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Compaction Study

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Compaction Study

Abstract

The Doon Compaction Study was started in the spring of 1997. The goal was to determine the impact heavy grain carts might be having on the Moody soils and how deep-tilling might reduce the yield loss.

Disciplines

Agricultural Science | Agriculture

Compaction Study

Kris Kohl, ag engineering field specialist

Introduction

The Doon Compaction Study was started in the spring of 1997. The goal was to determine the impact heavy grain carts might be having on the Moody soils and how deep-tilling might reduce the yield loss.

Methods

Plots were established in the spring of 1997 by compacting half of the plots using a 13.7-ton axle weight grain. The total weight (tractor and cart) was 25 tons. Plots were tracted so that every square foot was compacted. The plots were then split into four subplots with one receiving V-ripping in the spring and one in the fall, one receiving V-ripping in both the spring and fall, and one receiving no deep tilling.

Compacted Plot

Spring V-rip	Spring & Fall V-Rip
No V-rip	Fall V-rip

Non Compacted Plot

Spring V-rip	Spring & Fall V-Rip
No V-rip	Fall V-rip

All plots were lightly disked prior to planting. There are three replications of each

compaction and non-compaction treatments, and all plots are in a corn-soybean rotation. Yields are collected on the corn portion of the rotation when compaction is considered to cause the greatest yield reduction.

Results

The 2000 yield results showed higher yields on the compacted plots. More tillage may have caused the soil to dry out and may have reduced the seedbed quality in a dry year. Plots on the side hill had the highest yields regardless of previous compaction. Dry years do not allow the crop to reach its full potential and are not good years to evaluate compaction problems as indicated by the 2000 season data.

Average yields for the last 4 years are presented in Table 2. The compacted soil seemed to respond to the V-Rip treatment in the spring immediately after the compaction event. This research would support trying to elevate a compaction problem as soon as possible after it has taken place. If no compaction has taken place deep tilling does little benefit on the moody soils. The differences over time are getting smaller each year.

Acknowledgments

The Sioux-Lyon Implement Company supplied the tractor, grain cart, and V-Ripping equipment. The Doon Elevator supplied the corn to compact the plots. Their help is appreciated. Mark Hanna, ISU ag engineer, helped plan and layout the study.

Table 1. Yield results for 2000 soil compacted in 1997.

<u>Year</u>	<u>Treatment</u>	<u>V-Rip Treatment</u>	<u>Yield</u>
2000	No compaction	No Ripping	142.6
	No compaction	Spring	140.7
	No compaction	Fall	145.5
	No compaction	Spring & Fall	133.8
	No compaction	Average	140.7
	Compaction	No Ripping	148.7
	Compaction	Spring	148.0
	Compaction	Fall	137.0
	Compaction	Spring & Fall	140.4
	Compaction	Average	141.5

Table 2. Four-year yield averages on compacted and non-compacted plots.

<u>Year</u>	<u>Treatment</u>	<u>V-Rip Treatment</u>	<u>Yield</u>
1997-00	No compaction	No Ripping	150.6
	No compaction	Spring	150.5
	No compaction	Fall	154.0
	No compaction	Spring & Fall	146.3
	No compaction	Average	150.3
	Compaction	No Ripping	152.4
	Compaction	Spring	154.8
	Compaction	Fall	141.6
	Compaction	Spring & Fall	142.5
	Compaction	Average	147.8