MISSISSIPPI STATE UNIVERSITY EXTENSION
Center for Forage Management and Environmental Stewardship

Reduce Seed Cost by Properly Calibrating Your Drill

Volume 10, Issue 5

Rocky Lemus
Extension Forage Specialist

May 2017

Visit us at: **http://mississippiforages.com**

Calibration of drills is important to ensure stand success. Forage seed cost has increased in the last decade and representing a large percentage of establishing a new pasture or hay field. This should have forage producers thinking more seriously about properly calibrating the drill. Calibration of equipment by trial and error as you plant several acres can be costly in many ways. Planting lower seeding rates that required can result in thin stand and higher weed competition. On the Other hand, higher seeding rates could translate in better establishment (not necessarily in higher yield) and higher seeding cost. Forage species and seed lots can vary in their flowability through the drill due to seed size and seeding rates. That is why is important to calibrate the drill even if the same variety is being seeded, but the year and lot of seed have changed.

One of the recommendations when calibrating a drill is to follow the manufacture's recommendations to obtain an accurate seeding rate, but the reference chart is not always accurate. Although the charts can be a good starting point, producers need to remember that there are variations in ground speed, seed cleaning method, seed size, shape, density, weight, purity, and seed coatings or seed treatments creating a discrepancy among the chart recommendation and the actual seeding rate. These discrepancies can range from 25 to 50%. Drills should be calibrated under field conditions whenever possible and calibration becomes more important as the cost of the seed increases.

When calibrating a drill, producers should know two things: the seeding rate and the area covered. The seeding rate is the amount of seed divided by the area covered. Seeding rate is usually expressed in pounds of seed per acre. To determine the effective seeding area. Producers need to measure the width that the seed is actually being drop for specific drill type. For grain type drills it is recommended to measure the distance between the disks opener and then multiply the width by the number of disk openers plus one.

Determining the Distance for Calibration – There is also a need to determine the distance for calibrating the equipment. The distance for calibration can vary depending on the type of the drill being used. It is usually more desirable to use a fraction of an acre to calibrate the drill. Using this approach will help to calculate the seeding rate by multiplying the amount of seed collected by a constant factor. The most common distances used are 1/10, 1/25, 1/50 or 1/100 acre (***Table 1***). To calculate the area covered by an arbitrary distance use the following equation:

$$\textbf{Area Covered} = \frac{[drill\ with\ (ft)\ x\ travel\ distance\ (ft)\ ]}{43{,}560\ (\frac{sqft}{acre})}$$

Determining the Seeding Rate – During the calibration process seed need to be collected to make the necessary adjustments. Keep in mind that the seed must be collected when traveling the distance at the same speed you will travel if the field were to be seeded. It might be good idea to do the calibration in the field that will be planted to account for any variation in field conditions. Before starting the calibration process, it will be helpful to have small containers to catch the seed, large tarp or plastic sheet, container to weigh the seed, scale, calculator and a stopwatch. There are several methods calibrating methods for determining the rate of seed being applied per acre.

1. ***Collect Seed from Driving the Drill over a Distance –*** In the drill, seed tubes can be disconnected and a container or bag can be attached at the end of the tube to collect the seed during the established distance from each seed opening. Once the seed is collected, weight the amount of seed to obtain a seed weight and divided it by the travel distance. Necessary information for this seeding rate calculation includes effective drill width (number of drill rows x distance between rows), distance traveled, and weight of seed collected. For example, a drill has an effective seeding width of 12 ft. In a 200 ft, it drops 1.23 lbs of annual

Table 1. Calculated distance that must be traveled when using fractions of an acres as guide to estimate area covered.

Acre Fraction	Calculating Distance to Travel	Multiplier Factor
1/10	Distance = 4,356 sq ft / seeding with (ft)	10
1/25	Distance = 1,724 sq ft / seeding with (ft)	25
1/50	Distance = 871 sq ft / seeding with (ft)	50
1/100	Distance = 436 sq ft / seeding with (ft)	100

ryegrass. What is the seeding rate?

$$\textbf{Area Covered} = \frac{12\ ft\ x\ 200\ ft}{43{,}560\ (\frac{sqft}{acre})} = 0.055\ acre$$

$$\textbf{Seeding Rate} = 1.23\ lbs \div 0.055\ acre = 22.4\ lbs/acre$$

2. ***Weighing Residual Seed –*** This method is also known as the difference method. The drill should be completely empty and clean before using this method. You can place a known amount of seed in the drill and travel a known distance at the same speed. Then, weight the remaining amount of seed in the drill bin or box. The amount of seed planted will be equal to the initial mount of seed minus the amount of seed left. Although the seed left in the bin can be removed using a shop vacuum, it is important to make sure that the vacuum is empty and clean before starting the removal process and that all the remaining seed is collected. When weighing the seed, always tare the scale to zero for weighing the container or subtract out the weight of the weighing container. For example, five pound of bahiagrass are placed in an 8-ft drill. After traveling 300 ft, it is determined that 2.75 lbs of seed remain in the box. What is the seeding rate?

