

WHAT IS IT ABOUT STRIP-TILL IN 2009 THAT IT IS AN ANSWER FOR ROW CROP PRODUCTION ?

By: Michael Petersen, Orthman Agronomist

For more than 165 years, modern agricultural practices beyond the stick scratching and seed being poked in the ground we have attempted to improve tillage methods to start seeds and nurture plants to a yield. A number of people stake their worth that any sort of tillage is courting ruination of the soil. Another group has a focus on working the soil into submission so the seed to soil contact may be considered ideal. Which is right or is there a median way?

Let us look at what assists the plant to gets its start and off and running. Modern-day planters, especially those for commercial row crops are now capable of precisely placing seed at selected uniform depths with reasonable soil coverage and firmness around the seed for best germination. For maize (corn) the best seed depth is 1 to 2 inches below the soil surface. For soybeans the depth is near the same and so goes the list of row crops we raise here in the U.S. But what about the pre-plant tillage to prepare the seedbed and initial first six weeks of the soil-root interface?

It would serve all of us well to ask ourselves at least a couple of reasonable questions of tilling for seasonal crop growth. Do you potentially have any soil compaction which could negatively impact root and/or crop growth, inhibit water movement and penetration, impacts of hard clods, soil that crusts and a myriad of other issues including soil erosion? Is tillage for any of you a cultural affair that resembles – *“I am a farmer so therefore I must turn the soil so folks know I am a hard worker?”* Can tillage be done to prepare an area for the seed to germinate then establish a rooting profile to feed the above ground crop to a strong yield in a much smaller footprint?



It is our contention in the Strip-Till community that precision tillage is a viable answer. Agriculturists are seeing the advantages to better tillage systematics in order to give the emerging plant a root system to insure a yield of fruit, grain, tubers, roots or above ground forage (biomass). We at Orthman Manufacturing have a “farmer generated” system that makes this all happen. As stated previously, tillers of the earth, farmers have stirred the ground to grow crops that we eat, feed livestock then eat them later. We have in the past over tilled the soil and we are seeing the soils degrade due to oxidation of soil organic matter, breakdown of basic soil structural units, losses of oxygen, nitrous oxides and other gases such as CO₂, and the losses of soil biological life. We know we can do better.

Truth be known, natural recuperation of soil quality characteristics does take years. What if we significantly slow the breakdown of soil structure by engaging in better soil management to use crop aftermath (residues), by precise vertical tillage for the crops immediate rooting profile, place fertilizer in the pathway of the roots uptake, and not bury those seasons of residues and allow a more natural breakdown? This management concept puts the grower in a mode of using his/her soil and water resources better, time, labor, input dollars to maximum benefit and remain a real steward of all his/her resources.

Let’s highlight several items with strip-till systematics....

- **Better use of crops aftermath as useful nutrition, fertilizer and food to the soils and subsequent crop**
 - keep soils cooler in the heat of the summer months for improved fine root development
 - help diminish the impact of raindrops which dislodge barren soils – then erosion occurs and soil organic matter, silt and clay, fertilizer and most of all dollars are lost
 - allows rain and irrigation water to infiltrate much more quickly both dry and wet soils
 - less soil surface crusting in the spring
 - actual soil carbon storage instead of oxidizing carbon to the atmosphere by tillage
 - gain the return of organic forms of N-P-K-S-Zn, etc sources
 - return of soil carbon products for insects, earthworms, and microbes for food
 - warmer soil seedbeds by 2 to 7° F. for potentially improved germination

- **Till only the zone for alleviation of soil compaction and improve early crop development**



- with strip-till, vertical tillage to not invert or tumble the soil
- tilling a zone 8 – 12 inches wide by 5 – 13 inches deep in a V-like trench
- to fracture the zone of compacted soil by lifting, cracking on natural soil-fabric lines and yes stirring for a near homogenous soil base
- vertical tillage in strip-till does not re-insert compaction when done timely, at proper soil moisture percentage and at the best depth

- **Tilling and placing fertilizer products**

underneath the soil surface for improved use to the crops root systems

- able to use new methods and distribution tubing behind a tillage shank at specific and precise depths
 - continue to soil test every year to evaluate macronutrient and micronutrient fertilization, change soil sampling procedure to better gauge where nutrients are utilized in strip of previous year to the future strip – this provides the grower better evaluative processes and basis to fertilize wisely and economically
 - able to use considerable less products than surface broadcast applications
 - improve the efficiency of fertilizer to the plant/root system
 - decrease the number of passes to accomplish the fertilizing process
 - placing material in the root-zone so the root growth is not on a hunting expedition, product is close at hand for the root uptake; after one year we cut back to 0.9lb N/bushel sought after in corn and at three years we are down to 0.75lb N/bushel seeking and maintaining high economic yields.
 - placement minimizes surface losses due to erosion both by wind and water
- **Decrease of input costs before seeding**
 - with strip-till, diesel consumption is 1.0 to 1.75 gal/acre
 - fewer trips across the field for plant preparation; fewer than 10 minutes/acre
 - less wear-maintenance on tractors, some 2000+ acre growers are keeping their tractor hours below 450 hours per season per tractor to accomplish all their field work
 - less wear, maintenance on tillage tools because now reduced tillage tool inventory

To summarize....

Once we consider these concepts and reasons why this systems approach can and will work, we can gauge the costs and savings for any row crop operation from California to Florida and North Dakota to the Rio Grande Valley of Texas, and right on your property. Growers are improving their crop germination, stand and crop development because of the very good seedbed we create with the strip-till implement, warmer soils, better placement of fertilizer right in the seedbed for quicker uptake and more efficient use of the products and timing. Growers are observing water infiltrating the soil in the summer months when the big rains come, considerably less runoff and erosion. Those intense summer thunderstorms that can dump two inches in 25 minutes, strip-tilled fields can absorb a much greater share of that rain than conventionally tilled ground and many times strip-till will absorb as much as or more than Zero-Till ground. In our studies in the western Corn Belt (2002-2006) we measured water infiltration 2.2 to 5.0 inches per hour compared to conventionally tilled at 0.06 to 1.8 inches per hour. Those rains can be crop savers or gone and carrying tons of sediment away! Saving fuel these days with the high prices for diesel soaring to >\$4.00/gallon is always a good economic move. With strip-till we are enjoying tillage diesel fuel costs less than \$2.48/acre at \$2.25 diesel compared to a more traditional tillage program of \$14.65/acre. When prices were at that \$4.00 per gallon, farmers saw a wider margin of savings. Fertilizer being placed in the root zone more proficiently with strip-till can ramp the efficiency of fertility from levels at best 10-12% with broadcast methods to 50% or better with the precision placement. By reducing due to the accuracy of where it sits for the plant root system, farmers can slice dollars off the fertilizer costs substantially.

As we consider the above facts with increasing prices to fertilize, purchase the newer hybrids, higher land rental or lease costs, more expensive pesticides (which includes weed control, insects or disease issues), rising water costs, higher management costs and so on – boy what is it going to be for any of us to farm more wisely and economically? Strip-till makes a lot of sense and gives the farmer a good deal more control or grip on how to weather this.

If you want to know more and are considering why strip-till might be for you contact us at www.precisiontillage.com or www.orthman.com, we are ready and willing to answer your questions.