

# BROCCOLI PROJECTED PRODUCTION COSTS 1992-1993

BC-SI-93

Mechanical operations at custom rates. Hand labor at \$5.75 per hour (\$4.50 plus Social Security, unemployment insurance, transportation, supervision and fringe benefits)

Yield--500 26-lb. cartons 85-110 days to maturity. Field packed

OPERATION	CUSTO RATE	MATERIALS		HAND LABOR--		COST Per acre	
		Type	Cost	Hours	Dollars		
<b>LAND PREPARATION</b>							
Stubble disc	19.00					19.00	
Subsoil	31.00					31.00	
Disc 2x	10.00					20.00	
Landplane 2x	10.75					21.50	
Border, cross check & break borders	15.00					15.00	
Flood		Water 1 ac/ft	11.50	1	5.75	17.25	
Wil-Rich chisel plow	12.75					12.75	
Disc 1x	10.00					10.00	
Triplane 1x	9.25					9.25	
Fertilize	7.00	500#-- 11-52-0	67.75			74.75	
List	12.25					12.25	
<b>TOTAL LAND PREPARATION</b>						<b>242.75</b>	
<b>GROWING PERIOD</b>							
Precision plant	15.25	Hybrid seed 50M	110.00			125.25	
Sprinkler irrigate	140.00					140.00	
Spray herbicide	7.00	Dacthal	30.80			37.80	
Thin				8	46.00	46.00	
Cultivate 1x	11.25					11.25	
Fertilize & furrow out 1x	10.00	80# N @ .31	24.80			34.80	
Water-run fertilizer		40# N @ .31	12.40			12.40	
Hand weed				4	23.00	23.00	
Irrigate 8x		3 1/2 ac/ft	34.50	8	46.00	80.50	
Insect control 4x	8.00	Insecticides	25.00			65.00	
Disease control 2x	8.00	Fungicide	41.00			57.00	
Chop stalks	11.00					11.00	
<b>TOTAL GROWING PERIOD COSTS</b>						<b>644.00</b>	
<b>GROWING PERIOD &amp; LAND PREPARATION COSTS</b>						<b>886.75</b>	
Land Rent (net acres)						225.00	
Cash Overhead---		12% of preharvest costs & land rent					133.41
<b>TOTAL PREHARVEST COSTS</b>						<b>1245.16</b>	
<b>HARVEST COST - FIELD PACK</b>							
Custom harvest, pack, sell and haul to cooler (No extra services)		500	26 lb cartons @	3.40 /carton		1700.00	
<b>TOTAL ALL COSTS</b>						<b>2945.16</b>	

### PROJECTED PROFIT OR LOSS PER ACRE

	price/carton					Break-even \$/carton
	5.00	6.00	7.00	8.00	9.00	
Cartons per acre	300	400	500	600	700	
	-765	-465	-165	135	435	7.55
	-605	-205	195	595	995	6.51
	-445	55	555	1055	1555	5.89
	-285	315	915	1515	2115	5.48
	-125	575	1275	1975	2675	5.18



# FRESH MARKET BROCCOLI CULTURE 1992-1993

<u>YEAR</u>	<u>ACRES</u>	<u>YIELD/ACRE*</u>	<u>VALUE/ACRE</u>
1991	8,764	461	\$2791
1990	10,484	445	2197
1989	11,928	381	2023
1988	9,250	437	3059
1987	7,874	427	2493

\* 26# cartons (Source: I.C. Agricultural Commissioner's Reports)

**PLANTING-HARVEST DATES:** Broccoli is most often planted starting late August and continues through mid-November. Harvesting begins late November and lasts until mid-March. Sometimes early plantings develop brown bead, a physiological disorder thought to be related to lack of calcium uptake and excessive heat during head formation. Late plantings (maturing in April) tend to produce short plants with a purplish cast and irregular sized beads.

