IN THIS ISSUE

Issue 26, October 30, 2015 • USDA-NIFA Extension IPM Grant

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Agronomy Tips

Dry weather can affect soil sampling and test results

Bits & Pieces

Purdue's Second Annual Crop Scouting Competition a Success

VIDEO: Purdue's 2015 High School Crop Scouting Competition

Weather Update

Moisture and Temperature Accumulations

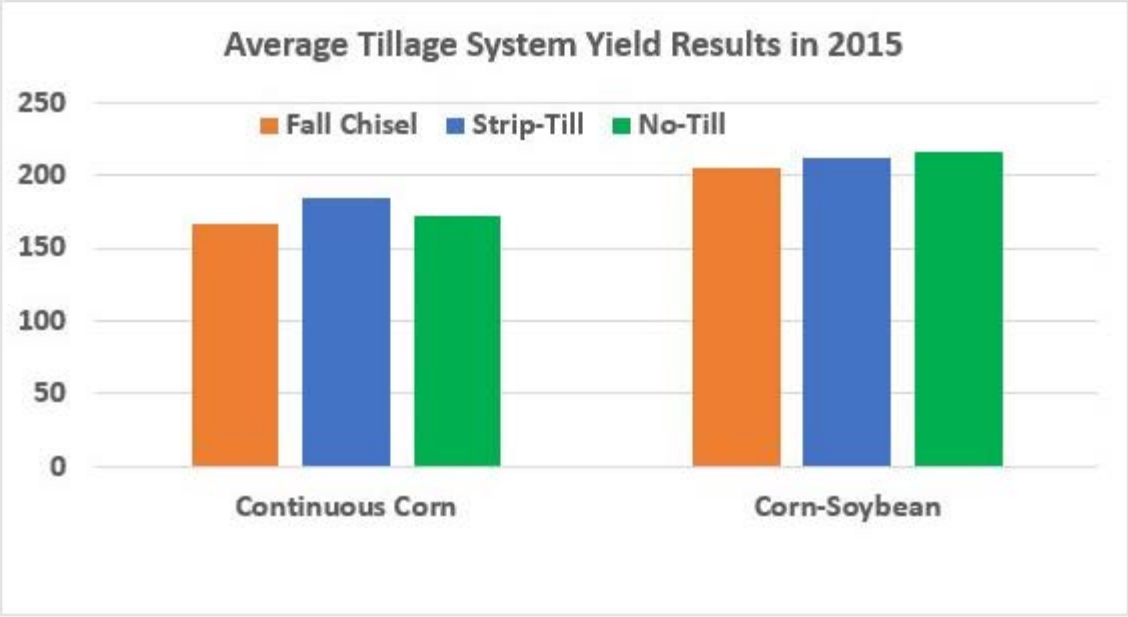
No-till Corn and Strip-till Corn Exceed Expectations in 2015 – (Tony J. Vyn and Terry D. West) -

Given all the excessive rain and cool temperatures this spring in northern Indiana, there was some concern about how no-till and strip-till corn yields would end up at the end of the season. Well, the

results from the 41st year of our long-term tillage plots near West Lafayette, IN, are in and they tell an interesting story. These prairie soils (about 4% organic matter) at the site are silty clay loam and naturally poorly drained, but systematically tiled. We didn't suffer from as much rain as some other counties, but we still had over 10" of rain in June and over 7" in July at this location.

The first surprise is that corn yields with no-till were better than chisel plowing in both continuous corn and in the corn-soybean rotation. Yields were 11 bushels per acre better than fall chisel plow and spring secondary tillage when corn followed soybean, and 5 bushels per acre better than the fall chisel plow in continuous corn (Figure 1). Most of the reason for that is the improved soil structure in long-term no-till versus chisel plow system (a system where we did secondary tillage with soil a little wetter than we wanted to simply so that we could accomplish planting by May 23).

