

# Field Evaluation of Broccoli Varieties Grown in Southwest Low Desert Soils

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## ***Abstract***

*Based on acreage, broccoli is the third largest vegetable crop in Yuma County, after head lettuce, and romaine. It generates over \$36 000000 a year. Efforts are continuously made by both seed industry and growers to grow better varieties that respond to consumers' choice. Selection of newly adapted varieties is made based on agronomic performance as well as commercial value. Stand uniformity, disease resistance, color, head shape, and head size are among characteristics that are evaluated. The objective of this demonstration trial is to evaluate the characteristics of new varieties grown under standard cultural practices. Twelve varieties were tested at Yuma Agricultural Research Center. No incidence of disease was observed and the overall evaluation rating was greater than 4 indicating that all varieties tested will do well under similar growing conditions and planting date. Significant head diameter and plant height were observed among varieties tested.*

## **Introduction**

Yuma producers grow close to 8,000 acres of broccoli every year that generates over \$36,000,000 to the county economy. Continuous efforts are made by the seed industry and growers to improve the production of broccoli. Variety selection and crop management practices are the main factors that contribute to growing profitable broccoli. Varieties are selected for agronomic performance and commercial value. In the field, desirable agronomic qualities of broccoli crop also include uniform maturity and uniform size, good holding capability and acceptable disease resistance. Market values include color and uniformity. Good heights, dome-shaped heads, high density with a blue to blue green color are also important.

## **Methods and Materials**

Sakata and Bejo seed companies participated in the University of Arizona broccoli variety trial in 1999-2000. The Yuma Agricultural Center was used as the study site. We planted 12 varieties in a completely randomized block design with two replications. We used an Earthway® hand push planter to plant the 12 varieties in two-row beds on October 15, 1999. We used 42-inch spacing and 50-foot long plots planted with a north-south orientation. Plots were irrigated the day following planting. Standard cultural and IPM practices were utilized throughout the growing season. A commercial crew thinned all plots to 10-inch spacing.

All varieties had varying growth rates. Plant characteristics were evaluated over a period of time during the growing season. Most growth parameters were evaluated using a 1 to 5, scale with 1 as the least desirable. Parameters evaluated otherwise are explained in Table 1. Parameters rated on 1 to 5 scale were averaged to give the overall rating. Varieties with an overall rating between 4 and 5 are expected to grow well under

This is a part of The University of Arizona College of Agriculture 2000 Vegetable Report, index at <http://ag.arizona.edu/pubs/crops/az1177/>

similar conditions. Varieties with overall rating of 3 and below may experience some problems. Five heads per plot were measured for head diameter, and plant height as sub-samples to evaluate the head's uniformity and subject to the analysis of variance using Duncan Multiple Range (SAS ver.7).

## **Results and Discussion**

Results of field evaluations are shown in Table 1. The overall rating for all varieties was greater than 4 indicating that all these varieties tested will do well under similar growing conditions. No incidence of disease was observed among varieties tested. Overall varieties tested were uniform as shown by no significant difference in variety\*sampling interaction (Table 2). Broccoli varieties tested at the Yuma Agricultural Center showed a significant difference in head diameter and plant height Marathon Performa had a larger head diameter than any other variety, while Fiesta had the smallest. Results also indicated that Sedona was significantly taller than any other variety, while CMS was the shortest. All varieties tested in 1999-2000 growing season performed well. When grown under similar conditions and planting date these varieties are expected to perform well in growers' fields. Although broccoli varieties planted on October 15, 1999 performed well, the planting date was delayed by 8 to 10 days. Different results may have occurred if planting operation were made earlier.

Table 1. Analysis of variance for head diameter and plant height of broccoli varieties grown at Yuma Valley Research Center, 1999-2000

Source of variation	DF	Head diameter	Plant height
		Pr.>F	Pr.>F
Rep	1	0.527	0.544
Variety	11	<0.0001	0.026
Variety*sample	48	0.847	0.999
R2		0.62	0.429
CV		17.7	9.28
Mean Comparison			
Variety		Head diameter (in)	Plant height (in)
Marathon Performa		7.55a <sup>†</sup>	19.30b <sup>†</sup>
Liberty		7.40ab	19.90ab
DPSX105		7.40ab	17.70c
CMS		7.10abc	19.80ab
Heritage		6.70abc	18.50bc
Picacho		6.55bc	20.0ab
Sedona		6.55bc	21.50a
Monterey		6.35dc	19.10bc
Durango		6.35dc	18.90bc
Triathlon		5.55ed	19.40b
Fiesta		6.40e	19.10bc
Shadow		4.95e	19.20bc

<sup>†</sup> Means followed by same letters are not significantly different at 10% alpha level

Table 2. Data summary of observations collected on broccoli variety trial conducted at Yuma Agricultural Center 1999-2000

Yuma Valley	Overall Evaluation (a)	Head Shape (d)	Bead Size (b)	Bead Color (c)	Head Compactness (a)	Head Diameter in	Uniformity (a)	Field Holding (a)	Plant Height (in)	Head Position (C)	Habit (g)	Stalk (b)	Incidence of Disease (a)	Bracting (a)	Starring (a)	Maturity at Harvest F		Key
DPSX105 (Palmer)	4.3	F	S	B	4		3	4		E	4	5	5	5	4	M	1/24	Nice color, early variety, lack of compactness
Picacho (Palmer)	4.3	S	S	BG	4		3	4		E	4	5	5	5	4	M	1/30	Nice color, maturity not uniform
Sedona (Palmer)	4.4	D	S	BG	5		3	5		E	3	5	5	4	5	M	1/30	Domed shape, nice green color
Triathalon (Sakata)	5	D	M	BG	5		5	5		E	5	5	5	5	5	M	1/24	Nice color, uniform maturity, late variety
Marathon Performa	4.1	S	M	Y	3		4	4		E	4	4	5	5	4	M	1/24	Head flat, but uniform, early maturity
Fiesta	4.9	D	S	G	5		5	5		E	5	5	5	4	5	M	1/30	Small head size, uniform and domed shape
Shadow	4.9	D	M	BG	5		5	5		E	5	5	5	4	5	M	1/30	Late maturity, dark green color, uniform, domed shape
Monterrey	4.8	S	M	G	4		5	5		M	4	5	5	5	5	M	1/30	Nice plant height and color, head not compact
Durango	4.3	F	L	YG	3		5	4		M	4	3	5	5	5	M	1/24	Nice height, lack of compactness, semi flat
Liberty	4.8	S	M	YG	4		5	4		E	5	5	5	5	5	M	1/24	Good height, early maturity, semi-domed shape
CMS	4.3	S	S	YG	3		4	4		E	4	4	5	5	5	M	1/24	Head flat, somehow uniform, early maturity
Heritage	5	D	S	YG	5		5	5		E	5	5	5	5	5	M	1/30	Late variety, Uniform, nice green color, domed shape

**Key**

- 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, f=flat, k=knuckled
- e) bg= blue green, g=green yg= yellow green, P= purple, Wt=white tip, V=very
- f) m=medium, o=over, u=under, v=very
- g) 5=erect, 1=wide

**Comments**