

# Broccoli Variety Trials 1987/1988

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## 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 five years ago to nearly 3,000 acres during the 1987/1988 season. Broccoli is planted in the Yuma area from late August through March.

Desirable plant characteristics include a dome-shaped head to shed water; small-to medium-size 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.

## METHODS AND MATERIALS

The broccoli variety trials conducted during the 1987/1988 season included 37 varieties from 9 seed companies with 4 planting dates, from September 4 to November 17. The broccoli was direct-seeded in double rows on 40-inch beds, using an Earthway push planter. The 20-foot single-bed plots were later thinned to a 7-inch spacing between plants; the plots were replicated when possible.

The first planting was made with Doug Mellon Farms on September 4 in the upper Yuma Valley; the second planting on October 14 was at the Yuma Valley Ag Center; the third planting was in the lower Yuma Valley with the Woods Company on October 17; and the fourth planting on November 11 was at the Yuma Valley Ag Center.

Because varieties differ in their rate of development, they were evaluated periodically as they matured; an indication of their maturity was made at the time of evaluation to further refine the days to maturity. Varieties which are indicated as being undermature had heads averaging a little smaller than normally harvested; overmaturity indicates slightly larger than average heads.

Plant characteristics which were evaluated include: plant height; head position; uniformity of maturity; and tolerance to downy mildew. Head characteristics included: head shape; firmness or compactness of the head; head size; head color; knuckling (lumpy appearing heads composed of smaller headlettes); and starring (opening of the florettes to show the yellow of the petals).

Many of the characteristics were rated on a scale from 1 to 5, with 1 being most desirable and 5 being 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 may provide an acceptable performance, although the variety has some problem areas. Varieties with an overall rating of 4-5 are considered unacceptable for commercial use.

## RESULTS AND DISCUSSION

A summary of the overall evaluations from the four planting dates, as well as the evaluation of the October 16 trial for downy mildew tolerance is shown in Table 1. More detailed evaluations of the four trials are provided in Tables 2-5. The September 4 planting shown in Table 2 was harvested earlier than expected due to a high market situation, preventing an evaluation of all but the earliest varieties. Since early varieties are commonly used during this planting period, the trial still provides meaningful information.

During the 1987/1988 season temperatures averaged above normal through much of the fall, followed by temperatures well below normal for most of December. Nighttime temperatures during late December dipped into the lower 20s on several occasions, freezing the plants to ground level. The most dramatic affect of this extreme cold was seen in the November 17 planting, where the plants began forming heads when they were only 6 inches high. As a result, the evaluations shown in Table 5 may not correctly reflect varietal performance under normal circumstances.

Varieties which require a short growing season are commonly used early in the season. These include Packman, Cruiser and Green Duke. The varieties most widely used throughout the mid-portion of the season are Emperor and Commander, while late varieties include Skiff, Schooner, Pirate, Green Duke and Marathon.

New varieties which consistently performed well in these trials include Exp. #12 (Sakata), 83-1 (Sakata), Exp. PTOB-8 (Brinker Orsetti), and FMX 94 (Ferry-Morse). Two varieties which has shown good tolerance to downy mildew as well as high quality characteristics over the last 2 seasons are 83-1 (Sakata) and T 452 (Takii).

**Table 1. Summary of Overall Evaluations for the Four Planting Dates and Ratings for Downy Mildew Tolerance from the October 16, 1987, Trial.**