$$\textbf{Area Covered} = \frac{8\ ft\ x\ 300\ ft}{43{,}560\ (\frac{sqft}{acre})} = 0.055\ acre$$

$$\textbf{Seeding Rate} = (5\ lbs - 3.8\ lbs) \div 0.055\ acre = 21.8\ lbs/acre$$

Calibrating a Broadcast Seeder – When calibrating a broadcast seeder, the spreading width and the driving speed should be determined first. Before starting the calibration and for safety reasons, it is important to remain clear of the spreaders and spinner during the process. To determine the spreading width, select a location that is protected from the wind and lay down a clean and wide tarp behind the tractor. Add a small amount of seed to the spreader and set the gate opening to the desired setting. Keeping the unit in place, turn on the spreader for at least 10 to 20 seconds at the RPM and spinner speed to be used in the field when broadcasting and measure the outer layer where the seeds land on the tarp. To determine uniformity of the spreading pattern, lay several small containers on the tarp to catch the seed (***Fig. 1***). To avoid seed bouncing out of the container, add some cloth or paper towels to the containers.

a. After measuring the spreading width, calculate the distance needed to cover 0.10 acre. For example, if the spreading with is 25 ft, what is the distance needed to cover 0.10 acre?

$$Travel\ Distance = \left[\left(43{,}560\ sq\frac{ft}{ac}\right) \div spreading\ width\ (ft)\right] \times acre$$

$$Travel\ Distance = \left[\left(43{,}560\ sq\frac{ft}{ac}\right) \div 25\ ft\right] \times 0.10\ acre = 174\ ft$$

b. The second step in this process is to determine the driving speed. Using the distance calculated in step a, drive at the intended spreading speed for planting and record the time needed to cover that distance. It is recommend to drive the same distance and get an average speed. For example, let assume that driver took an average of 20 seconds to drive 174 ft. The average speed is then 6 MPH (1 ft/s = 0.681818 MPH)

c. Once the speed have been determined, return to the area where the tarp or plastic is located. Making sure that tarp is clean, add seed to spreaders and turn the spreader for the same length of time needed to drive the distance calculated in step a (in this example, 20 seconds). Collect the seed in the tarp and pour into container and weigh the seed to calculate the seeding rate. It is important to make sure that no seed is spilled from the tarp or the container. If the desired seeding rate is not achieved, adjust the spreader gate opening or driving speed and repeat the process of collecting the seed. For example, if the average time to cover 0.10 is 20 seconds and the amount of seed collected during that time is 2.5 lb, the seed rate should be:

$$\textbf{Pounds of Seed Spread per Acre (lbs)} = Seed\ weight\ (lbs)\ x\ multiplier\ factor\ (table\ 1)$$

$$\textbf{Pounds of Seed Spread per Acre (lbs)} = 2.5lbs\ x\ 10 = 25\ lbs\ per\ acre$$

$$Pounds\ of\ Seed\ Spread\ per\ Acre\ (oz) = [Seed\ weight\ (oz)\ x\ multiplier\ factor\ (table\ 1)] \div 16\ oz\ per\ lb$$

$$Pounds\ of\ Seed\ Spread\ per\ Acre\ (grams) = [Seed\ weight\ (g)\ x\ multiplier\ factor\ (table\ 1)] \div 454.4\ g\ per\ lb$$

