

SILAGE CORN

P R O D U C T I O N & C O S T S

SANTA BARBARA COUNTY



Warren E. Bendixen
Farm Advisor

Agricultural Extension Service
University, of California.
Santa Barbara County

UC Cooperative Extension

SILAGE CORN

Corn is the most popular silage crop in Santa Barbara County. Grown principally as a feed for dairy cows, it is used to a lesser degree for beef cattle. Silage corn is double-cropped with small grain (oats, barley) for green chopping.

This crop is used in rotation with other feed crops with individual growers planting 25-100 acres to corn.

The acreage of silage corn has been increasing. This trend is shown on Figure No. 1.

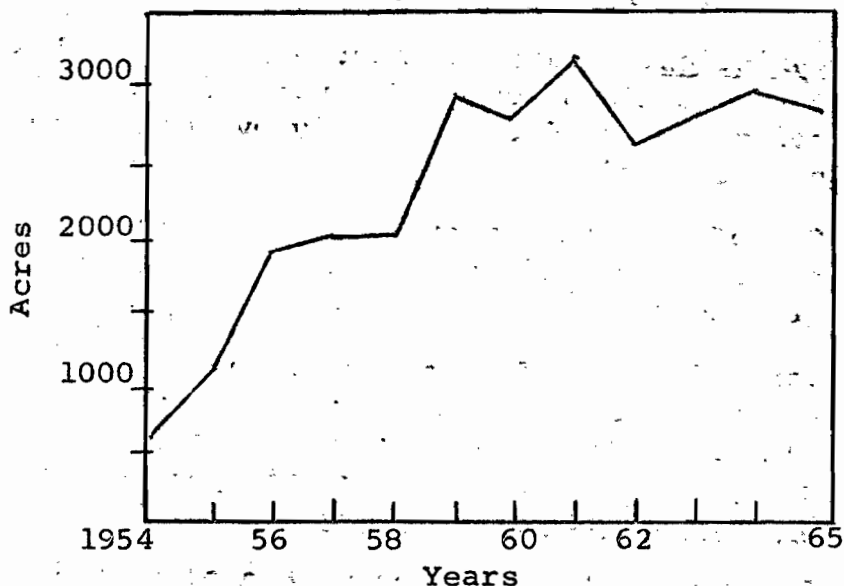


Figure 1. Acreage of silage corn grown in Santa Barbara County.

MANAGEMENT FACTORS

Soils. Corn can be grown on a wide range of soils. Sandy soils require more frequent irrigation and fertilizer applications.

Compacted soils, or medium to high saline or alkali soils, will produce poor yields.

Seed-bed Preparation. Land preparation begins in April. Generally, pre-irrigation is required to provide adequate moisture during the 7-10 day germination period.

Land preparation may consist of discing, plowing, discing, and land planing. Like all crops, a well prepared seed bed is essential for a good stand.

Varieties. A large number of varieties have proven satisfactory. New varieties are being developed continuously by commercial seed companies.

One of the most important factors in selecting a variety is the length of the growing season.

Varieties should be selected which will mature to the dent stage and utilize all of the available growing season. The medium to medium-late varieties are generally better suited to this area.

Planting. Corn does best when planted in warm weather. Plant in late April or early

May. The seed is planted 2-3 inches deep in rows 30-40 inches apart. Row spacing of 36 inches apart are preferable to wider spacing. The actual spacing will depend upon the cultivation and harvesting equipment used.

There is a trend toward narrower rows. Narrow rows enable more efficient utilization of sunlight and moisture. Weed competition is reduced because the ground is shaded earlier.

There are some disadvantages to narrow rows. Narrow rows increase cultural costs. More testing is needed to fully evaluate row spacing.

The number of plants per acre depends on the variety used. Stiff-stalked varieties can be planted at 25,000-29,000 plants per acre. Varieties with weaker stalks should be planted at a population between 20,000-24,000 plants per acre. Table No. 1 shows the relationship between row spacings and number of plants per acre based on the distance between plants in the row.

Fertilization. High yields require high fertility. A 20-30 ton yield will use from 130-200 lbs. of nitrogen (N), 55-80 lbs. of phosphorus (P_2O_5), and 120-180 lbs. of potassium (K_2O).

Soil analysis, along with past fertilizer responses, can aid in determining phosphorus, potassium, and zinc requirements.

