Grain Drill Seeding Rate Calibration Method For Cover Crop Mixes

2020

Know Your Resources:

Local USDA Natural Resource and Conservation Service (**NRCS**) Representative.

Georgia Soil and Water Conservation Commission **(GSWCC)**

Local **Soil and Water Conservation Districts**

Local County **Extension** Agents

Resource Conservation and Development Council (**RC&D**)

Your Neighbors!

Cover crops provide benefits in the form of erosion control, increasing soil organic matter, retaining nutrients with roots that prevent leaching, and provide organic matter for building soil structure. The importance of being good stewards of our agricultural soils was brought to national attention after the dust bowl events and the widespread loss of agricultural soils in the early 1930s. With increasing trends in human population, there exists the potential for greater demand of agriculturally produced goods and services. Historically, cover crops have been introduced into agricultural systems as a tool for conserving soil or weed management.

Other ecologic benefits of cover crops have been recognized, including improved water quality, increased crop productivity, and production of livestock feed (Hobbs et. al., 2008). Planting legumes can add nitrogen (N) to soils, while other species of non-legume grasses can add organic matter and reduce erosion. Some species of brassica have large taproots that reduce the compaction of soil (Chen and Weil, 2010; Ebelhar et al., 1984; Kasper et al., 2001). Using cover crop combination recipes is an option to provide seasonal vegetative cover for protection or improvement of the land.

The purpose of this brochure is to provide one way of calibrating a No Till Seeding Drill. This allows for planting of multi species cover crop in one pass over a field.

The first step is to identify the desired result of using a cover crop blend. Do you want to suppress weeds? Would you like to try and cut back on the amount of fertilizer applied to crops?

Need help making that decision? Your Local Natural Resources Conservation Service (NRCS) office or any of the other resources listed on this page can help.

Visit https://gaswcc.georgia.gov/additional-resources for helpful links on cover crops and to download a **NRCS** produced **Cover Crop Decision Tool Spreadsheet**. This tool can be used to generate species recommendations for planting based on desired results!

Recommended Supplies:

- SCALE
- ESSENTIAL TOOLBOX
- TUBS LARGE ENOUGH TO HOLD SEED MIXTURES
- GRAIN SCOOP
- DESIRED SEEDS FOR BLEND COMPONENTS
- NOTEPAD/LOG BOOK AND PEN
- CALCULATOR
- DRILL OPERATING MANUAL/ SEEDING CHARTS

After you have identified and purchased your cover crop seeds, it's time to get the drill set up and calibrated. This brochure provides instructions on how to combine and load multiple seed species into seed boxes for planting. Taking the time to calibrate the drill allows for certainty of applying the intended amount of seed onto one's property.

For this example, we will be using general information and machine –specific numbers provided by each individual drill. The equations and calibration process apply for all drills. (This example uses information from a Great Plains 3P606NT Drill)

Let's assume that we are using a Fall Cover Crop Blend consisting of:

- **Cereal Rye @ 31 lbs. per acre**
- **Radish @ 2 lbs. per acre**
- **Vetch @ 4 lbs. per acre**

The total weight of the species mix to apply s targeted @ **37 lbs.** per acre.

- Your drill's operating manual should provide an indicated range for crank revolutions per acre or hectare along with seeding rate charts organized by specific plant species.

- A test to calibrate your drill with your mix for the whole acre is not practical, so we can reduce the indicated revolutions by using a ratio to create a reasonable test. **Let's use 1/10th of an acre.**

In our example, let's assume that the drill we are loading indicates that it has **900** crank revolutions per acre. We need scale that down to 1/10th of an acre by using the equation below.

$$900\ revolutions\ per\ acre\ X\ \frac{1}{10th} = 90\ test\ revolutions$$

When we take our sample of blended cover crops, we will be turning the calibration crank arm 90 times.

By collecting a sample, we can fine-tune the settings on the drill to the desired application rate.

Natural Resources Conservation Service (NRCS) offers technical and financial assistance to farmers for a variety of conservation-based practices including Cover Crops!

Get connected and find your local representative by visiting:

offices.sc.egov.usda.gov/locator/app

There are 40 local Soil and Water Conservation Districts in Georgia. Many of them offer a No Till Drill for planting seeds.

Consult your seeding rate chart to obtain a starting point for the settings on the **Drive Type**, **Seeding Cup Doors,** and the **Seed Rate Handle**.

Identify the largest seed within your mix and locate the seeding rate chart from your drills manufacturer to obtain your initial settings before the calibration test.

