-	-
PSX 16284 (Petoseed)	-	-	2
PSX 50585 (Petoseed)	3	3	-
S 89016 (Royal Sluis)	4	-	-
S 89020 (Royal Sluis)	4	-	-
SBC 7202 (Sakata)	4	4	2
XPH 5608 (Asgrow)	4	-	-
XPH 5609 (Asgrow)	3	-	-
XPH 5683 (Asgrow)	3	-	-
XPH 5773 (Asgrow)	3	-	-
2804 (Synergene)	3	-	3
6099 (Synergene)	4	-	-
6236 (Synergene)	-	-	3
6241 (Synergene)	-	-	2
6517 (Synergene)	-	-	2
7202 (Synergene)	4	-	-

Table 2. Broccoli variety evaluations for the September 11, 1990 planting with Waymon Farms, Inc.

Variety	Overall Eval. (a)	Head Shape (d)	Bead Size (b)	Bead Color (e)	Head Compactness (a)	Uniform Maturity (a)	Field Flooding (a)	Plant Height (b)	Head Position (c)	Stalk Diameter (b)	Starring (a)	Evaluation Date	Comments
Beaufort (Bejo)	3	D	M	BG	4	3	3	M	M	L	3	2/1	Medium-sized heads, starring, large stalk
Claudia (Ferry Morse)	3	D	M-L	BG,P	5	2	2	S	M	L	5	12/12	Compact dome-shaped head, large stalk, poor uniformity
Commander (Northrup King)	4	S	M	BG	4	3	4	M	M	L	5	12/27	Smallish compact head, large stalk
Cruiser (Royal Sluis)	3	F	M	BG	3	3	3	M	M	M	5	12/12	Head with medium-sized heads, moderate stalk and uniformity
Emerald City (Sakata)	3	D	S	BG,P	5	3	4	L	M	M	5	12/27	Dome-shaped compact head, freeze damage to heads, moderate stalk
Galaxy (Asgrow)	4	F	M-L	BG	4	4	3	M	M	L	5	11/30	Earliest maturing variety, good uniformity, variable-sized larger heads, large stalk
Galleon (Petoseed)	3	F	M-L	BG,P	3	3	3	S	M	L	5	12/4	Early maturing, moderately compact flat head, variable bead size, good stalk
Green Duke (Northrup King)	3	F	S-M	G	2	3	3	M	M	M	5	12/12	Small-medium sized heads, knocking, loose head, moderate-sized stalk
Legend (Sakata)	4	D	M	BG,P	5	3	4	L	E	M	5	12/27	Smallish dome-shaped compact head, medium-sized heads, moderate stalk
Mariner (Petoseed)	4	D	M-L	BG	4	3	4	M	E	M	5	1/2	Smaller dome-shaped compact head, medium stalk, medium to large heads
Midori (Brinker Orsetti)	4	D	S-M	BG	5	4	3	S	M	L	4	12/12	Compact dome-shaped head, large stalk, some browning & starring of beads
Ninja (Sakata)	3	D	M	BG	4	3	4	M	M	L	5	1/2	Dome-shaped irregular heads, large stalk, medium-sized beads
Packman (Petoseed)	4	F	S-M	BG	4	3	3	M	M	L	5	12/4	Early maturing compact head with small to medium-sized beads, large stalk
Sprinter (Sakata)	4	S	S-M	BG	4	3	4	M	M	M	5	12/19	Smaller head with small to medium-sized beads, clean stalk, good uniformity
Sultan (Sakata)	4	D	S	BG,P	5	3	5	S	M	M	5	12/19	Short plant, compact dome-shaped head with small beads, purpling
Tribute (Bejo)	3	S	M	BG	4	3	3	M	M	L	3	1/2	Medium-sized heads, starring as heads mature, large stalk
NS 649 (Neuman)	3	S	M	BG,P	3	4	3	M	E	S	5	12/12	Smaller head with some purpling, slender stalk, uniform maturity
PSX 50585 (Petoseed)	3	S	M	BG,P	4	2	3	M	E	M	5	1/2	Irregular-shaped head, variable bead size, non-uniform maturity
S 89016 (Royal Sluis)	4	S	S	BG	5	3	4	S	M	L	5	12/12	Compact head, small beads, good-sized stalk, moderate uniformity, short plant
S 89020 (Royal Sluis)	4	S	S-M	BG,P	4	3	4	M	M	L	5	12/12	Smaller-sized heads, small to medium-sized beads, good stalk, moderate uniformity
SBC 7202 (Sakata)	4	S	M	BG	4	3	4	M	M	L	5	12/27	Compact head, medium sized beads, large stalk, moderate uniformity
Sunet 8019 (Sunseed)	4	D	M	BG	5	5	5	M	M	L	3	12/27	Compact dome-shaped head, medium-sized beads, large stalk, starring
XPH 5608 (Asgrow)	4	S	M	G	4	4	4	S	M	L	5	12/19	Uniform maturity, medium-size green heads, large stalk
XPH 5609 (Asgrow)	3	D	M	BG	3	4	3	M	E	M	5	12/27	Smallish loose exerted heads, medium-sized beads, moderate stalk
XPH 5683 (Asgrow)	3	S	L	BG,P	4	4	3	S	M	L	5	12/27	Small plant, compact head, large white-tipped heads, large stalk
XPH 5773 (Asgrow)	3	D	M	BG,P	4	3	4	L	E	L	4	1/2	Medium-sized heads, some starring, large stalk
2804 (Syngene)	3	D	M	BG,P	3	3	4	L	E	S	4	1/7	Late maturing, small dome-shaped heads, slender stalk
6099 (Syngene)	4	S	S	BG	5	3	5	S	M	L	5	12/19	Short plant, compact small head, small beads, large stalk
7202 (Synrgene)	4	D	M	BG	4	4	4	M	M	M	5	1/2	Nice-shaped head, medium head and stalk size, uniform maturity

