

# Planting Corn for Grain in Tennessee

Angela Thompson McClure  
Associate Professor, Plant Sciences

Although seed genetics can dictate yield, a poorly planted seed never reaches its yield potential. Favorable weather plays an important role in stand quality, but producers can save money on replant costs by managing factors that can be controlled, such as field selection and planting time, seedbed preparation, seeding rate, planter settings and insect management.

## Selecting a Field

Corn can be grown on a wide range of soil types, but it grows best when planted in a deep, well-drained, medium- to coarse-textured soil that supplies adequate moisture. Timely moisture and adequate drainage are probably the most important factors in producing good corn yields. Poorly drained areas should be improved where possible to increase yields in those locations. In Tennessee, the majority of cornfields are not irrigated; therefore, selecting fields with soils that promote good root development is critical to a good corn crop. Some examples are shown below.



**Table 1. Types of land and yield potential for corn production.**

Type of Land	Description	Yield Potential
Excellent	Irrigated or level river bottomland with deep soil, good drainage and excellent ability to supply moisture in summer.	Above 150 bu/A
Good	Level upland or shallow bottomland with good ability to supply moisture in summer.	125 to 150 bu/A
Fair	Rolling or hilly upland with moderate ability to supply moisture in summer.	Up to 125 bu/A

## Preparing the Seedbed

More than 80 percent of Tennessee field corn is grown in no-till systems. No-till land is usually firmer at planting and harvest and allows corn to be planted on sloping ground that is normally subject to erosion. A good burn-down weed control program (see PB 1580 – 2009 Weed Control Manual for Tennessee) is essential to plant into a clean seedbed. With a planter equipped for no-tillage, the undisturbed seedbed can provide a firm surface for planting through residue and allow for a uniform seeding depth. Row cleaners may improve furrow closure in fields with heavy ryegrass or crop residue that can prevent furrow closure and increase incidents of herbicide injury to seedlings. Follow equipment recommendations for setting row cleaners – never set them too deep. Aggressive cleaning over rows can allow serious erosion down the seed furrow on hilly ground. In addition, row cleaners set too deep can create air pockets, which reduce seed-to-soil contact.

Where a conventional seedbed is used, fields should be tilled at least two weeks before planting to allow cover crop or vegetation to decompose. Disk as needed to prepare a firm, uniform seedbed that will make proper placement of the seed easier.

## Planting Date

Corn development is mainly related to temperature and not day length; therefore, corn can be planted earlier in the spring than other field crops. Good germination and emergence are likely when soil temperature at a 2-inch depth is 55 F by 9 a.m. for three consecutive days and the short-term weather forecast looks favorable. This optimal time for planting can occur as early as late March in southwestern Tennessee and counties bordering Alabama in central Tennessee. Most counties west of the Tennessee River begin planting in early April, while Middle and East Tennessee counties begin planting by mid-April.

When soil is dry and temperatures are cool, seed can remain viable for a few weeks and germinate when conditions improve. Avoid planting corn when cold or excessively wet conditions are expected. A frost occurring after emergence can burn leaves off plants, but the growing point for corn remains protected from freezing below ground up until V6 (about 12-inch corn). Later development is usually not affected by freeze damage to young corn. Planting into upland soils should be done as early as possible to take advantage of better early-season moisture conditions. Early-planted corn completes more vegetative growth in the cooler, early-season weather and is less affected by foliar diseases and late-season corn borers.

Plant corn as early as practical for best results, typically before May 1 in West and Middle Tennessee and before June 1 in East Tennessee. The average yield decreases by approximately one bushel per day when planted after May 1 to June 1, and yield loss is even greater when planted after June 1.

## Plant Population

Seeding rates for corn have increased in recent years partly due to the improved stress tolerance of newer hybrids. Seed companies provide recommended seeding rates based on the physical traits of the hybrid and response to stress. Producers should use the lower end of recommended

seeding rates in less productive fields or fields that are late planted, and the higher end of seeding rate recommendations in irrigated fields or highly productive fields with good moisture capacity. A typical seeding rate for dryland corn planted in an optimum window on productive soils would be 30,000 seeds per acre to achieve a final stand of 27,000 to 28,000 plants per acre.

