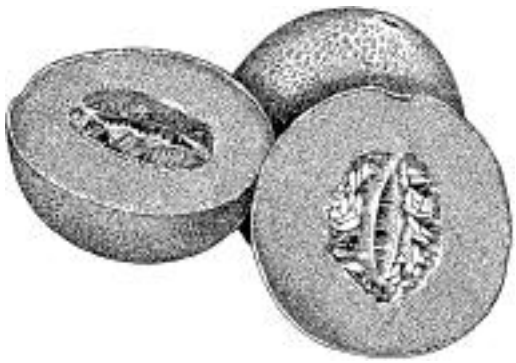
U.C. COOPERATIVE EXTENSION

SAMPLE COST TO ESTABLISH AND PRODUCE

CANTALOUPES



SLANT-BED, SPRING PLANTED

IMPERIAL COUNTY – 2003

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For an explanation of calculations used for the study refer to the attached General Assumptions or call the author, Keith S. Mayberry , at the Imperial County Cooperative Extension office, (619)352-9474 or e-mail at ksmayberry@ucdavis.edu.

FOREWORD

We wish to thank growers, pest control advisors, chemical applicators and dealers, custom farm operators, fertilizer dealers, seed companies, contract harvesters, equipment companies, and the Imperial County Agricultural Commissioners office for providing us with the data necessary to compile this circular. Without them we could not have achieved the accuracy needed for evaluating the cost of production for the field crop industry in Imperial County.

The information presented herein allows one to get a "ballpark" idea of field crop production costs and practices in the Imperial County. They do not reflect the exact values or practices of any one grower, but are rather an average of countywide prevailing costs and practices. Exact costs incurred by individual growers depend upon many variables such as weather, land rent, seed, choice of agrichemicals, location, time of planting, etc. No exact comparison with individual grower practice is possible or intended. The budgets do reflect, however, the prevailing industry trends within the region.

Overhead usually includes secretarial and office expenses, general farm supplies, communications, utilities, farm shop, transportation, moving farm equipment, accountants, insurance, safety training, permits, etc. In most of the crop guidelines contained in this circular we used 13 % of the total of land preparation, growing costs and land rent to estimate overhead.

Since all of the inputs used to figure production costs are impossible to document in a single page, we have included extra expense in man-hours or overhead to account for such items as pipe setting, motor grader, water truck, shovel work, bird and rodent control, etc. Whenever possible we have given the costs of these operations per hour listed on the cultural operations page.

Not included in these production costs are expenses resulting from management fees, loans, providing supervision, or return on investments. The crop budgets also do not contain expenses encumbered for road and ditch maintenance, and perimeter weed control. If all the above items were taken into account, the budget may need to be increased by 7-15%.

Where applicable we have used terminology that is commonly used in the agricultural industry. These terms are compiled in a glossary at the end of the circular. We feel that an understanding of these terms will be useful to entry-level growers, bankers, students and visitors.

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2002-2003 Field/Vegetable Prevailing Rate for Field Operations
IMPERIAL COUNTY

HEAVY TRACTOR WORK & LAND PREPARATION

OPERATION	$/ACRE
Plow	30.50
Subsoil, 2nd gear	39.00
Landplane	12.75
Triplane	11.25
Chisel 15”	25.00
Wil-Rich chisel	16.00
Big Ox	24.00
Slip plow	41.00
Pull/disc borders	6.75
Make cross checks (taps)	6.25
Break border	6.00
Disc, stubble	21.00
Disc, regular	12.50
Corrugate	11.00
Disc, regular with ring roller	13.50
List 30” beds 12-row	15.00
List 40” beds 8-row	15.00
Float	10.00
Disc, borders	7.00
Dump (scraper) borders	14.50

