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CALIBRATING YOUR GRAIN DRILL OR SEEDER CAN SAVE BOTH SEED AND MONEY

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Admittedly, the agronomic impact of over-seeding or under-seeding a field is complex and beyond the scope of this article. However, we can agree that the most farmers have worked out a seeding rate with their agronomist and exceeding that rate may not be productive, especially at $265+ per bag in the case of alfalfa ($500 for switchgrass). If you plan to seed at a rate of 12 lb per acre and your actual seeding rate is 14 lb, then you are applying a little over $10 of extra alfalfa seed each acre that you cover. Increase that to 16 lb and now $20 of extra seed is hitting the dirt. Over-seeding costs add up, even across a small number of acres. Calibrating and maintaining your drill will pay important dividends.

Before we get started, it is important to take precaution to ensure your safety. Start out with the drill on a level surface and block the wheels. It is also important to lock or block the raised drill before servicing. If the drill is connected to the tractor, engage the tractor parking brake and/or place transmission in park, and remove the key. When handling drill components, be sure to use proper skin, eye and respiratory protection to avoid contact with residual seed treatment, fertilizer, herbicides or pesticides. Always follow precautions indicated on the product label.

The first step in fine-tuning your drill should be maintaining its seed meters and drive components. Most of these machines use a fluted-wheel seed meter. These meters are adjusted in two ways: changing how much of the wheel is exposed to the seed and altering the rotational speed of the fluted-wheel relative to ground speed. The meters are usually driven by the press wheels or one of the drill's tires, so that seeding rate is linked to ground speed. A chain or inter-meshing gear drive is used to generate a ratio between ground traveled and meter rotations. Sprockets with differing number of teeth (diameter) can change this ratio and therefore vary the range of seeding rates. It is important to realize this ratio begins at the press wheel or drive tire. This is our first adjustment. Tire diameter, the ratio between forward speed and subsequent seeding rate is maintained by proper tire inflation. An under-inflated tire will reduce the gear reduction of the drive, leading to a higher seeding rate as the tire makes more rotations for each acre of ground covered. The opposite is true for an over-inflated tire.

The next step before calibration is to clean out any dirt or grease that may have accumulated on the drive chains, idlers and sprockets or gears. Dirt-laden grease can be abrasive, causing unnecessary wear to the drive components. While cleaning these areas, take a moment to check the chain alignment and attend to any sprockets that may have migrated out of place. The sprockets themselves may also have a story to tell. Check for excessive wear or for evidence that the chain has been not riding properly on the sprocket. These signs could indicate a misaligned sprocket or excessive chain elongation. Chains also may have rusted over the winter. Rusty chain joints can become stiff, resulting in irregular power transmission to the planter's seed metering system. When lubricating chains, do not use lubricants that may cause a buildup of dust or dirt on the chain or associated sprockets. Ask your dealer's parts or service department to recommend the latest in drill chain lubricants.

After servicing the chains, check the meters themselves. Meters and seed tubes should be cleaned of all seed or fertilizer before storing the drill at the end of the season. Any movement of the fluted-wheel adjustment handle should be followed by equal movement of each fluted-wheel. All fluted-wheels should respond with the same displacement to ensure the same volume of seed is metered at each wheel. Also, make sure the feed gate is adjusted for your particular crop. Larger seeds (soybeans, peas) require the gate to be more open whereas smaller seeds (wheat, oats) require the gate to be nearly closed.

Because fluted-wheels meter by volume and agronomists talk in pounds, we need a translation. That translation is built into the seeding rate chart in your operator's manual or the drill's cover. The drill manufacturer developed this chart and it's their best effort to relate seeding rate to meter gear ratio and fluted-wheel position. The relationship between chart and actual seeding rate could be off for many reasons, for instance if your seed has a different bulk density than the seed that was used to make the chart. If your seed has a lower bulk density than the chart, less weight will fit into the volume of each flute and the meter will dispense less weight with each revolution, causing the seeding rate to be lower than indicated in the chart. If more weight fits in, then the seeding rate will be higher.

There are two ways to create your own calibration. The first is a field method and the second can be done in a stationary setting. Each has its own advantages. The field method's advantage is the calibration is determined using field conditions, accounting for any slip or deviation in the diameter of the drive wheel. The second method is a little more involved but can be done before you can get into the field and gives you a little more control in the way the seed is measured. This is the method that I present here.

First, you'll need to measure the diameter (height) of the drill's tire or press wheels. A level and tape measure will make quick work of this. Tire diameter (squat) will change as weight is lost during seeding, so it is a good idea to measure the tire height with the drill about half full. This will give us an average tire diameter. Next, safely block up the drill at its drive tire.

The next step is to simulate covering 1/10thof an acre by rotating the drive wheel or press wheels. Here is some math to calculate how many times to rotate the tire to cover that area for your drill:

Rotations = 16,639 ÷ (W(ft) x D(in))

Example:
W = 10 ft
D = 30 9/16 inches

Rotations = 16,639 ÷ (10 x 30.56) = ***54***

In this equation, the number of tire rotations needed for 1/10 th of an acre is related to a constant divided by the product of the width of the drill (W) in feet and the loaded diameter of the drill's drive tire or the diameter of the press wheels (D) in inches.

During the calibration, you'll need to collect the seed so the total amount metered during calibration can be weighed. To collect the seed for the weight measurement, individual bags can be placed at the end of each seed tube or a tarp can be placed under the drill. After rotating the tire, carefully collect all of the seed dispensed and weigh. The weight of this seed multiplied by 10 is the seeding rate in pounds per acre. For example, if 1.2 lbs is collected, then the drill is seeding at a rate of 12 lb per acre. Repeat this process two to three times to assess your measurement error and if the measurements aren't too far off take an average. If getting a scale this accurate is not possible you may need to seed more area (e.g., one-fifth of an acre) so scale resolution is less of a concern. Multiply number of rotations by two to cover one-fifth acre. Seeding rate will now be calculated by multiplying collected seed by five. Those with scales accurate to one-half pound may need to cover an acre, which would be 544 revolutions of the tire in the above example!

The drill calibration should be repeated as you change crops or if there is a considerable change in seed size (bulk density). Also, note the important role that tire diameter plays in the process. On drills ground driven by a pneumatic tire, tire pressure should be checked daily. Finally, check your drill's operator's manual for more specific information on calibration.

Calibrating your drill may seem like a considerable time commitment, but let's consider seeding 20 acres of alfalfa at a 14 lb rate instead of 12 with $265 per bag seed. That's $10 of extra seed per acre multiplied by 20 acres, yielding you $200. If you spend two hours getting the calibration right as the snow melts, that's a payback of $100 per hour.