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Planter Preparation, Maintenance and Calibration

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Planter Preparation and Maintenance

Every planter should be cleaned in preparation to head back to the field each season. However, getting a planter ready for optimum seeding is more than cleaning. Final yield can vary dramatically on the basis of plant populations in the field, so it is best to plant adequate seeds to ensure that the final plant stand is optimum for the desired yield. Obtaining optimum yield depends on how you prepare and set your planter. Adjusting planters to plant a specified number of seeds per foot of row is important in obtaining a proper stand.

Below is a checklist that growers should run through to ensure the best stand for any crop. Planters should be checked from the safety chain to row drive units. It is suggested to:

1. Check the drive trains; make sure they are not rusted or stiff.
2. Check the shaft bearings and sprocket bearings for their shape and condition. They should be well lubricated.
3. Clean and inspect the chemical meters used for seed treatments on the planter.
4. Check the opener blades; make sure they are not worn.
5. Check the sprocket teeth for wear.
6. If equipped, make sure the vacuum meter system is clean and seals are not worn to ensure proper metering.
7. Use the owner's manual extensively for calibration.
8. Follow all hourly service requirements and greasing requirements.
9. Stop by the dealer or visit the equipment manufacturer's web site to learn what is new.
10. In the field, dig to expose seeds in the row to be sure the planter is operating correctly. This may help avoid an erratic stand after emergence. Confirm desired seed depth and seed-to-soil contact.

Setting a Planter

Desired Planting Rate

Let's take planting cotton seed as an example. Suppose the desired cotton stand is 38,000 plants per acre. Assuming the number of surviving, healthy plants will be approximately

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80 percent, the planting rate (PR) can be calculated by the following equation:

$$PR = \frac{\text{Plants per acre desired}}{\text{Emergence percentage}}$$

$$PR = \frac{38{,}000}{0.80}$$

$$PR = 47{,}500 \text{ seed/acre}$$

Seed Per Foot of Row Required for Planting

Convert the planting rate to reflect the row spacing in use. (In this example, a 38-inch row spacing is considered to be common in Arkansas cotton production.) An acre of land is equivalent to 43,560 square feet (ft^2).

$$\text{Seed/foot of row} = \text{Planting rate} \times \frac{1 \text{ acre}}{\text{area in } ft^2} \times \frac{\text{row spacing}}{\text{row}} \times \frac{1 \text{ foot}}{\text{inches in a foot}}$$

$$\text{Seed/foot of row} = \frac{47{,}500 \text{ seeds}}{\text{acre}} \times \frac{1 \text{ acre}}{43{,}560 \text{ ft}^2} \times \frac{38 \text{ inches}}{\text{row}} \times \frac{1 \text{ foot}}{12 \text{ inches}}$$

$$= \frac{47{,}500 \times 38}{43{,}560 \times 12} \quad \frac{\text{seeds}}{\text{foot of row}}$$

$$= 3.45 \quad \frac{\text{seeds}}{\text{foot of row}}$$

Note: Count seeds in a minimum of 10 feet of row and take the average to ensure the planting rate is as desired. Check a few rows.

Amount of Seeds Required

To determine the total weight of seeds needed for planting the whole field, it is essential to know the approximate weight of seed required per acre. The weight of seed per acre required will be determined based on the desired plant population, seed germination and seed size. For many crops, size and germination rate vary considerably. Therefore, it would not be wise to depend on the same number of pounds per acre each year. The result could be thick or thin stands.

Most of the seed companies provide information on seeds per pound. If you want to confirm the seed size, count the number of seeds in one ounce of seed and multiply by 16 to get the average per pound. To get a better estimate, check several bags. To calculate the approximate pounds of seed per acre, use the following formula:

$$\text{Pounds of seed/acre} = \frac{\text{(feet of a row/acre)} \times \text{(seed/foot of a row)}}{\text{(number of seeds/pound)}}$$

For example:

Feet of row per acre for a 38-inch row =

$$\frac{\text{(area in ft}^2\text{ in an acre)}}{1} \times \frac{\text{(12 inches)}}{\text{(1 foot)}} \times \frac{1}{\text{(38 inches)}}$$

$$= (43{,}560 \times 12)/38$$

$$= 13{,}756$$

Desired seeds per foot of a row = 6
Seeds per pound = 3,200

Therefore:

$$\text{Seed requirement} = \frac{\text{(feet of rows/acre for 38-inch row)} \times \text{(desired seeds/foot of a row)}}{\text{(seeds /pound)}}$$

$$= \frac{13{,}756 \times 6}{3{,}200}$$

$$= 25.8 \text{ pounds/acre}$$

Pneumatic Planters (Air or Vacuum)

Seed weight for each seed lot can be calculated using the following formula:

$$\text{Seeds/pound} = \frac{\text{number of seeds in a bag}}{\text{pounds in one bag}}$$

Seed companies provide information on the number of seeds per bag and weight of the bag on the seed bag itself or on the seed tag. For example, a 50-pound bag contains 100,000 seeds, so there are 2,000 seeds per pound. Knowing correct pressure (air or vacuum) for the calculated seed weight is essential and can be found in the operations manual of the planter. Correct seed disc (or drum) selection for the calculated seed weight or size is crucial in getting the right work done. Keeping a logbook record of the seed weight and disc number makes it handy to recall the procedures. Using the planter's operations manual, select a correct transmission setting for the desired seeding rate.

Calibrate actual seed drop with the planter transmission settings and the planter monitor readouts. Calibration is recommended at normal planting speeds and seeding rates under as close to field conditions as possible. Simultaneous calibration of any pesticide and fertilizer planter attachments would be a good idea. Application rates are subject to change

from year to year. Use the correct calibration cup for pesticides. The planter toolbar needs to be parallel to the soil surface when the planter is in the ground and running. Otherwise, it will affect disc opener depth, press wheel efficiency and the adequacy of seed-to-soil contact.

Other Issues

1. No-tillage planting

The seeding rate calculations presented above assumed conventional seedbed preparation. In case of planting without seedbed preparation (no-tillage) for small grains or other crop stubble, increasing the suggested seeding rates 10 to 15 percent is recommended.

2. Factors affecting stands

a. Soil conditions – Cloddy, crusted or dry soil may reduce emergence. The desired soil temperature should be 68 to 90 degrees Fahrenheit at the intended planting depth for fast germination and a high rate of emergence.

b. Seed treatment – Fungicides may increase emergence of lower-quality seed.

c. Depth of planting – Planting depths may depend upon soil type and the existing moisture situation. Deeper planting slows emergence and may reduce final stands. Seeds need to be placed in firm, moist soil and covered adequately.

d. Herbicides – Many herbicides can affect stands and seedling vigor in cases of excessive application rates or excessive rainfall.

e. Cultivation – Cultivation in furrow (between rows) will not affect stands. Rotary hoes are useful in breaking soil crusts and in small weed removal, but in the morning hours as the seedlings are brittle, stand loss may occur. Care should be taken to avoid stand loss.

f. Planting speed – Most planters do a much better job if they are not operated too fast. Read the operator's manual carefully to determine the suggested maximum speed.

3. Replanting decision

The decision to replant or to keep a partial stand is dependent on the costs associated with replanting, estimated yield improvement, effects of later planting, uniformity of the partial stand, weed control and the physical condition of the remaining plants.

Good luck for the season!

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