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by

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Field corn grown for grain or silage is a profitable crop in many areas of Idaho. As silage it meets the need for high-energy forage, and as grain it is a valuable feed for dairy and beef cattle, sheep, and swine.

Corn grain has been shipped into the state for many years to meet a demand for high-quality feed grain. We can grow a product at home that will satisfy this demand.

Quality of both silage and grain depends directly on maturity. Immature corn results in sour, poor-smelling silage and light or chaffy low-feed-value grain. To produce top quality silage or grain it is necessary to plant varieties and follow production practices which will insure satisfactory maturity at harvest time.

Areas for Corn Production:

Corn requires certain growing conditions to compete with other crops. In general corn does not grow at temperatures below 50° F., therefore, areas with a growing season that has many hours below 50° F. cannot be expected to grow corn. Mean summer "July" temperatures should be 66° F. or higher, and night temperatures should be above 50° F. most of the growing season. In Idaho cool nights slow the growth of corn so that a so-called 85-day variety may take 100 to 110 days to mature.

In the cooler corn growing areas of the state corn is produced mainly for silage. However, in the warmer areas, it is grown both for silage and grain. Figure 1 gives the zones adapted for corn production.

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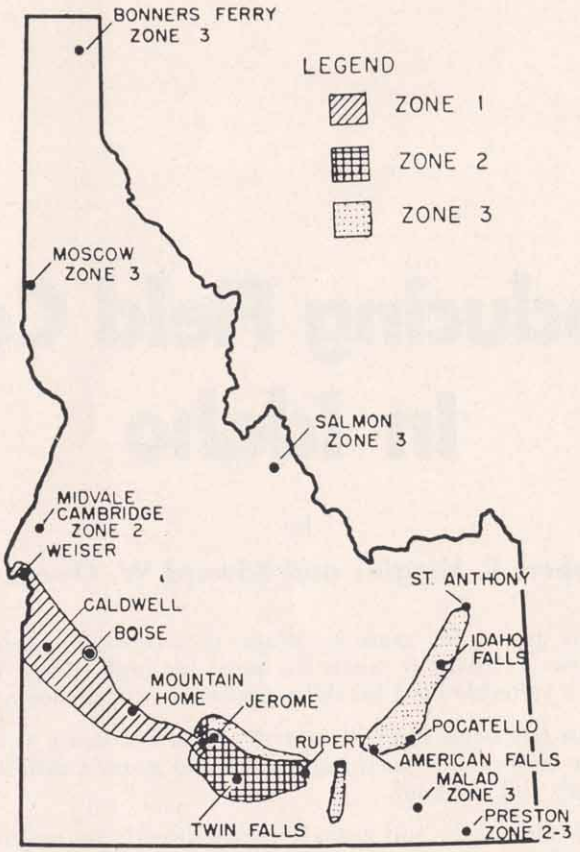


Fig. 1. Areas of adaptation for corn production in Idaho. Zone 1 has the longest growing season, Zone 2 has a medium season, and Zone 3 has the minimum climate requirements.

Moisture Requirements:

Corn makes its most rapid growth during July and August. During this time the crop has a great demand for moisture. High yields of either grain or silage cannot be expected unless moisture is available during this critical period. This contributes to the low yields of corn under dryland conditions and is the main reason for the absence of corn production on the dryland areas of the state. Corn is primarily an irrigated crop in Idaho.

Soils:

Corn does well on most normal soils if fertility is high. It can be planted earlier in sandy soils than in clay or silt. Many areas that grow

good corn in spite of a relatively short growing season are able to do so because of light-textured soils that warm up quickly in the spring and stay warmer during the growing season.

Rotations:

Corn is adapted to almost any crop rotation. It follows pasture and alfalfa satisfactorily, but top yields do not result when following sugar beets or onions. Because of heavy root clumps, corn may not be a desirable crop ahead of beans, sugar beets, or other small, close-cultivated crops.

Corn is an excellent crop to use in fighting weeds. Green corn or corn stover can also be a soil builder.

Selecting a Variety:

Select a variety of corn to fit the specific growing conditions. Many hybrids are available that will produce high yields under the different climatic conditions. The relative maturity of varieties is of primary importance. Choose a variety that will use all the available growing season and still reach full maturity. Hybrid corn varieties show some local differences in the way they respond. Therefore, specific variety recommendations cannot be made. Personal likes and dislikes based on experience, reputation of local seed dealer, and relative maturity ratings will determine the variety you plant.

