PURDUE UNIVERSITY | Extension - Entomology

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# Pest&Crop newsletter

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In This Issue

- Moth Trappers Have Been Busy! Worry Time?
- 2022 Black Cutworm Pheromone Trap Report
- Armyworm Pheromone Trap Report – 2022
- Hay Harvest Equipment Maintenance Is Critical For Success
- Purdue Crop Chat Episode 32, How Early Is Too Early To Plant?
- Maximum Weekly Planting Progress For Corn And Soybean In Indiana: Has It Increased Over Time?
- Historical Corn Grain Yields In The U.S
- Abnormal Ear Development In Corn: A Review
- Cool And Wet Conditions Now Predicted Over Next Few Months

## Moth Trappers Have Been Busy! Worry Time?

*(John Obermeyer)*

In looking over the black cutworm pheromone trap reports, it is obvious that many moths have arrived into areas of Indiana. This, coupled with a delayed planting season, increases the likelihood that high-risk fields may experience damage. Still at this point, many variables must perfectly align for these pests to cause a stir in Hoosier fields.

First, understand that eggs are now just being laid on preferred plants, that being winter annual broadleaves (e.g., chickweed, dandelion). Currently, those fields are in abundance because of the current wet conditions. After hatch, which takes about a week, the young larvae are most vulnerable to natural and man-made events. They are very prone to dramatic weather events, e.g., freezing, and natural enemies, e.g., ground beetles. They need a constant and healthy food source, only available if field work/herbicides continue to be delayed for multiple weeks. Their death rate, even under ideal conditions, is very high.

Monitoring moth arrival, and numbers captured, is an inexact science. We cannot predict with certainty that high moth counts will equate to high pest damage. Instead, it is best to understand the pest and how the next few weeks unfold. Should the moth flight continue at this pace AND fields remain untouched, then you might better understand why future articles might sound as though the “sky (or moths) is falling.”

Happy Scouting!

Handful of male black cutworm moths from an intensive capture.

## 2022 Black Cutworm Pheromone Trap Report

*(John Obermeyer)*

| | | BCW Trapped | | | | | |
|---|---|---|---|---|---|---|---|
| **County** | **Cooperator** | **Wk 1 4/1/22 - 4/6/22** | **Wk 2 4/7/22-4/13/22** | **Wk 3 4/14/22 - 4/20/22** | **Wk 4 4/21/22 - 4/27/22** | **Wk 5 4/28/22 - 5/4/22** | **Wk 6 5/5/22-5/11/22** |
| Adams | Roe/Mercer Landmark/Decatur | 7 | 9 | 6 | | | |
| Allen | Anderson/Blue River Organics/Churubusco | 0 | 0 | 0 | | | |
| Allen | Gynn/Southwind Farms/Ft. Wayne | 0 | 0 | 1 | | | |
| Allen | Kneubuhler/G&K Concepts/Harlen | 9 | 29* | 44* | | | |
| Bartholomew | Bush/Pioneer Hybrids/Columbus | 2 | 1 | 4 | | | |
| Clay | Mace/Ceres Solutions/Brazil | 1 | 1 | 4 | | | |
| Clay | Fritz/Ceres Solutions/Clay City | 0 | 2 | 0 | | | |
| Clinton | Emanuel/Frankfort | 9 | 19* | 11 | | | |
| Daviess | Brackney/Daviess Co. CES/Montgomery | | | 0 | | | |
| Dubois | Eck/Dubois Co. CES/Jasper | 0 | 3 | 38* | | | |
| Elkhart | Kauffman/Crop Tech/Millersburg | 0 | 3 | 6 | | | |
| Fayette | Schelle/Falmouth Farm Supply/Falmouth | 7 | 4 | 10* | | | |
| Fountain | Mroczkiewicz/Syngenta/Attica | 0 | 1 | 1 | | | |
| Hamilton | Campbell/Beck’s Hybrids | 0 | 10* | 14* | | | |
| Hancock | Gordon/Koppert Biologicals/Greenfield | 15* | 5 | 9 | | | |
| Hendricks | Nicholson/Nicholson Consulting/Danville | 0 | 1 | 46* | | | |
| Hendricks | Tucker/Bayer/Brownsburg | | 4 | | | | |
| Howard | Shanks/Clinton Co. CES/Kokomo | 0 | 1 | 2 | | | |

