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Compacted Soils: A Forgotten Yield Limiter

FOR IMMEDIATE RELEASE: Crop harvest is an exciting time for most producers. It is often joked that planting, fertilizing and spraying are all done solely for the chance to get to ride around in the combine. Although most farmers take much pride in every farming practice they endeavor in, it's always nice to get the crop off the field and a paycheck in the pocket. One downfall to row crop harvest is not what's taken off the field, but rather the potential soil compaction that may be occurring below ground.

Compaction can be caused by a variety of issues within the soil. Naturally dense soils, surface crusting and cultural practices can all contribute to compaction. One specifically prevalent during harvest is vehicle-induced compaction. This can be divided into two types, shallow and deep.

Shallow compaction is defined as any compaction occurring within the normal tillage zone. This can be from five to ten inches deep, depending on the location. Shallow compaction is related to the pressure applied to the surface of the soil and is considered temporary since it is usually eliminated by normal tillage practices.

Deep compaction, or subsoil compaction, occurs below the normal tillage zone and is caused by weight or force applied to the soil. It is mostly affected by the maximum axle weight. A moist soil can be compacted to a depth greater than 18 inches by a 10-ton axle load. To put this into perspective, consider that the weight of a 1,050 bushel grain cart is 19,700 pounds when empty. When filled, it can weigh over 78,500 pounds. The grain cart can transfer about 8,000 pounds to the tractor through the tongue of the wagon, so the grand total is 70,500 pounds. If the grain cart has two axles, that comes to 17.6 tons per axle. In addition, a 12-row combine full of corn exceeds 20 tons per axle. Both of these examples have exceeded the 10-ton axle load limit.

If compaction is suspected, look for malformed plant roots, standing water or excessive water erosion, increased power requirements for field operation, stunted plant growth and reduced yields. Also note that yields will be most affected in a dry year since soil strength increases as soils dry.

The best cure for compaction is to avoid it. To reduce the potential and minimize compaction, limit traffic when fields are wet and confine the majority of the traffic to the end rows as much as possible.

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