
U.C. COOPERATIVE EXTENSION

SAMPLE COST TO ESTABLISH AND PRODUCE

ICEBERG LETTUCE



IMPERIAL COUNTY – 2000

Prepared by:

Keith S. Mayberry Farm Advisor, U.C. Cooperative Extension, Imperial County

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.

The University of California Cooperative Extension in compliance with the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, and the Rehabilitation Act of 1973 does not discriminate on the basis of race, creed, religion, color, national origins, or mental or physical handicaps in any of its programs or activities, or with respect to any of its employment practices or procedures. The University of California does not discriminate on the basis of age, ancestry, sexual orientation, marital status, citizenship, medical condition (as defined in section 12926 of the California Government Code) or because the individuals are disabled or Vietnam era veterans. Inquiries regarding this policy may be directed to the Personnel Studies and Affirmative Action Manager, Agriculture and Natural Resources, 2120 University Avenue, University of California, Berkeley, California 94720, (510) 644-4270.

University of California and the United States Department of Agriculture cooperating.

FOREWORD

We wish to thank growers, pest control advisors, seed companies, transplant producers, contract harvesters, fertilizer dealers, and equipment companies 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 dynamic and important vegetable industry in Imperial County.

The information presented herein allows one to get a "ballpark" idea of vegetable production costs and practices in the Imperial County. They do not reflect the exact values or practices of any grower or shipper, but are rather an amalgamation 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, 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, supplies, donations, utilities, transportation, 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. For crops that require additional labor or extra operations (i.e. leaf lettuce) we used 17% overhead to account for the additional expenses.

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, etc. Whenever possible we have given the costs of these operations per hour.

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

Keith S. Mayberry
(Principal researcher and editor)
Farm Advisor
Vegetable Crops

Refugio A. Gonzalez
County Director

Tom Turini
Farm Advisor
Plant Pathology

Khaled M. Bali
Farm Advisor
Irrigation/Water Science

Eric T. Natwick
Farm Advisor
Entomology

Jose L. Aguiar
Farm Advisor
Vegetable Crops
Coachella Valley

Mark D. Stutes
C.E. Staff

August 2000

**2000-2001 VEGETABLE CROPS PREVAILING RATES
IMPERIAL COUNTY**

**HEAVY TRACTOR WORK & LAND
PREPARATION**

<u>OPERATION</u>	<u>\$/ACRE</u>
Plow.....	27.75
Subsoil, 2 nd gear.....	38.75
Subsoil, 3 rd gear.....	32.75
Landplane.....	12.00
Triplane.....	11.00
Chisel 15".....	24.75
Wil-Rich chisel.....	14.75
Big Ox.....	21.25
Slip plow.....	39.00
Pull/disc borders.....	6.00
Make cross checks (taps).....	6.00
Break border.....	5.75
Disc, stubble.....	21.75
Disc, regular.....	11.50
List 40" beds.....	13.50
Float.....	10.00
Disc, borders.....	11.25
Laser (acre).....	34.00-38.00
Dump (scraper) borders.....	14.00

**PLANTING, CULTIVATING & LIGHT
TRACTOR WORK**

	<u>\$/HR</u>
Power mulch dry.....	23.00
Power mulch with herbicide.....	27.00
Shape 40" beds.....	9.50
Precision plant 40" beds.....	17.50
Cultivate 4-row 40" beds.....	13.00
Spike 40" beds.....	9.75
Spike and furrow 4-rows 40" beds.....	10.25
Furrow out 40-42" beds.....	9.75
Lilliston 40" beds.....	10.75
Lilliston 40" beds with/herbicides.....	14.50
Inject fertilizer and furrow out 40" beds.....	13.50
Fertilize dry and furrow out 40" beds.....	13.50
Broadcast dry fertilizer >300lb/a.....	7.00
Broadcast dry fertilizer <300lb/a.....	6.00
Ground spray 4-row.....	10.00
Ground spray 8-row.....	9.00
Layby herbicide.....	22.00

