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Fall Versus Spring Tillage, Which is Better

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Abstract
Questions about the timing of tillage and the difference between fall and spring tillage are being asked frequently. As the growing season comes to a conclusion and harvest is under way, this is a good time to start thinking about other fall operations such as tillage. Even though tillage may be needed in certain situations and field conditions, well managed field and proper crop rotation generally may not call for tillage. Before we get into the differences between fall and spring tillage, we would like to stress a few facts that need to be considered in deciding whether or not to till.

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Questions about the timing of tillage and the difference between fall and spring tillage are being asked frequently. As the growing season comes to a conclusion and harvest is under way, this is a good time to start thinking about other fall operations such as tillage. Even though tillage may be needed in certain situations and field conditions, well managed field and proper crop rotation generally may not call for tillage. Before we get into the differences between fall and spring tillage, we would like to stress a few facts that need to be considered in deciding whether or not to till.

There are two main considerations for making a tillage decision – soil conditions and management.

1. Soil conditions include - soil drainage, top soil depth, soil slope, organic matter and soil texture. These factors can have significant effect on how successful the tillage system (no-till or conventional tillage system) is and what kind of effect tillage can have on soil quality, productivity and water quality.

2. The second consideration is management, which include sets of management decisions that are equally important - residue management, crop rotation, equipment availability and efficiency (proper setting of planter for different tillage systems, calibration of combine to ensure uniform residue distribution, etc.), tile drain for managing excess soil moisture, fertilizer program and soil testing, crop hybrids that are suitable to that area of the state, insect and disease control program, and a whole set of other management decisions that will determine the success level of crop production.

These two considerations are critical to achieving the intended results of any tillage system.

The decision to till in the fall or spring will be dictated by many factors that are not easy to control. The two main factors for tillage in the fall or spring are soil moisture conditions and soil temperature. These two factors can have significant impact on soil fracturing, tillage depth, clod size and level of soil compaction. Therefore, soil moisture and soil temperature can influence tillage practice, and ultimately yield and soil quality performance.

Normally, if there has been no excess rain during harvest, the fall soil moisture profile will be more suitable for tillage and soil fracturing than in spring when soil moisture is most often at field capacity or above. When soil moisture is above field capacity any travel on the field whether combining or tilling soil can cause maximum soil compaction.

Tilling soil during spring potentially may: lead to soil compaction, not be very effective in soil fracturing due to high soil moisture, potentially smear soil, and create large sized soil clods. These collectively will be very counter-

productive by reducing yield and soil quality. The decision to wait for tillage until spring can carry certain risks due to time constraints, when rain may prevent farmers from entering fields on time.

If tillage is necessary, fall tillage is a better option because soil moisture is generally below field capacity; there is less potential for soil compaction; and soil temperature is suitable. When soil temperature drops to the freezing point it is not easy to fracture the soil, because the solid water (ice) in the soil prevents it from breaking into small clods. Delaying tillage can have negative consequences on soil condition and ultimately on yield performance.

However, tillage in general needs to be the last management option considered for improving soil tilth and productivity. There are alternatives that are equally as effective as conventional tillage. Site specific conditions, soil quality consideration, water quality consideration and economics of tillage need to be included in the decision whether to till.

Over the past 10 years, long-term tillage studies conducted across Iowa on five tillage systems and three crop rotations show a wide range of yield responses in corn and soybean for different regions in Iowa. These differences in yields reflect various soil and climate conditions across the state. The purpose was to document the most effective tillage and crop rotation combination for each region. The main findings of this research so far are that soybean yields after corn shows no significant difference between tillage systems. In fact soybean in no-till preformed as good or better than any tillage system (chisel plow, strip-tillage, deep ripping and moldboard plow). The choice of tillage for corn is more complex, but as noted above, careful consideration should be given to soil's long-term health and productivity as decisions are made.

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