Plant the same varieties for silage as you do for grain. Varieties suggested for Idaho fall into 3 maturity ranges: long-season varieties that will mature only in the longer growing season areas—zone 1; medium-season varieties that require a growing season at least as long as that found in zone 2; and short-season varieties, the only varieties expected to mature in the limited growing-season areas of zone 3.

In the long-season areas, short-season varieties can be planted as late as June 15; while varieties best adapted for the area should be planted as early as possible. Table 1 lists varieties that have proven satisfactory in tests at Parma, Twin Falls, and Aberdeen.

TABLE 1—HYBRID CORN VARIETIES

Short Season (Zone 3)	Medium Season (Zone 2)	Long Season (Zone 1)
DeKalb 29, 36, 45, 50	DeKalb 57, 59, 222, xL15, xL25	DeKalb 224, 409, 415A, xL45, 633*
Idahybrid 216	Idahybrid 330	Idahybrid 544, 54-40, 680*
Kingscrost KE444, KE475	Kingscrost, KS5, KM589	Kingscrost KM589, KT6
Pfister 24	Pfister 28, 55	Pfister 234, 277, 62, SX9
Western 85	Western 90	Western 90, 101*

*Suitable for silage only due to maturity.

Production Practices

Fertilizer:

High soil fertility is essential. Any corn crop should have 100 to 160 pounds of available nitrogen per acre. This should be applied during land preparation. Side dressing is not advised because of root damage. Other fertilizer applications should be based on soil test and advice from

the county agent. (See Idaho Extension Bulletin 325 "A Guide for Fertilizing Idaho Farm Crops.")

Nitrogen deficiency is shown by firing of the lower leaves. General fertility deficiency is often shown by small, crooked ears with reduced kernel set.

Land Preparation:

Corn responds to good farming practices. Irrigation before plowing will assure adequate moisture in the top three feet of soil. This will enable the corn to grow as much as possible before the first irrigation. The seedbed should be mellow and free of weeds. It should be only firm enough to allow regulation of planting depth. Corn seed is more likely to decay in a tightly packed seedbed than in a soft one.

Planting Dates:

Plant from two weeks to one month before the last killing frost. Corn can be frosted to the ground when it is two to eight inches high and still produce a crop. More fields are lost by late planting than by early planting.

Let "growing weather" determine when to plant. Planting early is no advantage if the soil is wet and both soil and air temperature are below 50° F.

Planting Rates:

Planting rate is largely determined by the productive ability of the soil. With highly fertile soil and adequate irrigation water, a rate of 18,000 to 22,000 plants per acre is desirable. Early-maturing hybrids respond better to high planting rates than do late-maturing hybrids.

Corn seed is separated into different sizes according to length, width, and thickness of the kernel. The size of seed determines the pounds needed to plant an acre. Ordinarily, 15 to 20 pounds of seed per acre is enough. One method of measuring planting rate is to count the seeds per foot of row. Table 2 gives the seed spacing required for given plant populations per acre at different row widths. Tests show that row spacings of 30 to 40 inches are best. The equipment available for harvesting determines the row spacing. Usually 36-inch or 38-inch rows are preferred.

TABLE 2—IN-ROW SEED SPACING REQUIRED FOR GIVEN PLANT POPULATIONS PER ACRE

Plants Per Acre	32-inch Rows	34-Inch Rows	36-Inch Rows	38-inch Rows
15,000	13.1"	12.3"	11.6"	11.0"
16,000	12.3	11.5	10.9	10.3
17,000	11.5	10.8	10.2	9.7
18,000	10.9	10.2	9.7	9.2
19,000	10.3	9.7	9.2	8.7
20,000	9.8	9.2	8.7	8.2
21,000	9.3	8.8	8.3	7.9
22,000	8.9	8.4	7.9	7.5
23,000	8.5	8.0	7.6	7.2
24,000	8.2	7.7	7.3	6.9
25,000	7.8	7.4	7.0	6.6
30,000	6.5	6.1	5.8	5.5
35,000	5.6	5.3	5.0	4.7

Planting Practices:

Any one of three methods of planting may be desirable depending on the soil, weed, and equipment situation. (1) Planting so the field surface is left in a level condition is most common. (2) Some growers corrugate and plant in the bottoms of the corrugations. This provides for excellent weed control and also allows the seed to be placed in good moisture without planting too deeply. (3) Another method that is gaining popularity is to plant on the level and throw a ridge above the seed. This ridge is later harrowed off, allowing the young plants to emerge readily. The practice also provides excellent weed control.

Planter speed should be no faster than two and a half miles per hour. Too much speed causes skips and poor stands.

