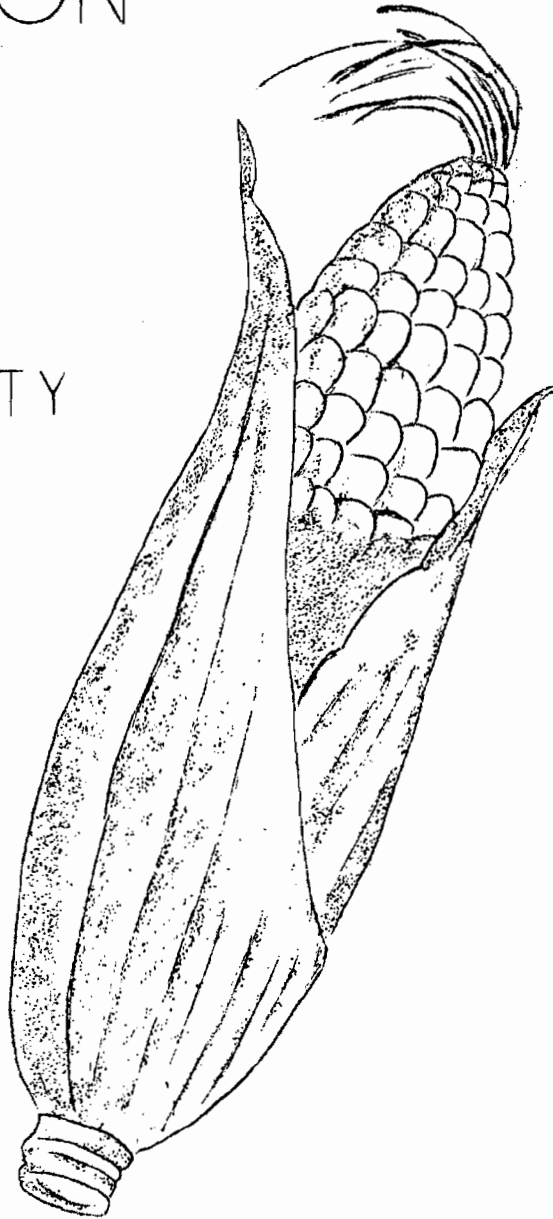


Rec 3/4/55

# HYBRID CORN PRODUCTION

IN  
YOLO COUNTY



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Field corn has been raised in Yolo County for many years. With the development of hybrid varieties, the demand for corn as a feed, and the need for new crops, more interest is being shown in producing field corn. From 100 acres in 1951, hybrid corn acreage increased sixteenfold to approximately 1600 in 1954.

This crop is adapted to the deep, fertile soils of Yolo County where sufficient moisture can be supplied during the growing season. Although yields have not been high, growers are optimistic about the possibilities of this crop. They feel that with good care and management, profitable yields can be obtained. Corn has been double-cropped after barley, but yields have been low and harvesting complicated by rains. Some growers have successfully produced silage after barley, as corn for silage can be harvested earlier than corn for grain.

Fusarium has been a serious disease in this area, and resistant varieties are needed to insure consistent maximum yields. Corn is not as tolerant of high alkali as milo, and should not be planted where alkali may be a problem.

California imports a large quantity of corn for livestock and poultry feed, and at the present time there is an excellent demand for all corn raised in the state. California producers have the advantage of a freight differential of approximately \$10.00 per ton between California and the corn exporting states.

Hybrid corn prices are usually better than those of barley or grain sorghums. The state average price of corn from 1950 to 1953 was \$3.50 per cwt. while the average prices of barley and milo for the same period was \$2.90 and \$3.38 respectively. Average 1954 Yolo County prices were: corn \$3.20, milo \$2.50, and barley \$2.15 - \$2.20.

Information in this leaflet has been obtained through interviews with over 40 corn growers during the past 4 years and from studies made at the University of California at Davis. For further information or answers to specific questions, see your Farm Advisor, 721 Main Street, Woodland.

## YIELDS

Yields of the fields surveyed have ranged from 1200 to 6600 lbs. shelled corn per acre. Early plantings on good row-crop land have produced the highest average yields as the following chart indicates.

### 1954 CORN CROP YEAR

<u>MONTH PLANTED</u>	<u>APRIL</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>
Number of Fields	11	6	6	2
Acreage	450	250	250	60
Yield-shelled Corn per acre	4200#	3900#	2300#	Not available
Fields not harvested by first rains-- Nov. 8, 1954	1	1	4	2
Fields not harvested by Dec. 31, 1954	0	0	4	2

The chart shows that in April and May, 17 fields were planted on 700 acres. April plantings averaged 4200 pounds of shelled corn; May plantings--3900 pounds. Only two fields were unharvested at the first fall rain.

