CORN SILAGE PRODUCTION

SONOMA COUNTY

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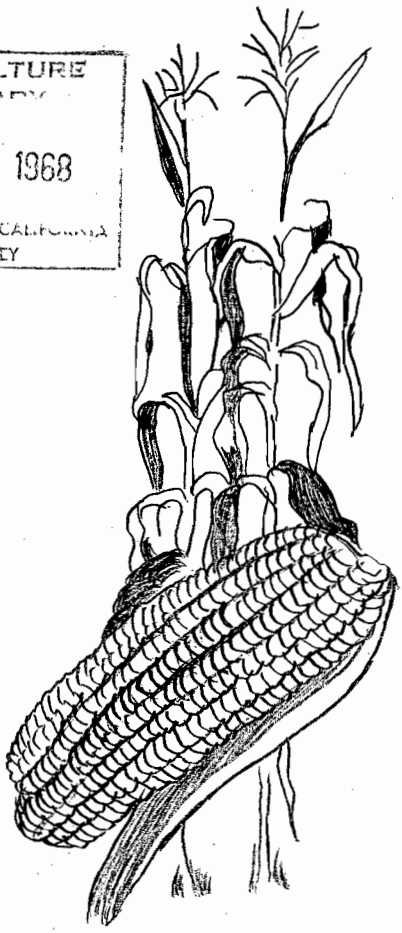

Prepared by: Farm Advisors Willard C. Lusk
and Earl W. Holtz

Farm & Home Advisors Office
Rm. 100-P, Sonoma Co. Administration Cen.
2555 Mendocino Avenue
Santa Rosa, California 95401
Telephone: 527-2621

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3/67:300 UC Cooperative Extension

CORN SILAGE IN SONOMA COUNTY

Corn silage can be a profitable crop in Sonoma County provided adequate yields are obtained. Profitable yields can be obtained under both dry-land and irrigated conditions if good cultural practices are followed as indicated below.

1. Plant as early in the season as possible. This is necessary in order to have adequate time for the corn to properly mature.
2. Row spacing and plants per acre will be related to the available moisture as shown in Table I.
3. Yields providing a high nutritive value will require proper applications of fertilizer in heavy amounts.
4. Weeds must be controlled to conserve moisture and soil nutrients.
5. Plant only those varieties that are early or medium maturing.

SEEDBED PREPARATION

Fertile, fairly deep soil is necessary for high yields of corn silage. Texture can range from a sandy loam to clay. Land preparation begins in April or early May. It may consist of discing, plowing, discing and land planing. A well-prepared, and moist seedbed is essential for a good uniform stand.

VARIETIES

Early maturing varieties should be planted in Sonoma County. Medium to late varieties will not mature most years in time to be harvested prior to early fall frosts and rain. Early varieties will mature to the dent stage and can be harvested with a higher feeding value than later maturing varieties that will be immature at harvest time. See examples in Table II.

SEEDING RECOMMENDATIONS

Corn germinates best when the soil temperature is at least 60° in the top few inches of soil. On some sites, planting can start in late April, but most corn will be planted in May. Pounds of seed planted per acre will depend upon row spacing and plant population and may vary from 12 to 20 lbs. of seed per acre. Row spacing in Sonoma County varies from 30" to 40". The trend is toward 30" to 32" rows because of higher yields. Irrigated corn planted 30" to 32" rows can have a plant population of 23,000-28,000 per acre. Table I shows the relationship between row spacings and number of plants per acre based on the distance between plants in the row. Corn should be planted into moist soil 2"-3" deep and should germinate in 7-10 days.

FERTILIZATION

High yields require high fertility and irrigation. To produce 20-40 tons corn silage per acre requires the following:

Tons/acre of Corn Silage	Lbs. of Nutrients Used		
	N	P_2O_5	K_2O
20	160	60	85
30	240	90	185
40	320	120	210

Application of 100-200 lbs. per acre of nitrogen are usually required. When high rates of fertilizer are applied, part may be broadcast and worked into the soil prior to planting and part can be side dressed at time of planting 2" below and 2" to side of seed.

Zinc deficiencies have occurred in numerous corn fields in Sonoma County. Soil applications of 50 lbs. per acre of zinc sulfate (22.8% zinc) have corrected the deficiency. If a zinc deficiency shows up in the current crop, it can

be corrected by foliar applications of 1 lb. zinc sulfate per acre.