LIGHT TRACTOR WORK

Power mulch dry	25.00
Power mulch with herbicide	28.00
Shape 30” 6 row	10.75
Shape 40” 4 row	10.75
Plant 30” beds nonprecision	20.00
Plant 40” beds nonprecision	18.00
Precision plant 30” beds	22.00
Precision plant 40” beds	20.00
Mulch plant wheat	19.50
Plant alfalfa (corrugated)	17.50
Plant bermudagrass (flat)	13.75
Plant sudangrass	14.75
Cultivate 30” beds 4-row	16.00
Cultivate 40” beds 4-row	14.00
Spike 30” beds 4-row	13.25
Spike 40” beds 4-row	11.25
Spike and furrow out 30” 4-row	14.00
Spike and furrow out 40” 4-row	12.00
Furrow out 30” beds 4-row	13.25
Furrow out 40” beds 4-row	11.25
Lilliston 30” beds 6-row	13.00
Lilliston 40” beds 4-row	13.00
Lilliston 30” beds with/herbicides 6-row	15.00
Lilliston 40” beds with/herbicides 4 -row	15.00
Inject fertilizer & furrow out 30” beds 4-row	15.00
Inject fertilizer & furrow out 40” beds 4-row	13.00
Fertilize dry & furrow out 30” beds	17.00
Fertilize dry & furrow out 40” beds	15.00
Flat inject fertilizer NH_3	15.00
Broadcast dry fertilizer	7.00
Ground spray 40” 8-row	12.00
Ground spray 30” 8-row	14.00
Chop cotton stalks	13.75

HARVEST COSTS Field Crops

	BY UNIT
Combine alfalfa seed	41.75/acre
Windrow alfalfa seed	17.50/acre
Rake bermudagrass	5.00/acre
Swath bermudagrass	13.50/acre
Swath sudangrass	11.25/acre
Rake sudangrass	5.25/acre
Swath alfalfa	8.00/acre
Rake alfalfa	4.50/acre
Bale (all types of hay- small bale)	0.65/bale
Haul & stack hay – small bale	0.25/bale
Bale (large bale 4X4)	10.00/bale
Bale (large bale Jr. 3X4)	9.00/bale
Stack & load large bale	6.00/bale
Dig sugar beets	2.60/clean ton
Haul sugar beets	2.45/clean ton
Combine wheat	15 per acre + 0.55 /cwt over 1 ton
Haul wheat	5.50/ton
Combine bermudagrass seed 1st time	40.00/acre
Combine bermudagrass seed 2st time	25.00/acre
Haul bermudagrass seed (local)	175/load
Haul bermudagrass seed (Yuma)	300/load

MISCELLANEOUS OPERATIONS BY THE HOUR

Motor grader	48.00
Backhoe	45.00
Water truck	40.00
Wheel tractor	35.00
Scraper	36.00
Versatile	56.00
D-6	56.00
D-8	70.00
Buck ends of field	28.00
Pipe setting (2 men)	37.00
Laser	88.00
Work ends (disc out rotobucks)	35.00

CANTALOUPE CULTURE 2002-2003

Annual acreage, yield, and value of spring cantaloupes in Imperial County, CA (1997-2001)

Year	Acres	Yield/Acre*	Value/Acre
2001	9,339	490	$3,077
2000	11,318	419	$2,480
1999	14,664	380	$2,315
1998	14,087	513	$3,180
1997	13,605	434	$2,918

* 38 lb cartons

Source: I.C. Agricultural Commissioner's Reports 1997-2001

In 2001, there were also 1,659 acres of fall cantaloupes, which had a yield of 376 cartons per acre and a gross value of $3,444 per acre.

PLANTING-HARVESTING DATES Spring cantaloupes are planted from late December (using plastic) through mid-March. Slant beds are used for roughly 60 percent of the acreage; plastic mulched mid-bed trench system is used on the rest. Harvesting begins in May and continues through mid- July.

The fall crop is generally planted from mid-July through late August for harvest in mid-October until the first frost.

