



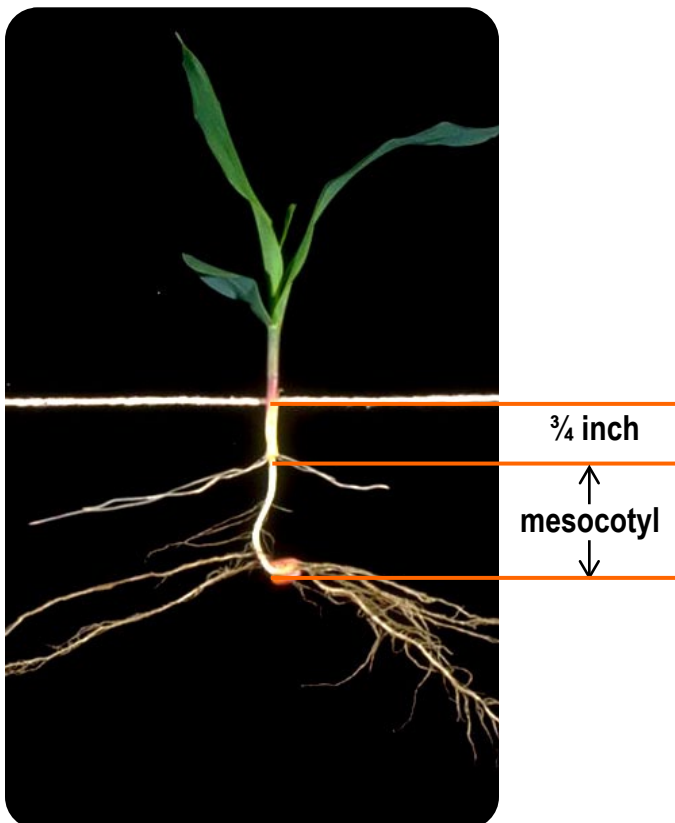
## Corn Planting Depth and Spacing

Planting corn to a depth of 1½ to 2 inches is optimum for nodal root development

- 2 inches – best under normal conditions
- 1½ inches – may be favorable when planting early into cool soils
- **Never plant shallower than 1½ inches**

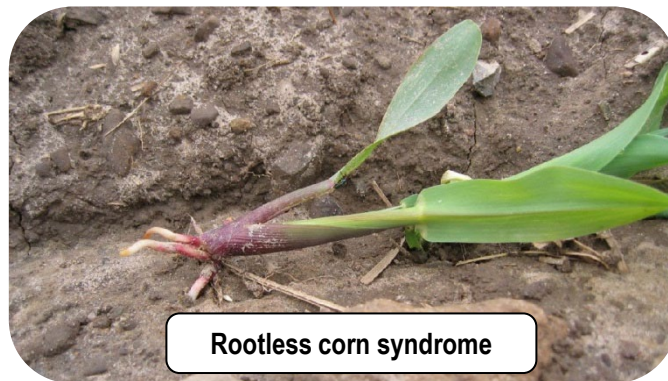
### Determining Planting Depth

- Planting depth can easily be determined after seedling emergence.
- The nodal root area (crown or growing point) typically develops about ¾ of an inch beneath the soil surface regardless of the seeding depth.
- Measure the mesocotyl length (the area between the seed and crown or growing point, then add ¾ inch to determine the planting depth.



### Corn planted too shallow:

- Is less able to uptake water and nutrients through the roots. Shallow-rooted corn plants suffer dramatically during periods of summer drought.
- Can develop a condition called “rootless corn syndrome”. Plants will fall over due to the lack of nodal root development in dry soil.
- Can expose corn seedlings to herbicide residues increasing the potential for herbicide injury.
- Late-season root lodging concerns are reduced with improved nodal root systems.



Rootless corn syndrome

### Symptoms of Irregular Planting Depth:

- Uneven emergence.
- Non-uniform mesocotyl length.
- Varying plant height.
- More severe root-lodging in summer wind events

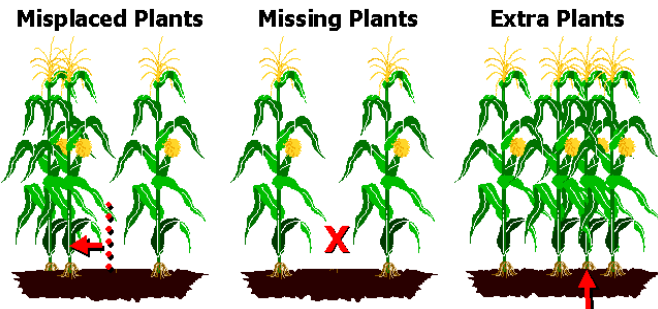
### Planting Depth Recommendations

- Set the planting depth in the field, with the planter being pulled at full operating speed.
- Check for good seed-soil contact; strive for firm seedbeds that promote uniform emergence and stronger root systems.
- Slower planting speeds between 4 to 5 mph achieve more uniform planting depths.
- Utilize in-row residue managers where needed; especially in corn-following-corn rotations.
- Utilize a planter down-pressure control system.

