SOUTHERN PIEDMONT CLIMATE-SMART PROJECT led by: RODALE INSTITUTE

What is a No-Till Drill?

A no-till drill is a specialized agricultural implement used to plant seeds without disturbing the soil through tilling. This method helps preserve soil structure, reduce erosion, and improve water retention. Learn more about the operations, uses, functions and advantages of no-till drill use in the information below.

How Does It Work?

No-till drills operate on the principle of minimal soil disturbance. The coulters or openers create a narrow slit in the soil, leaving the majority of the soil structure intact. This helps preserve soil health, organic matter, and soil structure. By leaving crop residue on the soil surface, no-till drills help retain moisture, reduce erosion, and improve soil structure over time. The residue acts as a natural mulch, moderating soil temperature and suppressing weed growth. No-till drills are designed for precision planting, ensuring seeds are placed at the correct depth and spacing for optimal growth. This precision can enhance crop establishment and yield potential.

Key Components

- Coulters or Openers: No-till drills are equipped with coulters or openers that create a slit or furrow in the soil. These discs or blades cut through residue from previous crops and organic matter on the soil surface.
- Seed Tubes: Behind the coulters, seed tubes deliver seeds from the seed box or hopper down into the furrow created by the coulters. The depth of these seed tubes can usually be adjusted to control seed placement depth.
- Depth Control Mechanism: No-till drills have mechanisms to control the depth at which seeds are planted. This ensures seeds are placed at the optimal depth for germination and early growth, which can vary depending on crop type and soil conditions.
- Press or Closing Wheels: After seeds are deposited into the furrow, press wheels or closing wheels follow behind to press the soil back over the seeds. This ensures good seed-to-soil contact, which is crucial for germination.
- Seed Metering System: The seed metering system within the seed box or hopper regulates the flow of seeds to the seed tubes. This system is calibrated to achieve the desired planting rate per acre, ensuring uniform spacing and density of plants.

Dig Deeper

More training resources from the Southern Piedmont Climate-Smart Project

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Safety Tips

1. Familiarize yourself with the Southern Piedmont Climate-Smart Project No-Till Drill SOP. Pay special attention to recommended maintenance procedures and safety precautions.
2. Wear appropriate personal protective equipment (PPE), including gloves, safety goggles, sturdy footwear, and clothing that covers your arms and legs to protect against debris and moving parts.
3. Ensure the tractor used for the field operation is sized appropriately and in good working condition.
4. Follow proper hitching procedures and verify that the tractor's brakes, lights, and other safety features are functioning correctly.
5. Operate the tractor and no-till drill at a safe speed, suitable for field conditions, terrain, and the capabilities of equipment.
6. Be cautious around moving parts such as coulters, seed tubes, and press wheels. Keep hands, feet, and loose clothing away from these areas to prevent entanglement or injury.
7. Follow recommended guidelines for seed and fertilizer loads to prevent overloading the no-till drill. Overloading can affect equipment balance, stability, and maneuverability.
8. When finished drilling, turn off the tractor engine and allow the no-till drill to come to a complete stop before dismounting or performing any maintenance tasks.

Proper Seed Rates

Recommended seeding rates from NRCS, agronomists and seed dealers are the Pure Live Seeding rates (PLS). Drilling requires less seed than broadcasting, but PLS rates should be considered. Accounting for PLS is done using the seed tag on the seed bag. That is, every bag of seed may have some inert or other matter and no seed has 100% perfect germination. This is particularly relevant if you have coated seed. To calculate the actual desired seed rate based on PLS, you take your seed rate goal and divide it by the percent that is actually pure live seed. For example, if your goal is 100 lbs of winter rye per acre, but your seed tag says 98% Pure Seed and 94% Germination, then your target seeding rate would be 100/(0.98 x 0.94) = 100/0.92 = 109 lbs/acre.

Calibrating a Drill

In order to accurately achieve your seeding rate goals, you should always calibrate the drill you are using. Start with the seeding chart either on the inside of the drill box cover or in the drill manual. It will give you a good approximation for the correct setting. However, the seeding charts may not be accurate, with variable seed size even within a species. To get more accuracy, you can put a measured quantity of seed in the drill, travel a known distance, and then vacuum out and weigh the remaining seed. You can also calibrate a drill by determining the number of wheel revolutions in a given length (i.e. 200 ft) and then with the drill in a stationary position, move the wheel by hand as you catch the seed in some manner. There should also be calibration instructions in the manual of your drill.

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