VARIETIES Popular cantaloupe varieties include: Primo *Syngenta*; Goldmine *Harris Moran*; Impac *Seminis*; Oro Rico *Harris Moran*; Pacstart *Seminis*; Laredo *Seminis*; Mission *Seminis;* Hymark *Seminis;* Cruiser *Harris Moran*; Sol Real *Syngenta;* Ocotillo *Syngenta;* Esteem *Syngenta;* Zeus *Seminis;* RML 7930 *Syngenta;* and Gold Rush *Harris Moran*.

PLANTING INFORMATION Slant-bed or "Yuma-bed" culture was developed to orient the south face of the bed toward the winter sun. The sun's rays strike the soil surface at a nearly perpendicular angle, converting light energy into heat. Flat beds reflect a greater portion of the incoming radiation and are therefore cooler. Maximum bed heating is achieved when the bed angle is roughly 35-37 degrees from horizontal.

Seed is planted ½ inch deep on 80-inch beds. Custom-built, slant-bed planters using random flow seeding units are common. Air planters may be used for precision planting. Seed lines are located midway up the slope. Care must be taken to locate the correct seed line position as the beds will be reworked and reformed during the season. Forming a bed with a depression at the crown will increase the incidence of fruit and root rotting fungi.

After the melons are thinned to approximately 12 inches in-row, the beds are worked to relocate the seed line. Soil is shaved off the top of the beds and into the furrow. After several passes with small tractor-mounted discs, the field is virtually flat with seed lines 80 inches apart. Sidedress fertilizer is applied and new furrows are made for irrigation.

The melons are direct seeded on alternate N-S oriented 40-inch flat beds to minimize excessive heat to the seed lines. Later the off beds are split and the planted beds are reformed to a full 80-inch bed.

The mid-bed trench system involves the use of a bed shaper to produce a trench or groove in the center of an 80-inch wide bed. The shape of the trench varies from grower to grower, but normally they are 6-10 inches wide at the bottom, 20 inches wide at the top, and 12 inches deep. Trenches are seeded at the bottom using a random flow planter or an air-type, vacuum precision planter. Pre-emergence herbicide is sprayed in the trench. A tractor-mounted, plastic-mulch laying machine is used to stretch a 40-inch wide sheet of 1-1½ mm plastic sheet over the trench and to secure the edges with soil.

Fall planted melons emerge rapidly after the initial irrigation. When the plants have 3 to 4 true leaves, they are thinned to 5-7 inches down the seed line row.

SOILS Well-drained soils are preferred. Sandy or silt loams are sometimes selected for the earliest crop. Heavier soils are preferred because of their greater water holding capacity, which slows the onset of vine collapse. Beds should be left cloddy to allow for maturing melons to develop with minimal soil contact and good aeration.

Fields located in the northern portion of the valley near the Salton Sea are preferred for the early melon crops. This area is less subject to freezing due to the influence of the sea. Spring cantaloupes are also planted in Winterhaven (eastern Imperial County).

IRRIGATION Slant-bed cantaloupes are usually furrow irrigated. Sprinkling tends to cool the soil and cantaloupes do not respond well to prolonged or frequent irrigation.

After planting, the tops of the beds are shaved to fill the furrows and bring the furrow water closer to the seed lines. The beds are then irrigated and water is "subbed" (moved by capillary action) past the seed line. This may take several days.

Following emergence, water is often withheld for several weeks. This is done to maintain soil warmth and promote early growth. The last irrigation is normally scheduled one week prior to harvest. Excessive moisture during harvest may increase ground spotting, rotted fruit, and soft fruit.

FERTILIZERS Most growers apply liquid 10-34-0 fertilizer injected into the beds at planting or broadcast 11-52-0 prior to listing the beds. Up to 150 pounds of actual nitrogen may be side-dressed. Normally UAN32 or AN20 is used.

POLLINATION At least one colony of bees per acre is recommended and 1½ colonies are better. The bees should be distributed on at least two sides of a 40-acre field; distribution of bees within fields is even better. Research has indicated that yields are increased with heavy bee saturation.

Flowers that are bisexual (i.e. fruit-producing flowers) are only open for one day. On the average, a well-pollinated flower will receive at least 15 bee visits during this time. If the flower is poorly pollinated, the flower aborts.

