Planter Maintenance and Calibration
by Steve Butzen and Tom Hall

Summary

• Excellent planter condition is required for today’s planting challenges. Of all production variables that affect profitability, planter condition is one of the most controllable.

• Research studies clearly show that planter condition affects the quality of stand establishment, and superior stand establishment is critical to optimizing yield.

• Planter maintenance should begin when the last field is planted. Proper cleaning and storage at that point can save hours of time and effort later.

• Long before spring arrives, growers should go completely through their planter. The seed meters, monitors, drop tubes, row units and drive train should all be carefully examined.

• Pioneer’s MeterMax™ operators offer professional meter inspection, cleaning, maintenance and calibration using a planter meter test stand.

Introduction

Low commodity prices have greatly reduced the margin of error in agriculture. To succeed today, growers must continue to increase their precision in every aspect of their farming operation. One key focus area should be stand establishment. Research studies have shown that high populations of evenly spaced, uniformly emerging crop plants are needed to optimize yields and profits.

Research studies have also revealed that planter condition affects the quality of stand establishment. A split-planter study by Pioneer Hi-Bred (Doerge and Hall, 2000) showed an average yield improvement of 4.2 bu/acre due to planter calibration. At some locations, the advantage for calibration exceeded 20 bu/acre. In a research study conducted by Purdue University, yield losses in the range of 7 to 15 bu/acre were observed in uneven stands (Nielsen, 1997). Clearly, fine-tuning planters to achieve the best possible stands should be the goal of every producer.

Planter and Seed Face Challenging Environment

The challenges facing both the planter and seed are immense. Growers are often planting into cold soils in rough seedbeds with high crop residue. With increased time demands, they are sometimes forced to increase planting speeds as well. In this environment, the seed must be properly singulated and carefully deposited in the soil at the prescribed depth and spacing. The seed furrow must then be closed gently yet firmly to provide good seed to soil contact for proper moisture uptake and germination. Without a finely tuned planter performing at the limit of its capability, excellent stand establishment is unlikely.

Post-Planting Maintenance Prior to Storage

Planter maintenance begins when the last field is planted. At that point, the planter should be cleaned, rust-proofed, and stored out of the weather. Thoroughly clean the coulters and disk openers and apply rust-preventive paint. Lubricate bearings and chains or remove chains and soak in oil.

Remove all the seed and seed treatment out of the planter boxes. Also, immediately remove all the seed out of finger pick-up meters and store the meters in a warm, dry location. For vacuum planters, the seed meters should be disassembled and cleaned with warm soapy water. Do not re-install the seed disks and other meter parts on the planter. To prevent warping, hang the seed disks on a peg in the shop, basement or other location where extreme temperatures and humidity can be avoided. To prevent mixing parts during re-assembly, keep the parts for each meter separate, or mark each part with its row number.

Pre-Season Maintenance

Long before the demands of early spring materialize, growers should have their planters tuned and ready to go. This
involves going completely through the planter and inspecting all moving parts for wear, damage or rust. The seed meters, seed monitors and seed drop tubes, row units, drive train and other systems should all be carefully examined.

Seed Meters

Finger pick-up type

Finger pick-up meters should be disassembled, cleaned, inspected and calibrated every year, or every other year with low use. The backplate, brush and fingers should be carefully examined and replaced if worn. The seed conveyor belt should be checked for wear, brittleness and cracks. When re-assembling, it is important to set the proper tension on the fingers as described in the owners manual.

Pioneer’s MeterMax operators offer professional meter maintenance and calibration using a planter meter test stand. MeterMax service includes pre-testing of finger meter accuracy, then completely disassembling, cleaning and inspecting each part. Operators will carefully examine the backplate, fingers, brush and conveyor belt for wear. Worn-out parts are replaced, and the meters are re-assembled and tested. Adjustments continue until exacting standards for seed drop accuracy are met.

Vacuum or air type

John Deere VacuMeter and White air planters require the proper seed disk and pressure setting based on the weight of the seed (expressed as seeds/lb.). To calculate seeds/lb., divide the number of kernels in the bag by the weight of the bag (both are on seed tag). Use the owner’s manual to identify the proper disk and pressure for the seed weight. Double-check the vacuum setting.

