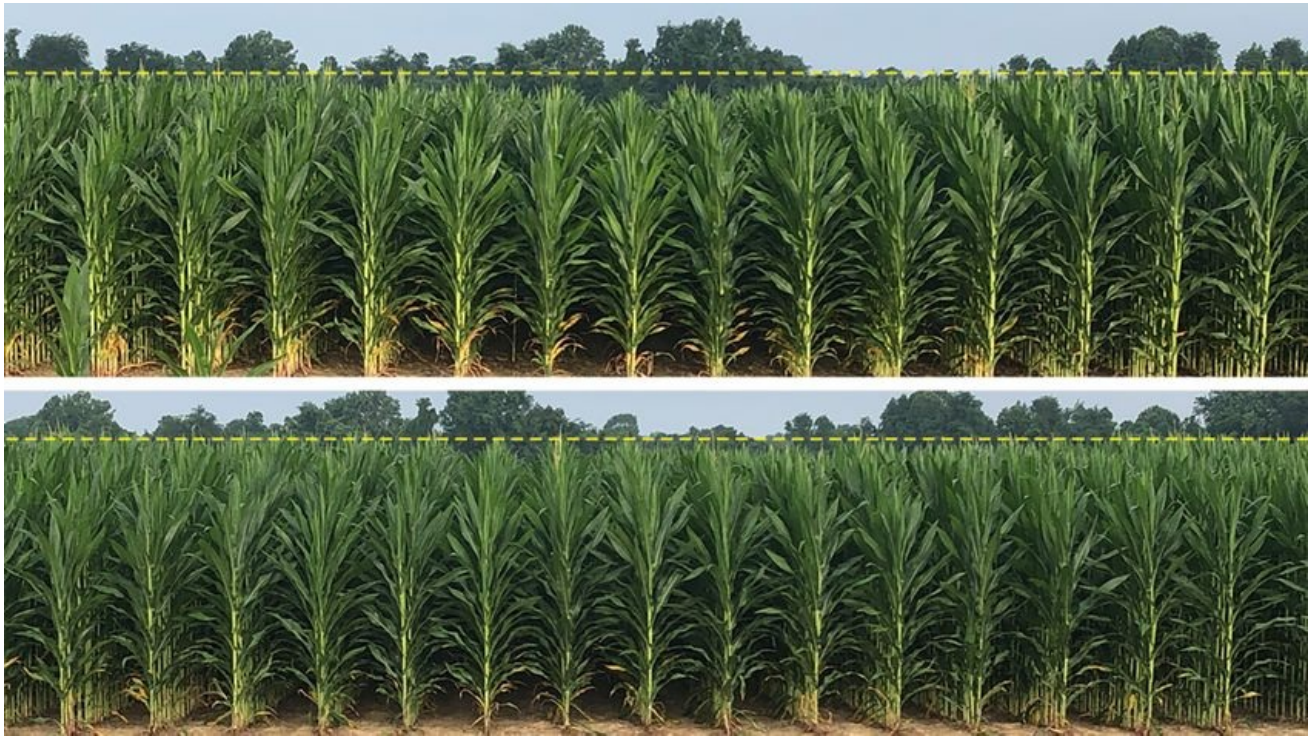

The 2020 AGCO Crop Tour completed comparisons to help answer key questions many growers have, including determining if there is yield loss in the center rows planted with high-capacity, central-fill planters. AGCO agronomists also investigated ways to mitigate center-row compaction when planting with high-capacity, central-fill planters.

AGCO Crop Tour Harvest Report No. 1: Planter Compaction Yield Penalties

Observations indicate soil compaction from wheel traffic and pinch rows can be managed.

January 19, 2021

DULUTH, GA – AGCO Corporation (NYSE:AGCO), a global leader in the design, manufacture and distribution of agricultural machinery and solutions, has released yield results from its 2020 Fendt® Momentum® Crop Tour.

During the 2020 growing season, field demonstration plots were planted in five locations in the United States, including Illinois, Minnesota, Ohio, North Dakota and South Dakota. In addition to continued comparisons of the impacts of various planting depths, downforce levels and seed singulation on corn yield, the AGCO team also measured the effect of equipment-induced soil compaction on the crop in 2020.

“Soil compaction caused by wheel traffic is an increasing concern among farmers, especially due to the weight of today’s tractors and high-capacity, central-fill planters,” says Jason Lee, AGCO agronomist and farm solutions specialist. “Compaction can restrict root growth, limit nutrient and water uptake and ultimately lower corn yield. Our plots in 2020 looked at ways growers can reduce compaction at planting and avoid those yield penalties.”

The AGCO team asked three questions regarding planter-induced soil compaction:

1. Is there yield loss in the center rows planted with high-capacity, central-fill planters?
2. Can yield loss be mitigated when planting with high-capacity, central-fill planters?
3. Does pinch-row soil compaction cause yield loss, and if so, how much?