KEY

- (a) 5 = most desirable, 1 = undesirable
- (b) S = small, M = medium, L = large
- (c) E = exerted, M = medium, L = low
- (d) D = domed, S = semi-domed, F = flat
- (e) BG = blue-green, G = green, P = purple
- (f) M = mature, O = over, U = under

Table 3. Broccoli variety evaluations for the October 11, 1990 planting with Doug Mellon Farms.

Variety	Overall Eval. (a)	Head Shape (d)	Head Size (b)	Bead Color (e)	Head Compactness (a)	Uniform Maturity (a)	Field Holding (a)	Plant Height (b)	Head Position (c)	Stalk Diameter (b)	Starring (a)	Evaluation Date	Maturity at Harvest (f)	Comments
Arcadia (Sakata)	3	D	S-M	B-G	5	3	4	L	M	M	4	1/30	M	Peaked knuckled compact head, purpling variable-sized beads
Buccancer (Petoseed)	3	S	M-L	B-G	4	3	4	M	M	S	4	1/22	M	Tight branching head, somewhat large beads, stalk a bit slender
Claudia (Ferry Morse)	3	D	M	B-G	3	4	4	M	M	S	4	1/22	M	Peaked head, knuckling, slender stalk
Commander (Northrup King)	4	S	M	B-G	3	4	4	M	M	M	5	1/22	M	Fairly uniform maturing head, some knuckling, medium stalk
Emerald City (Sakata)	3	S	M	B-G	5	3	4	M	M	S	5	1/30	M	Compact head, medium-sized beads, slender stalk
Emperor (Northrup King)	3	S	M-L	B-G	3	3	4	L	M	M	5	1/22	M	Semi-domed head, some knuckling, beads a bit large
Esquire (Harris Moran)	3	D	L	B-G	5	4	4	L	E	S	5	1/30	M	Smallest dome-shaped head, purpling large beads, slender stalk
Everest (Northrup King)	4	D	M	B-G	5	4	4	M	M	S	4	1/18	M	Smooth peaked head, moderate branches, slender stalk
Excelsior (Harris Moran)	3	D	S-M	B-G	4	3	4	M	M	L	5	1/22	M	Smooth peaked head, white-tipped variable-sized beads, good weight
Galaxy (Asgrow)	3	S	L	B-G	3	3	4	M	E	M	5	1/11	O	Variable bead size, looser lumpy appearing head, good stalk
Greenbelt (Northrup King)	5	D	S	B-G	5	4	5	M	M	M	5	2/1	M	Compact, uniform head, small beads, good stalk, uniform maturity
Headline (American Takii)	3	D	L	B-G	5	3	3	L	M	M	3	2/1	M	Compact head, variable-sized large beads, some starring
Legend (Sakata)	3	D	L	B-G	5	4	4	L	M	S	5	1/30	M	Smallest head, large beads, very slender stalk
Marathon (Sakata)	3	D	S-M	B-G	5	3	5	M	M	M	5	2/1	M	Compact head, small to medium-sized beads, some purpling, good stalk
Midori (Brinker Orsetti)	3	D	S-M	B-G	4	3	5	S	M	M	5	1/18	M	Small plant, variable-sized beads, somewhat knuckled peaked heads
Ninja (Sakata)	4	S	M	B-G	5	3	4	S	M	L	5	1/22	M	Smooth, dome-shaped head, large stalk, non-uniform maturity
Pinnacle (American Takii)	3	S	L	B-G	3	3	3	S	M	M	4	1/30	M	Purpling heads with variable-sized large beads, moderate stalk