**PLANTING INFORMATION** Broccoli is customarily direct seeded. The use of transplants is prohibitively expensive and would require roughly 48,000 plants/acre at a cost of roughly \$600/acre.

A Stanhay precision planter or an air planter is often used to sow the crop at a depth of 1/8-1/4" on double-row 42" beds. Spacing between seedlines is usually about 13". Broccoli is typically planted to a stand and not thinned. If the field is to be thinned, seed is planted at roughly 2-3" spacing then thinned to 5-6" between plants.

In-row spacing varies according to grower preference, taking into consideration the percent inbreds, the roughness of the seedbed, the time of the year, insect pressure, and variety. Inbreds of some varieties produce marketable broccoli heads while others produce plants which have heads smaller than a half dollar. Normal spacing in-row is 5-6", however, depending upon the grower preference spacing can range from 4-8".

University research has shown that plants develop larger heads at wider spacing and more compact heads with the narrow spacing. Often heads may become too large or too small when spacing is improper. Yield may be lost due to off-sized heads. Likewise, some varieties under adverse climatic conditions produce large stems (1.5" or more) which are objectionable to shoppers. Wide spacing may also contribute to hollow stem in broccoli, a marketing defect which reduces price.

For precise planting, the broccoli seed must be sized and closely matched to the hole size in a Stanhay planter belt. Skips or doubles will occur with improperly sized belts. Seed and equipment dealers usually have testing equipment to evaluate your needs.

Natural, nonpelleted seed is typically used for broccoli plantings. Seed is sold by the M (thousands). A normal broccoli planting requires 49.6 M seeds per acre at a 6" spacing. Broccoli seed will germinate at temperatures of 40-95 F.



# BROCCOLI (continued)

**VARIETIES:** "Pirate", "Emperor", "649", "Green Belt", "Pinnacle", "Claudia", "Everest", "Green Duke", "Marathon", "Galaxy", "Packman" and "Cruiser" are some of the major varieties grown in the Southwest. All are hybrids.

Almost any commercial broccoli variety will produce a crop when planted throughout the season. However, many varieties are best adapted to early, mid or late season planting slots. The highest yield and most desirable head quality will be achieved by selecting the proper variety for a given planting date.

The most desirable broccoli head would have a compact dome-shape and have small-to-medium uniform beads. The "dome" is preferred as water from rain or dew will run off the heads. Standing water is conducive to fungal and bacterial growth. The stem should be slick with relatively few leaves which cause stem scars when stripped off during packing. The heads should mature uniformly allowing for a once over harvesting, however, most fields are harvested twice. The heads may be dark green or have a purplish cast. Either color is acceptable, however, mixtures of green and purple detract from the appearance of a packed carton.

"Cateye" (also called "starring") is a condition where some beads begin breaking into yellow flower. Some varieties have a tendency to develop this defect more quickly than do others. A yellowish tone on the sides of the beads is not considered a defect as it is the result of insufficient light reaching these areas during growth.

**SOILS:** Well drained soils are preferred, although broccoli may be grown on a wide range of soil textures. Excellent broccoli crops have been produced on soils ranging from dune sand to silty clay. When grown on silty clay soils, it is necessary to prepare a fine seedbed in order to precision plant effectively. Broccoli has greater salt tolerance than do lettuce, carrots or onions.

**IRRIGATION:** Sprinkler irrigation is normally used for stand establishment in the Imperial Valley, while furrow irrigation is frequently used in Yuma. After emergence, the field is converted to furrow irrigation. Broccoli is irrigated 6-8 times during the season.

**FERTILIZERS:** Five hundred pounds of 11-52-0 are normally broadcast prior to listing the beds. This will provide ample nutrients for the crop until the first cultivation and sidedressing. Some growers prefer to add small amounts of nitrogen through the sprinklers or in the first water-back after sprinkling. About 80 pounds (units) of nitrogen are applied in a single sidedress application. UAN 32 or AN 20 are popular nitrogen fertilizers. If needed additional nitrogen may be applied later in the irrigation water. Broccoli is not a heavy fertilizer user when compared to crops such as cauliflower or tomatoes.