Figure 1. Preliminary 2015 corn yield results from a long-term tillage experiment at West Lafayette, IN. Corn grain yields are averaged for with and without a nitrification inhibitor (Instinct®) when a 200 pound/acre side-dress N rate was applied as UAN at V4 stage.



Note: All tillage treatments were planted with the same hybrid (P1498 CHR) on the same day (May 23, 2015). Starter N was applied as 10-34-0 (20 gallons/acre) and sidedress N was applied as coulter-banded UAN to give a total N application of 223 pounds N/acre for all plots. Plant populations averaged 33,600 and were not affected by tillage or rotation treatments.

Normally, no-till corn yields about equal to the fall chisel plow system when corn follows soybean, but not when corn follows corn. In fact, no-till corn after corn is usually about 7% lower in yield

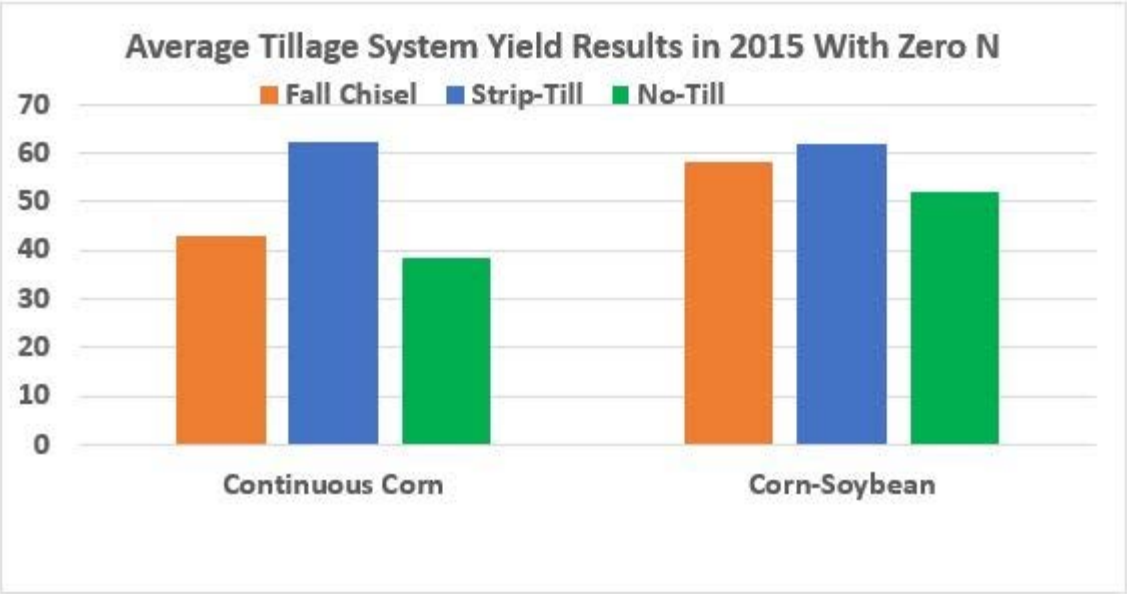
than the fall chisel system even when we do everything right in terms of best management for no-till.

The second surprise is that corn yields with strip-till were better than both chisel plow and no-till when corn followed corn, and about equal to no-till when corn followed soybean (Figure 1). Usually strip-till corn yields equal those with the fall disk-chisel system, but this year they surpassed the chisel system by 18.5 bu/acre when corn followed corn. The main advantage of seeding into a friable, dry and warmer strip of soil with minimal soil compaction during planting is the key advantage here for the fall strip-till system.

Yields with the strip-till system may have been even higher if we had taken advantage of the earlier soil drying to plant even earlier. But, in this research, all tillage systems were planted on the same day. The spring of 2015 was so wet and cool that the fall strip-till system offered a great opportunity for an extended number of planting days between the frequent rain events.