Soil moisture determines planting depth. Plant no deeper than is necessary to place the seed in moist soil. This is usually about one to one and a half inches. Permanent roots develop just below the surface regardless of how deeply the seed is planted. Deep planting reduces stand and causes weak, spindly plants.

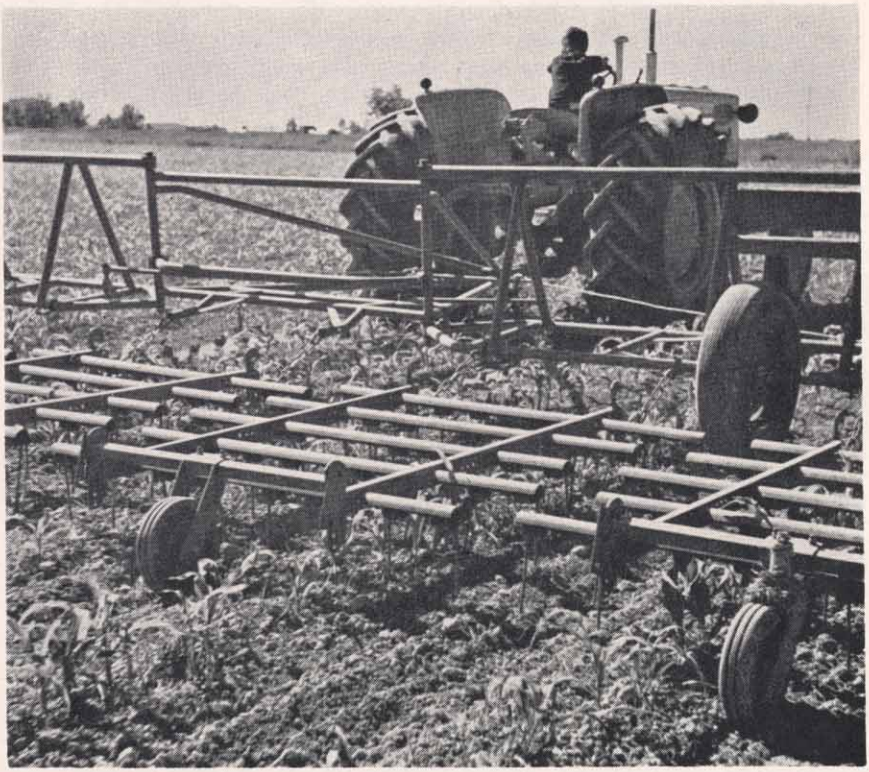


Figure 2. A flexible-tooth harrow cultivating young corn in the two and three-leaf stage.

Cultivation:

Cultivation is done either to control weeds or to provide a furrow for irrigation. Excessive cultivation causes soil compaction.

Use a spike-tooth or flexible-tooth harrow for weed control up to the time the corn is in the two or three leaf stage. This harrowing will fill the planting corrugation or remove the ridge depending on which planting technique was used. It will also kill young seedling weeds without damaging the corn.

Additional cultivation may be done with standard row-crop cultivators.

Use care in cultivation. Corn has a massive root system with many roots close to the surface. Root pruning will result from excessively deep, close cultivation. Remember cultivation is primarily for weed control. Figure 2 shows how a flexible-tooth harrow may be used to cultivate young corn.

Irrigation:

Corn uses soil moisture in the upper three feet. During the period from emergence to first tassel appearance, the available soil moisture can be allowed to dry down to 40% before irrigating. From beginning tasseling until first dent, irrigate when the level reaches 50%. This means more frequent irrigation after tasseling than before tasseling.

Irrigation after the corn is dented is not necessary for maximum yields. However, having good soil moisture until full maturity is reached may reduce stalk breakage and excessive drying.

Weed Control:

Annual grasses and broadleaf weeds are the primary problems, but perennial weeds may also be serious. Cultivation generally is the most practical method of controlling annuals. Chemical control is recommended only when unusual conditions exist. Table 3 gives materials, rates and timing registered by the USDA for use on corn.

Although most field corn varieties can be safely sprayed with 2, 4-D, some hybrids may be damaged more than others. Avoid spraying over the top of corn when it is in the immediate pre-tassel stage.

Insects and Disease:

Ordinarily insects are not a problem in field corn production in Idaho, but corn-ear worm, aphids or mites may become severe in some years. Control of these pests is outlined in University of Idaho Extension Bulletin 216 "Idaho Recommendations for Insect Control."