Corn was planted at all five locations with a Fendt Momentum planter pulled by a row-crop tractor running dual tires. All comparisons were planted in 30-inch rows, with the exception of the North Dakota location where the corn was planted in 22-inch rows.

To compare the impact of compaction caused by tire pressure and planter weight, the plots were planted using one of three settings on the Momentum planter:

- Load balance. The planter's optional Load Logic™ system automatically monitored and hydraulically transferred weight equally to all wheels, while also automatically adjusting tire pressure to the lowest manufacturer-recommended psi for the weight.
- Controlled traffic. The system intentionally pulled weight from the wings and concentrated it on the in-line tandem transport wheels, also with auto-adjusted low tire pressure.
- Disabled. The Load Logic system was disabled so the planter operated much like other central-fill planters, with the weight concentrated in the middle of the planter and tire inflation pressures at a static 55 psi, a common road-transport pressure level.

To allow for yield comparisons, rows from wing sections of the planter were harvested separately from the center section at four of the locations. At the Ohio location, each row was harvested individually to determine its yield.

Takeaway No. 1: Eliminating pinch rows likely to improve yields

Of all the yield data, none was more telling than the row-by-row comparison made at the Ohio location, where Lee described the soil condition at planting as "a little tacky." This led to some soil compaction, which restricted root growth and impacted the corn crop later in the season when the weather turned dry.

Rows were designated as pinch rows (those with a tire track on both sides of the row), affected rows (those with a tire track on one side of the row) and non-affected rows (no tire tracks). The resulting agronomic message was clear: Pinch-row soil compaction reduces yield, especially in less-than-ideal planting conditions.

"Because of its in-line tandem wheel design, Momentum creates no pinch rows unlike other planters where there are tire tracks on both sides of a row," Lee explains. "The dual wheels on our row-crop tractor created two pinch rows, and those rows averaged about 194 bushels per acre, whereas the rows without wheel compaction averaged a little more than 203 bushels per acre."

The two pinch rows created by the tractor yielded 9 bushels less than the rest of the rows across the planter. When that loss is averaged across the entire planter, the total yield penalty from pinch rows was 2 bushels per acre in this comparison.

"While it's only one year of data at one location, our results mirror the same yield penalty that others have demonstrated. The more pinch rows in your setup, the larger the potential impact on overall yield in a field. That being said, how many pinch rows are you creating at planting?" asks Lee.

Lee notes it was interesting that the plot showed virtually no yield difference between rows affected by compaction on only one side and rows without compaction.

"I would have expected some yield loss. We'll repeat these demonstrations in other soil types with varying planting conditions and tillage practices to see if the trend continues," he adds.

Takeaway No. 2: Planting into ideal soil conditions is best

Lee says that at three of the five locations, there was no yield difference on average between wing sections and the center planter section, regardless of the combination of air pressure in the tires and how the planter weight was managed.

"We recorded an average yield difference of less than 1 bushel per acre, so you have to ask why," Lee says. "And the answer is simple: When we planted at those three locations, the conditions were ideal. The soil moisture was incredibly fit for planting, to the point we weren't going to create enough compaction to produce yield differences. I think it really emphasizes the importance of planting into fit conditions."

Takeaway No. 3: Yield loss from center-fill planter compaction can be mitigated

The 2020 AGCO Crop Tour demonstrated the effect of equipment-induced soil compaction on corn yield. This photo illustrates the impact of soil compaction from planting into wet soils in a field that was "super flat and poorly drained". The poor stand establishment shown is a stark reminder of the importance of planting into fit conditions whenever possible.

At the North Dakota location, wet soil conditions at planting led to soil compaction, providing a different yield result. With Momentum's weight-transfer system enabled and spreading weight across the entire planter, rows from the planter's center section averaged 8 bushels more per acre than when the system was disabled and weight was concentrated in the center rows.

"Yes, we want to plant into fit conditions, but oftentimes Mother Nature doesn't cooperate," Lee says. "That's what happened in North Dakota. Our location was super flat and poorly drained. Planting into that wet soil made it quite evident that by spreading the weight of the planter across the entire machine we can mitigate compaction-induced yield loss from high-capacity, central-fill planters, especially in the center section where the planter weight is typically concentrated."

Growers often select high-capacity, central-fill planters to increase productivity and maximize the acres they plant during the short planting windows that provide optimum yields. However, the planter's weight may have negative agronomic consequences leading to yield loss. The 2020 Crop Tour confirmed this conundrum but offers a solution in the form of Fendt's innovative planter design.

"With Momentum, we don't have to sacrifice the agronomics to be productive," Lee says. "I'm looking forward to the 2021 Crop Tour and learning more about how we can help growers improve their planting practices and ensure their corn crop reaches its full yield potential."

For more information about best planting practices and observations from the AGCO Crop Tour, watch the 2020 Fendt Momentum Virtual Crop Tour online at https://youtu.be/Viqxt06_NMw. Visit www.fendt.com/us/planters or contact your local dealer to learn more.

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