| County | Cooperator | BCW Trapped Wk 1 4/1/22 - 4/6/22 | Wk 2 4/7/22-4/13/22 | Wk 3 4/14/22 - 4/20/22 | Wk 4 4/21/22 - 4/27/22 | Wk 5 4/28/22 - 5/4/22 | Wk 6 5/5/22-5/11/22 |
|---|---|---|---|---|---|---|---|
| Jasper | Overstreet/Jasper Co. CES/Rensselaer | 1 | 19* | 8 | | | |
| Jasper | Ritter/Dairyland Seeds/McCoysburg | 0 | 5 | 3 | | | |
| Jay | Boyer/Davis PAC/Powers | 17* | 28* | 10 | | | |
| Jay | Liechty/G&K Concepts/Berne | | | | | | |
| Jay | Shrack/Ran-Del Co-Alliance/Parker City | 0 | 52* | 23* | | | |
| Jennings | Bauerle/SEPAC/Butlerville | 0 | 16 | 30* | | | |
| Knox | Clinkenbeard/Ceres Solutions/Edwardsport | 0 | 0 | 0 | | | |
| Knox | Edwards/Ceres Solutions/Fritchton | 1 | 0 | 0 | | | |
| Kosciusko | Jenkins/Ceres Solutions/Mentone | 0 | 2 | 2 | | | |
| Lake | Kleine/Rose Acre Farms/Cedar Lake | 1 | 13 | 19* | | | |
| Lake | Moyer/Dekalb Hybrids/Shelby | 0 | 0 | 6 | | | |
| Lake | Moyer/Dekalb Hybrids/Schneider | 0 | 0 | 3 | | | |
| LaPorte | Deutscher/Helena Agri/Hudson Lake | 0 | 0 | 0 | | | |
| LaPorte | Rocke/Agri-Mgmt. Solutions/Wanatah | 0 | 22* | 12 | | | |
| Marshall | Harrell/Harrell Ag Services/Plymouth | 0 | 0 | | | | |
| Miami | Early/Pioneer Hybrids/Macy | 0 | 1 | 3 | | | |
| Montgomery | Delp/Nicholson Consulting/Waynetown | 0 | 0 | 1 | | | |
| Newton | Moyer/Dekalb Hybrids/Lake Village | 0 | 0 | 1 | | | |
| Perry | Lorenz/Lorenz Farms/Rome 1 | 0 | 0 | 0 | | | |
| Perry | Lorenz/Lorenz Farms/Rome 2 | 0 | 0 | 0 | | | |
| Porter | Tragesser/PPAC/Wanatah | 0 | 3 | 3 | | | |
| Posey | Schmitz/Posey Co. CES/Mt. Blairsville | | | 28* | | | |
| Pulaski | Leman/Ceres Solutions/Francesville | 0 | 0 | | | | |
| Putnam | Nicholson/Nicholson Consulting/Greencastle | 1 | 3 | 10 | | | |
| Randolph | Boyer/DPAC/Farmland | 3 | 5 | 4 | | | |
| Rush | Schelle/Falmouth Farm Supply/Carthage | 0 | 0 | 1 | | | |
| Scott | Tom Springstun/Scott Co. CES/Scottsburg | 0 | 0 | 3 | | | |
| Shelby | Fisher/Shelby County Coop/Shelbyville | 0 | 0 | 0 | | | |
| St. Joseph | Carbiener/Breman | 0 | 0 | 0 | | | |
| St. Joseph | Deutscher/Helena/New Carlisle | 0 | 0 | 0 | | | |
| Sullivan | McCullough/Ceres Solutions/Farmersburg | 0 | 1 | 3 | | | |
| Sullivan | McCullough/Ceres Solutions/Dugger | | 0 | 0 | | | |
| Tippecanoe | Bower/Ceres Solutions/Lafayette | 4 | 10 | 18* | | | |
| Tippecanoe | Nagel/Ceres Solutions/W. Lafayette | 7 | 26* | 35* | | | |
| Tippecanoe | Obermeyer/Purdue Entomology/ACRE | 4 | 4 | 6 | | | |
| Tippecanoe | Westerfeld/Bayer Research Farm/W. Lafayette | 0 | 0 | | | | |
| Tipton | Campbell/Beck's Hybrids | 1 | 0 | 5 | | | |
| Vermillion | Lynch/Ceres Solutions/Clinton | 0 | 0 | 1 | | | |
| White | Foley/ConAgra/Brookston | 0 | 2 | | | | |
| Whitley | Boyer/NEPAC/Schrader | 0 | 9 | 31* | | | |
| Whitley | Boyer/NEPAC/Kyler | 0 | 7 | 7 | | | |

* = Intensive Capture…this occurs when 9 or more moths are caught over a 2-night period

## Armyworm Pheromone Trap Report – 2022

*(John Obermeyer)*

| County/Cooperator | Wk 1 | Wk 2 | Wk 3 | Wk 4 | Wk 5 | Wk 6 | Wk 7 | Wk 8 | Wk 9 | Wk 10 | Wk 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dubois/SIPAC Ag Center | 0 | 0 | 120 | | | | | | | | |
| Jennings/SEPAC Ag Center | 0 | 0 | 10 | | | | | | | | |
| Knox/SWPAC Ag Center | 0 | 5 | 58 | | | | | | | | |
| LaPorte/Pinney Ag Center | 0 | 24 | 11 | | | | | | | | |
| Lawrence/Feldun Ag Center | 4 | 31 | 31 | | | | | | | | |
| Randolph/Davis Ag Center | 0 | 0 | 0 | | | | | | | | |
| Tippecanoe/Meigs | 0 | 5 | 19 | | | | | | | | |
| Whitley/NEPAC Ag Center | 0 | 0 | 15 | | | | | | | | |