Poultry manure at 10-20 cu. yards per acre has given excellent yields of corn silage. It takes about 2 cu. yards of poultry manure to equal 1 ton and will average 1-4% nitrogen, 1-5% P_2O_5, 1-3% K_2O.

IRRIGATION

Corn in Sonoma County is furrow irrigated or sprinkler irrigated and requires ample moisture for high yields. Corn should never be allowed to show moisture stress. Most irrigated corn in the county receives one to four irrigations and varies from 6" to 16" of irrigation water per acre during the season.

WEED CONTROL

Two materials are recommended by the University of California for chemical weed control. Pre-emergence weed control using Atrazine at 2-4 lbs. actual per acre for annual broadleaf weeds and watergrass. You must have a light rain or irrigation after the chemical is applied to get results. Do not plant crops other than corn or sorghum within 18 months after application.

Post-emergence weed control using 2,4-D Amine, 3/4 to 1½ lbs. acid per acre for broadleaf annual weeds only. Corn should be over 10" tall when sprayed. A directed spray from drop nozzles is recommended.

WIREWORM AND CUT WORM CONTROL

See University of California leaflet on pest and disease control program for, "Field Corn and Sorghums."

TABLE I

PLANT POPULATION PER ACRE

Plants/50' row	Spacing In Row	Width Between Rows 30"	32"	34"	36"	38"
109	5.5"	38,016	35,640	33,544	31,680	30,013
100	6.0"	34,848	32,667	30,746	29,040	27,510
92	6.5"	32,168	30,158	28,384	26,807	25,396
86	7.0"	29,870	28,003	26,352	24,891	23,581
80	7.5"	27,878	26,135	24,598	23,231	22,009
75	8.0"	26,134	24,501	23,066	21,778	20,632
71	8.5"	24,600	23,062	21,705	20,499	19,420
67	9.0"	23,232	21,780	20,499	19,360	18,341
63	9.5"	22,009	20,633	19,419	18,341	17,375
60	10.0"	20,909	19,602	18,449	17,424	16,507
57	10.5"	19,913	18,669	17,570	16,594	15,721
55	11.0"	19,008	17,820	16,772	15,840	15,006
52	11.5"	18,182	17,045	16,043	15,151	14,354
50	12.0"	17,424	16,334	15,373	14,520	13,755

To determine the number of plants per acre: Measure 50' of row. Count the number of plants per 50' row. The number of plants per acre is obtained by locating the plants per 50' row in the first column, then follow across to your field row width.

TABLE II

SUMMARY OF RESULTS

Variety	D.M.*	D.M./ Acre (Tons)	TDN**/ Acre (Tons)	Green Wt/ Acre (Tons)	Green Wt/ Acre-70% Moisture (ton)	TDN/100 lb.	Crude Protein (%)	Crude Fiber (%)
361	25.3	10.58	7.22	41.82	35.27	17.25	9.3	25.7
497	31.4	9.97	6.85	31.76	33.24	21.58	8.9	23.7
441A	27.5	9.04	6.17	32.88	30.14	18.56	9.8	21.5
527	31.9	8.60	5.88	26.96	28.67	21.79	9.6	22.2
441	23.0	8.45	5.83	36.72	28.15	15.88	8.6	22.5
84	22.7	8.40	5.86	36.99	27.99	15.83	7.3	26.5
628	21.2	8.37	5.75	39.71	27.91	14.55	8.9	25.2
640	19.6	8.12	5.58	41.41	27.05	13.78	8.7	26.6
325	23.3	8.09	5.54	34.71	26.96	15.94	9.5	21.6
315	22.8	7.62	5.31	32.71	25.40	15.90	9.2	23.8
66	19.2	7.45	5.16	38.79	24.82	13.31	7.4	31.1

* Dry Matter
** Total Digestible Nutrients

HARVESTING THE CROP

Corn should be cut for silage when most of the kernels are dented and the moisture content is between 65-70 per cent. Early maturing corn varieties in Sonoma County reach the proper stage to harvest in late September and early October. The corn should be finely cut, ½" to 3/4" length. Fill the silo rapidly to avoid nutrient losses. Spread and pack each load of silage with a tractor to reduce molding. Good quality silage should have a clean pleasant odor and a high content of grain.

