

What's Been Happening with Roots in 2008 In-the-Row Right Under Spring Strip-Till?



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Our field research to better understand how roots in a strip-till system function and give the grower a better chance at reaching his/her potential yield has gotten past the first two stages of observations at the Lexington, Nebraska Orthman Research Farm. We compiled all the data from the 25th day after emergence (DAE) and 55th DAE from different fertility rates, a seed treatment study, pre-plant fertilizer and a set of check rows using all the same Mycogen variety of corn.

The information we share here does not infer that one fertilizer or seed corn answers all the questions but if the systematic approach we employ of strip-till can help growers reach their yield goals. This spring all arrows pointed in the direction that we would be on our way to hit a goal of 200 bu/ac plus. The clouds arrived and we have had over 28 inches of rain since April 1. Mercy! The Central Platte Valley is feeling the effects of a shallow water table along with some flooding-out issues since the clouds opened up. Our soils remained cold and wet for so long that root development has been retarded considerably in ridge-till, strip-till and conventionally tilled ground.

The first look during the week the corn was 25 days old demonstrated some interesting features. In the following table we observed corn growing as expected in cold, wet soils. The varieties we chose are 111 to 114 RMD (relative maturity days), just so that is understood.

Table 1. Orthman Strip-till Corn Root Research at 25DAE - Lexington, NE June 2008

Seed Company	Fertility Program	# Prim. Nodal Roots	Depth of Rbots [max]	# Advent Roots	# 2nd set Adv Roots	Total No. Adv & Nodal Roots	Ht of Center leaf [in.]
Mycogen	ppl w/ST	15	12	8	4	24	28-33
Dekalb	ppl w/ST	15	12	8	3	23	26-32
Mycogen	check-8rows	8	10	6	2	20	18-28
Mycogen	ppl w/ST & SC	18	15	13	4	33	29-36
Dekalb	ppl w/ST & SC	18	16	12	5	33	32-36
Mycogen	check-8rows	8	8	7	2	17	15-26

Legend of Fertility program: ppl w/ST [pre-plant 52#N, 56#P, 12#K, 6#S, 1#Zn with 1tRIPr]

ppl w/ST & SC [pre-plant 52#N, 56#P, 12#K, 6#S, 1#Zn with 1tRIPr + New Seed Coating experimental]

check-8rows: no pre-plant, no fertility w/ strip-till 1tRIPr

In the next few weeks the rains did not relent totally, the water table has subsided some to 30 inches or more down below the soil surface and we completed the 55 DAE root digs. The corn has made strides at 'growing up' to be real corn that passers-by could say it might make something. But nearly all of the Central Platte River Valley is looking as though corn is slow and uneven.

We would like to say the corn roots are growing gang-buster and 250 bushels here we come. With water tables at 30 inches in late July and cold soils of temperatures below 55° F. near the water table, roots are gasping for air and slowed way down for growth. We here at Orthman have stated often that corn root development is very dependent upon soils warming to have deeper root growth. When soils shiver at temperatures of 55°F. into the month of July, corn root growth will be retarded (slowed). Best vertical root development for corn is 55 to 63°F., this was all investigated by a team of soil scientists out of the University of Georgia in the late 1990's.

As you observe in the next table, at 55DAE the root systems are gaining and sure tell us that the water table is a significant impasse for the roots to go deeper.

Table 2. Corn Root Development at 55DAE at Lexington, NE July 2008

Variety Plots	#Nodal/Primaries	#Adven Roots	#2nd Set Adven.	Total # Roots	Rooting Depth
Dekalb plot A1 w/seed coat	24	14	10	48	29
Dekalb plot A2 w/seed coat	26	12	10	48	28
Dekalb plot B1 w/seed coat	23	12	12	47	27
Dekalb plot B2 w/seed coat	24	12	10	46	29
Mycogen plot A1 w/seed coat	26	12	10	42	30
Mycogen plot A2 w/seed coat	22	10	12	44	31
Mycogen plot B1 w/seed coat	22	14	10	46	27
Mycogen plot B2 w/seed coat	22	12	10	44	31
Check/no-pre-plant Mycogen	12	10	12	34	28
Myco Strip-Till pre-plant only	15	12	10	37	30
Kugler 4gal/ac Mycogen	18	14	12	44	27
Kugler 6gal/ac Mycogen	16	18	14	48	33

Water table is consistent from 30 to 38 inches deep across plots on July 23, 2008

Height of the corn plants were in the 12-14th leaf stage and were ranging from 55 to 70 inches tall.

Discussion

It is after years (35+) of looking at roots I am intrigued that the root system in cold wet soils are doing so well. The nodal/primary root system with the sustained release Kugler fertilizer in-furrow products are going places which is good in a water and cold stressed soil environment. Agronomically that is quite important for all of us. The check plots do depict a need for fertility and we wanted to show that in a year when fertilizers seem to have climbed onto an Atlas rocket and left the earth's orbit. It is not a year to fudge and not use fertilizer as a starter or pre-plant. The color, width of ear leaf, and longer stem internode spacing all help us draw a similar observation that fertilizer is an important element to best fertility management in high yield corn.

The experimental seed coat material has caught the scientists eyes and attention with a sharp turn around (similar to whiplash effect) who developed this material and me too.

Orthman strip-tillage was chosen because we know that it is one-of-the-best seedbeds going, and being precision minded about how we fertilize and drop seeds will go a long way to getting a successful study off and running. Farmers in Texas, Kansas, Colorado, Nebraska, Iowa, Indiana and many other states we carry out research in, will say the strip-till advantage is there for sure to plant behind.

Keep watching what is posted here on PrecisionTillage.com. We will keep you abreast of the progress and final yield. On September 12th at the Lexington, Nebraska Orthman North Plant location we will be having our 2nd Annual Field Day to discuss the field studies and what is new for Orthman Manufacturing.

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