HYBRID CORN and FERTILIZERS FOR CORN

Cir. 411

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HYBRID CORN

and

FERTILIZERS FOR CORN

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THE development of hybrid corn is one of the most important achievements in plant breeding in recent years. It is an outstanding example of the influence of scientific research in revolutionizing the production practices of one of the nation's most important crops.

Corn hybrids are rapidly replacing the standard open-pollinated varieties in most of the states where corn is a major crop. In the principal Corn Belt states, 96 to 100 percent of the corn acreage is planted with hybrid seed. It is grown less extensively in Oklahoma, but the acreage is rapidly increasing. In 1944, only 138,000 acres, or 7 percent, of the total corn acreage in the state were planted with hybrid seed. The acreage of hybrid corn increased to 894,000 acres in 1951, or 71.5 percent of the total corn acreage.

Hybrids Increase Corn Yields

Research studies conducted by the Oklahoma Experiment Station during the past several years indicate that corn yields can be substantially increased by planting adapted hybrids. The better hybrids have consistently produced higher yields than open-pollinated varieties on both bottom land and upland soils. In the four-year period, 1947 to 1950, the recommended hybrids averaged about one-third more corn per acre than the best open-pollinated varieties.

Hybrid Vigor

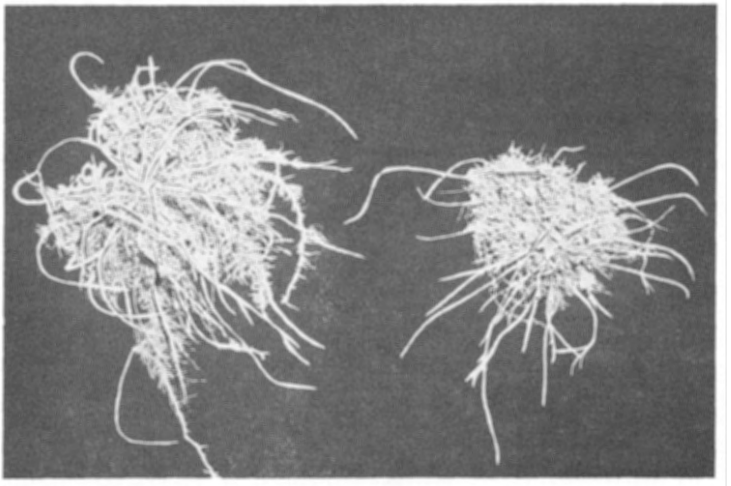
The term "hybrid," as used in corn breeding, does not refer to a cross of different varieties of corn, but rather to a cross between true breeding strains known as inbred lines, or a combination of such lines.

When two relatively pure inbred lines are crossed, the resulting hybrid will usually be much more vigorous than the original open-pollinated varieties from which the inbreds were developed. Superior vigor is due primarily to the fact that by careful inbreeding and selection, a large number of desirable growth factors can be combined in the inbred lines. When the inbreds carry the factors which make for vigor, leafiness, large root systems, strong stalks, and resistance to disease, a desirable hybrid will usually result. This largely explains why adapted hybrids produce higher yields than open-pollinated varieties.

Obtain New Seed Each Year

Hybrid seed corn maintains its uniformity and superior vigor for one generation only. When seed from a field of hybrid corn is saved and planted the following year, a reduction in yield will occur. In tests conducted by the Oklahoma Experiment Station, this reduction in yield has averaged 25 percent. Similar results have been reported in other states. To obtain the full benefits from corn hybrids it is, therefore, necessary to purchase new seed each year.

Showing effect of fertilizer on root development of corn plants.



Rate of Planting

For maximum yields, hybrids should generally be planted thicker than open-pollinated varieties. On soils which are similar in fertility, late maturing hybrids will usually produce higher yield when planted at a rate somewhat thinner than that required for maximum yields of early maturing hybrids. The same hybrids should be planted thicker on soils of high fertility than on soils of low fertility.

When corn is planted on upland soils in 42-inch rows, it is suggested that the plants be spaced 18 to 21 inches apart in the row. On bottom land soils of medium fertility, the plants may be spaced 15 to 18 inches apart in the row. On bottom land soils of high fertility, the plants may be spaced 12 to 15 inches apart in the row.

Hybrids for Different Types of Soils

Early maturing hybrids have generally produced highest yields on upland soils. In favorable seasons, medium maturing hybrids will also produce good yields on the better upland soils.

On bottom land soils of medium fertility, medium maturing hybrids will give best results under average conditions. Late maturing hybrids will also produce good yields on these soils in favorable seasons.

For bottom land soils of high fertility, late maturing hybrids will usually produce highest yields.

Highest Yielding Hybrids in Official Tests*

Corn performance tests are conducted each year by the Oklahoma Experiment Station at several locations in the corn producing section of the state. Plantings are made on both bottom land and upland soils. The results of these tests serve as a guide in determining which hybrids are best adapted in the state.

* Okla. Expt. Sta. M-231, "Performance of Corn Varieties and Hybrids, 1951," by Jas. S. Brooks and Hartwill Pass.