No serious disease problems affect Idaho field corn. Occasionally stalk rots, and smut infestations may cause damage, but this is not a regular occurrence. Serious disease buildup can be avoided by following a rotation in which corn is not grown in the field for several years in a row.

TABLE 3—MATERIALS, RATES, AND TIMING FOR WEED CONTROL IN CORN AS REGISTERED BY THE U.S.D.A.

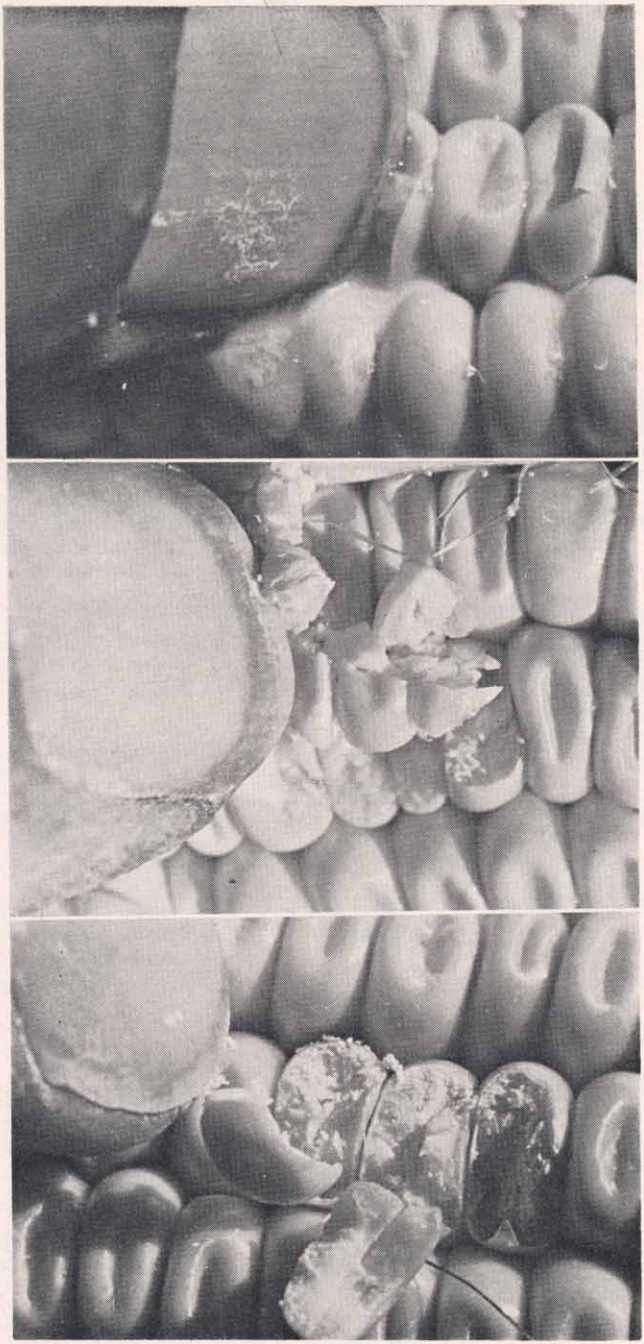
READ THE LABEL CAREFULLY before using any chemical for weed control.

Material	Rate/A.	Notes on Use
2, 4-D amine For annual and perennial broadleaf weed control	2 lbs. 1½ lbs.	Applied pre-emergence for annual broadleaf control and as directed spray when corn is over 18" tall. Apply after first corn leaves unfold to pre-tassel boot stage.
Sinox PE or Pre-merge	2½-3 gal.	Apply as pre-emergence spray for control of annual weeds when corn begins to break soil.
Eptam	4 lbs. active ingredient	Apply pre-plant or pre-emergence. Work thoroughly into soil immediately after application. Do not plant seed deeper than 2 inches. Do not use on hybrid corn grown for seed.
Lorox Corn grown for grain only. Do not use on light sandy soils.	3 lbs. active ingredient	Apply pre-emergence or directed post-emergence when corn is 12-18 inches high. Do not feed treated forage to livestock. Do not apply within 60 days of harvest.
Amitrole	4 lbs. active ingredient	For Canada thistle whitetop or quack-grass control apply 10-14 days before plowing. Plant corn immediately.
Dalapon	8 lbs. commercial product	For quackgrass control apply preplow. Wait 10-14 days—plow. Plant crop 4 weeks after plowing.
Randox T Corn grown for grain only	4½ quarts	Apply pre-emergence.
Randox	4 lbs. active ingredient	Apply pre-emergence for grassy annual control.
Avadex For wild oat and some annual grass control	1½ lbs. active ingredient	Apply pre-plant or pre-emergence. Work thoroughly into soil immediately after application.
Falone	6 lbs. active ingredient	Apply pre-emergence immediately after planting. Do not apply when seeds are shallow planted.
Diuron 2 P.P.M.* Tolerance—Forage 1 P.P.M.* Tolerance—Grain	8 lbs. active ingredient	Apply pre-emergence.
Atrazine Do not use when other crops will follow corn	1 lb. active ingredient 4 lbs. active ingredient	Apply post-emergence as directed spray when corn is 20-30 inches tall and weeds not over 1½ inches tall. A lay-by spray. Apply to fields as pre-emergence or post-planting no later than 3 weeks after planting.
Simazine Corn must follow corn when using this material	1 lb. active ingredient 4 lbs. active ingredient 2 lbs. active ingredient	Apply post-emergence as directed spray when corn is 20-30 inches tall and weeds not over 1½ inches tall. Apply in fall. Plant only corn in treated fields. Apply pre-emergence not later than 3 weeks after planting.