Pioneer on-farm surveys have shown that uniform plant spacing maximizes yield.

### Types of non-uniform plant spacing:

- Misplaced plants due to worn planter parts
- Missing plants (skips)
- Extra plants (doubles)



### Misplaced plants

- May decrease yield relative to a uniform stand

### Missing plants

- Will decrease yield relative to a uniform stand
- Yield of adjacent plants will increase, but not enough to compensate for the missing plant

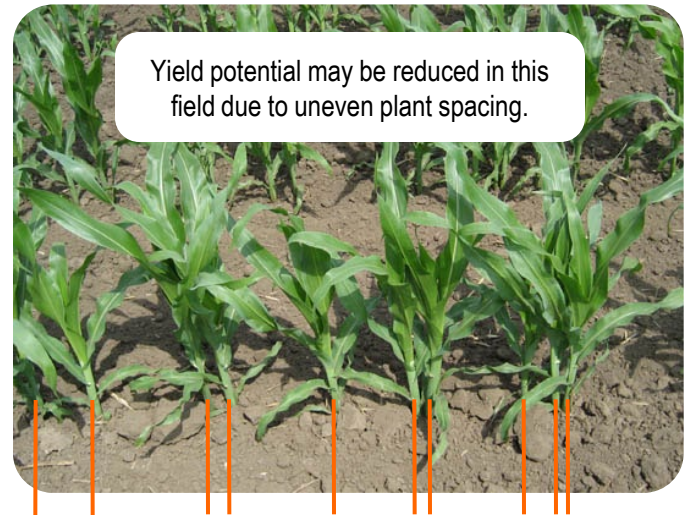
### Extra Plants

- May increase yield slightly if stand is below optimum
- Yield of doubled plants as well as adjacent plants will decrease, but the yield of the extra plant will compensate for this reduction

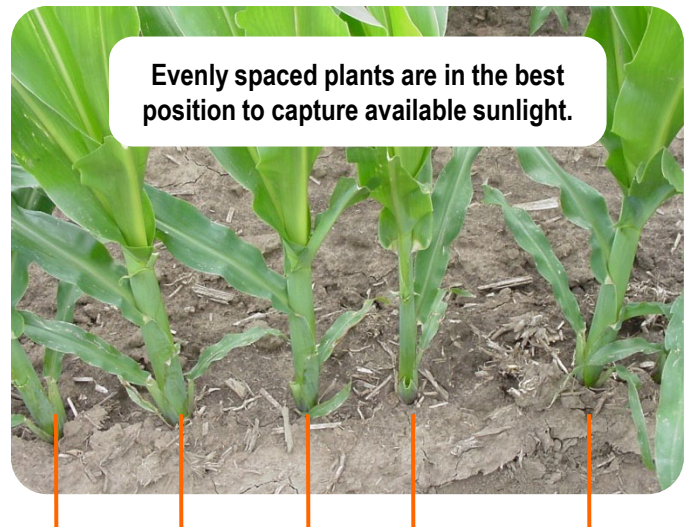
### Grain yield of individual plants by position relative to skips and doubles (30,000 plants/acre)

Plant Position	Plant yield (lbs)
Next to skip	0.43
2nd from skip	0.40
Control	0.39
Next to double	0.35
Double	0.33

Nafziger, E. D. 1996. Effects of missing and two-plant hills on corn grain yield. Journal of Production Agriculture 9:238-240.



Pioneer studies show that individual plant yield is maximized when plants are within 2 to 3 inches of perfect equidistant spacing (see image below).



### Management Tips

- Make sure the target plant population is high enough to maximize profitability.
- Typical seed corn germination is about 95%. Overplant by at least 5% to reduce the effects of germination-induced skips in corn following corn.
- Overplant for expected reductions due to insects and more stressful soil conditions (cold and wet).
- Be sure to check that the planter is properly adjusted and calibrated by digging behind the planter in every field.