VARIETY	Planting Dates				Downy Mildew
	9/04/87	10/14/87	10/16/87	11/17/87	
Brigadier (Petoseed)		2	3	4	4
Commander (Northrup King)		2	2		3
Cruiser (Royal Sluis)	1	3	4	3	3
Emperor (Northrup King)		2	3	2	3
Green Duke (Northrup King)	2	2	3	2	3
Mercedes (Northrup King)		4	4		2
Packman (Petoseed)	2	3	3	4	3
Pirate (Petoseed)		1	1	2	3
Schooner (Royal Sluis)		2	2	2	3
Skiff (Royal Sluis)		2	2	3	3
Exp. PTOB-8 (Brinker-Orsetti)	1	2	3	2	2
Exp. 12 (Sakata)		1	1	2	3
Exp. 83-1 (Sakata)		2	2	1	1
Exp. 83-3 (Sakata)		3	2	4	3
Exp. 91 (Sakata)		2	2	3	1
FMX 62 (Ferry-Morse)		3	3	4	2
FMX 63 (Ferry-Morse)		3	4	3	3
FMX 94 (Ferry-Morse)		2	1	3	4
FMX 95 (Ferry-Morse)		3	3	4	4
FMX 100 (Ferry-Morse)		2		3	3
FMX 101 (Ferry-Morse)		2	3	3	4
HMX 6139 (Harris Moran)		2	3		3
HMX 6141 (Harris Moran)		3	2	2	3
PSX 20684 (Petoseed)		3	2	3	2
PSX 21584 (Petoseed)		2	3	3	4
QS 2804 (Quali-Sel)		2	3	3	1
QS 6236 (Quali-Sel)		2		3	4
QS 6241 (Quali-Sel)		2	2	4	3
QS 6270 (Quali-Sel)		2	2	3	2
QS 6466 (Quali-Sel)		1	2	4	2
QS 6482 (Quali-Sel)		3	4	2	1
T-408 (Takii)		2	3	2	3
T-452 (Takii)		2	2	3	1
TX-411 (Takii)	2	2	3	3	4
TX-637 (Takii)		2	3	2	3

Key: 1 = most desirable, 5 = undesirable

**Table 2. Broccoli Variety Evaluations for the September 4, 1987, Planting with Doug Mellon in the North Yuma Valley.**

VARIETY	Overall Eval. (a)	Stalk Diameter inches	Plant Height (b)	Head Position (c)	Head Shape (d)	Bead Size (b)	Bead Color (e)	Head Compactness (a)	Uniform Maturity (a)	Knuckling (a)	Starring (a)	Harvest Date	Maturity at Harvest (f)
Green Duke (Northrup King)	2	1.3	L	L	S	M	BG	2	3	3	1	11/24	OM
Packman (Petoseed)	2	1.3	M	L	S	M-L	BG,P	1	2	2	1	11/24	M
Cruiser (Royal Sluis)	1	1.4	L	L	D	M	BG	1	2	2	1	11/24	UM
TX-411 (Takti)	2	1.2	L	L	D	M-L	BG	2	3	3	1	11/30	M
Exp. PT0B-8 (Brinker Orsetti)	1	1.1	S	L	D	M-L	BG	2	4	2	1	11/30	M

**KEY**  
 (a) 1 = most desirable, 5 = undesirable  
 (b) S = small, M = medium, L = large, V = variable  
 (c) H = high, M = medium, L = low  
 (d) D = domed, S = semi-domed, F = flat, V = variable  
 (e) BG = blue green, DG = dark green, LG = light green, P = purple  
 (f) M = mature, O = over, U = under

Table 3. Broccoli Variety Evaluations for the October 14, 1987, Planting at the Yuma Valley Ag Center.

