Satellite Conference Studies Ways To Prevent Soil Compaction

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HERSHEY (Dauphin Co.) — What do silage trucks, grain bins, manure spreaders, and combines have in common?

For one thing, they are major contributors to soil compaction on the field.

And soil compaction contributes to plant disease, yield problems, and other factors detrimental to farming.

Panelists answer questions from the satellite audience at the conference. Left to right: Marvin Hall, assistant professor of forage management; Greg Roth, assistant professor orf corn management; and Lynn Hoffman, agronomy senior research associate.

Lynn Hoffman, agronomy senior research associate at Penn State, spoke to farmers at a Crop Production Satellite Seminar broadcast from Mitchell Studio B at University Park. The broadcast was "downlinked" to various locations throughout the state, including Hershey, Hazleton, Williamsport, and other sites.

"The most common cause of compaction problems is getting on the field at the wrong time of the year, (using) tillage tools, discs or plows, or getting on the field with heavy loads," said Lynn Hoffman, agronomy senior research associate at Penn State.

Broadcast downlinked

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At University Park, signals were sent to G Star 1 satellite on the Ku Band, Channel 12, at 11,927 megahertz. At the Hershey downlink location, about 30 farmers listened to Penn State crop experts on studies dealing with soil fertility, compaction, plant diseases, and pest problems.

Hoffman spoke about soil compaction and the effects on crop growth.

In general, the higher clay content of the soil, the more likely a farmer will encounter compaction.

Test for compaction

But farmers must first be able to test for compaction and determine if, in fact, other problems exist in the field as well.

The best way is to test for compaction. Sometimes the compaction layer could be on the surface or up to 8 inches below the surface, according to Hoffman.

To identify a compaction problem, a farmer can dig with a backhoe or use a shovel to find the compaction zone. Or if they take a soil sample, the common soil probe, if used to push the soil, can determine where compaction exists.

"If you have a compaction problem, there'll be a spot there where you'll feel some resistance and all at once that soil probe will go down much easier," said Hoffman. "If this shows up in your field more than once or twice, try to watch and see if it's showing up at about a consistent level." Hoffman said the compaction could be deeper than the topsoil.

Reach beneath topsoil

Another way to measure compaction is with a ¾ -inch rod with a handle welded to the top. The probe is long enough to reach deep beneath the topsoil. Or farmers can use a penetrometer — a device like the soil probe which includes a resistance dial to determine a range of compaction layers.

"It's important that you recognize just where that compaction layer is in the soil," he said. There are a few ways a farmer can relieve compaction. One is by planting some crops that have the ability to penetrate the compaction layers (such as soybeans, buckwheat, or alfalfa) which have a good rooting system, said Hoffman.

For a shallow compaction problem, standard tillage equipment can break the zone. For a deeper compaction problem, farmers can use deep tillage equipment, such as a V-ripper or a paraplow to get the job done.

It's important, according to Hoffman, that farmers find out exactly how deep the problem is. "You don't want to relieve that compaction with your deep tillage tool any deeper than that compaction layer. If you come back in there with a piece of heavy equipment and recompact the soil, it's going to compact down there at the depth you actually relieved the compaction layer the last time."

Modify equipment

Preventing compaction is another way farmers can curb the problem through the use of equipment modifications.

In the case of a manure spreader, a farmer can use 1020 truck tires with tandem axles. This spreads out the compaction zone. Also, flotation tires (using 22-28 pounds of pressure per tire) can create a different footprint to help distribute the weight of the load that is placed on the spreader.

"The amount of compaction you cause on a load will be in direct proportion to the amount of air pressure you have in that tire," said Hoffman.

Using a different type of tire or tire width is an important consideration, "one that you can carry out to other tools on your farm like silage wagons and grain wagons," he said.

Tandem tires

Front tractor wheels also hold to about 30 to 50 percent of the total load. But using tandem tires or wider tires can also help considerably in reducing compaction. Also, a four-wheel drive tractor reduces compaction because it reduces tire slippage.

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