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For Immediate Release

Tillage with No-Till?

Almost 3 million acres of Colorado farmland employs no-till strategies, and this acreage is expected to continue to increase. No-till farming has continued to gain momentum in the state due to a number of positive factors associated with this technique. Benefits of no-till include decreased soil erosion, increase soil moisture retention, decrease in fuel usage associated with tillage, decreased labor costs from not tilling, increased soil carbon, and increased soil organic matter. Most of these benefits result in increases to farm income. However, crop production issues with no-till are showing up more frequently. Issues include herbicide resistant weeds (herbicides for weed control are substituted for tillage) and soil compaction problems.

Weeds such as Kochia and Palmer Amaranth have become resistant to glyphosate herbicides due to excessive use of this herbicide. Both weeds are open-pollinated plants which opens up the resistant gene-transfer possibilities tremendously. As a result, using one herbicide only over a long period of time for weed control basically selects the weed population for resistance to the herbicide being used. Current research indicates more than 40 weed species are glyphosate resistant. Preventing weed seed production to control the above-mentioned weeds is a strategy producers have used for a long time. When herbicides fail, tillage may be an option even in a no-till system to prevent problem weeds from producing seed for next year.

Research is showing that a well-timed one-off tillage (strategic tillage) can control herbicide resistant weeds and prevent the resistant weed from producing seed that will interfere with next year's crop. Strategic tillage performed at some interval (possibly once every two or three years) differs greatly from conventional tillage, which is performed often every year. Strategic tillage can be done with a variety of methods but usually is performed using light tillage tools and shallow depths in Colorado. The strategy involves eliminating, with tillage, herbicide resistant plants before they produce seed. Research is reporting that strategic tillage, when managed correctly, reduces some weed populations by 70%.

Soil compaction is another issue that can be problematic for Colorado no-till producers. Soil compaction is a direct result of traffic or past tillage in fields when soil moisture is too high. Research has also indicated that the winter freeze-thawing effect is not effective for breaking soil compaction, especially in dry soil conditions over winter. In Colorado, topsoil is wind deposited and many soils are silt loam, which is prone to soil compaction issues. Soils that contain more sand do not have serious soil compaction problems and therefore, would not need tillage to address compaction. If tillage is practiced to reduce compaction, consider tilling when soils are dry to enable the best compaction mitigation outcomes. Tilling wet soils can make the issue worse as side compaction layers are created. Tilling dry soil creates fracturing which addresses the compacted layer. Be sure to know where the compaction is located and till to levels just below that depth. Therefore, probe soils to determine the compacted depth, and till just below that depth. So, if compaction is found at 5-6 inches, till to 7 inches and no deeper.

Many agriculturalists agree that tillage should be a last strategy for addressing herbicide resistance and soil compaction. Other cropping system strategies are available such as pre-emergent herbicide applications for resistant weeds and tap-root cropping choices for soil compaction. Disadvantages of tillage include losing

soil moisture, creating fields with water runoff issues, losing accumulated soil carbon, reducing soil organic matter, reducing soil cover, and a number of others. These factors need to be kept in mind when considering tillage in a no-till field. However, researchers at the University of Nebraska found that strategic tillage, when performed properly, did not ruin the benefits of no-till production. Kansas State University research also found that a single tillage did not negatively affect crop production when performed in a no-till system. The key is to have a crop production reason to till, such as resistant weeds or soil compaction. Tillage, just to till, could cost producers money otherwise.

Source: Megan Sever, Crops and Soils