Pirate (Petoseed)	3	S	S-M	B-G	5	3	4	S	M	L	5	2/1	M	Short plant, compact head, medium-sized large beads, very large stalk
Schooner (Royal Sluis)	4	S	M	B-G	4	3	3	L	M	S	4	2/1	M	Irregular-shaped knuckled head, some starring, slender stalk
Skiff (Royal Sluis)	4	S	M	B-G	4	3	4	M	M	M	4	1/30	M	Somewhat knuckled head, medium-sized beads, medium stalk
Sultan (Sakata)	4	S	S	B-G	4	3	4	M	M	S	5	1/22	M	Short plant, small beaded head, slender stalk, heavy sideshoots
Zeus (American Takii)	3	F	M-L	B-G	3	3	4	M	M	S	5	1/22	M	Flat head, moderate to large beads, stalk a bit slender
FMX 143 (Ferry Morse)	3	D	S-M	B-G	5	2	4	L	M	M	5	1/30	M	Knuckled head, variable-sized white-tipped beads, bracting
FMX 144 (Ferry Morse)	4	S	M	B-G	4	4	4	S	M	M	5	1/22	M	Moderately smooth head, moderate stalk, uniform maturity
FMX 145 (Ferry Morse)	4	S	M-L	B-G	5	3	3	M	M	L	3	1/30	M	Purpling heads, larger beads, large stalk, starring
PSX 50585 (Petoseed)	3	S	S-L	B-G	3	4	4	M	M	L	5	1/18	M	Knuckled head, variable bead size, large stalk, good weight, uniform maturity
SBC 7202 (Sakata)	4	S	M	B-G	4	3	4	M	M	S	5	1/22	M	Peaked head, stalk a bit slender, non-uniform maturity
Sunex 8019 (Sunseed)	4	S	M-L	B-G	5	3	3	M	M	L	3	2/1	M	Compact head, medium to large beads, starring, large stalk, side branching
XPH 5608 (Asgrow)	3	S	S-L	B-G	4	3	4	S	M	L	5	1/22	M	Irregular-shaped, knuckled head, variable-sized beads, large stalk
XPH 5609 (Asgrow)	3	S	M-L	B-G	3	4	4	M	E	M	5	1/22	M	Very knuckled head, variable head size
XPH 5611 (Asgrow)	3	S	L	B-G	5	4	4	S	M	S	5	1/18	M	Short plant, somewhat knuckled head, large beads, slender stalk
XPH 5773 (Asgrow)	3	S	L	B-G	5	3	4	L	M	M	5	1/30	M	Large-beaded head, moderate stalk
2804 (Synergene)	3	D	M-L	B-G	4	3	4	L	M	S	5	2/1	M	Domed head on slender stalk, medium to large-sized beads
6241 (Synergene)	3	S	L	B-G	4	3	4	L	M	M	4	1/30	M	Purpling compact heads, large-sized beads
6517 (Synergene)	3	S	L	B-G	4	4	3	L	M	M	4	1/30	M	Large-beaded purpling head, moderate stalk, fairly good uniformity
7202 (Synergene)	3	S	M-L	B-G	4	2	4	M	M	S	5	1/30	M	Smallest heads, slightly large beads, small stalk, non-uniform maturity

KEY: (a) 5 = most desirable, 1 = undesirable (b) S = small, M = medium, L = large (c) E = exerted, M = medium, L = low (d) D = domed, S = semi-domed, F = flat (e) BG = blue-green, G = green (f) M = mature, O = over, U = under

Table 4. Broccoli variety evaluations for the November 15, 1990 planting at the Yuma Valley Agricultural Center.