PREVAILING RATES BY THE HOUR

	<u>\$/HR</u>
Motor grader.....	50.00
Backhoe.....	42.50
Water truck.....	39.00
Wheel tractor.....	32.00
Scraper.....	27.00
Versatile.....	53.00
D-6.....	46.50
D-8.....	65.00
Burn ditches.....	28.00
Buck ends of field.....	30.00
Pipe setting (2 men).....	33.00
Laser.....	70.00
Work ends.....	40.00

IRRIGATION

Sprinkler irrigate.....	\$125-160.00/acre
1 acre-foot of water.....	14.56
Sprinkler irrigate carrots.....	155.00

*Note – Cultural rates for specific crop operations listed on crop budgets.

ICEBERG LETTUCE CULTURE 2000-2001

Annual acreage, yield, and value of wrapped iceberg lettuce
in Imperial County, CA (1995-1999)

Year	Acres	Yield/Acre*	Value/Acre
1999	9,072	604	\$5,021
1998	8,298	598	\$5,207
1997	9,864	533	\$3,660
1996	9,945	506	\$3,698
1995	8,748	576	\$5,024

* 40 lb. cartons wrapped;

Source: Imperial County Agricultural Commissioner's Reports 1995-1999

Annual acreage, yield, and value of naked pack & bulk iceberg lettuce
in Imperial County, CA (1995-1999)

Year	Acres	Yield/Acre*	Value/Acre
1999	11,087	645	\$3,895
1998	10,141	552	\$3,434
1997	12,056	540	\$2,662
1996	12,156	453	\$2,440
1995	13,484	510	\$3,534

* 50 pound cartons

Source: Imperial County Agricultural Commissioner's Reports 1995-1999

PLANTING-HARVESTING DATES Planting extends continually from mid-September to mid-November. Early plantings (mid-September) are harvested in early December, while October plantings are harvested in January and February. November plantings are harvested in March.

VARIETIES Crisphead, iceberg or head lettuce are terms used to differentiate this type of lettuce from leaf or Romaine lettuces. Varieties are adapted to specific planting periods. Planting a variety out-of-slot will result in non-heading, puffiness and bolting. As the season progresses, temperatures change from extreme heat both night and day to cool days with nights

UC Cooperative Extension-Imperial County Vegetable Crops Guidelines Aug. 2000

near freezing. Moderately high temperatures can occur in early spring. Early plantings mature in less than 90 days while later ones require 120 days or more.

The following are commonly planted varieties and seed producers in italics: Fall Green *Harris Moran*; Annie *Asgrow*; Raider *Genecorp*; Rico *Synergene*; Desert Storm *Harris Moran*; Merit *Various*; Desert Queen *Genecorp*; Honcho II *Genecorp*; Kofa *Synergene*; Palmetto *Peto*; Yuma *Harris Moran*; Cool Breeze *Asgrow*; Vancrisp *Peto*; Vanmor *Harris Moran*; Winterhaven *Various*; Red Coach 74 *Various*; Valley Queen *Paragon*, Bubba *Genecorp*; Navigator *Genecorp*; Lighthouse *Paragon*; Jupiter *Paragon*; Grizzly *Peto*; and Coolguard *Asgrow*.

Non-primed, natural lettuce seed may be susceptible to thermodormancy when ambient temperatures are above 90°F for an extended period of time. Priming will allow the seed to overcome thermodormancy and germinate well at high temperatures. Several companies offer priming. Thermodormancy can also be broken by starting the initial irrigation in the late afternoon whereby the seed imbibes water and germinates during the cooler hours of the night.

PLANTING INFORMATION Most of the lettuce is planted using pelleted seed and a precision planter. Seed are planted 2 to 3 inches apart within-rows on 40 to 42 inch beds. At a 2 inch spacing there will be 157,000 (157 M) seed per acre. Cost of seed per acre varies with variety coating, spacing, and seed enhancement or priming treatments.