The third surprise is that strip-till resulted in higher yields than chisel plowing even when no nitrogen (N) was applied except for the 23 pounds of N in the starter band at planting (Figure 2). The relative yield gain for strip-till when no side-dress N was applied was especially apparent in continuous corn. The results of this table also make it abundantly clear that even 40 years of continuous no-till do not magically result in more available mineral N in soil for corn to use. It is doubtful that farmers can be successful in no-till corn production systems by using lower N rates than they do in conventional tillage systems, and certainly not when corn follows corn or a grass or cereal cover crop.

Figure 2. Preliminary 2015 corn yield results from a long-term tillage experiment at West Lafayette, IN. Corn grain yields are averaged for the first time corn had ever been produced on these plots with anything less than 180-240 pounds of N/acre since 1975.



Note: All tillage treatments were planted on the same day (May 23, 2015). Starter N was applied as 10-34-0 (20 gallons/ac) and zero sidedress N was applied.

Frustrated farmers are understandably strongly tempted to do deep and intensive tillage following a disappointing corn harvest in 2015. But these results, and others like them over the decades in the Eastern Cornbelt provide reassurance that both no-till and strip-till can maintain or increase corn yields compared to the most common fall tillage system. Extreme rain events (such as getting 5 or more inches in 24 hours) also make soil protection with residue cover even more important. Strip-tillage, done properly, is an even more reliable tillage system than some conventional tillage alternatives in both continuous corn and corn-soybean rotations.

Finally, these yield results confirm once again that the benefits of rotating corn with soybean instead of growing corn after corn are particularly obvious when weather conditions during the growing season (and especially the early part of the growing season) are unfavorable. Corn yields averaged 17% lower when corn was grown continuously in 2015; that compares to a 10% yield reduction for continuous corn versus corn after soybean with the same 3 tillage systems in the last 5 years (2010-2014). So the bottom line is that crop rotation pays, and adoption of either strip-till or no-till pays dividends despite severe weather challenges.

back to top

Dry weather can affect soil sampling and test results – (Jim Camberato and Brad Joern) -

Editors note: Article was submitted before the recent rains.

The accurate analysis of representative soil samples to determine lime and fertilizer needs is fundamental to crop production. Unfortunately persistent dry weather resulting in prolonged periods of low soil moisture can affect soil sampling depth and potassium (K) soil test levels.

Sampling depth

The recommended sampling depth for row crop fields is 8-inches deep. When soils are dry achieving the proper sampling depth becomes difficult. Nutrients and pH levels in soil are stratified with all tillage methods except moldboard plowing. Nutrients tend to be higher at the soil surface due to surface application or shallow placement of fertilizers and the crop recycling of nutrient-releasing residues to the soil surface. Shallow soil sampling typically results in higher than expected nutrient levels.

Soil pH stratification is a function of nitrogen (N) placement and tillage. Lower soil pH arises from N in fertilizer and manure, and from N fixation by soybean. Lime application increases pH and the location of its effects depends on the extent of incorporation. Shallow sampling can over- or under-estimate soil pH depending on the combination of N and lime placement and incorporation.

Potassium

Typically soil test K levels are lower than expected in a dry fall. One factor that contributes to low soil test K is that most of the K taken up by the crop during the growing season remains in the residue and has not been returned to the soil by rainfall. This is a larger issue with corn than soybean because corn stover contains much more K than soybean straw. Stover from a 200 bushel per acre corn crop contains 220 pounds of K_2O per acre whereas straw from 55 bushel per acre soybeans only contain 35 pounds of K_2O per acre. For every 100 pounds of K_2O per acre retained in the stover soil test K in a typical 8-inch deep soil sample would be lowered about 8 to 25 parts per million (ppm) dependent on soil type, texture, and other soil factors.

