AGRONOMIC Spotlight
Technology Development by MONSANTO ®

Considerations for Using Row Cleaners

This spring has been cool and wet across the region, leaving many fields looking less than optimal for planting. Soils are wet and cold, and many fields have heavy residue, especially if tillage was skipped last fall. Row cleaners can be used on these cool, wet, high residue soils to promote faster soil warming and improve consistency of seed placement by minimizing interference from crop residue (Figure 1). While row cleaners are not a substitute for suitable planting conditions, they may be a useful tool to help maximize yield potential in high residue environments.

Purpose of Row Cleaners

Row cleaners (residue managers, trash whippers, trash managers) are mounted on the planter ahead of the planting unit. Row cleaners are designed to push residue to the side and clear a path for disc openers to create a true 'V' seed trench. A central Iowa study determined that removing residue from the seed row increased corn height significantly and reduced the number of days until 50% emergence[1]. A yield increase, reduced barrenness, and reduced moisture at harvest were also attributed to this type of strip preparation.

Removing residue helps to avoid hair-pinning (bending and pushing straw stalks into soil by double disc openers), which can wick moisture away from the seed in the furrow and prevent good seed to soil contact. By moving residue and exposing bare soil, row cleaners can help increase soil temperatures in the seed zone. This in turn can lead to accelerated germination time. Row cleaners may also help to decrease seedling blights by minimizing contact between potentially diseased residue and germinating seeds. Row cleaners move residue and clods out of the way of disc openers and gauge wheels and thereby help them to maintain contact with the soil surface and to gauge depth effectively.

Row cleaners are not a substitute for suitable planting conditions. Row cleaners can expose wet soil which may stick to depth gauge wheels resulting in uneven seed depth. Residue clearing also must be consistent in order to avoid uneven emergence.

Types of Cleaners

There are two types of row cleaners. Fixed row cleaners mount directly to the planter face plate and are often used in very heavy residue no-till conditions. Coulters may need to be removed when using this type of cleaner. Floating row cleaners have the ability to follow the contours of the field. In

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Figure 1. Uneven emergence in a field of corn planted after corn (left). Properly adjusted row cleaners remove residue from the row and can lead to more consistent planting depth and spacing (right).

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many cases, floating row cleaners may be used in combination with a coulter for additional soil disturbance and residue cutting. With either type of row cleaner, setting the correct height is key.

Proper Adjustment

Optimal adjustment of row cleaners should remove surface residue with minimal soil disturbance. In a Monsanto study, optimal adjustment of row cleaners was defined as removal of the surface residue with slight soil disturbance[2]. Setting the row cleaners too low resulted in a tillage effect up to two inches deep into the soil surface, and a yield reduction of 39 bushels/acre compared with yields when row cleaners were set at optimal height. Row cleaners set too high had minimal effect on residue removal, and yield was 22 bushels/acre less compared with those when row cleaner height was optimal.

When row cleaners are set too deep, seed may end up in ground that was not worked and that is too wet and cold for optimum germination. These conditions may also lead to sidewall compaction. Row cleaners that are set too deep are also more likely to come up cloddy in wetter soils, which in turn can lead to poor seed to soil contact. In addition, too much soil disturbance in the row can lead to soils drying out and crusting over. Row cleaners that are set too high may miss some of the surface residue and leave it in the row. This can lead to poor germination and uneven stands (Figure 2).

For optimum performance from row cleaners, it is important that the planter is level. Without proper adjustment and leveling, row cleaners can create a trench in front of disc openers, which interferes with seed placement. Down pressure should be adjusted frequently to maintain uniform planting depth without creating excessive down force that can result in sidewall compaction. One or two spiked closing wheels can be used to help break up sidewall compaction. Drag chains should be added when using spiked closing wheels. If furrows are prevented from closing because they are too shallow due to compaction or wet conditions, germinating seed may die from exposure to wind and sun.

Figure 2. Uneven emergence due to residue remaining in the row.

In Summary, although row cleaners are not a cure-all, they can be a helpful tool when dealing with cool, wet soils and high residue situations. They are particularly useful when planting corn after corn and may enable earlier planting while helping to ensure optimal conditions for seed germination and plant emergence.

Sources: [1]T.C. Kasper, D.C. Erbach, and R.M. Cruse. 1990. Corn response to seed-row residue removal. Soil Science Society of America Journal. 54:1112-1117; [2]Illinois 2007. Monsanto data; Additional references: K. Balkcom et al. 2010. Managing cover crops in conservation tillage systems. Sustainable Agriculture Research & Education. [Online] http://www.southernsare.org (verified 29 April 2011); D. Griffith et al. 1994. Strip preparations for no-till corn and soybean (CT-4). Purdue University. [Online] http://www.ces.purdue.edu (verified 29 April 2011); G. Hoette. 1997. Missouri no-till planting system manual. University of Missouri. [Online] http://extension.missouri.edu (verified 28 April 2011).