The highest quality, earliest maturing, and largest fruit are produced near the crown of the plant. For this reason it is important that an adequate supply of bees be delivered to the field when the first male blossoms develop.

PEST CONTROL Spring cantaloupes are subject to a number of insect problems including cutworms, aphids, mites, loopers, silverleaf whiteflies, leafhoppers, and leafminers.

The silverleaf whitefly can cause yellowing, wilting and death of plants. They remove a large quantity of plant sap during feeding. The excrement from whiteflies called "honeydew" falls on the fruit and foliage. Black-colored fungi develop on the nutrient-rich excrement causing an undesirable appearance of the fruit. Field packing becomes nearly impossible, as the fruit need to be washed to remove the discoloration.

Sudden wilt caused by *Pythium* sp. is a serious problem affecting melons after fruit set. The problem is lessened by using alternate furrow irrigation, which allows for a portion of the root zone to remain dry.

Mosaic viruses including zucchini yellow mosaic (ZYMV), watermelon mosaic II (WMV), papaya ringspot (PRSV), and cucumber mosaic (CMV) are vectored by various aphid species during the spring. There is no control.

Powdery mildew, caused by *Sphaerotheca fuliginea* or *Erysiphe cichoracearum*, is a foliar diseases favored by warm weather and moisture. Dusting sulfur and agrochemicals are used for control. Other diseases of lesser importance include charcoal rot caused by *Macrophomina*

phaseolina, root rots caused by *Fusarium* spp., *Pythium* spp., and *Rhizoctonia solani*, and gummy stem blight caused by *Didymella bryonia*.

Melon vine decline (*Monosporascus cannonballus)* can cause serious damage at harvest. Other than soil fumigation by methyl bromide, there is no control.

Fusarium fruit rot, caused by *F. roseum*, can cause severe damage. Control measures must be applied as a preventative (i.e. before disease occurs) in order to be effective. Otherwise, control measures are useless.

Weeds are serious problems in spring cantaloupes. Herbicides have not been successful, therefore growers rely on hand weeding and cultivation during the bed reconstruction process to kill unwanted weeds.

HARVESTING Most of the crop is field-harvested on tractor-pulled platforms that span 12 beds. The basic harvest crew consists of 14 to 17 people including a field supervisor. A harvesting crew can harvest 50 to 60 cartons per hour.

The decision to "break" a field is determined by many factors: market price, sugar content of the fruit, weather, and anticipated yield.

Cantaloupes should have at least 10 percent soluble solids (sugar) for good dessert quality. However, the minimum legal standard is 8 percent. High quality, crown-set fruit may have 14 percent soluble solids or more. While cantaloupes ripen and soften after harvest, they do not increase in sugar content.

The preferred shape for a cantaloupe is round and symmetrical. Triangular-shaped melons are difficult to pack and rattle in the box.

Picking is done according to melon background color. Full-slip, straw-colored melons are no longer the industry standard. Greenish cast cantaloupe hybrid varieties are acceptable provided they contain sufficient sugar.

First impressions of the fruit coming from a district are important in establishing a good report with buyers. This makes it important to pack a good carton at the beginning of the season.

Rough handling resulting in scuffing or bruising of the net and puncturing or cracking of the fruit will increase the incidence of decay and dehydration.

Melon packers size and cull the melons to be packed. Approximately 3 to 15 percent of the fruit (off-sizes and blemished fruit) are discarded back into the field. Sizing is by "feel" with packed sizes being 9, 12, 15, 18, 23, or 30 fruit per carton. Carton weight is approximately 40 pounds. Most of the time there are no 30's shipped. Presentation is important in establishing repeat melon sales. Care should be taken to pack high quality melons free of defects and sunburn.

Cartons are stacked 42 per pallet and 12 to 14 pallets per trailer. It takes 2 to 2.5 hours to fill a trailer. Filled trailers are taken to pressure or "forced air" type coolers to remove field heat. Hydrocooling is also used, but only with shed packed fruit, not field pack.