Showing effect of ammonium nitrate on early growth of corn.

The following list of hybrids includes those which have produced the highest yields in the official tests during the past two years. The hybrids are classified according to maturity:

YELLOW HYBRIDS

Early and Medium Maturing*

Pioneer 300	McCurdy 987	Pioneer 302
U. S. 13	Keystone 38	Pioneer 332
Keystone 42		

Late Maturing

Texas 28	Watson 124	Texas 20
Nichols 101	Funk G-711	Texas 12
Texas 24	DeKalb 1002	Texas 18
Keystone 222	McCurdy 135	Texas 26

WHITE HYBRIDS

Medium-late and Late Maturing

Tomson K-2234	P. A. G. 631W	McCurdy 1005W2
Funk G-777W	Texas 11W	U. S. 523W
Kansas 2234	United U-6	Funk G-788W

* Pioneer 302 and Pioneer 332 are medium maturing. The other hybrids listed in this section are early maturing.

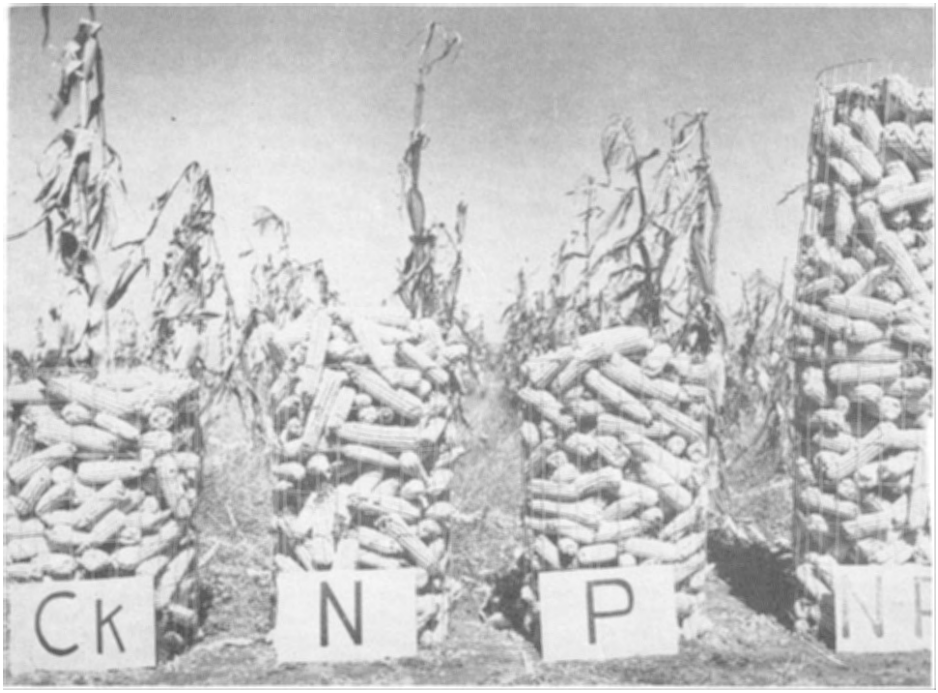
Fertilizers for Corn

Response from the use of commercial fertilizers with corn will depend primarily upon the amount and distribution of rainfall, the fertility and physical condition of the soil, and tillage practices. In most seasons, best response will be obtained when corn is fertilized on deep sandy and sandy loam soils in the eastern part of the state, and when early or medium maturing hybrids are used. Drought may frequently offset the beneficial effects of fertilization when late maturing hybrids or varieties are planted.

Selection of a fertilizer, or combination of fertilizers, will depend upon which of the nutrients needed by plants are lacking in the soil. A soil test is a valuable aid in determining fertilizer needs.

The nutrients most commonly lacking in cultivated soils are nitrogen, phosphorus, and potassium. There are several different kinds of mixed fertilizers containing varying percentages of these elements. The formula on the bag indicates the kind of fertilizer it contains. The formula consists of three figures. The first figure indicates the number of pounds of nitrogen; the second, the number of pounds of phosphoric acid; and the third, the number of pounds of potash in 100 pounds of the fertilizer.

Mixed fertilizers, such as 5-10-5 or 4-12-4, usually contain a sufficient amount of phosphorus to produce a good yield of corn. They contain enough nitrogen and potash to give the corn crop a good start, but not enough to carry



Selecting the right kind of fertilizer is important. Very little increase in yield was obtained from either superphosphate or ammonium nitrate alone. When both were applied, the yield was increased from 22 bushels to 46 bushels per acre.

it through to maturity and produce a high yield. For example, 200 pounds of a 5-10-5 fertilizer contain enough phosphorus to produce about 40 bushels of corn, but only enough nitrogen and potash to produce 5 bushels. Consequently, if the soil is low in nitrogen or potash, maximum yields of corn will not be obtained with a 5-10-5, 4-12-4, or a similar mixed fertilizer applied at usual rates.

To provide more potash when corn is planted on soils deficient in this mineral, a high potash fertilizer, such as 5-10-10, should be applied at planting time. Additional nitrogen can be supplied with a side-dressing of ammonium nitrate, ammonium sulphate, or anhydrous ammonia.