Eight fields were planted in June and July on 310 acres. Only two June fields were harvested before the Nov. 8, rains. June planting yield was 2300 pounds. July plantings were unharvested at the end of the year and yield data was not available.

Yolo County growers raising corn silage in 1954 in a double-cropping program reported yields varying from 7.5 to 16 tons per acre, while two fields of single-cropped corn yielded 13.5 and 20.5 tons per acre.

Since corn silage is worth approximately 1/3 the value of alfalfa hay, it does represent a good return per acre if high yields can be obtained.

In 1951 a silage test was conducted at the University of California at Davis. Plantings were made on May 11 and June 20. The earlier planting yields ranged from 16.4 to 19.4 tons of silage per acre, while the June 20 plantings produced from 15.2 to 18.5 tons per acre.

## VARIETIES

There are a large number of hybrid corn varieties available. Seed companies are developing improved varieties continually. Tests at the University of California at Davis have shown that the following varieties are satisfactory for Yolo County. Generally, the later maturing varieties will produce more than the earlier varieties.

<u>Very Early</u>	<u>Medium Early</u>	<u>Medium Late</u>	<u>Late</u>
Kingscrost KS6	DeKalb 459	DeKalb 666	DeKalb 1002
	Kingscrost KY4	Pfister 381	Pioneer 302
	Kingscrost K3A	Pioneer 300	
	Pfister 347	Vinton K22	
	Pioneer 352		

Researchers Smeltzer, Smith, and Madsen of the University of California at Davis have conducted very complete variety trials. Their plot data indicates a considerable variation between different years. The averages listed below included as many as 22 different varieties. Yields were reduced in some cases because the corn was deliberately infected with fusarium to determine its resistance to this disease.

SUMMARY OF GRAIN YIELDS AT DAVIS: Expressed as a percentage of K3A (Average yield of K3A was 4978# per acre)

<u>VARIETY</u>	<u>YRS. TESTED</u>	<u>% OF K3A</u>	<u>VARIETY</u>	<u>YRS. TESTED</u>	<u>% OF K3A</u>
Kingscrost K3A	9	100	Pfister 347	5	102
Kingscrost KY7	2	112	Pfister 381	3	104
Kingscrost KY4	6	100	Pfister 383	3	110
Kingscrost KR2	6	101	Pioneer 302	6	101
Kingscrost KS6	4	90	Pioneer 352	5	108
DeKalb 459	4	97	Vinton K22	7	96
DeKalb 666	3	102	Vinton V35	3	94
DeKalb 1002	7	104	Morses Grain	1	112

## LAND PREPARATION

A well-prepared, weed-free seed bed is essential for a good stand. Corn seed needs an adequate supply of moisture to germinate. Pre-irrigation may be necessary if soil moisture is low. Since a good stand is one of the determining factors for high production, every care should be taken to have a good seed bed with adequate moisture.

Land preparation varies considerable from farm to farm. The amount of land preparation is determined by the previous crop, time of year, amount of moisture in the soil, and the type of soil. For example, on sandy loam soil following barley, one grower landplaned, disced twice, harrowed and rolled before planting. Leveling may be necessary for adequate irrigation.

## PLANTING

Corn is a warm weather crop. The soil temperature should be about 60° for rapid germination. In general, early planting results in fewer disease problems and higher yields. Early plantings also insure maturity and harvest before fall rains. Please refer to chart under "Yields."

Plant after the danger from spring frosts is over. Usually corn may be planted any time after April 10. Since corn requires from 130 to 160 days to mature, plantings for grain are not recommended after June 1. Corn for ensilage may be planted up to June 20, since it can be harvested about 30 days earlier than when harvested for grain. If a large acreage is being planted, it is advisable to stagger plantings or use varieties with different maturity dates in order that the entire crop will not mature at once.

A 40-inch row spacing is recommended as most mechanical pickers are designed to harvest 38 to 42 inch row spacings. Plant into moisture, but no deeper than 4 inches--1½ to 2 inches is probably the optimum depth. Two or four-row corn planters are the most popular. Beet planters with the proper plates may be used.

Maximum yields have been obtained with 9 to 11 inch plant spacings within the

row. This spacing will require 12 to 14 pounds of seed per acre. Some seed companies attach tags to seed sacks giving planter settings for that particular lot of seed.

