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G79-471 Choosing Corn Hybrids

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Choosing Corn Hybrids

This publication explains what factors to consider and compare when selecting a corn hybrid and how to obtain recent hybrid test data.

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One of the most important decisions a corn producer makes is choosing the hybrid seed. Hundreds of hybrid names and numbers are advertised and offered for sale. Selecting the few that offer the greatest yield and profit potential requires time, effort, and study. This should be a continuous process for a corn grower because important information on new or established hybrids may be encountered at any time.

How Hybrids Differ

Corn hybrids differ in essentially every plant and response characteristic. The following are particularly important to the farmer:

1. **Maturity**. In general, full season hybrids at any location will yield most. Length of season differs across Nebraska. In the fall, the average date of first frost varies from Sept. 15 in the northwest to Oct. 15 in the southeast. Growing degree days vary from about 2,100 in Kimball, Scotts Bluff and Box Butte counties to 3,300 in Webster, Nuckolls, Thayer, Jefferson, Gage and Pawnee. Obviously, full season varieties for western Nebraska must mature in a much shorter season and with a much lower number of heat units (growing degree days) than those in south central and southeast Nebraska. For more information on growing degree days, see *G86-796, Growing Degree Day Requirements and Freeze Risk as a Guide to Selecting and Planting Corn Hybrids* and *G83-673, Maturity Dates and Freeze Risks Based on Growing Degree Days*.

   Hybrids react differently to latitude, location, altitude and other factors. Temperature and moisture conditions through the season can modify rates of development. Thus, there is no precise measure of maturity for any hybrid in terms of days from planting to harvest. The same hybrid may be classed as 105-day, 110-day or 115-day if it is rated at three different places. When carefully rated

at one location, such ratings do show relative maturity.

In yield tests, moisture content at harvest is frequently given as a measure of relative maturity since all hybrids in such tests are harvested on the same date. The harvest day for the tests should be soon enough after the earliest hybrids mature so that a meaningful range of moisture differences exists between the early and late hybrids.

Black layer formation is a precise indication of physiological maturity. This is discussed in NebGuide *G76-301, How to Tell Corn, Sorghum Maturity*. The moisture content of hybrids may differ markedly at physiological maturity.

2. **Rate of drydown.** Hybrids lose kernel moisture at different rates in the field. Rapid drydown after physiological maturity is desirable to permit earlier harvest, reduce drying costs, and reduce field losses.

3. **Harvestable yield.** Consistently high harvestable yield is the most important characteristic to be considered. Hybrids of the same maturity may differ widely in yield. Yield is the overall measure of how well the hybrid is adapted and how well it may respond to favorable weather and good management. Measured yields under a farmer's own conditions over three or four years will reflect the hybrid's ability to produce under specific soil, climatic and management conditions.

   When choosing hybrids, consider the following factors which can influence harvestable yields:

   Lodged plants--stalk and root strength. Root lodging is considered to exist when stalks lean 45 degrees or more. Hybrids differ in the patterns and rate of brace root development. Of course, high corn rootworm infestations can contribute greatly to root lodging. Shorter plants with low ears are less susceptible to lodging, but some newer hybrids seldom root lodge although they are rather tall and have high ear placement.

   Stalk breakage is higher at high plant populations, in hybrids with less stalk strength, or in insect or disease damaged stalks. Stalks with a heavy rind and high strength are less subject to ear loss due to breakage even if damaged by corn borers or stalk rots.

   Dropped ears. Important differences exist among hybrids in ability to retain ears until harvest time, thus directly influencing harvestable yield. Problems with dropped ears also are noticeable in the spring from volunteer corn.

   European corn borer resistance. Breeders have developed hybrids that are damaged less by European corn borers, especially the first brood. Borers in stalks or ear shanks may limit ear development and lead to increased breakage and dropped ears, a serious problem every year. Unfortunately, the differences in corn borer resistance between hybrids is quite small.

   Resistance to Goss's Wilt and Blight. This bacterial disease is now well established in Nebraska. Most frequent occurrence and damage has been in north central, central, and southwest Nebraska. Yield losses in seriously infected fields can be up to 50 percent. Good hybrids are available that are resistant to this disease. In areas where Goss's Wilt is occurring, growers should choose these resistant hybrids.

   Corn Lethal Necrosis. Corn Lethal Necrosis (CLN) is a disease of corn found mostly in south central Nebraska. For more than 10 years the South Central Research and Extension Center has

tested hybrids for tolerance to corn lethal necrosis. Test results are released annually in the *Corn Lethal Necrosis Report.* It is available from your local agricultural extension agent or the South Central Research and Extension Center in Clay Center.

