

BROCCOLI

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BROCCOLI IS WELL ADAPTED to the western San Joaquin Valley, and with careful selection of varieties, can be harvested every month except from mid-June to mid-September. The trials reported here were in response to an increased interest by freezing processors and produce handlers in broccoli production in the San Joaquin Valley.

During 1970 and 1971 the following varieties were evaluated: Pacifica; Waltham 29, Rex, Medium 90, Medium Late 145, 143A, E0206, 4638, Sea Breeze, Spartan Early, Gem, Atlantic, Harvester Crusader, Bravo, Green Duke, Topper 43, 430, 593 and 592.

Selections of all of these varieties were planted on the following dates: February 19, March 17, April 20, May 29, May 26, June 17, July 21, July 23, August 11, September 8, and October 1.

Harvest periods for the above planting dates are shown in table 1. Only those varieties judged superior for each period are shown.

Choice of variety is extremely important in the San Joaquin Valley. Varieties

were found which performed the best in each season. In no instance did a variety which performed well in one season do equally well in another.

Hot weather effects on broccoli included excess growth, delayed maturity by up to 30 days, deformed and discolored heads, large hollow stems, and deformed plant growth. The most common effect was the formation of multiple main stems, each of which usually formed a king bud but resulting in a harvest extending over a long period. Most varieties performed quite differently in the Valley than in their usual area along the coast. The most readily observable difference was the taller and more vigorous growth found in the Valley.

Spartan Early produced ideal heads and quality during 100°F weather in early September, having a plant 14 to 18 inches high. **Topper 430** produced a large, hollow stem when planted early in July but a very desirable stem and head when planted later in the year.

Green Duke and **143A** produced excellent, high quality heads for a concentrated harvest in February and March. Green Duke is the most outstanding variety in its season for the Valley. It has a long season of usefulness, a large head, a high percentage of cut out, and little hollow stem. It may well be adapted to mechanical harvest. **Atlantic** produced a one-shot harvest from mid-November to mid-December, its quality declining as January approached. **Harvester** and **Gem** have machine harvest potential for both spring and fall. **Pacifica** has consistent high quality but in all seasons its harvest period extends through four or five cuttings over a period of up to six weeks. A late July planting was found to provide the most concentrated harvest in November. **Bravo** is an unusual variety, being the only one tested which gave good meaty heads of high color and uniformity during the month of July.

Fertilizer requirements differed widely among broccoli varieties. For Pacifica (a large, rank-growing hand-harvest type), optimum rates were found to be

TABLE 1. OPTIMUM PLANTING AND HARVEST TIMES FOR VARIOUS BROCCOLI VARIETIES IN THE SAN JOAQUIN VALLEY

Variety	Planting date	Harvest date
Atlantic	Aug. 10-30	Nov. 10-Jan. 15
Green Duke 143A	Aug. 25-Oct. 15	Jan. 20-Mar. 20
Topper 430		
Harvester	Sept. 1-15	Nov. 15-Dec. 15
Gem		
M.L. 145	Sept. 20-Oct. 10	Mar. 10-Apr. 10
Topper 430		
Green Duke	Jan. 1-Feb. 10	Apr. 15-May 15
Gem		
Crusader		
Topper 430	Feb. 10-20	May 10-30
Harvester		
Green Duke		
Bravo	Mar. 11-April 10	June 10-July 10
Spartan Early	June 10-July 10	Sept. 10-Oct. 20

TABLE 2. BROCCOLI YIELDS FROM 5 SUCCESSIVE HAND HARVESTS OF THE PACIFICA VARIETY, WEST SIDE FIELD STATION—1970

N	Fertilizer treatments		Broccoli yield		
	Pounds per acre		Tons per acre		
	P	K	Total	Grade A	Chop grade
0	60	0	2.20	1.64	0.51
60	60	0	2.84	1.90	0.72
120	60	0	3.16	2.29	0.66
180	60	0	3.50	2.62	0.79
240	60	0	3.30	2.44	0.56
300	60	0	3.85	2.63	0.83
240	0	0	3.46	2.50	0.70
240	60	100	3.20	2.55	0.61
240	0	100	3.67	2.56	0.80
	LSD 5% level		0.44	0.35	N.S.
	LSD 1% level		0.60	0.47	N.S.

for the San Joaquin Valley West Side

DON MAY LYNDON BROWN

in the range of 120 to 180 lbs of nitrogen per acre. Soil tests should be used to determine the need for phosphorus, potassium or zinc. Phosphorus should be applied usually when bicarbonate soluble P is found to be less than 10 ppm. Potassium is needed when available soil K falls below 80 ppm. Zinc should be applied when soil levels are less than 0.5 ppm dithizone extractable zinc.

