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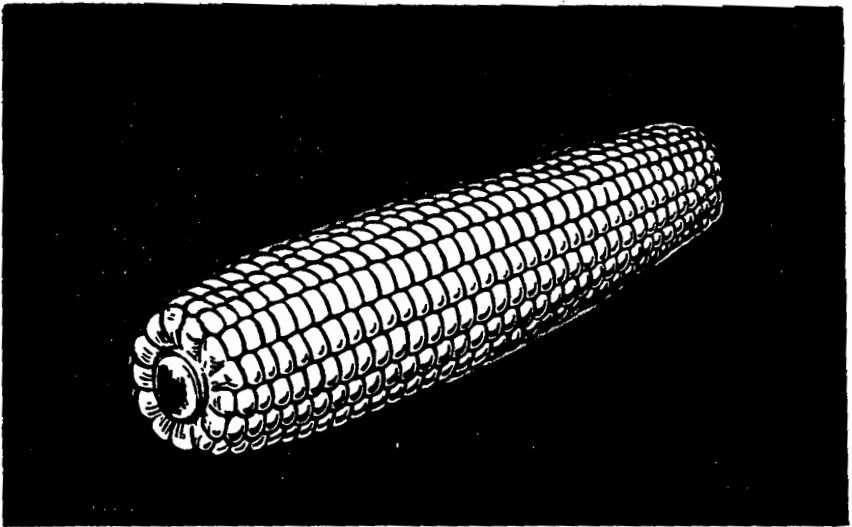
SILAGE CORN

PRODUCTION AND COSTS

Santa Barbara County

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

The acreage of silage corn has decreased in recent years due to competition from seed beans and vegetable crops. This acreage trend is shown on figure No. 1.

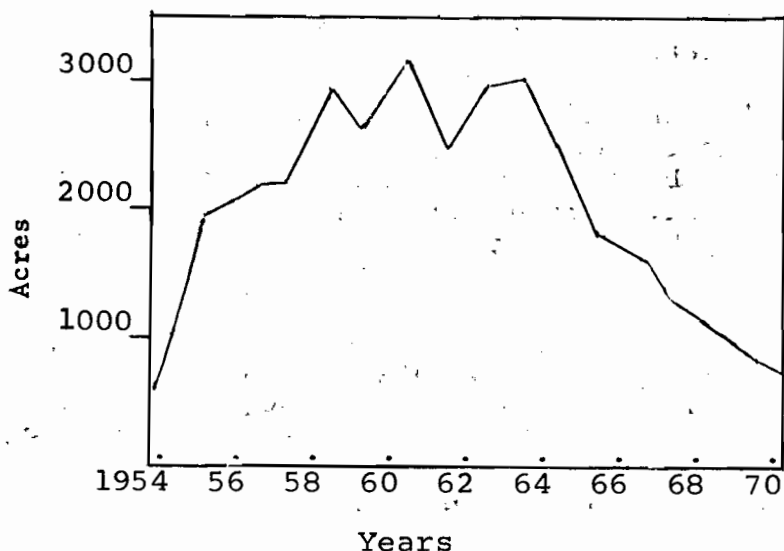


Figure 1. Acreage of silage corn grown in Santa Barbara County.

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 disking, plowing, disking, 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 continually 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. Varieties from maturity groups numbers 4 and 5 are generally best 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 30-36 inches apart. 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.

PLANT POPULATION

The number of plants per acre depends on the variety used. Each variety has a plant population to which it is best adapted. 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.

COST OF PRODUCTION

The cost of producing silage corn in this area is high. Many of the production costs are the same for low yields as high yields. Managing the corn fields for high production increases profit per acre.

Plan the management of the silage corn before planting. Plant early, harvest at the dent stage, and do not let the corn stress for water or fertilizer.

The costs of producing silage corn are shown on page 6 and 7. Profits per acre from silage corn are shown on page 5.

Table No. 1
PLANT POPULATIONS PER ACRE

Plants per 50' row	Spacing in row	Plants Per Acre					
		28"	30"	32"	34"	36"	38"
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.

CORN SILAGE PROFITS AS AFFECTED BY YIELD & PRICE

Yields Tons/Acre tons	Total Production Costs \$	Corn Silage - Price/Ton					
		\$10.00	\$11.00	\$12.00	\$13.00	\$14.00	\$15.00
		\$ - Profit or Loss Per Acre					
20	225.94	- 25.94	- 5.94	+ 14.06	+ 34.06	+ 54.06	+ 74.06
25	237.87	+ 12.13	+ 37.13	62.13	87.13	112.13	137.13
30	249.80	50.20	80.20	110.20	140.20	170.20	200.00
35	261.73	88.27	123.27	158.27	193.27	228.27	263.27
40	273.65	126.35	166.35	206.35	246.35	286.35	326.35