VARIETY	Overall Eval. (a)	Plant Height (b)	Head Position (c)	Head Shape (d)	Head Size (b)	Head Color (e)	Head Compactness (a)	Uniform Maturity (a)	Knuckling (a)	Starring (a)	Harvest Date	Maturity at Harvest (f)
FMX 62 (Ferry-Morse)	3	M	M	S	M-L	BG	3	3	2	1	2/1	M
FMX 63 (Ferry-Morse)	3	M	H	S	M-L	BG	3	2	3	3	2/1	M
FMX 94 (Ferry-Morse)	2	M	M	S	M-L	BG	2	2	2	2	2/1	M
FMX 95 (Ferry-Morse)	3	M	H	D	M-L	BG	2	1	2	3	2/1	M
FMX 100 (Ferry-Morse)	2	M	M	S	V	BG	2	3	1	2	2/1	UM
FMX 101 (Ferry-Morse)	2	M	M	S	M-L	BG	2	2	2	1	2/1	M
Exp. PTOB-8 (Brinker-Orsetti)	2	M	M	S	M	BG	2	3	2	2	2/1	M
HMX 6139 (Harris Moran)	2	M	M	D	M-L	BG	3	1	3	1	2/1	M
HMX 6141 (Harris Moran)	3	M	M	D	M	BG,P	3	2	3	1	2/1	M
Commander (Northrup King)	2	M	M	S	M-L	BG	3	2	2	1	2/1	M
Emperor (Northrup King)	2	L	M	D	M-L	BG	2	1	2	2	2/1	M
Green Duke (Northrup King)	2	M	H	S	M	BG	3	2	2	2	2/1	M
Mercedes (Northrup King)	4	M	H	D	L	BG	4	2	2	3	2/1	M
Brigadier (Petoseed)	2	M	M	S	L	BG	2	1	1	2	2/1	M
Packman (Petoseed)	3	M	H	S	L	BG	3	3	2	3	2/1	OM
Pirate (Petoseed)	1	M	L	D	S-M	BG	1	1	1	1	2/1	UM
PSX 20684 (Petoseed)	3	M	M	D	L	BG,P	2	1	1	2	2/1	M
PSX 21584 (Petoseed)	2	M	M	D	M-L	BG	2	2	1	2	2/1	M
QS 2804 (Quali-Sel)	2	M	H	D	M	BG,P	2	3	2	2	2/1	M
QS 6236 (Quali-Sel)	2	S	L	D	M-L	BG	2	3	1	2	2/1	M
QS 6241 (Quali-Sel)	2	M	M	D	M-L	BG,P	2	3	2	1	2/1	M
QS 6270 (Quali-Sel)	2	M	M	D	M-L	BG	1	2	2	2	2/1	UM
QS 6466 (Quali-Sel)	1	M	M	D	M	BG	1	2	2	1	2/1	M
QS 6482 (Quali-Sel)	3	S	M	D	M-L	BG,P	1	2	1	2	2/1	M
Cruiser (Royal Sluis)	3	M	M	S	M-L	BG	2	2	2	3	2/1	M
Schooner (Royal Sluis)	2	M	M	D	M	BG	2	2	2	2	2/1	M
Skiff (Royal Sluis)	2	M	M	D	S-M	BG	2	2	2	1	2/1	UM
Exp. #12 (Sakata)	1	S	H	D	M	BG	2	1	1	1	2/1	M
Exp. #91 (Sakata)	2	H	M	D	M-L	BG	2	1	1	2	2/1	M
83-1 (Sakata)	2	L	M	D	M-L	BG	2	2	1	1	2/1	M
Exp. 83-3 (Sakata)	3	L	M	D	S	BG,P	1	3	3	1	2/1	M
T-408 (Takii)	2	M	M	D	M	BG	2	1	2	2	2/1	M
T-452 (Takii)	2	M	M	S	M	BG	3	2	2	1	2/1	M
TX-411 (Takii)	2	M	M	D	M-L	BG	2	1	2	1	2/1	M
TX-637 (Takii)	2	M	M	D	M	BG	3	2	3	1	2/1	M

KEY

- (a) 1 = most desirable, 5 = undesirable
- (b) S = small, M = medium, L = large, V = variable
- (c) H = high, M = medium, L = low
- (d) D = domed, S = semi-domed, F = flat, V = variable
- (e) BG = blue green, DG = dark green, LG = light green, P = purple
- (f) M = mature, O = over, U = under

**Table 4. Broccoli Variety Evaluations for the October 16, 1987, Planting with the Woods Company in the South Yuma Valley.**

