Can Tap-rooted Winter Cover Crops Alleviate Subsoil Compaction? (S06-williams132930-Poster)

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Abstract:

Deep-rooted cover crops may alleviate effects of subsoil compaction with less expense and more benefits than tillage. We hypothesize that tap-rooted cover crops penetrate compacted soil when wet and relatively soft during winter, leaving channels that enable roots to better penetrate the soil profile during the summer. We conducted replicated experiments in four MD/PA locations with compacted soil layers 25-45 cm deep. Treatments included no-till management of three tap-rooted Brassica cover crop species (forage radish, oilseed radish and canola), cereal rye, a radish/rye mix and a no-cover control. Other treatments consisted of radish/rye and a no-cover following deep chisel tillage. We used a minirhizotron camera to observe cover crop and soybean roots to 40 cm deep. We observed soybean roots growing in channels made by cover crop roots. We monitored soil water above and below the compacted layer using gypsum electrical resistance blocks and soybean water stress using infrared thermometer measurements of leaf-air temperature. Initial data suggests soybean water stress correlated with soil strength or bulk density. Heavy mulch left by the rye cover crop resulted in significantly higher soil water during the soybean growing season.

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