The feeding value of corn silage in terms of total digestible nutrients can vary from 13 to 22 per cent. Corn silage has approximately one-third the feeding value of hay. Good corn silage should have a TDN above 18 per cent.

Considerable spoilage can occur on the surface of trench and bunker type silos unless the top is covered. This loss can be as high as 10 per cent in a few months. Much of this loss can be prevented by using a heavy duty paper or a plastic covering.

A field trial to compare corn silage varieties was conducted at the St. Anthony Farm in 1966. This trial was conducted under irrigated conditions. All corn varieties were planted on May 8 and harvested September 30. The row spacing was 32 inches with the following rates of fertilizer applied. Two hundred eighty lbs. of nitrogen, 200 lbs. of P_2O_5 and 225 lbs. of K_2O. The corn was irrigated three times with approximately a total of 12 inches of water per acre. Table II is a summary of the results.

The differences in green weight per acre are due to the variation in moisture content. The differences in moisture content are primarily due to the difference in maturity with those varieties having the higher TDN value maturing earlier in the Bloomfield area of Sonoma County.

The TDN per 100 lbs. of silage is approximately equal for all varieties although there are some differences in protein value.

This trial indicates that it is necessary to plant an early medium to early maturing variety in order to get the most nutrients per 100 lbs. of silage.

SAMPLE COSTS TO PRODUCE CORN SILAGE, IRRIGATED
Sonoma County, 1966.

Based on a yield of 25 tons of green silage per acre. All labor at $2 per hour (includes social security and workmen's compensation); 65 h.p. diesel wheel tractor at $2.70 per hour; 30 h.p. gas wheel tractor at $1.46 per hour.

Operation	Hrs/ Acre	Labor Cost	Equip Cost	Materials Kind	Materials Cost	Sample Costs Per Acre	Sample Costs Per Ton	Your Costs Per Acre	Your Costs Per Ton
Disc&harrow, 2x	.5	$ 1.00	$ 2.80			$ 3.80			
Plow, 1x	.4	.80	1.36			1.16			
Disc&harrow, 1x	.25	.50	1.40			1.90			
Fertilize(broadcast)	.2	.40	.33	250#N, 125#P_2O_5, 75#K_2O	$50.00	50.73			
Plant(4 row)	.3	.60	.59	19 lb.	5.32	1.51			
Rolled, 2x	.5	1.00	.93			1.93			
Cultivate,2x,(4 row)	.6	1.20	.74			1.94			
Irrigate, 3x	6.0	12.00			6.50	18.50			
Weed control	.2	.40	.89			1.29			
TOTAL CULTURAL COST		$17.90	$ 9.04			$77.76	$3.11		
Chop for silage	4.0	8.00	13.60			21.60			
Haul (2 trucks)	8.0	16.00	1.08			17.08			
Pack in silo	4.0	8.00	10.80			18.80			
TOTAL HARVEST COST		$32.00	$25.48			$57.48	$2.29		
Cash overhead						5.00			
County tax on equipment						5.00			
Cash rent, land						30.00			
TOTAL CASH OVERHEAD COSTS						$40.00	$1.60		

	Investment/acre	Depr.	Int.		
Silo	$90.00	$4.50	$2.70		
Equip minus tractor($6,300)	31.50	3.15	1.89		
TOTAL	$121.50	$7.65	$4.59	$12.24	$0.49
Total cost per acre in silo				$187.48	
Total cost per ton in silo					$7.38

Yield per acre	15	20	25	30	35
Total cost	$12.50	$9.37	$7.42	$6.25	$5.36

Other Publications Available at the Farm Advisors Office

Circular 481 - Oats for Grain and Forage

Circular 411 - Silage, Silage Crops & Silos

Bulletin 2186 - Making and Feeding Hay-Crop Silage

Pest & Disease Control Program for Field Corn and Sorghums

Circular 476 - Managing Irrigated Pastures

Paraquat - For Range Seeding Without Cultivation

Salina Strawberry Clover

Bulletin 775 - Grain Fertilization in Calif.

Facts About Chicken Manure as a Fertilizer

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Cooperative Extension work in Agriculture and Home Economics, United States Department of Agriculture, University of California, and Sonoma County cooperating
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George B. Alcorn, Director, California Agricultural Extension Service.
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