Seed weight can differ between lots of the same hybrid, especially when seed is produced under stress conditions. Keep seed lots separate and be aware of seed weight when switching hybrids or seed lots.

MeterMax technicians can calibrate the vacuum or air pressure setting of your planter and match specific seed weights to proper air pressure settings.

Seed Monitors and Seed Drop Tubes

Seed monitors should be cleaned and checked thoroughly. A bottle brush may be the best tool to rid seed sensors of dirt and seed treatment buildup.

Check seed drop tubes to be sure they are clear and free of obstructions, and not worn by disk openers. Rough edges caused by wear can alter seed drop accuracy. Any hindrance or obstruction that interferes with seed drop can result in poorly placed seeds, even though meters are functioning perfectly. If seed tubes are worn, they may need replacing.

Row Units

In addition to the seed meters, monitors and drop tubes, the other parts that comprise the row unit or affect its function need to be maintained. This includes the tool bar, parallel arms, down-pressure springs, coulters and other attachments, double-disk openers, depth gauge wheels and closing wheels.

Proper function of the row units is critical to achieve good seed to soil contact and help insure even emergence. Very uneven emergence results in competition of late emerging plants with larger established plants, reducing the yield of late plants considerably. In tough seedbed conditions, including high residue, and hard, dry or cloddy fields, achieving good seed to soil contact is especially challenging.

Row units occasionally receive punishment and may become bent, twisted or mis-aligned. To check alignment, mark the center point of the row unit on the tool bar. Go out a set distance each way from the center point and then measure the distance to the back corner of the seed box on each side (Fig. 1). To help prevent future misalignment, lift the planter completely out of the ground before turning.

Tool bar. Be sure the toolbar and attached row units are level. The coulters, double-disk openers and closing wheels are all designed to run level, so this setting is very important. Set the toolbar height at 20 inches for correct down-pressure on springs and to help ensure that row units run level and work as designed.

Parallel arms. The parallel arms should be checked routine-ly, as the bushings and bolts do wear and may need replacing. Down pressure springs are often ignored so check these parts as well. Proper down pressure is needed for uniform seed depth, especially in hard or variable fields. See the owner’s manual for correct down-pressure settings.

Coulters and other attachments can impact seed to soil contact, especially with high residue on the field. Coulter depth is important to cut residue cleanly rather than crimping it and pushing it into the seed furrow. Most coulters should be set to run about 1/4 inch above the depth of the double-disk openers. Be sure that coulters and residue attachments are aligned properly with the double-disk openers.
Double-disk openers must be functioning properly to achieve good seed to soil contact. As disks wear, they become shorter and may no longer meet at the bottom. This results in an irregular furrow, shaped like a "W" instead of a "V" (Figure 4.) This can result in variable placement of the seed and improper closing of the furrow by the closing wheels. If disks measure less than 14 ½ inches in diameter, they should be replaced with new disks measuring 15 inches. Determine if disks are meeting properly at the bottom and adjust if necessary.

Figure 4. Worn disks affect furrow shape.

Depth-gauge wheels. Check depth-gauge wheels to be sure they turn and move up and down freely. Also, be sure the wheels are properly positioned against the opening disks, as this adjustment is overlooked on many planters.

Closing wheels must be centered on the seed furrow. Be sure the wheels turn freely and check the down-pressure exerted on the soil to be sure it is appropriate for the field type (e.g., notill).

Drive Train and Other Systems

Because the seed meters are driven by the planter wheels, it is critical that the tires are properly inflated and in good condition. Replacement tires must be similar to the originals, or the population charts in the owner's manual will not be accurate. Check the manual for recommended tire pressure. Check the planter transmission to verify sprocket settings for your desired plant population. Check all chains for wear and be sure they are properly lubricated and tensioned with no stiff or frozen links.

Planter hydraulic hoses and cylinders should be thoroughly inspected for leaks or wear. Planter markers should be inspected and calibrated. Also check planter electrical systems and tractor voltage.

Acknowledgements

The authors gratefully acknowledge the images and other information on planter maintenance contributed by Precision Planting, Inc.

References


*MeterMax is a trademark of Precision Planting, Inc.