## **PEST CONTROL:**

Late season broccoli is not prone to suffer significant damage from insects, however, early season plantings may be readily attacked by flea beetles and worms.



## BROCCOLI (continued)

Cabbage loopers, armyworms, salt-marsh caterpillars, cutworms, sugarbeet nematodes, flea beetles and aphids can cause extensive damage unless controlled.

Recently, the sweetpotato whitefly strain B has caused substantial damage to broccoli seedlings due to massive feeding pressure. The damage has caused a 2-3 week delay in the normal maturity of the crop, completely throwing plantings out of their targeted market windows. In addition, white stalk of broccoli developed on some plantings. This disorder is believed to be due to a toxic feeding reaction associated with whitefly.

Downy mildew (Peronospora parasitica) is the major fungal disease of broccoli. University research has shown that foliage can suffer a substantial amount of mildew lesions without affecting yield or quality. There are mildew tolerant varieties available.

Herbicides are relatively effective for controlling weeds in broccoli with the exception of london rocket. Hand weeding is often necessary to remove weeds that develop during the winter.

**HARVESTING:** Broccoli crops are field packed. They are harvested twice and sometimes three times depending upon the market. Overmaturity is a major problem especially under favorable growing conditions and warmer weather. There is a tendency to overplant broccoli as it is an easy crop to grow. Most growers either ship the product themselves or have a contract with a shipper. Little, if any, broccoli is grown on the open market on speculation.

Broccoli heads are removed by hand usually by snapping the stem. Leaves are stripped from the stem and the heads are placed on the table of a field harvesting machine.

Heads are chosen on the basis of size and conformation. They must be roughly 3" in diameter and normally not over 8" maximum size. The heads must also be free of defects such as cateye, broken florets, dirt, debris, irregular head size and excessive flaring of the florets from the main stalk.

Normally 2-4 heads are trimmed to an 8" length and secured by a rubber band. Occasionally more heads are used for a bunch if there is a high market price. The broccoli is packed in 26-pound, waxed-fiberboard cartons containing 14 or 18 bunches.

A small amount of the crop is sold as field cut "florets". The loose florets are placed in mesh bags and packed in 9-12# cartons containing 3-4 bags. There is also some "crown cut" broccoli sold. The top dome is cut from the stem at a 3" length. This is considered a "premium cut". While crown cut broccoli commands a high market price, the harvesting process is slow and meticulous. Crown cut buyers have very demanding standards that must be adhered to.

Broccoli requires rapid cooling to insure quality. Harvested cartons should be taken immediately to the cooler. Liquid-icing is the standard cooling method. The process involves injection of an ice-water slush forced into the waxed cartons providing immediate cooling of the product. Liquid-icing allows



## BROCCOLI (continued)

for the ice to come into contact with maximum surface on the product. Broccoli cartons should never be allowed to set for more than an hour on the dock before cooling and be taken immediately after icing into refrigerated storage. Failure to do so will cause a loss of some of the benefit from cooling.

If bunched broccoli is stored at 32F with a relative humidity of 90-95 percent, it should have a 10-14 day shelf life. At higher temperatures the shelf life may be cut drastically. Storing at 50 F, for example, will reduce the shelf life to 5 days. Excessive storage time will cause yellowing and softening of the tissue and beads. Off-flavor and bad odor may develop as well.

Broccoli should never be stored with ethylene sources such as ripening melons, avocados, bananas, apples or pears. Exposure to ethylene will accelerate the yellowing of the beads.

Cooling and palletizing costs are charged to the buyer, however, the price per carton may be quoted as "loaded". This means that these extra services were included in the quote.

**NUTRITION** An average broccoli stalk contains only 30 calories and provides 240% of the RDA of vitamin C along with 10% of the RDA for vitamin A. Broccoli has recently been discovered to aid in the prevention of some forms of cancer.

