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<http://www.no-tillfarmer.com/articles/4038-reasons-why-many-growers-are-harvesting-higher-no-till-yields-in-their-fields-than-some-university-scientists-find-in-research-plots>

**29 Reasons Why Many Growers Are Harvesting Higher No-Till Yields in Their Fields Than Some University Scientists Find In Research Plots**

By [Frank Lessiter](http://www.no-tillfarmer.com/authors/6-frank-lessiter/articles) posted on January 1, 2015 | Posted in [No-Till 101](http://www.no-tillfarmer.com/topics/88-no-till-101)

In the December 2014 issue of *No-Till Farmer,* we looked at a worldwide analysis of over 5,000 side-by-side, tillage-system observations found in 610 peer-revived studies. In this evaluation of studies conducted around the world, researchers at the University of California-Davis determined that no-till did not yield as well as corn grown under more intensive tillage practices.

That got me to wondering why successful no-till growers seem to obtain better results than the yields reported from numerous small-scale research studies conducted by university folks and some seed and fertilizer suppliers.

To provide some answers, the *No-Till Farmer* editors asked a few university educators, consultants and no-till growers for their thoughts. If you’re like me, you’ll be amazed at how candid the responses were from these educators and growers.

**1.**Researchers are all over the board when it comes to defining reduced-tillage practices, which make comparisons extremely difficult. Terms such as no-till, reduced-till, mulch-till or conservation tillage are used very loosely, and many times the scientists don’t bother to explain how much or what kind of soil disturbance occurred.

**2.**Some small-scale plots measure only 10- by 30-feet to remove statistical and spatial inconsistencies. Yet, tractor and planter tire traffic can cover up to 40% of the area, and reduced traffic is among the items that makes no-till shine. Even when compaction occurs, the scientists don’t want to mess with a research study’s protocol.

**3.**Small-scale plots don’t allow for the use of real-world-sized equipment. As an example, research done in an Illinois farm situation found plots with 1,000-foot row lengths had a corn yield difference of only 4 bushels per acre compared with a 29-bushel difference within 50-foot rows.

**4.**Developing a long-term no-till “systems” approach is not what most scientists evaluate, as they prefer to research procedures with only a few variables. On the other hand, growers have much more experience in developing successful no-till methods and systems.

**5.**The peer review of no-till scientific research papers makes total systems analysis difficult. To run statistics that are acceptable to peer reviewers, everything needs to be kept constant, except for one or two variables. This means planting time, timing of weed control, rate of herbicides, form and timing of fertilizer and recommended plant populations are often wrong for the no-till plots, yet correct for the intensively tilled plots. Since planting in comparison plots must be done on the same date, no-till crops are often planted when the soil is still wet, which leads to sidewall compaction.

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| **Gain Benefits From All Types Of Research**  Most innovative no-tillers are looking for a better and more profitable way to produce crops. By searching for results that are both practical and success-oriented, they can see the broad picture of the associated benefits without worrying about sophisticated statistics to separate small yield differences.  When it comesto making significant changes in their cropping programs, many of these no-till innovators want to be able to combine data from university research with onfarm research results. They have learned that this combination of data offers them the best of both worlds by combining both practical and science-based information.  For the best no-till results, maybe researchers need to switch to including much more large-scale field data in their research projects.  A case in point would be the highly successful model developed by South Dakota State University researcher Dwayne Beck at the Dakota Lakes Research Farm at Pierre, S. Dak. Not only does Beck do strictly field-scale no-till research, but has been able to make the total farming operation profitable at the same time.  Thanks to many of the latest technology breakthroughs in the past decade or so, it is now possible for no-till researchers to enjoy the best of both worlds, They can provide valuable data not only from small-scale research plots abut also test their idea with valid, large-scale replicated field tests while working with a few no-till farmers. Accurately calibrated yield monitors and all of today’s related “big data” collection opportunities allow a researcher to work with long-time successful no-till farmers to set up replicated strips that can provide several acres of valid yield results. |

**6.**Most research studies are funded with two- or three-year financial grants, while four or more years are needed for soils to recover from years of intensive tillage.

**7.**Rotating tillage practices doesn’t allow the soil to reap the full benefits of no-tilling.

**8.**Some no-till plots are evaluated only during the first year after intensive tillage, with no consideration for inputs such as cover crops or crop rotations. The full benefits of a mature no-till system can’t be captured in a one-year study.

**9.**Since small plots are also often used for other agronomic research, studies are sometimes done in plots that have only been no-tilled for one or two years. When this occurs, there’s likely to be a yield decline for several years until the rhizosphere re-establishes itself.

**10.**Many short-term no-till studies don’t recognize valuable soil property changes. Some long-term plots show no-till yield benefits, where this was not realized during the first several years.