Variety	Overall Eval. (a)	Head Shape (d)	Bead Size (b)	Bead Color (e)	Head Compactness (a)	Uniform Maturity (a)	Field Folding (a)	Plant Height (b)	Head Position (c)	Stalk Diameter (b)	Starting (a)	Evaluation Date	Maturity at Harvest (f)	Comments
Arcadia (Sakata)	5	D	M	BG	5	3	5	M	M	M	5	2/25	M	Purpling, white-tipped beads, compact dome-shaped head, medium stalk
Claudia (Ferry Morse)	2	S	M-L	BG	3	4	3	S	M	S	4	2/25	O	Short plant, variable head shape and field holding
Emerald City (Sakata)	3	D	M-L	BG	4	3	3	M	E	S	3	2/25	M	Fairly compact head, starrng
Esquire (Harris Moran)	2	D	L	BG	3	3	3	L	M	S	4	2/25	O	Large plant, mostly loosening heads
Excelsior (Harris Moran)	2	S	M	BG	2	4	2	S	M	S	5	2/25	M	Separated knuckled heads, white-tipped beads
Greenbelt (Northrup King)	5	D	S-M	BG	4	4	5	L	M	M	5	2/4	M	Compact dome-shaped head, good bead and stalk size
Marathon (Sakata)	5	D	S-M	BG	4	4	5	M	M	S	5	3/4	M	Small-beaded dome-shaped heads
Pirate (Petoseed)	3	S	M-L	BG	4	4	3	S	M	S	5	2/25	M	Most heads holding shape, short plant
Schooner (Royal Sluis)	3	D	M-L	BG	3	5	3	M	E	S	4	2/25	M	Uniform-maturing exerted head, some dome-shaped, others flattish
Skiff (Royal Sluis)	4	D	M-L	BG	3	5	4	M	E	S	4	2/25	M	Uniform maturing dome-shaped head, slender stalk
Tribute (Bejo)	3	D	L	BG	3	2	3	S	M	S	5	2/25	M	Non-uniform maturity, some heads have kept shape, others blew up
PSX 16284 (Petoseed)	2	D	L	BG	2	4	2	M	E	S	4	2/25	O	Purpling irregular-shaped heads that blow up
SBC 7202 (Sakata)	2	S	M-L	BG	2	4	2	S	E	S	5	2-25	O	Irregular-shaped loose heads
Sunex 8019 (Sunseed)	3	S	L	BG	4	3	3	M	M	M	5	2/25	M	Irregular-maturing heads, hold shape fairly well
2804 (Synergene)	3	D	M-L	BG	4	3	3	L	M	S	5	2/25	M	Compact dome-shaped head, large plant
6236 (Synergene)	3	S	L	BG	4	4	4	M	M	S	5	2/25	M	Fairly compact head, large beads
6241 (Synergene)	2	S	L	BG	2	3	2	M	E	S	5	2/25	M	Loose irregular-shaped heads, non-uniform maturing
6517 (Synergene)	2	S	L	BG	3	4	3	M	E	S	4	2/25	O	Uniform maturing separating head

KEY

- (a) 5 = most desirable, 1 = undesirable
- (b) S = small, M = medium, L = large
- (c) E = exerted, M = medium, L = low
- (d) D = domed, S = semi-domed, F = flat
- (e) BG = blue-green, G = green, P = purple
- (f) M = mature, O = over, U = under

Table 5. Weekly Weather Summary from September 2, 1990 through March 30, 1991 for Yuma, Arizona.

Date	Average Temperature	Departure (a)	High	Low	Precipitation
Sept. 2 - Sept. 8	93	+3	113	77	Trace
Sept. 9 - Sept. 15	96	+8	116	80	.00
Sept. 16 - Sept. 22	86	-1	105	67	.00
Sept. 23 - Sept. 29	83	-1	101	66	.00
Sept. 30 - Oct. 6	82	0	101	64	.95
Oct. 7 - Oct. 13	79	0	99	58	.00
Oct. 14 - Oct. 20	78	+2	96	60	.00
Oct. 21 - Oct. 27	76	+3	98	57	.00
Oct. 28 - Nov. 3	73	+3	98	48	.00
Nov. 4 - Nov. 10	65	-2	88	47	.00
Nov. 11 - Nov. 17	73	+9	91	54	.00
Nov. 18 - Nov. 24	66	+4	85	49	Trace
Nov. 25 - Dec. 1	59	-1	83	43	.00
Dec. 2 - Dec. 8	60	+2	75	44	.00
Dec. 9 - Dec. 15	59	+2	79	43	Trace
Dec. 16 - Dec. 22	50	-6	68	34	.00
Dec. 23 - Dec. 29	47	-8	65	30	.01
Dec. 30 - Jan. 5	55	0	67	41	1.02
Jan. 6 - Jan. 12	56	+1	70	42	.12
Jan. 13 - Jan. 19	61	+5	79	42	.00
Jan. 20 - Jan. 26	57	+1	74	39	.00
Jan. 27 - Feb. 2	57	-1	79	36	.00
Feb. 3 - Feb. 9	65	+6	85	46	.00
Feb. 10 - Feb. 16	69	+9	87	51	.00
Feb. 17 - Feb. 23	65	+4	85	48	Trace
Feb. 24 - Mar. 3	66	+4	86	50	.60
Mar. 4 - Mar. 9	65	+3	84	47	.00
Mar. 10 - Mar. 16	59	-5	75	41	Trace
Mar. 17 - Mar. 23	59	-6	82	43	.09
Mar. 24 - Mar. 30	61	-5	80	43	.30