SILAGE CORN

1971 - Cost Analysis Work Sheet

SILAGE CORN YIELD - 30 tons/acre

						Operating Costs/Acre				
						Fuel & Repairs	Deprec.	Interest	Total	
Equipment Operator - \$2.60* per hour total						CT-Crawler tractor	\$3.80	\$2.00	\$1.20	\$7.00
Irrigator - 2.30* " " "						WT-Wheel tractor	1.20	1.40	.55	3.15
Hand Labor - 2.10* " " "						SPC-Chopper	4.85	3.60	1.65	10.10
Operation	Tractor	Acres /Hour	Hours /Acre	Labor \$	Fuel & Repairs \$	Materials		Cost/Acre		
						Kind and Amount	Costs \$	Sample \$	Yours	
<u>Cultural Costs</u>										
Disc 2x	CT	1.25	.75	1.95	2.85				4.80	
Plow 1x	WT	2.00	.50	1.30	.60				1.90	
Landplane 1x	CT	3.33	.30	.78	1.14				1.92	
Harrow 1x	CT	3.33	.30	.78	1.14				1.92	
Plant (4 row)	WT	3.33	.30	.78	.36	Seed - 18 lbs. @ 35¢	6.30		7.44	
Cultivate 2x	WT	1.50	.67	1.74	.80				2.54	
Weed Control						Custom Application 2,4-D	4.00		4.00	
Manure						15 tons/ac. applied @ \$1.50/ton	22.50		22.50	
Nitrogen Fertilizer						100 lbs. @ 12¢, plus \$2 applic.	14.00		14.00	
Irrigate 6x total			6.00	13.80	2.00	Water - 2 1/2 ac. ft. @ \$5	12.50		28.30	
Nitrogen Fert. in water						Fertilizer-50 lbs/ac. @ 10¢ applied	5.00		5.00	
Repairs to equipment					3.86				3.86	
Total Cultural Costs			8.82	\$21.13	\$12.75		\$64.30		\$ 98.18	
<u>Harvesting Costs</u>										
Chopping corn	SPC	.80	1.25	3.25	6.06				9.31	
Trucks			2.50	6.50	7.50				14.00	
Packing Silage	CT	.50	2.00	5.20	7.60				12.80	
Total Harvest Costs			5.75	\$14.95	\$21.16				\$ 36.11	
Storage (silage)									15.00	
Rent (Proportionate share - 60% of \$90)									54.00	
Business & Miscellaneous Costs						6% of cultural, harvest costs & rent			\$ 12.20	
<u>Interest & Depreciation</u>						<u>Depreciation</u>	<u>Interest 7%</u>			
	Tractors					\$ 8.76	\$ 4.83			
	Chopper					4.50	2.06			
	Trucks (used)					5.00	2.50			
	Irrig., bldgs., other equip. (\$90,10 yrs-60%)					5.40	1.26			
Total Depreciation & Interest						\$23.66	\$10.65		\$ 34.31	
Total Cost Per Acre									\$249.80	
Cost Per Ton									8.33	

*Social Security, Workman's Compensation Insurance included.

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FERTILIZATION

High silage corn yields require high fertility. The soil may be able to supply all or a portion of these nutrients. The fertilizer nutrients that may be deficient are nitrogen, phosphorus, potassium and zinc.

Fertilizer recommendation should be based on the needs of each field. Few soils contain adequate amounts of nitrogen for high production.

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

The following amounts of nutrients are removed when the silage corn is harvested. This gives an indication of the amount of nutrient that must be available to the plant either from the soil or through applied fertilizer.

Silage Corn Yields	Nitrogen N	Phosphorus P ₂ O ₅	Potassium K ₂ O
Tons/Acre		lbs/Acre	
20	160	60	100
30	240	90	180
40	320	120	250

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 applied as split applications. The corn plant produces almost 60-70% of its total weight after tasseling begins. During the period following tasseling the corn plant will take up half of its total amount of nitrogen.

Part of the nitrogen may be applied at planting time. Nitrogen is also applied as a side-dress application previous to or shortly after the first irrigation.

Nitrogen may also be applied in the irrigation water at tasseling time.

Phosphorus and potassium applications should be applied preplant or at planting time.

Zinc deficiencies occur in numerous corn fields in Santa Barbara County. Soil applications of 20 lbs/acre of zinc (Zn) in the form of zinc sulfate supplies the zinc requirements for several years.

If a zinc deficiency occurs in the current crop, it can be corrected by a foliar application of 1 pound of zinc sulfate per acre applied in 100 gallons of water.

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.

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

Post-emergence applications of 2,4-D Amine, ¾ to 1½ lbs. active material per acre controls broadleaf weeds. Corn should be over 10" tall when sprayed. A directed spray from drop nozzles is recommended.

PROPER HARVESTING MATURITY

Stage of maturity is one of the most important factors influencing the yield and nutritional value of silage corn. Yields can be increased 20-50% by delaying harvest until the dent stage. This could mean an additional \$50-\$150 per acre. Corn in this area reaches the proper stage for harvest in late September or early October.

