

Seedbed Preparation

by Jim Boersma, Pioneer Area Agronomist

Seedbed preparation sets the stage for optimal growth and development throughout the growing season and ultimately has a major impact on yield potential. This fact sheet reviews management decisions regarding when to begin seedbed preparation, how to minimize compaction and some tillage tips to help optimize plant stands and profitability.

Determining When Soils are Fit

The following soil test is a quick method to accurately gauge if soil is ready for spring tillage and seedbed preparation.

Take your trowel and dig down 3 to 4 inches into the seed bed. Grasp a handful of soil from the trowel and squeeze it. Soils are too wet for spring tillage if any of the following are true:

Does it feel tacky? Can you make a ball that sticks together? Does it form a ribbon when squeezed between your thumb and forefinger (as shown below)?



Ribbon indicates soil is still marginal for field work.



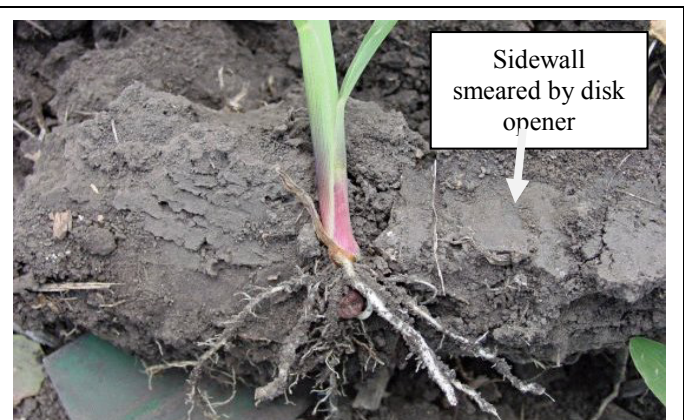
If soil crumbles when pressed, soil is suitable for field work.

Soil should be dry enough in the top 3-4 inches that it does not form a ribbon with normal compression in your hand. Soils in proper condition for seedbed preparation should crumble between your fingers and have favorable tilth. These properties will optimize early growth and minimize soil compaction.

Soil moisture conditions can change between the time the seedbed is prepared and planting begins in the field. If soils become wet, be patient and allow them to dry out. Try to work fields as close to planting operations as possible. Planting into wetter soils, or working soils too wet will cause sidewall compaction from the disk openers. This type of compaction is frequently the cause of uneven emergence. In addition, this compacted soil then restricts corn and soybean root systems. Restricted nodal root systems will reduce the plants ability to seek out moisture and nutrient uptake, lowering yield potential.

Improving Seedbeds for Optimum Yield Potential

- Evaluate every field for soil moisture conditions. Use the simple “ribbon” test to determine soil conditions and fitness for seedbed preparation.
- Reduce compaction with proper tire inflation and counter weights for spring tillage and planting equipment.
- Under dry conditions the use of a packer/roller may help improve seed-to-soil contact and germination.
- Select hybrids with above average stress emergence scores for earliest planting dates. Refer to seed guides.
- Soil temperatures should reach a minimum of 50 degrees at the 2-inch depth prior to starting planting.

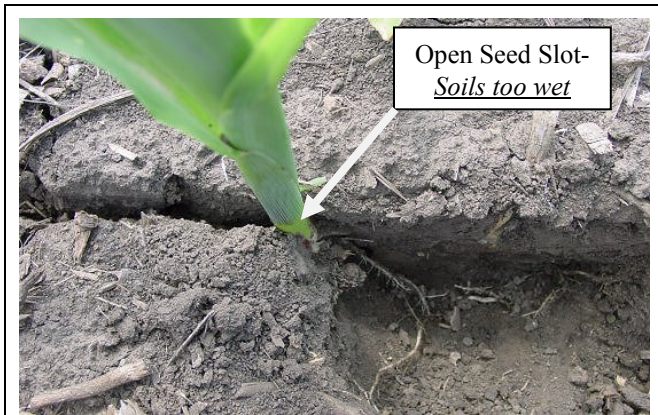


Wet soils at planting can lead to sidewall smearing that restricts optimum nodal root growth and yield potential.

Proper Tire Pressure

Compaction in the top 6 to 8 inches is related to soil moisture conditions, inflation pressure (psi) and the total axle load of the equipment. One thing that can help prevent soil compaction is ensuring that your equipment has proper tire pressure and counter balance weight.