Seed is usually treated with a fungicide before it is bagged. Where wire-worms or seed corn maggot may be a problem, treat with four ounces of 25 per cent lindane or 1-1/3 ounces of 75 per cent lindane per 100 pounds of seed.

### IRRIGATION

Corn needs plenty of water throughout the growing season. It will require about as much water as sugar beets--approximately 30 acre inches. The number and frequency of irrigations will depend upon the soil type, depth of penetration, stage of growth, and weather conditions. The crop should not suffer from lack of moisture. Early irrigations may be fairly shallow since the young plants roots spread close to the surface. About tasseling time the roots will move down to a depth of 6 feet in loam soil.

Irrigations may be discontinued when the corn begins to dent. Irrigations after this time may delay harvest.

### WEED CONTROL

Corn will not compete well with weeds for plant food and moisture, but weeds can be controlled fairly easily. Broadleaf weeds, especially morning glory, may be controlled by spraying with 2,4-D when the corn is between 12 and 24 inches tall. Avoid spraying over the top of the foliage. Drop-nozzles are preferred. Permits are required for the use of 2,4-D. These may be obtained from the Agricultural Commissioner. One or two cultivations done in conjunction with furrowing for irrigation will generally take care of most of the weeds. Shallow cultivation to avoid disturbing corn roots is best.

Sheep were used by one grower to clean up late-appearing weeds such as morning glory. The sheep were put in after the last irrigation and before harvesting. They did very little damage to the standing corn, merely eating the lower

leaves of the corn plants. This grower also used the sheep to pasture beet tops before beets were harvested.

### FERTILIZATION

Corn is a heavy feeder. Application of nitrogen will usually pay. Rates from 100 to 150 pounds of actual nitrogen are recommended, except when immediately following alfalfa. Apply at planting time or as a side-dressing prior to the first irrigation. A split application of fertilizer--75 pounds of nitrogen before planting and 50--75 pounds of nitrogen before the first irrigation is advised on sandy soils. Care should be taken during the second application that the shallow roots are not injured.

### INSECTS

The corn ear worm is the major insect pest of corn. On field corn there is no economical control for this insect. Usually these ear worms affect only the tip of the ear.

Aphids may be numerous at times. There is no economical control for this insect.

### DISEASES

Corn smut and fusarium ear rot are the two major diseases of corn. There is no control for either of these diseases.

Fusarium or "pink-rot" has been quite serious in Yolo County fields. This disease causes the ears to mold in the field, the kernels becoming crusted together with fungus growth. It occurs especially in late-maturing corn, in seasons of early rain, or in fields heavily irrigated late in the season. High humidity before the corn reaches the hard-dough stage is conducive to this disease. Some varieties are more susceptible than others.

Both boil and head smut attack corn. In boil smut large, fleshy, and irregular swellings appear on the stems, ears, and kernels. These are at first covered with a whitish membrane which bursts at maturity and sets loose a mass of dusty, black spore powder. Damage from boil smut is greatest when the galls

occur on the ear. Galls on the plant below the ear cause very little yield reduction. Head smut is not enclosed in a membrane but covers the ears and tassels with a mass of black spores and also stunts the plant.

#### HARVESTING - GRAIN

Usually it will take from 130 to 160 days from time of planting to time of harvesting. Some fields have required only 120 days while others have required 185 days to mature. Early planting will help insure harvest before fall rains and heavy winds.

Harvest may begin when the ear corn dries to 25 per cent moisture. Early planted corn may dry in the field to storage moisture--around 13 per cent. When high-moisture corn is harvested, it is necessary to dry to storage moisture. Corn over 15 per cent moisture is usually dried. Commercial dryers have handled most of the drying. On the farm, unheated-air-drying is practical and should be considered if corn or rice will be produced on the farm over a period of years.

The picker and stationary sheller, the picker-sheller combination, and the combine have been used to harvest corn in Yolo County. The picker-sheller is the most popular, but it does have some limitations. When high moisture corn is being harvested, the sheller will not work efficiently and some kernels are crushed while others may not be removed from the cob. The sheller works best on dry corn; but if the corn is too dry, the picker may cause excessive loss by shattering and snapping the ears. Probably the ideal moisture content for a picker-sheller combination is about 18 per cent. Slow ground speed is necessary to keep grain loss at a minimum. Normally, 10 acres can be harvested in a 7 hr day.

In some instances a corn picker has been used and the corn shelled as a separate operation. If cribs were available for drying, this would be a very satisfactory arrangement.