Eastern Oklahoma

Corn fertilizer recommendations for different types of soil in eastern Oklahoma, when corn is not grown in rotation with a legume, are as follows:

(1) Bottom land soils medium to high in organic matter and medium to high in phosphorus and potassium. (Will produce 40 to 60 bushels of corn per acre under average conditions when no fertilizer is used.)

Apply 30 to 50 pounds of ammonium nitrate per acre at planting time.

Side-dress with 75 to 100 pounds of ammonium nitrate per acre at second cultivation.

(2) Bottom land soils medium to low in organic and medium to high in phosphorus and potassium. (Will normally produce 25 to 40 bushels of corn per acre when no fertilizer is used.)

Apply 30 to 50 pounds of ammonium nitrate per acre at planting time.

Side-dress with 100 to 150 pounds of ammonium nitrate at second cultivation.

(3) Bottom land soils medium to low in organic matter and low to very low in phosphorus. Some of these soils are also very low in potassium. (Mostly deep, sandy soils of low productivity.)

(a) If soil is medium to high in potassium, apply 200 pounds of 4-16-0, 100 pounds of 16-20-0, or 100 pounds of 10-20-0 per acre at planting time. If these grades are not available, 200 pounds of 5-10-5 or 4-12-4 may be used.

(b) If soil is low to medium in potassium, apply 200 pounds of 5-10-5 or 4-12-4 per acre at planting time.

(c) If soil is very low in potassium, apply 200 pounds of 5-10-10 per acre at planting time.

With either (a), (b), or (c) apply 75 to 150 pounds of ammonium nitrate per acre as a side dressing at the second cultivation.

(4) Dark-colored, sandy, upland, prairie soils medium in organic matter, low to very low in phosphorus, usually low to high in potassium.

(a) If soil is medium or higher in potassium, apply 75 pounds of 16-20-0, 100 pounds of 10-20-0, or 150 to 200 pounds of 4-16-0 per acre at planting time. When these grades are not available, 150 to 200 pounds of 5-10-5 or 4-12-4 may be used.

(b) If soil is low in potassium, apply 150 to 200 pounds of 5-10-5 or 4-12-4 per acre at planting time.

(c) If soil is very low in potassium, apply 200 pounds of 5-10-10 per acre at planting time.

With either (a), (b), or (c) apply 75 to 125 pounds of ammonium nitrate per acre as a side dressing at second cultivation.

(5) Light-colored sandy, upland, forest soils low in organic matter, low to very low in phosphorus, and very low in potassium.

Apply 150 to 200 pounds of 5-10-10 per acre at planting time. Side-dress with 100 to 150 pounds of ammonium nitrate per acre at second cultivation.

If ammonium sulphate is used instead of ammonium nitrate, increase the rate of application 50 to 60 percent. Anhydrous ammonia should be applied at rates which will provide equivalent amounts of nitrogen.

Western Area

Corn will not give profitable response to fertilizer treatment when moisture is the first limiting factor in plant growth. In the western part of the corn producing section of Oklahoma, fertilizers will probably not give profitable increases in corn yields, except in seasons when rainfall during June and July is favorable. Corn should be grown in rotation with a legume, such as sweet clover or alfalfa, to maintain a good supply of organic matter and readily available nitrogen in the soil.

On deep, sandy soils which normally produce less than 20 bushels of corn per acre, fertilization will likely be profitable under average conditions. Fertilizer treatments should be the same as for similar soils in the eastern part of the state.

Methods for Applying Fertilizers

The starter fertilizer for corn should be applied at planting time with a combination row planter and fertilizer distributor. The best placement of the fertilizer is in a band along the row, 1 to 2 inches to the side of the seed, and at least 2 inches deep. The fertilizer may also be placed in the row, 1 to 2 inches directly below the seed.

When ammonium nitrate and ammonium sulphate are applied as side-dressings, they should be placed 10 to 12 inches to the side of the row and at least 3 inches deep. A convenient way to apply the fertilizer is with an attachment on the cultivator. It should be dropped behind the second shovel, which runs about 12 inches from the corn row. A straight shovel should be used instead of a sweep to make a furrow 3 to 4 inches in depth.

If an attachment for side-dressing is not available, the fertilizers can be applied with the fertilizer distributor on the corn planter, by moving the hitch 10 to 12 inches off center on the draw bar of the tractor. A horse-drawn planter can also be used by driving the team so as to place the fertilizer 10 to 12 inches to the side of the corn row.

Anhydrous ammonia is applied with special equipment designed for that purpose. It may be applied either before the corn is planted or as a side-dressing about May 15.

First printing	1945	20,000
Revised	1948	10,000
Revised, Feb.	1950	20,000
Revised, Feb.	1951	15,000
Revised, Feb.	1952	15,000

Cooperative Extension Work in Agriculture and Home Economics, The Oklahoma A. & M. College and the United States Department of Agriculture Cooperating. Distributed in Futherance of the Acts of Congress of May 8 and June 30, 1914.