Corn stores nutrients in the ears very rapidly as it matures and over 50% of the TDN in silage corn at the dent state is in the grain.

Ears at the dent stage make up more than 55% of the dry weight of the corn. In the milk stage, less than 40% of the weight is in the ear.

The corn plant increases in nutritive value as it matures because of the constant increase in the proportion of nutrients in the kernels while the composition of the stalks and leaves remain about the same.

Animals prefer corn harvested in the dent stage. They consume more feed and the digestible energy is higher at this stage.

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 silage yields can be very misleading unless you know the moisture content. In the coastal area, silage corn maintains a high moisture content. Considerable corn is harvested in the 74-78% moisture content.

A 30 ton/acre yield at 70% moisture is equal to a 37.5 ton/acre yield at 76% moisture. The yields shown on Figure 2 (page 12) are all equal when compared at the same moisture content.

Harvesting corn before the dent stage produces seepage losses up to 20%. Most plant materials can only hold about 70% moisture at a common silo pressure of 15 pounds per square inch. This seepage causes losses of many water soluble nutrients and minerals.

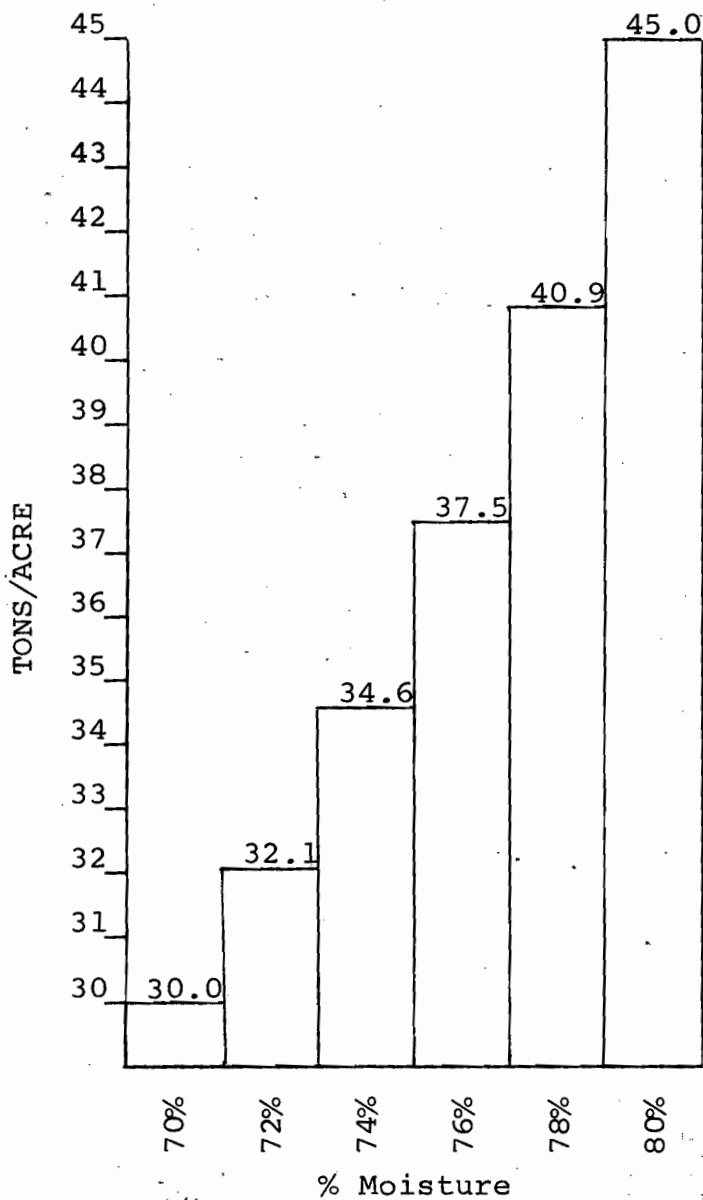


Figure 2. This figure shows the number of tons/acre which are equal to 30 tons/acre at 70% moisture.

Silage quality produced from corn harvested in the milk stage and earlier is reduced, not only from excessive seepage losses, but the nutritive value of the silage is significantly lower.

HARVESTING EQUIPMENT

Silage corn is harvested with tractor drawn or self propelled field choppers. The corn 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. However, the 3 to 1 ratio is not always true, due to variations in quality of both silage and hay. This should be considered when making comparisons.

Good corn silage has a TDN of approximately 19.9% 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 silage.

Losses in the silo range from less than 10% to more than 35%, depending on the silage corn being ensiled, type of silo, and the cover. The average loss is 18-20%.

MARKET

Most of the corn is grown and fed by dairymen on their own farms. Some growers have contracts to grow the corn for local dairies.

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