Only 20 acres was combine harvested in Yolo County in 1954, but during the past two years there has been considerable interest in using a combine with a picker attachment. These combines have worked well and offer possibilities in



this area. Several machinery companies are experimenting with attachments for combines and should have them available in a short time. Cost is approximately \$1,500.00 for a conversion unit.

### HARVESTING - SILAGE

Corn is ready for silage about 40 days after silking. It should be well-dented and in the soft to hard-dough stage. At this stage most of the kernels of the dent varieties will be dented and the kernels will have hardened so that milk cannot be squeezed out. The plant will contain between 65 to 70 per cent moisture which is best for making silage. When a large acreage is to be ensiled and a long harvest period is expected, it is necessary to start filling the silo before the crop has reached the best stage; in order to complete harvest before the corn becomes too mature to be ensiled.

Corn harvested for silage too early will not have developed its full feed value. It may also contain too much moisture and cure improperly. Corn harvested too-dry packs poorly, traps air, and molds around the air pockets. Too-moist corn may be remedied partially by the addition of hay to the silage while too-dry corn may be helped by adding water.

Most growers have used a field chopper. The corn should be cut into sections  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches long. The short sections will aid in the packing and curing of the silage.

A tower, pit, or an above-ground trench-type silo can be used to store the silage. It will require approximately 6 weeks for the ensilage to cure.

### PASTURING CORN

Corn can be harvested by hogs. They should be brought to a full grain ration before turning them in the field. Hogs of various sizes should be used if possible. Hogs can be confined to small areas in the field with an electric fence in order to clean the field uniformly. For maximum gains supplement the corn with a protein concentrate and salt.

Hogs may also be used following machine-harvest to clean up shattered corn

and lost ears which may amount to approximately 10 per cent of the yield. This loss can be salvaged partially by pasturing with hogs.

Sheep can also be used for pasturing corn as mentioned earlier in the weed control section. Sheep are put in again after harvest to clean up the corn. Charge for the sheep can be either on a gain basis or a charge per head per day basis.

#### GLEANNING THE FIELD

Where strong winds blew down part of his corn, one grower burned the stubble after harvesting. Corn ears, easily seen, were then picked up by a crew. The cost of labor was about \$5.00 per acre. Six hundred pounds of shelled corn was recovered at a gross return of about \$20.00 per acre.

COST TO PRODUCE HYBRID CORN IN YOLO COUNTY.

Yields 4000# 80 Acres

Labor \$1.00 - \$1.25 per hour

Operation Crew, Equipment	Hours per Acre	CASH COST PER ACRE				Inter. and Deprec.	Total Cost Per Acre
		Labor	Equip.	Material	Total		
Land Preparation*	2.2	\$2.75	\$2.85		\$5.60	\$3.75	\$9.35
Planting - 1 man Seed 12# 26¢ lb. 30 H.P. Tractor 4 Row Planter	.3	.40	.30	\$3.10	3.80	.50	4.30
Fertilize, Cultivate Nitrogen 100# 15¢ lbN 30 H.P. Tractor 4 Row Cultivator Fertilizer Attach.	.5	.60	.50	15.00	16.10	.55	16.65
Cultivate - 1 man	.3	.40	.30		.70	.30	1.00
Irrigate - 1 man 5X Power - 2 Acre Ft.	7.0	7.00	1.05	5.00	13.05	3.00	16.05
<b>TOTAL CULTURAL COST</b>		11.15	5.00	23.10	39.25	8.10	<u>47.35</u>
Harvest** Picking - 1 man 30 H. P. Tractor Picker - Sheller Hauling - Contract \$2.00 per Ton	.7	.90	1.60		2.50	5.00	7.50
				4.00	4.00		4.00
<b>TOTAL HARVEST COST</b>		.90	1.60	4.00	<u>6.50</u>	5.00	<u>11.50</u>
<b>TOTAL COSTS</b>		12.05	6.60	27.10	<u>45.75</u>	13.10	<u>58.85</u>

\*Land Preparation  
includes any or all--  
discing, landplaning,  
plowing, chiseling,  
harrowing, floating

Miscellaneous			
Taxes	10.00		
Other Cash	2.00		
Interest-Land		25.00	
<b>Total Misc.</b>	12.00	25.00	<u>37.00</u>

\*\*Custom Costs  
Harvest  
\$10.00 per Acre plus \$1.00 - \$2.00 per Ton  
Drying  
\$5.50 per Ton

TOTAL COST  
PER ACRE 95.85

COST PER CWT. 2.39