SOILS Lettuce prefers silt loams and sandy soils. The lighter soils provide better drainage during cold weather and warm up more readily. Lettuce has a moderately low degree of salt tolerance. Excess salinity results in poor seed germination and small heads.

IRRIGATION Most growers use sprinklers for the first 5 to 7 days or until the seedlings emerge and the grower can identify a green line down the seed rows. The field is then converted from sprinklers to furrow irrigation for the remainder of the season.

Care must be taken not to oversaturate the beds when growing early-season lettuce. Excess moisture favors the development of bottom rot (*Rhizoctonia solanai*).

Gated pipe is also used, especially near harvest. The major benefits of gated pipe is to allow for uniform application of water down furrows and to maintain a dry head basin so that harvest equipment can turn around on hard ground. The irrigation labor costs used also include shovel work, grader work, and pipe setting.

FERTILIZERS Five hundred pounds of ammoniated phosphate 11-52-0 are usually broadcast prior to listing. Nitrogen (N) is sidedressed just after thinning and during later growth. Early, warm-season lettuce requires less N than that grown in January and February. About 150 pounds actual N are used early, while 200 to 250 pounds actual N are applied during cold weather.

Lettuce is very sensitive to overdoses of ammoniacal fertilizers. Seedling injury will be expressed by root burn, yellowing of the leaves, and even dead plants. Fertilizer injury later in

the season is expressed by wilting of the outer leaves and a rusty reddish discoloration in the middle of the plant root.

PEST AND DISEASE CONTROL Insect pests include crickets, cutworms, leafminers, salt marsh caterpillars, and beet armyworms. Cabbage loopers can be especially serious after thinning. Aphids and thrips are late season insect pests and should be controlled.

The silverleaf whitefly has caused slow growth and delayed maturity of the crop. A preplant application of a soil applied systemic insecticide is commonly used to combat whitefly.

The most serious diseases affecting iceberg lettuce are lettuce big vein virus (LBVV), bottom rot (*Rhizoctonia solani*), grey mold (*Botrytis cinerea*), and lettuce drop (*Sclerotinia sclerotiorum* and *S. minor*). Use mosaic-free seed (i.e., no virus in 30,000 seed) to prevent lettuce mosaic virus (LMV).

Powdery mildew (*Erysiphe cichoracearum*) may need to be controlled with sulfur applications to avoid economic damage.

Freeze injury on mature lettuce will be expressed as blistering and peeling of the epidermis, followed by browning of the tissues. Normally freeze injury is confined to the cap and wrapper leaves.

Tipburn is a physiological disorder caused by the lack of mobility of calcium in the heads during warm weather and rapid growing conditions. Presently, there is no control for lettuce tipburn.

All currently used herbicides can cause crop injury under certain conditions. Avoid high rates on sandy soils during hot weather.

HARVESTING Head or iceberg lettuce is field packed into cartons. For ground harvest, crews of approximately 20 to 30 people are split up into small units called trios. There are two cutters and a packer in a trio. They often rotate jobs and are normally paid by the number of cartons packed. The solid lettuce heads are cut, trimmed to 4 to 5 wrapper leaves and packed 24 per carton. A carton weighs a minimum of 50 pounds gross weight.

Roughly 40 percent of the crop is wrapped. The trimmed heads (wrappers leaves removed) may be placed in plastic bags by field workers and the wrapped heads loaded with either 24 or 30 heads per carton. In most cases, cut and trimmed heads are stacked on a table of a field harvesting machine. Workers then wrap and seal individual heads in film or plastic bags. The heads are packed as they are in the other methods.

Lettuce is vacuum cooled prior to storage in a cold room. Vacuum cooling removes field heat in roughly 15 minutes.

Many companies bulk harvest lettuce. Bulk harvested lettuce is called “trimmed and cored” lettuce. The heads are loaded into bulk bins which are trucked to a processing plant. The heads are cooled, washed, and pre-cut into various types of retail packages for the food service industry. Salad products are used by fast food outlets, restaurants, institutional use, airlines, and schools.