Table No. 1
PLANT POPULATIONS PER ACRE

Plants per 50' row	Spacing in row	Width between rows					
		28"	30"	32"	34"	36"	38"
		Plants Per Acre					
150	4.0"	56,006	52,272	49,001	46,119	43,560	41,264
133	4.5"	49,782	46,464	43,560	40,997	38,720	36,682
120	5.0"	44,804	41,817	39,204	36,897	34,848	33,013
109	5.5"	40,732	38,016	35,640	33,544	31,680	30,013
100	6.0"	37,337	34,848	32,667	30,746	29,040	27,510
92	6.5"	34,466	32,168	30,158	28,384	26,807	25,396
86	7.0"	32,004	29,870	28,003	26,356	24,891	23,581
80	7.5"	29,869	27,878	26,135	24,598	23,231	22,009
75	8.0"	28,003	26,134	24,501	23,060	21,778	20,632
71	8.5"	26,356	24,600	23,062	21,705	20,499	19,420
67	9.0"	24,891	23,232	21,780	20,499	19,360	18,341
63	9.5"	23,581	22,009	20,633	19,419	18,341	17,375
60	10.0"	22,402	20,909	19,602	18,449	17,424	16,507
57	10.5"	21,335	19,913	18,669	17,570	16,594	15,721
55	11.0"	20,366	19,008	17,820	16,772	15,840	15,006
52	11.5"	19,480	18,182	17,045	16,043	15,151	14,354
50	12.0"	18,667	17,424	16,334	15,373	14,520	13,755

To determine the number of plants per acre: 1) Measure 50' of row. 2) Count the number of plants per 50'. 3) The number of plants per acre is obtained by locating the plants per 50' row on the first column, then follow across to your field row width. Example - 92 plants per 50'-36" row width-plants/acre = 26,807

Few soils contain adequate nitrogen carry-over for high yields. Applications of 100-200 lbs. of nitrogen are usually required. Manure applications usually are not adequate as the only source of nitrogen.

Nitrogen applications are usually side-dressed previous to, or shortly after, the first irrigation. On soil with low fertility, a pre-plant application is desirable.

Split applications of nitrogen are beneficial on sandy soils. Applying nitrogen in the irrigation water at tasseling time may be desirable if the plants are showing nitrogen stress.

The occurrence of zinc deficiencies is not uncommon in this area. Soil applications of 20 lbs. per acre of zinc in the form of zinc sulfate supplies the zinc requirements for several years. Foliar applications of 1 lb. of zinc sulfate per acre corrects deficiencies on the current crops.

Irrigation. Corn is furrow irrigated and requires ample moisture for high yields. Although corn can survive drought conditions, yields are severely reduced. A good rule is never to allow corn to show moisture stress.

Light, frequent irrigations are important for the young plants. Corn develops a secondary root system about an inch below the soil surface and the early root growth is shallow.

SAMPLE COSTS TO PRODUCE CORN SILAGE
Santa Barbara County 1966

Based on double cropping with
cereal grains for forage.

Man Labor, \$1.70/hour

Yield - 30 tons/acre

Operations Cost

	Fuel & Repairs	Deprec. & Int.	Total
CT-Crawler Tractor 80 Hp	\$3.80	\$2.80	\$6.60
WT-Wheel Tractor 60 Hp.	1.36	.68	2.34
Chopper	2.50	5.05	7.55

Operation	Hours/acre	Labor	Fuel & Repair	Materials		Cost/Acre	
				Kind and Amount	Cost	Sample	Your
CULTURAL COST							
Disc 3x	CT 0.75	1.27	4.95				6.22
Plow 1x	WT .75	1.27	1.75				3.02
Landplane 1x	CT .50	.85	3.30				4.15
Harrow 1x	CT .25	.43	1.65				2.08
Plant (4 row)	WT .33	.57	.78	Seed 16 lbs/A @ 28¢	4.50		5.85
Cultivate 2 x	WT .67	1.13	1.56				2.69
Weed control				Custom applic. 2,4-D			4.00
Manure				15 tons/acre @ 1.50/ton			22.50
Fert. Nitrogen				Applied \$2/A-100 lbs/A @ 12¢/lb.	12.00		14.00
Irrigation 6x	6.00	10.20		Water = 2½ ft @ 6.50/A/ft.	16.25		26.45
Fert. Nitrogen				Applied in water-50 lb/A	6.00		6.00
Other Equipment				Repair			2.50
				Depreciation (\$80-10 yr. life)			8.00
				Interest (½ cost \$40 @ 6%)			2.40
Total Cultural Cost	9.25	15.72	13.99		38.75		109.86
HARVESTING COST							
Chopping corn	WT 2.00	3.40	19.78				23.18
Trucks	4.00	6.80	6.00				12.80
Packing Silage	CT 2.00	3.40	11.60	(Reduced fuel rate @ \$3/hour)			15.00
Misc. Labor	1.00	1.70					1.70
Total Harvest Cost							52.68
Rent				Proportionate share \$60 - 60%			36.00
Tax (Eqpt. & Bldg.)				Proportionate share \$10 - 60%			6.00
Tot. Cost Production	18.25	31.02	51.37		38.75		213.39
Storage (silage)							15.00
Management				5% of \$213.39			10.67
Total Cost							239.06
Cost per Ton				@ 30 tons per acre			7.97