*Parts per million.

NOTE: Inclusion of any material does not necessarily imply a recommendation of this product nor does the omission imply a product may not be satisfactory.

3A—
Grain late in the milk stage of development



3B—
Grain at early dent stage

3C—
Grain at full dent stage

Figure 3. Estimate the maturity of silage by the texture of the immature grain when broken by the thumbnail (see text).

Harvesting Silage:

Silage is harvested with field choppers. The corn should be well eared and matured so that the starch is grainy. Corn harvested when it is not properly matured carries too much water: over 70 per cent. This means the amount of dry matter and nutrients going into the silo is less than desired, and the silage will not have a desirable odor and flavor. Corn harvested for silage should have at least 30 per cent dry matter and should be chopped fine. The stage of maturity determines the total nutrient value, the tonnage, and the dry matter content.

When corn is in the milk stage, the dry weight of leaf and stem has reached the maximum. On the other hand, the total dry weight of the ear and the total nutrient value doubles by the time the kernels reach the hard stage. More than half of the dry weight of good corn silage is made up of the ear portion.

Judging Maturity in Corn for Silage:

Visual observance of the degree of denting on the corn ear is a poor yardstick for estimating the maturity for silage. A far better standard is the texture of the immature grain when broken by the thumbnail. Figure 3 illustrates this test. Figure 3a shows grain late in the milk stage of development. Note the start of denting, upper right. Total plant moisture content will be about 78 per cent; grain content as per cent of total dry matter will be about 18 to 20 per cent. Figure 3b shows grain at early dent stage. Total plant moisture at this stage will be about 73 per cent, and grain content as part of the total dry matter, 30 to 35 per cent. Figure 3c shows grain at full dent stage but still moist enough to break with the thumbnail. Total plant moisture at this stage will be 65 to 70 per cent, and grain contribution to total dry matter will be 40 to 50 per cent.

Commercial field corn hybrids are almost all four-way or three-way crosses, and therefore show considerable segregation for genetic characteristics. Maturities in all three ranges are apt to be found in any crop of near ideal silage maturity. However, ears in the early dent and full dent stages should predominate. Among users of silage there is concern that the more mature grain in silage may pass through animals intact without being used. Studies have indicated that the apparently whole grain passing through the animal's digestive tract has most of the nutrients extracted during the process. Also, the recent use of ensiled high-moisture (30-35 per cent) shelled corn for feeding in the Midwest reduces such doubts.

Harvesting Grain:

Most grain corn is harvested by mechanical pickers. Some is harvested with combines that shell the corn as it is picked. Ear corn should be harvested when it is no higher than 30 per cent moisture. It will crib safely at this stage. If ear corn has more moisture it should be dried before storing. Shelled corn should be dried to 15 per cent moisture before it is stored.

Storage:

Silage can be stored in silos of various types. Requirements for good storage are the same regardless of the type of silo. The corn should be chopped fine and packed tightly into the silo so as to exclude all air. When air pockets remain mold and other spoilage develops. After filling the silo tightly seal the top surface.

If grain corn from Idaho is to be a popular item it must be properly stored. Ear corn should be stored in cribs not more than seven feet wide. The crip should have a ventilated floor, ventilated sides, and a roof to keep out the rain and snow. When filling the crib be sure to remove silks, husks, and shelled corn. Screen the crib to keep out birds and rodents.

Shelled corn, dried to 15 per cent moisture, is stored in clean, tight bins that are built tight enough to keep out birds and rodents.

Good storage of well-matured dry corn will insure a top market.

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