**11.**It takes three to five years to fully establish a no-till system. Researchers often don’t want to make any changes in the research protocol during the later years to get valid results. However, a no-till farmer by the end of five years may have modified his planter, added cover crops, changed fertilizer placement or made other refinements that boosted yields.

**12.**Having a graduate degree doesn’t necessarily make someone a good farmer.

**13.**While no-till growers believe in the educational benefits of university research, they don’t want to wait three years to decide if an “experimental treatment” is good or bad.

**14.**Onfarm research is good, but it has its own issues. Sometimes, farmers no longer want to do a comparison once a system is shown to be better.

**15.**Some graduate students working on a doctorate degree may end up being clones of their major professor, with the same thinking process or biases against no-tilling.

**16.**A serious issue is the need to publish scientific papers. If the research actually advances the knowledge base, that’s sometimes secondary to publishing a paper.

**17.**Some educators in the 1970s and 1980s had not developed the skill levels necessary to effectively evaluate no-till treatments. Did they completely control competition from weeds? Did they get adequate corn stands? On soils that do not crack, was there adequate mulch cover? Did the reviewers have enough knowledge to read the articles critically and recognize these kinds of concerns?

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| **How Research Plot Row Lengths Impact Yields**   |  |  | | --- | --- | | ***100-Foot Row Lengths...*** |  | | **Plot** | **Corn Yield Per Acre** | | 1 | 193 bu. | | 2 | 197 | | 3 | 196 | | 4 | 197 | | Yield variability difference | 4 bu. | |  |  |  |  |  | | --- | --- | | ***50-Foot Row Lengths...*** |  | | **Plot** | **Corn Yield Per Acre** | | 1 | 190 bu. | | 2 | 165 | | 3 | 194 | | 4 | 192 | | Yield variability difference | 29 bu. |   ***Calmer Agronomic Research Farm, Alpha, Ill.*** |

One person stated that early in his career, he came across a pair of plots at a major university that compared no-till and conventionally tilled soybeans. Since Treflan herbicide (which should be incorporated) was used in both plots, the no-till plot was a weedy mess and yielded significantly less. Yet the researcher’s conclusion in the early 1980s was that no-till soybeans yielded significantly less than conventionally tilled soybeans.

**18.**Results from one trial showed a corn yield increase with no-till on soils that do not crack and had adequate mulch cover, but no no-till response on soils that crack regardless of available in-season moisture. Did the peer reviewers know enough to consider various soil factors?

**19.**When a farmer growing continuous cotton with intensive tillage for years switches “cold turkey” to no-till, a yield drop is common. Adding corn, wheat and cover crops to the no-till rotation can bring the soil back to life. Such tillage and rotational changes re-aggregate the soil, allow a buildup of earthworms and other organisms to re-establish needed soil porosity and enable the establishment of mycorrhizae.

Once these processes have advanced, no-till can perform as well as or possibly better than conventional tillage. But educators need to recognize the no-till yield boost is largely due to improved uptake of water and nutrients resulting from better soil quality factors and improved mycorrhizae activity.

**20.**Farmers look for good data on which to base decisions, but don’t always find meaningful university data. The art of farming requires the use of “farmer’s intuition” and the power of observation over time.

**21.**Demands on a university or government scientist often make timely attention to farming detail difficult. Researchers may be attending conferences when their plots desperately need weed or insect control. Unless they have an excellent farm manager who can handle the fieldwork, this work may not be done in a timely manner.

**22.**Some researchers have proclaimed in peer-reviewed papers that no-till will not work under certain soil and climate conditions, even though nearby farmers are profitably no-tilling the same soils.

**23.**Budget restraints often prevent researchers from investing in adequate no-till equipment. Many university and federal government research facilities are using antiquated equipment and attachments that are not set up correctly or missing components many no-till farmers are using.

**24.**A no-till farmer takes a hands-on approach and conducts his own equipment modifications, calibrations, adjustments, planting, seed depth, etc., while some scientists have technicians to handle the “hands-on” work based on verbal instructions.

**25.**Offers from manufacturer staffers to help with equipment setup or to provide the latest attachments are often rebuffed by researchers since accepting this help could be an admission that they are not knowledgeable when it comes to equipment usage. Farm managers and field technicians often do not welcome industry help, as they feel it may threaten their standing with researchers.

**26.**Communication between researchers and field personnel is often poor and wrong instructions are given. Unless the researcher does the fieldwork, it falls on the shoulders of technicians to make sure a trial is done correctly.

**27.**Technicians may be discouraged from providing research trial suggestions, and some are unwilling to do this “no-till thing.”

**28.**Since the typical university farm may be evaluating multiple tillage practices and a wide range of agronomic studies, the farm staff can’t be an expert on all systems.

**29.**A researcher usually has other responsibilities so he or she can’t make sure planting, spraying and other operations are always done at the proper time.

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