One method of circumventing the need for pressure cooling in remote areas is to harvest at night, using lights or packing early in the morning before the melons heat up. Cool melons are placed under refrigeration.

Major losses of potentially harvestable fruit occur from mechanical damage and sunburn. Vine coverage has a lot of influence on the incidence of sunburned fruit. Once the roots quit pumping moisture to the fruit, the melons will heat and burn.

POSTHARVEST HANDLING Cantaloupes may be stored for roughly two weeks at 36-41^{o}F and 95 percent relative humidity. At lower temperatures, chilling injury may occur.

Hot water dips of 135 ^{o}F to 140 ^{o}F for three minutes reduce surface decay organisms. When hot water dips are used and fruit are stored in poly bags, cantaloupes have preserved well up to 30 days.

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For more information see “Cantaloupe Production in California”, DANR Publication 7218 available from the Imperial County Cooperative Extension Office or for a free download from the internet go to http://anrcatalog.ucdavis.edu/specials.ihtml

SPRING SLANT BED CANTALOUPE PROJECTED PRODUCTION COSTS 2002-2003

Hand labor at $9.25 per hour ($6.75 plus SS, unemployment insurance, transportation, supervision, workman's compensation, and fringe benefits).

Yield--450 cartons per acre. Slant bed culture Hybrid variety

OPERATION	Cost	Materials		Hand Labor		Cost
		Type	Cost	Hours	Dollars	Per acre
LAND PREPARATION						
Stubble disc 1x	21.00					21.00
Disc 2x	12.50					25.00
Triplane 1x	11.25					11.25
Border, cross check and break borders	19.00					19.00
Flood		Water 1 ac-ft	16.00	1	9.25	25.25
Fertilzer, spread	7.00	500 lbs. 11-52-0	58.75			65.75
Disc 2x	12.50					25.00
List beds	19.00					19.00
TOTAL LAND PREPARATION						**211.25**
GROWING PERIOD						
Shape beds/plant/and	25.00	Hybrid seed 20M	219.00			244.00
systemic insecticide		Admire	75.00			75.00
Herbicide, planting	12.00	Prefar	25.00			37.00
Back fill furrow	12.00					12.00
Thin				6	55.50	55.50
Cultivate 3x	16.00					16.00
Center beds	18.00					18.00
Work furrow and spike	12.00					12.00
Sidedress fertilizer & furrow out	17.00	80 lb. N @ .32	25.60			42.60
Hand weed 1x				6	55.50	55.50
Layby herbicide	12.50	Treflan	5.00			17.50
Pollination		1 1/2 hives @ $27/hive				40.50
Irrigate 5x		Water 3 3/4 ac/ft	60.00	8	74.00	134.00
Water-run fertilizer		40 lb. N @ .32	12.80			12.80
Insect control 4x	9.50	Insecticides	75.00			113.00
Disease control 2x	10.00	Fungicides	16.00			36.00
Bust beds (cleanup)	13.00					13.00
TOTAL GROWING PERIOD						**934.40**
GROWING PERIOD & LAND PREPARATION COSTS						1145.65
Land Rent (net acres)						200.00
Cash Overhead------	13 % of preharvest costs & land rent					174.93
TOTAL PREHARVEST COSTS						**1520.58**
HARVEST (field pack)						
Pick, pack, haul, cool, and sell	450 cartons @		3.75	per carton		1687.50
TOTAL OF ALL COSTS						**3208.08**

PROJECTED PROFIT OR LOSS PER ACRE
Price/ 38 lb.carton (dollars)

		5.00	6.00	7.00	8.00	9.00	Break-even dollars/ carton
	400	-1021	-621	-221	179	579	7.55
cartons	450	-958	-508	-58	392	842	7.13
per	500	-896	-396	104	604	1104	6.79
acre	550	-833	-283	267	817	1367	6.51
	600	-771	-171	429	1029	1629	6.28

* Harvest costs vary with the shipper, the field conditions and the market value.