VARIETY	Overall Eval. (a)	Stalk Diameter (b)	Plant Height (b)	Head Position (c)	Head Shape (d)	Head Size (b)	Head Color (e)	Head Compactness (a)	Uniform Maturity (a)	Knuckling (a)	Starring (a)	Harvest Date	Maturity at Harvest (f)
FMX 62 (Ferry-Morse)	3	S-M	M	M	D	M	BG	2	2	2	3	2/5	M
FMX 63 (Ferry-Morse)	4	S-M	M	H	S	M	BG	2	2	2	4	2/5	M
FMX 94 (Ferry-Morse)	1	M	S	H	D	M	BG	1	2	1	2	2/5	M
FMX 95 (Ferry-Morse)	3	S-M	S	H	D	M	BG	3	1	1	3	2/5	M
FMX 101 (Ferry-Morse)	3	M	M	M	S	M-L	BG	3	3	2	2	2/5	M
Exp. PTOB-8 (Brinker Orsetti)	3	S-M	S	M	D	M-L	BG	2	2	2	3	2/5	M
HMX 6139 (Harris Moran)	3	S-M	M	M	D	M-L	BG	2	3	2	2	2/5	M
HMX 6141 (Harris Moran)	2	M	M	M	S	S-M	BG	2	2	3	1	2/5	M
Chancellor (Northrup King)	3	M	M	M	D	M	BG	2	3	3	2	2/5	M
Commander (Northrup King)	2	M	M	M	S	M-L	BG	3	3	2	1	2/5	M
Emperor (Northrup King)	3	S-M	M	H	S	M-L	BG	2	3	2	1	2/5	M
Green Duke (Northrup King)	3	M	M	H	F	L	BG,P	3	3	3	2	1/29	M
Mercedes (Northrup King)	4	S-M	L	M	S	L	BG	4	2	2	3	1/29	UM
Brigadier (Petoseed)	3	S-M	M	M	D	L	BG	2	2	1	2	2/5	M
Packman (Petoseed)	3	M	M	M	S	L	BG,P	2	3	2	3	1/29	UM
Pirate (Petoseed)	1	L	M	L	D	S-M	BG	1	1	1	1	2/5	UM
PSX 20684 (Petoseed)	2	M	M	H	D	L	BG	1	2	1	1	2/5	M
PSX 21584 (Petoseed)	3	S	M	H	S	L	BG	2	1	1	3	2/5	M
QS 2804 (Quali-Sel)	3	S	M	M	D	M-L	BG	2	3	2	3	2/5	M
QS 6241 (Quali-Sel)	2	S-M	M	M	D	M-L	BG	2	2	1	2	2/5	UM
QS 6270 (Quali-Sel)	2	--	M	M	D	M-L	BG	1	2	2	2	2/5	UM
QS 6466 (Quali-Sel)	2	S-M	M	L	D	S-M	BG	2	3	2	2	2/5	UM
QS 6482 (Quali-Sel)	4	S-M	M	M	D	V	BG	2	3	2	2	2/5	M
Cruiser (Royal Sluis)	4	S	M	H	D	M-L	BG	2	3	2	3	2/5	M
Schooner (Royal Sluis)	2	S	M	M	D	S-M	BG	2	2	2	2	2/5	M
Skiff (Royal Sluis)	2	S-M	M	M	D	S-M	BG	1	2	2	1	2/5	M
Exp. #12 (Sakata)	1	M	M	M	D	M-L	BG	1	1	1	1	2/5	M
Exp. #91 (Sakata)	2	S-M	L	H	D	M-L	BG	2	1	1	2	2/5	M
Exp. 83-3 (Sakata)	2	S-M	M	L	D	S-M	BG	1	2	3	1	2/5	M
T-408 (Takii)	3	S	L	M	S	M-L	BG	2	2	3	2	2/5	M
T-452 (Takii)	2	S-M	M	M	S	M-L	BG	3	1	2	2	2/5	M
TX 411 (Takii)	3	S	L	M	S	M	BG	2	2	1	2	2/5	M
TX-637 (Takii)	3	M-L	L	H	D	S-M	BG	2	3	2	2	2/5	M

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- (c) H = high, M = medium, L = low
- (d) D = domed, S = semi-domed, F = flat, V = variable
- (e) B = blue-green, DG = dark green, LG = light green, P = purple
- (f) M = mature, O = over, U = under

Table 5. Broccoli Variety Evaluations for the November 17, 1987, Planting at the Yuma Valley Ag Center.