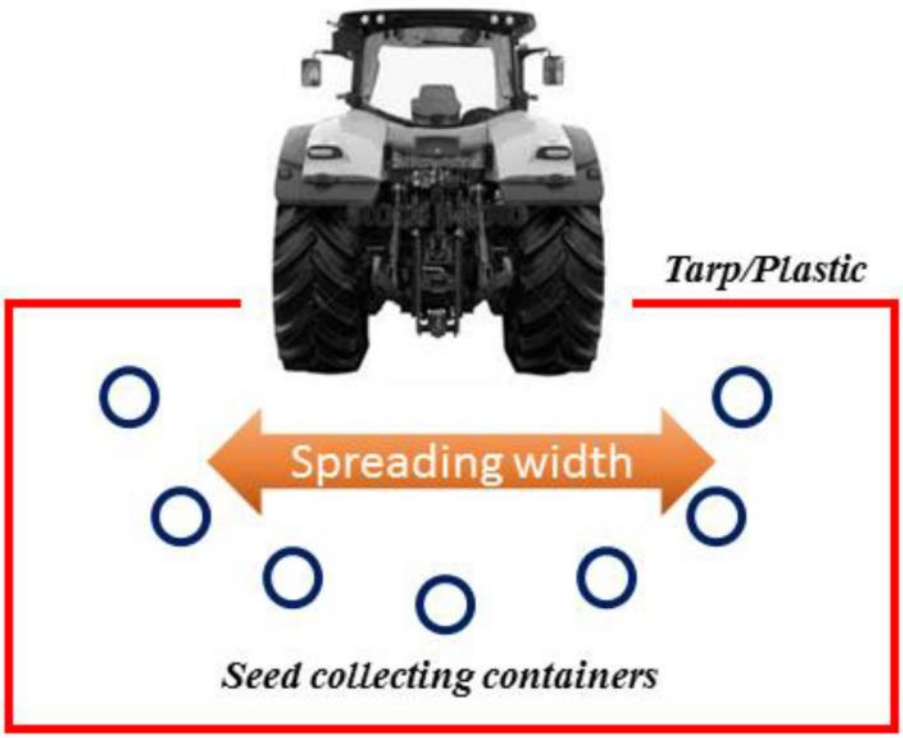

Figure 1. Configuration to determine the spreading pattern when calibrating a broadcast seeder.

Once the drill is properly calibrated using one of the methods described above, it is important to keep in mind that the calculated seeding rates are for bulk seed. A good source for determining seeding rates for you area are seed rate recommendations from your local County Extension Office. These seeding rates can be modified depending on planting date, soil type, type of establishment (till, no-till or broadcast), soil fertility levels, and other factors. To ensure that the recommended plant population, the seeding rate should be adjusted as Pure Live Seed (PLS, percentage of the bulk seed weight that is viable and should germinated when planted at the recommended seeding depth). Pure Live Seed (PLS) is calculated based on the purity and germination of the seed lot and variety. Keep in mind that PLS may vary among seed lots of the same seed variety or species and always ask for this information. For example, bahiagrass is recommended to plant at 20 lb/ac, but the seed has a 95% purity and 75% germination. How much seed should you plant?

$$PLS = \%\ germination\ \times \%\ purity$$

$$PLS = 0.95\ x\ 0.75 = 0.7125$$

$$Seeding\ Rate\ (PLS) = 20\ \frac{lb}{ac} \div 0.7125 = 28\ lb/ac$$

Calibrating the Drill Seeding Depth – Determining the planting depth is as important determining the seeding rate.

Small seeds such as clovers should not be planted deeper than ¼ inch. Planting small seeds too deep can result in poor emergence and poor stands. It is recommended to plant some test strips after the drill calibration. Unless seeds are color coated, they can be hard to see on the ground. To determine seeding depth, spray paint small batch of seed yellow or orange and let them to completely dry. Place these seeds in the seed box immediately above each seed box opening before pouring the rest of the seed. This will allow to see the seed placement in the first rows and adjust the seeding depth accordingly.

After calibrating the drill, it will be a good idea to keep track of the seeding rate after planting a few acres. Most the new drills in the market are now equipped with an acre meter that can be used to monitor seeding rates. Keep track of the amount of seed that you have used and divide the amount of the seed planted by the acres planted. Actual seeding rates may vary somewhat due to groundcover, soil conditions, overlapping between passes, and driving speed. A reason why calibrations are recommended to do in the field to be planted. Additionally, it is useful to check actual seeding rates by maintaining records of seed used and acres drilled over the years. Whether you are planting grasses, legumes or mixes, calibrating a seed drill prior to planting is beneficial so that the correct amount of seed per acre is applied. There is also calibration applications that help you determine the appropriate settings for your drill. Kuhn SA has developed a calibration assistant that could be downloaded from the Google or Apple App Store (http://www.kuhn.com/com_en/mobile-applications-seeders-calibration-assistant.html).

Upcoming Events

May 23, 2017—MS/LA Forage and Beef Field Day, Tylertown, MS
May 11, 2017—Hinds Co. Forage Field Day, Utica, MS
June 2, 2017—Jefferson Davis/Lawrence Co Forage Field Day
June 13, 2017—Alcorn Co. Forage Field Day
June 23, 2017—Warm-season Forage Field Day

For upcoming forage related events visit: ***http://forages.pss.msstate.edu/events.html***