Corn has a high water requirement at tasseling and silking periods and a shortage of soil moisture during this time will reduce yields.

Approximately 2-2½ acre feet of water per acre is required. Sandy soil requires more frequent irrigations than finer textured soils.

Weed Control. An application of 2,4-D amine is very effective in controlling broadleaved weeds in corn.

Proper Harvesting Maturity. Stage of maturity is one of the most important factors influencing the yield and nutritional value of corn for silage. Corn stores nutrients in the ears very rapidly as it matures and up to 50% of the TDN in corn silage is in the grain.

As corn matures, the percent moisture decreases and the dry matter content increases.

Research has shown the proper time for cutting corn silage is when the kernels are well dented and the moisture content is between 67-72%.

Corn in this area reaches the proper stage to harvest in late September or in October. In coastal areas, silage corn maintains a high moisture content. Moisture greatly influences yields as shown in Figure Nos. 2 and 3.

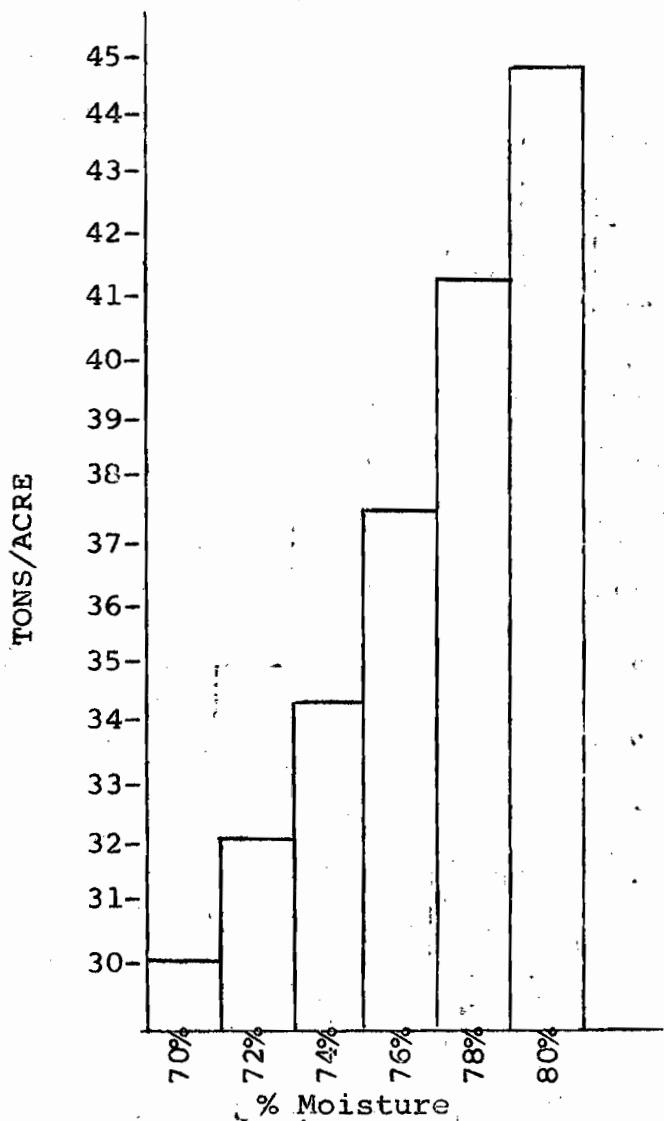


Figure No. 2

This chart shows the number of tons/acre, which are equal to 30 tons/acre at 70% moisture.