VARIETY	Overall Eval. (a)	Stalk Diameter (b)	Plant Height (b)	Head Position (c)	Head Shape (d)	Head Size (b)	Head Color (e)	Head Compactness (a)	Uniform Maturity (a)	Knuckling (a)	Starring (a)	Harvest Date	Maturity at Harvest (f)
FMX 62 (Ferry-Morse)	4	S	S	H	D	L	BG	3	3	1	4	3/4	OM
FMX 63 (Ferry-Morse)	3	S-M	S	M	S	M-L	BG	3	2	2	2	3/4	M
FMX 94 (Ferry-Morse)	3	M	S	M	S	M	BG	2	3	1	2	3/4	OM
FMX 95 (Ferry-Morse)	4	S	M	H	S	L	BG	4	1	3	1	3/4	OM
FMX 100 (Ferry-Morse)	3	M-L	M	M	S	M	BG	2	3	2	1	3/16	OM
FMX 101 (Ferry-Morse)	3	M-L	M	M	S	M	BG	2	3	1	1	3/4	OM
Exp. PTOB-8 (Brinker Ursetti)	2	M-L	M	M	D	M-L	BG	2	3	2	3	3/4	OM
HMX 6136 (Harris Moran)	2	L	S	M	S	S-M	BG	1	3	2	1	3/16	UM
HMX 6141 (Harris Moran)	2	L	M	M	D	M	BG	1	3	2	1	3/4	M
Chancellor (Northrup King)	2	M	L	M	S	S-M	BG	3	3	3	2	3/16	OM
Greenbelt (Northrup King)	4	M	S	M	S	V	BG	2	2	2	1	3/16	M
Emperor (Northrup King)	2	M-L	M	M	S	M	BG	2	3	2	1	3/16	OM
Green Duke (Northrup King)	2	M-L	M	M	S	M	BG	2	3	2	2	3/4	M
Brigadier (Petoseed)	4	M-L	M	M	D	L	BG	2	4	2	3	3/4	M
Packman (Petoseed)	4	M	T	M	S	L	BG	2	3	2	3	3/4	M
Pirate (Petoseed)	2	L	S	M	D	L	BG	1	3	1	1	3/4	M
PSX 20684 (Petoseed)	3	M-L	S	M	D	M-L	BG	1	3	1	2	3/4	OM
PSX 21584 (Petoseed)	3	M	M	M	D	L	BG	2	2	1	2	3/4	M
QS 2804 (Quali-Sel)	3	S-M	L	H	S	V	BG	2	1	3	3	3/16	M
QS 6236 (Quali-Sel)	3	M	M	M	S	M	BG	2	3	1	2	3/16	M
QS 6241 (Quali-Sel)	4	M	M	H	D	L	BG	2	4	3	2	3/4	M
QS 6270 (Quali-Sel)	3	S	L	M	S	M-L	BG	2	2	1	3	3/16	OM
QS 6466 (Quali-Sel)	4	M	M	M	S	V	BG	3	2	3	2	3/16	M
QS 6482 (Quali-Sel)	2	M-L	M	M	D	M-L	BG	1	3	1	2	3/4	UM
Cruiser (Royal Sluis)	3	M	M	M	S	L	BG	2	3	3	3	3/16	M
Schooner (Royal Sluis)	2	S	M	H	D	M-L	BG	2	3	2	2	3/4	M
Skiff (Royal Sluis)	3	M	S	M	F	V	BG	3	3	3	1	3/16	OM
Exp. #12 (Sakata)	2	L	S	M	D	M-L	BG	1	3	1	1	3/4	M
Exp. #91 (Sakata)	3	M	M	M	D	M-L	BG	1	2	1	2	3/4	UM
83-1 (Sakata)	1	L	L	M	S	M	BG	2	3	1	2	3/16	M
Exp. 83-3 (Sakata)	4	M	M	M	D	V	BG	2	3	3	3	3/16	M
T-408 (Takii)	2	M	M	M	D	M	BG	1	2	2	2	3/16	UM
T-452 (Takii)	3	L	M	M	D	M	BG	1	3	1	1	3/4	UM
TX-411 (Takii)	3	S	M	M	D	M-L	BG	2	3	2	1	3/4	UM
TX-637 (Takii)	2	M	M	H	D	M	BG	3	2	2	1	3/4	M

KEY

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