The amount of K extracted by soil testing methods is altered by dry soil conditions. At low soil test

K levels, K extraction overestimates availability. The opposite occurs at high soil test K levels, K availability is underestimated. In essence soil test extraction levels move to the middle with dry conditions. The extent to which this occurs is dependent on a number of soil factors, but first and foremost is the type and amount of clay. In Indiana soils the increases and decreases in soil test level with soil drying generally do not exceed 20 to 30% of the soil test level of moist samples.

Bottom line: Continue soil sampling if a full-depth sample can be attained. Be aware that soil test K levels may differ from what is expected due to the absence of residue K in the soil and changes in soil K extractability arising from dry soils. Utilize previous soil tests, actual K fertilization rates, and yield-based crop removal of K (0.27 lb K_2O per bushel of corn and 1.4 lb K_2O per bushel of soybean) to determine if soil K will likely be adequate for the next crop or if fertilization is needed.

back to top

Bits & Pieces

Purdue's Second Annual Crop Scouting Competition a Success – (Anna Freije and Kiersten Wise) -

On August 20, 2015, Indiana high school students could be observed identifying weeds, examining soybean leaves, and wandering through rows of corn at the Diagnostic Training Center at Purdue's

Agronomy Center for Research and Education (ACRE).Murmurs, and in some cases shouts, of things like "I think it's SDS!" followed by "Are you sure? Are you 100% sure? Let me take a look!" could be heard while passing the various teams. These students had arrived in West Lafayette early that morning to participate in Purdue University's second annual Crop Scouting Competition.

Purdue's Crop Scouting Competition began as an effort to provide youth with an opportunity to learn about integrated pest management (IPM), and highlight a variety of different career opportunities within the field of agriculture.

"Besides the education piece, our primary goal, we ultimately want students to see how enjoyable agriculture really is," said Corey Gerber, Ph.D., the director of the Purdue's DTC and a key organizer of the competition. He also mentioned that he hoped the competition would, "open the student's eyes and minds to the different areas of agriculture like agronomy, plant pathology, weed science and entomology."

Before competing, teams studied Extension material on crop growth stages, insects, weeds, diseases, and proper plant nutrition of corn and soybeans. When they arrived at the competition, they were tested on this knowledge at seven different stations led by Extension specialists or Purdue graduate students. Groups were required to make team decisions to solve problems in each area. .After the competition, students were provided a "goodie" bag filled with items donated by our sponsors, along with a t-shirt to commemorate their participation.

First place, and the $500 prize, went to South Newton. This was the second year in a row that this group won the competition. Eastern Hancock, another team that had participated in 2014, took second place and the $300 prize. North Harrison, a team new to the competition, came in third, winning $150 for their program.

Students and team leaders provided feedback about the competition in a post-event survey. "Great job putting on another great crop scouting contest this year!! I am going to continue to participate in this contest to broaden my knowledge of agriculture until I graduate high school," said a student. One of the team leaders wrote, "This is an amazing hands-on, real-life competition that interests students and holds their attention." The crop scouting competition was also a good experience on Purdue's side. "Overall, the competition has been a very enjoyable process for not only the students but also for the faculty and staff involved with it. It's just a great opportunity to show students the "big-picture" of agriculture, and from this, we hope to recruit students to come to

Purdue in the near future," said Gerber.

Plans for the 2016 competition are already in the works, and a date for the event will be forthcoming. Purdue University would like to thank the Indiana Corn Marketing Council, the Indiana Soybean Alliance, Dow Agroscience, Pioneer, Indiana Certified Crop Advisors, Weaver Popcorn, and Ceres Solutions for their generous sponsorship of this event.

