

Strip-Tillage Is Not a Single Action Anymore – It is Known as a System by Michael Petersen, Orthman Agronomist

As August goes, approximately 90-105 days after the corn that got in the ground in April is now going into hard dough and some fields starting to dent. Soybeans are forming beans in the numerous pods. Both crops are at the stage that requires a quarter to three-tenths of an inch per day. The needs of N-P-K-S have dropped off to nil from the huge demand some 30-40 days earlier. It is important to know whether or not that well developed root profiles with 6000 to 10,000+ cubic inches of soil volume explored by roots will allow complete grain fill to the tune of 700+ kernels per corn ear. Then success can be garnered when the combine goes into the field.



Image courtesy of Orthman Manufacturing, Inc and Clunette Elevator, Clunette, IN

How does a grower make this happen? Diligence, determination, planning, better choices of fertilizer, and utilizing strip-till technology all makes the above statements of root development and kernel yield. Placing the fertility in a correct proximity to downward root growth early on in the corns growth period is an imperative part of the entire approach to Strip-Till System farming. We have since the late 1990’s observed and measured row crop root systems under strip-till, Direct Seeding and conventional full width tillage systems. During the last 15 years, measuring roots have illustrated to us how better management techniques can enhance yield far more than what yield advances have come with just corn breeding alone.

It will interest many of you that some of today’s corn varieties have the same corn root architecture as to what has been defined by soil scientists as far back as the early 1920’s. The type of rooting architecture that can explore and garner water and nutrients from a larger portion of the soil profile, attaining 30,000 to 40,000 linear inches of root per plant will make for healthier plant and high yielding crop. This year is showing that in nearly every root dig we have completed.

Let’s look at some of the numbers in two portions of the Corn Belt.....

Table 1. Root Observations in Ohio, 2010 August 2010

Tillage Type	Max. Depth Roots at 107DAE	Depth of roots at 60DAE	Depth of roots at 25DAE	First 85% of roots (depth) @107DAE	Plant pop.-33K Ear kernel count/ear(range)	Yield potential- bpa
Conventional	45	32	14	26	504-576	184-192
Strip-Till	62	38	13	40	615-720	225-264
Direct Seeding	49	30	13	33	480-576	176-192

Table 2. Root Observations in Nebraska, 2010 August 2010

Tillage Type	Max. Depth Roots at 107DAE	Depth of roots at 60DAE	Depth of roots at 25DAE	First 85% of roots (depth) @107DAE	Plant pop.-30.3K Ear kernel count/ear(range)	Yield potential- bpa
Strip-Till	53	32	14	40	416-594	140-200
Direct Seeding	41	25	13	22	384-480	130-162

So what is the big deal?

Where should the root system be right now, mid-August may be your next question? In deep to very deep soils without limitations due to water table, some sort of tillage pan, or very high concentrations of calcium carbonate or salts down in the substratum we should see the following depths in the chart below.

Table 3. Mature rooting depths for 6 major crops

Row Crop	Depth of Max Development (inches)
Corn	60
Popcorn	36
Soybeans	38
Dry edible beans	30
Sunflowers	72
Gr. Sorghum	70

To be right up front, the ears we have pulled back the shucks on have revealed much more in Ohio. In the Strip-Till ears are 18 rows by 38-40 kernels in length, conventionally tilled 18 rows by 28-32 kernels in length and the Direct Seeded corn ears are 16 or 18 rows by 30-32 in length. Out west in Nebraska, strip-tilled and Direct Seeded corn ears at a population of 30,300 we have seen a little less of a spread due to the largess of rain and wet period. Strip-till ears are 16 or 18 rows by 26 to 33 kernels in length and the Direct seeded 16 rows by 24 to 30 kernels in length potentially yielding less than the corn fields in Ohio (see tables 1 & 2). We acknowledge there are corn fields better out there, but this is where we have two quick sets of observations we can share with you all right now.

Implications to our observations for a wet year like 2010.....

In the Ohio fields as well as the Nebraska fields we have looked at to compare tillage systems and these corn fields were similar with 105-107 maturity day length varieties. The same Pioneer Seed corn brand (different numbers) were planted, we are seeing what we have written of above and believe that with precision placed nutrition with the strip-till and other methods used to pre-plant fertilize for the conventional and direct seeded, we are seeing these kinds of differences in all of our 12 research field sites.

Fertilizer placement with the strip-till has (9 years out of 10) given the corn crop the best start early. The plant in the first 45-50 days of growth after merging does not have an intense hunger about it but the foundation is being set and everything from that point on is either take-away or gains. We say to growers all across the nation, why subtract when we can offer improvements. Now it is not a given that yield boosts will be grand. Getting the fertilizer/food placed well right off the start-line should provide the impetus for the corn plant to grow quickly with the warming/moisture front deep into the soil to reach those potentials as mentioned in Table 3. As you observed in the tables above that the corn crop in Ohio is reaching its potential in the Strip-Tilled fields.

Due to the cold and wet May and June months the Direct Seeded corn crops and many of the soybean fields we have looked at, they are behind due to be cool for so long and lacking oxygen for the roots to develop well. It is our hope that they do well and not take the yield hit.

Strip-till system technology is working and has many of the pieces of puzzle in place. Check out how Orthman's 1tRIPr can make the difference for you in profit and yield this summer by checking it out at the large Farm Shows such as Farm Progress in Boone, IA (Aug31-Sept2); Husker Harvest near Grand Island, NE (Sep14-16); and Farm Science Review-Columbus, OH (Sept 20-23).