The percentage of Grade A broccoli in the total yield of Pacifica (table 2) averaged 73.4% for the combined treatments, and there were no significant differences among treatments in percentage of Grade A. Spacing was 10 inches in the row, 2 rows per 40-inch bed.

Harvester, a specialty machine-harvest type, was evaluated on February 19 and August 11. Table 3 shows that for the spring planting, the 3-inch spacing with 200 lbs of nitrogen was superior to any other combination. This high rate of nitrogen maintained optimum quality in the field several days longer than the lower rates. Optimum time of harvest was when 80% of the plants were prime for processing.

Results for the fall planting of Harvester are given in table 3. Three rows per 40-inch bed produced 10 to 15% higher yields than two rows.

Wet treatments, irrigated at 0.2 bar produced slightly higher yields of Grade A on the average for November 10 and 16 and much lower on November 24 when brown berry and other defects caused serious losses. The dry treatment, irrigated at 0.70 bar, developed brown berry much more slowly, providing a longer and more stable harvest period. Quality was affected more by water management than by any other factor.

Head size increased and other defects decreased with increases of N up to 400 lbs per acre. The wet treatment reversed this effect.

Consistent with high quality and good yield, 300 lbs of N, 50 lbs of P with two rows per 40 inch bed, and irrigated at 0.70 bar, proved to be the best combination of fertilizer and spacing for Harvester.

The trials reported here demonstrate the importance of careful consideration in determining exact fertilizer needs and spacing for each new variety introduced to this area.

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TABLE 3. FALL BROCCOLI TRIALS OF HARVESTER VARIETY FOR MECHANICAL HARVEST, 1970—PLANT POPULATION, FERTILIZER, IRRIGATION HARVESTED NOV. 16

Fertilizer		Rows per bed	Irrigation	Yield total grade A	Per cent of total crop				
N	P				Total	Grade A		Chop	Other defects
lbs/A		no		tons/acre	%				
0	50	2	wet	1.67	62.1	34.8	27.3	36.5	1.4
		2	dry	1.74	65.7	30.8	34.9	31.8	2.5
		3	wet	2.12	62.9	35.1	27.8	36.3	0.8
		3	dry	1.78	58.8	28.8	30.0	40.8	0.4
100	50	2	wet	3.19	81.4	56.8	24.6	16.3	2.3
		2	dry	3.41	79.7	61.2	18.5	16.7	3.6
		3	wet	3.47	76.9	50.7	26.2	21.9	1.2
		3	dry	2.89	72.2	42.9	29.3	26.8	1.0
200	50	2	wet	4.42	88.9	74.4	14.5	9.8	1.3
		2	dry	3.33	84.5	62.1	22.4	14.8	0.7
		3	wet	3.90	80.2	55.1	25.1	19.1	0.7
		3	dry	3.99	81.6	59.3	22.3	17.8	0.6
300	50	2	wet	4.26	88.9	73.6	15.3	10.5	0.6
		2	dry	3.96	82.2	63.6	19.2	16.1	1.7
		3	wet	4.49	81.9	61.1	20.8	15.9	2.2
		3	dry	4.26	79.7	54.7	25.0	19.1	1.2
400	50	2	wet	4.66	88.1	77.3	10.8	9.3	2.6
		2	dry	4.19	88.2	74.5	13.7	10.6	1.2
		3	wet	5.52	81.2	61.4	20.8	14.5	3.3
		3	dry	4.58	83.0	55.9	27.1	16.3	0.7
300	0	2	wet	3.78	86.6	63.9	22.7	12.5	0.9
		2	dry	3.23	85.4	55.2	30.2	13.9	0.7
		3	wet	4.20	80.9	54.5	26.4	16.3	2.8
		3	dry	4.30	81.5	53.1	28.4	17.8	0.7