DANGER! ***BE SURE TO READ AND FOLLOW ALL SAFTY PERCAUTIONS RECOMMENDED BY THE DRILL MANUFACTURER.****

In our mix the largest seed is Rye. After consulting the seeding rate chart, the drill is initially set to:

DRILL SETTINGS

- APPLICATION RATE = 45
- SEED CUPS= 1

Using a scale, choose and weigh one of your empty containers. Record the weight for later use. **In this example, our container weighed 100 grams or 0.22 lbs.**

Mix and load more than enough seeds into the seed box to perform your test. Disconnect **3** seed tubes and place them into the collection buckets. The 3 disconnect tubes will be used to collect a sample of the amount of seed being applied by the drill.

Crank the arm the identified number of revolutions. In our example it was 90 revolutions.

Place the seeds from your three collecting tubes in the empty weighed container. Weigh the container and the seeds from your sample: this is it'-s **GrossWeight**.

Now, we need to find the **NetWeight** of our sample.

Benefits of Cover Crops

⇒ Reduce Soil Erosion

⇒ Produce and Scavenge Crop Nutrients

⇒ Reduce Soil Compaction

⇒ Provide Winter Weed Suppression

⇒ Improve moisture retention rates

⇒ Increase Nutrient Cycling

⇒ Provide Forage for Livestock

⇒ Improve Soil Microbiology

$$NetWeight = GrossWeight - ContainerWeight$$

$$\mathbf{1.01\ lbs} = 1.23\ lbs - 0.22\ lbs$$

With the **NetWeight** of the sample, we can now determine the **MeasuredRate** of application of the seed blend with the drill set at our initial settings.

$$\boldsymbol{MeasuredRate = \frac{NetWeight}{3} \times total\ \#\ of\ seed\ tubes \times 10}$$

$$\boldsymbol{30lbs = \frac{1.01\ lbs}{3} \times 9(\#\ of\ seed\ tubes\ on\ the\ drill) \times 10}$$

We can use the **MeasuredRate** to adjust our scale to the desired application. To make the adjustment, the **ExpectedSample** weight is needed. The **ExpectedSample** is the weight of what we desire to see in a sample if the application **FieldRate** was calibrated to our target of rate **37 lbs**. per acre. We can use this desired seeding rate to find the **RateSample.**

To calculate the **ExpectedSample,** we need to find the **SamplePerRow** that will represent the amount of the seeding blend pushed through each planting row on the drill.

$$\boldsymbol{RateSample = \frac{FieldRate}{10}} \qquad RateSample: \frac{37}{10} = 3.7$$

$$\boldsymbol{SamplePerRow = \frac{RateSample}{RowCount}} \qquad SamplePerRow: \frac{3.7}{9} = 0.41\ lbs$$

Cover Crop Mixes

Cover Crops

—Grasses—

- Cereal Rye
- Oats
- Wheat
- Barley

—Legumes—

- Clover
- Peas
- Lupine
- Vetch
- Sun Hemp

—Brassicas—

- Turnip
- Radish
- Rapeseed

Plug the **SamplePerRow** and **RateSample** into the **ExpectedSample** equation.

$$SamplePerRow \times SampledRows = ExpectedSample$$

$$0.41 \times 3 = 1.23\ lbs$$

The sample weight from the three tubes if the drill was set to distribute 37 lbs. per acre of the blended seed should have been close to **1.23 lbs**. From our first sample taken recall that we measured **1.01 lbs**. The drill needs to allow more seed.

To achieve the desired seeding rate per acre, we must adjust our seed rate handle setting from our initial setting of 45 on the scale to a **NewScale** that will provide more seed per acre.

$$NewScale = \frac{DesiredSeedingRate}{MeasuredRate} \times InitialScaleSetting$$

$$\frac{37}{30} \times 45 = 55.5$$

From our exercise we will need to adjust the application rate setting from the Initial setting of 45 to the **NewScale** setting of **55.5.** This formula provides a starting point for a new setting that should be closer to the desired application rate of 37 lbs. per acre.

Each machine will vary. To ensure accuracy rerun the calibration test until the desired application rate has been achieved. Record and save your settings for future reference.

NRCS and The Plant Materials Center in Americus, Georgia have produced a great document that provides instructions for using small seed attachments and adjusting planting depth settings.

Find a link to this and other helpful documents by visiting:

https://gaswcc.georgia.gov/additional-resources

Cover Crop Mixes

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