Newer 4-wheel-drive tractors are equipped with radial tires that should be inflated to 8 to 10 psi. A properly inflated radial tire will have a wider base and will have a noticeable “cheek” showing in comparison to older bias-belted tires, which were typically inflated to pressures of 20 to 25 psi. It is not uncommon for radial tires to be over-inflated to 20 to 25 psi because of previous experience with older bias-belted tires and



Wet soils at planting can lead to smearing of the seed furrow sidewall by the disk openers. This can lead to uneven emergence and restricted root growth.

the fact that a grower may not be accustomed to the look of a properly inflated radial tire. Properly inflated tires will not only significantly improve the ride in the tractor and improve fuel efficiency and pulling power, but will also help prevent compaction. For example, a tractor equipped with 18.4 R42 tires carrying an axle weight of 3,200 lbs would have a footprint area of 272 sq. inches when properly inflated at 8 psi. However, the same tire with an identical axle load would have a footprint area of only 125 sq. inches when inflated to 24 psi. Correct tire inflation more than doubles the footprint of the tire, spreading the load of the tractor across a much larger surface, thereby reducing compaction.

Consider these tips when getting your tractor ready for spring operations:

- Check tire pressure and inflate your tires based on the manufacturer's recommendations. Radial ply tires should be inflated to 8 to 10 psi.
- Always check the inflation pressure early in the morning before you go to the field. For optimum performance check and maintain tire inflation pressures once every two weeks.
- Use only low pressure gauges to check for inflation to obtain accurate readings.
- Properly inflated (low pressure) radial ply tires will also help reduce power hop problems in most cases. Rear ballast weights may also be required on high horsepower four wheel drive tractors.
- Remember that bias ply tires require higher inflation pressures than similarly sized radial ply tires. Serious tire damage can occur from sidewall buckling if under-inflated.
- Proper ballasting is necessary to obtain optimum performance from your tractor. The amount of ballast and the proper split in weight between the front and rear axle will depend on the type of tractor, the type of implement and soil conditions. Contact your dealer for specific information for your equipment.

Use of Rolling Baskets to Firm Seedbeds

Adequate seed-to-soil contact is critical for proper germination and nutrient uptake. Firm seedbeds are a goal all growers should strive toward. **When you walk on a field prior to planting, your boots should not sink into the soil more than an inch.** Loose seedbeds set the stage for uneven emergence, poor nodal root establishment, potential for root lodging in summer storms, reduced root mass which can lead to lower yields. So what steps can you take to make a difference in your seedbed preparation? With your secondary tillage this spring, if you work your soils just one time, you should consider having rolling baskets behind the cultivator in order to help firm seedbeds. Long, rigid-toothed mulch bars also help firm seedbeds. Under dry conditions the use of rolling baskets may help firm seedbeds and improve stand establishment. The use of packers under dry conditions has also been observed to aid uptake of nutrients such as zinc and potassium. However, using a packer in wetter conditions can increase bulk density of the soil and reduce soil tilth. The decision to use a packer should be made on a field-by-field basis as current conditions dictate. **Spiked tooth press wheels** are options for no-tillers where closing seed slots are a challenge. They help crumble side walls in wetter field conditions. Most growers use one spiked wheel per row.



Spiked tooth press wheels for minimum till or no-till conditions.

Residue management is the key defense against the garden slug this spring. Removing corn stalks and disturbing their environment with tillage may be the most effective means of reducing their numbers. Wetter conditions are what slugs thrive in, so periods of drier weather will help reduce their populations. The following link will take you to an excellent reference on slugs at the Ohio State University extension website: <http://ohioline.osu.edu/ent-fact/pdf/0020.pdf>.

Additional Information

Soil Compaction: What Can You Do? U. of Minn. Extension. <http://www.extension.umn.edu/cropnews/2005/pdfs/05MNCN21.pdf>

Let the Air Out – Advantages of Properly Adjusted Radial Tire Pressures. Ohio State University Extension. <http://ohioline.osu.edu/aex-fact/0530.html>

Tire Tractor and Ballast Management. University of Missouri. <http://muextension.missouri.edu/xplor/agguides/agengin/g01235.htm>