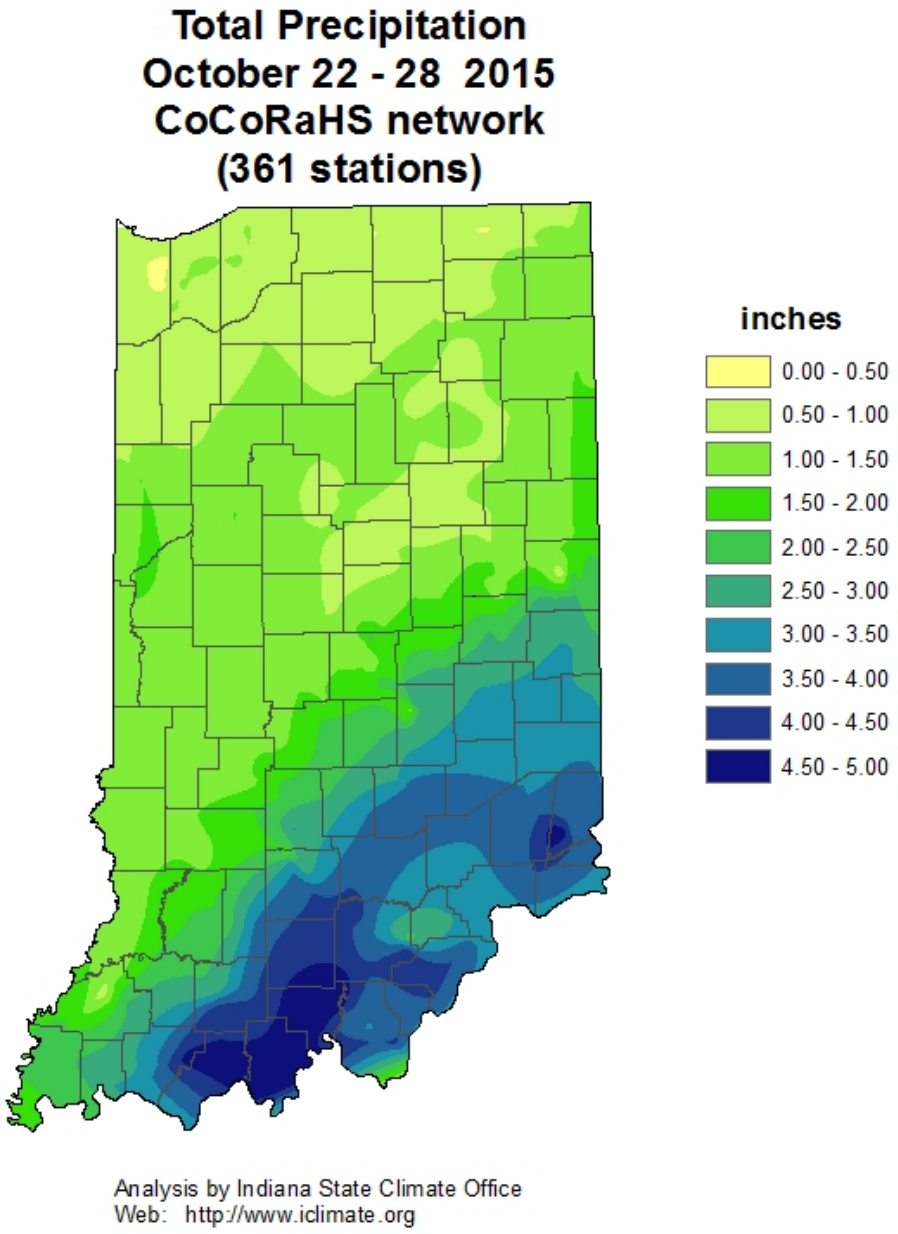
back to top

VIDEO: Purdue's 2015 High School Crop Scouting Competition

back to top

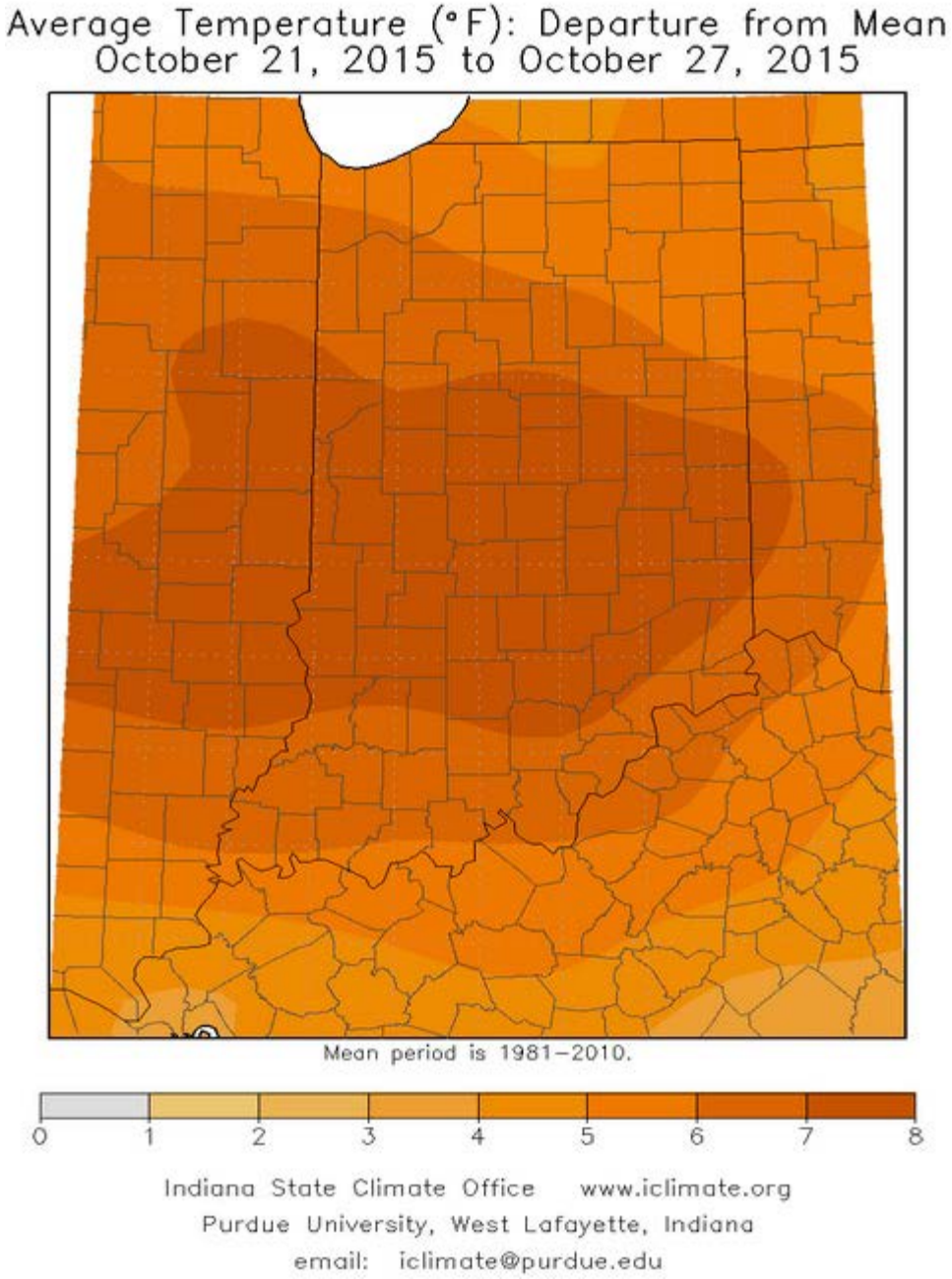
WEATHER UPDATE

Precipitation


Total Precipitation
October 22 - 28 2015
CoCoRaHS network
(361 stations)
inches
0.00 - 0.50
0.50 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
2.50 - 3.00
3.00 - 3.50
3.50 - 4.00
4.00 - 4.50
4.50 - 5.00
Analysis by Indiana State Climate Office
Web: http://www.iclimate.org

back to top

Temperature



back to top

Pest&Crop Newsletter

Purdue Cooperative Extension Service

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back to top