

## Impact of In-Season Sprayer Track Ruts on Corn

Questions arising from corn fertility presentation have been asked about the yield impact of in-season field traffic with field sprayers applying pesticides and supplemental nitrogen.

The concern was, that compaction in the ruts would limit root growth and subsequently reduce nutrient and water uptake, therefore limiting yield.

**Figure 1. Sprayer ruts in corn field (2016), visible at harvest.**



University of Minnesota studies indicate a possible 17% yield loss when corn is planted into parts of fields badly rutted *during the previous harvest*<sup>1</sup>. But yield loss data due to in-season wheel traffic ruts and compaction between rows is limited.

Most of Manitoba Agriculture's applied corn nitrogen research is done in farmer's fields, so sprayer traffic through plots does occur.

Manitoba Agriculture Soil Fertility Specialist, John Head, is seldom concerned as compaction ruts are rarely visible. However in 2016, on one of the sandy loam sites, sprayer ruts were 3-4" deep and quite visible, so they were taken to yield (Figure 1 and Table 1).

Corn yields were hand harvested, so comparisons could be made to rows with wheel track rut on one side versus corn rows not beside wheel tracks (Table 2).

**Table 1.** Corn yield of rows beside a wheel track or not beside a wheel track.

Nitrogen rate lb N/ac	Rows not beside wheel track	Row beside wheel track rut	Yield Scaled up to Whole Field *	Normal row vs rutted row difference	Whole Field Impact from ruts
	Yield bu/ac				
0-80	186	156	183	-30	-3
160-200	206	205	206	-1	0

\* a 100 foot sprayer would cover 40 rows of 30" spaced corn. Since 4 rows out of 40 are beside a wheel track, only 10% of the field is affected.

The observations, though not replicated shows an interesting trend.

- Where nitrogen (N) supply was inadequate, yield was reduced an average 30 bu/ac in that row beside a rut. But when scaled up to field scale using a 100' sprayer, this amounts to a 3 bu/ac or 1.6% yield loss.
- Where high N rates were applied there was no yield impact. It's possible the higher fertility compensated for any reduced rooting in the rut.

Grain moisture was only slightly higher in the rows beside ruts (+0.7% moisture).

It makes good sense to minimize field rutting by spraying when soils are dry. But since sprayers cover such wide swaths, there is minor yield impact across the field. The yield penalty of delayed weed control or nitrogen deficiency may well exceed the impact of ruts.

## References

<sup>1</sup>DeJong-Hughes, J. 2011. Ruts, Rolling and Tillage. <https://www.agvise.com/wp-content/uploads/2012/11/2011-Jodi-Ruts-Rolling-and-Tillage-Seminar.pdf>