Adjust the seeding rate for row width used. In non-irrigated corn, seeding rates should be reduced slightly for wide (36 inches or wider) rows to avoid crowding plants within the row. Data does not show consistent large yield increases with the use of narrow rows (<30 inches) in the Southeast. The advantage of a narrow row is that seed spacing within a row is greater at higher seeding rates and higher yields can be obtained when moisture is abundant. However, soil moisture must be adequate to support higher seeding rates and care should be taken to not overplant non-irrigated corn in narrow or twin row systems. The final number of plants per acre is more important than the row width in most cases.

Plant seed with a minimum germination rate of 90 percent at higher than the desired population (about 5 to 10 percent more seed) to achieve the final target stand. Seeding rates can be increased slightly when less than optimal weather conditions are anticipated. Some seed spacing information for specific populations is shown in Table 2.

## Planter Settings

Corn should be planted at the proper depth with uniform spacing between plants for an optimal stand. A seed monitor can detect seeding failures in planter units, but does not monitor seed spacing or depth. The only way to check placement is by calibrating the planter before planting and making periodic checks in the field behind the planter.

Seed should be planted 2 inches deep under most conditions. On warm, dry soils, seed can be planted deeper to moisture but not deeper than 3 inches. **Never plant corn less than 1 1/2 inches deep.** Planting too shallow prevents proper

**Table 2. Fit Number of Plants to Row Spacing Used**

Seeding Rate per Acre	Seed Spacing (Inches)			Final Stand	
	20" row	30" row	38" row	5% Loss	10% Loss
24,000	13.1	8.7	7.3	22,800	21,600
26,000	12.1	8.0	6.7	24,700	23,400
28,000	11.2	7.5	6.2	26,600	25,200
30,000	10.5	7.0	5.8	28,500	27,000
32,000	9.8	6.5	5.4	30,400	28,800
34,000	9.1	6.1	4.9	32,300	30,600

Darker shaded areas denote suggested seeding rate for non-irrigated corn at optimal planting date in productive soils. Irrigated corn can be seeded at 32,000 seeds per acre or more regardless of row width.

nodal root development on small seedlings. Planting too deep causes the emerging seedling to spend more energy pushing out of the ground and delays emergence time. Planting too deep can also cause uneven emergence patterns and loss to disease when soil is cool or wet or seedling vigor is low.

Full closure of the seed furrow is a critical step for proper planting. No-till fields should be dry enough to allow the planter to close the furrow completely. If the furrow is not closed, seeds are subject to predation by birds or animals, herbicide injury and alternate wetting and drying that result in low and uneven stands.

Properly set vacuum-type planters generally achieve the most uniform seed distribution within a row, followed by finger pickup or plateless type planters. Uniformly spaced plants compete less with each other for growth factors. Calibrate the planter at the speed you intend to plant. Check spacing by planting shallow on hard ground (end or turnrow) to count all seed. Remember to recheck the planter when changing seed sizes or seed treatments, particularly for plate-type planters.

Planting too fast can increase the number of skips and doubles within a row, which has been shown to reduce yields in some studies. Faster speeds also cause planter units to bounce, resulting in seed bounce and uneven seed placement. Follow manufacturer's recommendations for planter settings at higher speeds.

## Early-Season Insect Control

Deciding whether to use an insecticide treatment depends on the history of a field. Producers may want to consider a seed insecticide treatment (e.g., Poncho® or Cruiser®) in fields with a history of wireworm or seed corn maggot. Pasture or sod fields newly planted to corn should have either an insecticide seed treatment or some at-planting liquid or granular treatment for wireworm. No-till fields with heavy winter weeds burned down late, vetch cover or history of cutworm problems may need an in-furrow granular treatment, insecticide seed treatment or furrow overspray at planting with a recommended pyrethroid insecticide. For specific treatment rates and insect control recommendations, see Extension PB 1768, Insect Control Recommendations for Field Crops, at [www.utextension.utk.edu/publications/pbfiles/pb1064.pdf](http://www.utextension.utk.edu/publications/pbfiles/pb1064.pdf).

## Summary

Achieving a good stand is the first step to successful corn production. Careful attention to these factors affecting germination and emergence is critical for high yields:

- Follow seed company guidelines for target seeding rate.
- Adjust seeding rate to the yield potential of the field and row width.
- Plant as early as soil temperature allows (55 F, 2 inches deep by 9 a.m., three days in a row).
- Plant 2 inches deep under most conditions.
- Close the seed furrow properly.
- Calibrate and check behind the planter often.
- Drive at recommended speeds to improve the stand.
- Control insects and weeds as needed.