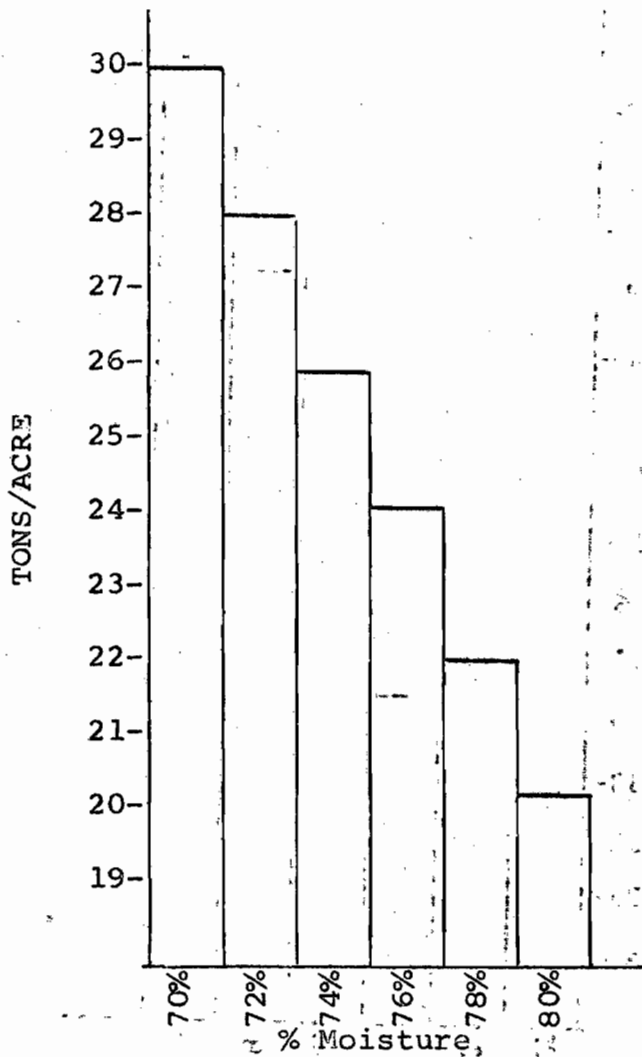


Figure No. 3

This chart shows the yield in tons/acre, adjusted to 70% moisture when 30 tons/acre are harvested at various percentage of moisture.

Harvesting Equipment. Silage corn is harvested with tractor drawn or self propelled field choppers. The corn is blown into trucks and hauled to the silos.

The chopper knives should be sharp and square. Fine (1/2" - 3/4" length), clean cut corn improves the quality of the silage.

Filling the Silo. Fill the silo rapidly to avoid nutrient losses and to maintain palatability of the silage.

Spread and pack each load of silage with a tractor. Good packing limits fermentation losses and reduces molding.

Crown the center of the silo two feet or more higher than the edges.

Quality of Silage. The silage should have a clean, pleasant odor, a natural green color, and a high content of grain.

Value of Corn Silage. The feeding value of corn silage in terms of total digestible nutrients is generally considered to be approximately one-third the price of hay.

Good corn silage has a TDN of approximately 19.0% and a protein content of approximately 1.3%.

Feed value losses which occur in the silo due to surface spoilage, fermentation, and seepage greatly influence cost of production and value of the silage.

Losses in the silo range from less than 10% to more than 35%, depending on the corn being ensiled, type of silo, and the cover. The average loss is 20%.

Market. Most of the corn is grown on the dairy farms. Some growers have contracts to grow the corn for local dairies.

CORN SILAGE PROFITS AS AFFECTED BY YIELD & PRICE

Yields Tons/Acre	Total Production Cost per acre	Corn Silage - Price/Ton			
		\$8.00	\$9.00	\$10.00	\$11.00
		profit per acre			
20	\$212.83	-52.83	-32.83	-12.83	+ 7.17
25	225.93	-25.93	- .93	+24.07	49.07
30	239.06	+ .94	+30.94	60.94	90.94
35	252.13	27.87	62.87	97.87	132.87

This table assumes deliveries to the storage unit. A normal loss in storage would reduce profits by approximately 20% if the selling price was on an out-of-storage basis.

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