POSTHARVEST HANDLING Lettuce is highly perishable and should be cooled as soon as possible after harvesting. Vacuum cooling will reduce product temperature to 34 °F and then it should be stored just above freezing at 98 percent relative humidity.

Lettuce harvested at prime maturity with no major defects may be held for 2 to 3 weeks at 34°F. At 37 °F, shelf life is reduced to 1 to 2 weeks.

Russet spotting is a disorder caused by storing lettuce in containers or cold rooms where there is ethylene gas present. Ripening fruits and gasoline engines can generate ethylene. Brown stain is a storage disorder caused by high carbon dioxide levels in the cold room.

For more information on iceberg lettuce, see “Iceberg Lettuce Production in California”, DANR Publication 7215 available from the Imperial County Cooperative Extension Office or for a free download from the Internet go to <http://anrcatalog.ucdavis.edu/specials.ihtml>

WRAPPED ICEBERG LETTUCE PROJECTED PRODUCTION COSTS 2000-2001

Hand labor at \$7.75per hour (\$5.75 plus SS,unemployment insurance, and transportation, supervision and fringe benefits).

Yield--500 50 lb. cartons per acre 90-120 days to maturity.

OPERATION	Cost	Materials		Hand Labor		Cost Per acre	
		Type	Cost	Hours	Dollars		
LAND PREPARATION							
Stubble disc	21.75					21.75	
Subsoil	38.75					38.75	
Disc 2x	11.50					23.00	
Landplane 2x	12.00					24.00	
Border, cross check & break borders	17.75					17.75	
Flood		Water 1 ac/ft.	14.56	1	7.75	22.31	
Disc 2x	11.50					23.00	
Triplane 1x	11.00					11.00	
Fertilize, double spread	8.00	500 lb. 11-52-0	63.75			71.75	
List 40" beds	13.50					13.50	
TOTAL LAND PREPARATION						266.81	
GROWING PERIOD							
Power mulch beds 1x	30.00					30.00	
Preplant whitefly control	10.00	Admire	75.00			85.00	
Precision plant	17.50	Coated seed 157M	128.00			145.50	
Sprinkler irrigate	145.00					145.00	
Herbicide	12.00	Kerb	32.00			44.00	
Thin				17	131.75	131.75	
Cultivate 2x	13.00					26.00	
Spike 2X	9.75					19.50	
Fertilize & furrow out 2x	13.50	120 lb. N @ .35	42.00			69.00	
Water-run fertilizer		60 lb. N @ .35	21.00			21.00	
Hand weed 1x				10	77.50	77.50	
Irrigate 4x		Water 3 ac/ft.	43.68	7	54.25	97.93	
Gated pipe	53.00					53.00	
Insect control 8x	9.50	Insecticides	200.00			276.00	
Stubble disc	21.75					21.75	
TOTAL GROWING PERIOD						1242.93	
GROWING PERIOD & LAND PREPARATION COSTS						1509.74	
Land Rent (net acres)						200.00	
Cash Overhead-----		13 % of preharvest costs & land rent					222.27
TOTAL PREHARVEST COSTS						1932.01	
HARVEST COST							
Cut, pack, haul, cool and sell		500 wrapped cartons @	5.25	per carton		2625.00	
TOTAL ALL COSTS						4557.01	

PROJECTED PROFIT OR LOSS PER ACRE

		Price/ 50 lb. carton (dollars)					Break-even \$/carton
		5.00	6.00	7.00	8.00	9.00	
Cartons per acre	500	-2057	-1557	-1057	-557	-57	9.11
	600	-2082	-1482	-882	-282	318	8.47
	700	-2107	-1407	-707	-7	693	8.01
	800	-2132	-1332	-532	268	1068	7.67
	900	-2157	-1257	-357	543	1443	7.40

* Harvest cost varies with the shipper, the field conditions and the market