Tolerance of stresses. Nebraska generally has a stressful climate for corn. Drought is frequent. Extended periods of hot days with low humidity and high winds are frequent in July but may occur any time in the season. Choosing hybrids that have shown good tolerance to stress is desirable.

Stay green characteristics. The ability of the corn plant to remain green and active later in the fall is a good sign of health and can aid in grain filling. This characteristic is even more important if the crop is to be harvested for silage.

4. **Other hybrid differences** that may be important:

Response to plant population. Some hybrids must be planted at high populations to yield well while others do better at lower populations. A flex ear size can adapt to population changes easier than a fixed ear size. Generally, a hybrid with flex ear size will not be filled to the tip. Some hybrids have prolificacy which allows them to produce multiple ears when conditions are good, but this is not a critical factor.

Plant and ear height. There are tall hybrids with excellent yield. Shorter hybrids, however, also can have high yield, a higher grain-to-stover ratio, less likelihood of stalk breakage and fewer problems in combining. Tall, high yielding hybrids may be good choices for silage.

Response to irrigation. For irrigationd conditions, it is important to identify hybrids which can use the extra water for grain production, tolerate the additional plant density, and respond to higher fertility. For dryland conditions, choose hybrids which can produce good yields without additional moisture.

Cost of seed. Less expensive seed is sometimes available, especially three-way and double-cross hybrids. Since it only requires one or two additional bushels per acre to pay the higher seed cost, do not sacrifice yield to buy cheaper seed.

Sources of Comparative Data on Hybrids

The best source of data comparing different hybrids is *EC 90-105, Nebraska Corn Hybrid Tests*, published by Nebraska Cooperative Extension and the Nebraska Agricultural Experiment Station. irrigationd and/or non-irrigationd tests, conducted in each of four maturity zones, include both open pedigree hybrids released by experiment stations and hybrids entered by seed producers under brand designations. Each company can have up to four hybrids tested. In 1990, 303 hybrid names and numbers entered under 50 brand names were involved in 25 tests held across the state.

The test at each location has four replications. Data are taken on yield, moisture at harvest, broken plants and dropped ears. Data are then averaged for hybrids in tests over two, three, four and five years in each maturity zone. These longer term averages are the most valuable because they show consistency in performance in a range of conditions.

Seed companies also conduct many trials. These are of greatest value for comparing hybrids being sold by the company. To give reliable information such tests should include at least three replications of each

hybrid. Results are more meaningful if they are averaged over several locations. Yields from single plots or fields are of little value for comparing yields whether machine harvested or not. They are valuable, however, for observations on maturity and plant characteristics.

Farmer testing also is helpful. Many farmers get some seed of a few promising hybrids in their area and set up their own tests. To provide a basis for sound decisions, farmer tests must be randomized and replicated. They must be planted at the proper date, have good weed control, good fertility level, and good general management. The farmer must keep accurate notes on date of planting, plant population, date of maturity, disease observations and harvest data. Farmers should test each hybrid for two or more years in comparison with those currently being grown on his farm. To improve the reliability of such tests, refer to *G84-723, Maximizing the Use of Farm Strip Plots*. It is risky to make a change based on one year's observations. Yield comparisons should always be adjusted to the standard 15.5 percent moisture as wet yield rankings could be misleading. The following formula will assist in converting any given moisture to 15.5 percent: subtract the measured moisture from 100 and divide that number by 84.5. This will give a conversion factor which can then be multiplied by the yield to give a corrected yield for 15.5 percent moisture.

Things to Remember in Choosing Hybrids

1. Choosing a hybrid may be your most important decision for increasing corn yields and profitability.
2. If a hybrid is superior, buy the seed whether it is round or flat, large or small. The shape and size of singlecross seed is largely determined by the ear characteristics of the inbred line used as the seed parent. Corn growers must buy and plant the seed produced. Extra costs of buying proper planter plates or a plateless planter that effectively handles kernels of various sizes and shapes is a small price to pay for the advantages of superior hybrids. It is the genetic makeup of the hybrid that determines its potential performance. Ordering early may help to assure obtaining seed of the hybrid you want at a discount.
3. Breeders in all companies and experiment stations are always making improvements. Try seed from several companies or sources. There is sure to be a better hybrid available or on its way. Keeping good notes and looking at a few promising new hybrids each year is certain to pay off.

Other Considerations

Careful selection of hybrids with a range in maturity may spread out harvest while minimizing field losses and drying costs. To assure early maturity, plant a short season hybrid early. Follow with a midseason and then with a full season to spread out the time for optimal harvest. Achieving the top yield of an early hybrid may require increasing the plant population. Consider "full season" to be a hybrid that will reach physiological maturity five to 15 days before normal frost date.

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