Wk 1 = 4/1/22-4/6/22; Wk 2 = 4/7/22-4/13/22; Wk 3 = 4/14/22-4/20/22; Wk 4 = 4/21/22-4/27/22; Wk 5 = 4/28/22-5/4/22; Wk 6 = 5/5/22-5/11/22; Wk 7 = 5/12/22-5/18/22; Wk 8 = 5/19/22 – 5/25/22; Wk 9 = 5/26/22-6/1/22; Wk 10 = 6/2/22-6/8/22; Wk 11 = 6/9/22-6/15/22

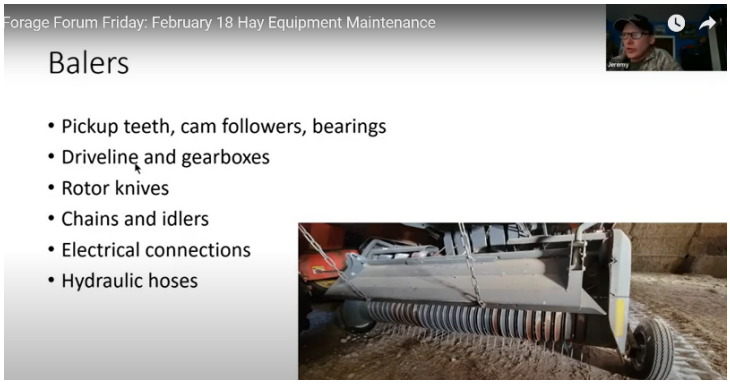
## Hay Harvest Equipment Maintenance Is Critical For Success

*(Keith Johnson)*

Are you prepared for hay harvest? It is hard to believe with the persistent cool spring temperatures, but cool-season grass and legume hay harvest will likely begin a month from now. Have you taken the time to make sure that your tractor, mower-conditioner, tedder, rake, baler, and bale wrapper are in good working order? In a recent "Forage Forum Friday" presentation, Purdue alumni and hay producers, Jeremy Sweeten and Dustin Johnson, discuss hay equipment maintenance. The presentation can be viewed at:

https://www.youtube.com/watch?v=1Rh0VFtzwOw

Take time next week, while soil conditions are too wet for row crop seeding, to find hay harvest equipment concerns and get parts ordered, so faulty parts can be replaced in timely fashion so harvest can occur when the forages are ready to be cut.




Finding worn parts on hay equipment and getting them replaced before hay harvest is an important task. (*Photo Credit: Jeremy Sweeten*)

## Purdue Crop Chat Episode 32, How Early Is Too Early To Plant?

*(Shaun Casteel)* & *(Dan Quinn)*

This is Purdue Crop Chat, a regular podcast from Hoosier Ag Today and the Purdue University Extension Service, featuring Purdue Extension soybean specialist Dr. Shaun Casteel and Extension Corn Specialist Dr. Dan Quinn. On this episode, Shaun and Dan discuss how corn is no longer king in Indiana or the US after USDA's Prospective Plantings report last week showed that farmers will plant more soybean acres than corn, and tips for those planting beans on beans. Also, with some farmers already hitting the field (maybe to get their neighbors all riled up), how early is too early to plant?

The Purdue Crop Chat is made possible by the Indiana Corn Marketing Council and Indiana Soybean Alliance. Your Indiana corn and soybean

checkoff investments yesterday are paying off today. New research, new uses, demand creation — bringing dollars back to the farm. Check it out at YourCheckoff.org.

Click here for the podcast.

# Maximum Weekly Planting Progress For Corn And Soybean In Indiana: Has It Increased Over Time?

*(Bob Nielsen)*

- Fact: Corn and soybean planting equipment is larger than 25 years ago.
- Fact: Individual farmers can plant more acres per day than 25 years ago.
- Yet, total maximum weekly planting progress has changed little over 25 years.

The number of 30-, 40-, and 60-ft wide (or larger) field crop planters across the U.S. Midwest is greater today than, say, 25 years ago. Certainly, individual farmers can plant more acres of corn and soybean per day with today's large field equipment than they could 25 years ago. Consequently, it seems logical that planting season delays can be overcome by the capability of today's modern planters to plant a greater percent of the state's crop per week when "push comes to shove."

As is often the case with "logical conclusions", the historical data do not necessarily support the logic. Historical planting progress data suggest that the maximum number of acres of corn and soybean planted per week in Indiana has not changed much over the past 25 years. The accompanying figures illustrate the number of acres and percent of total acres planted during the respective weeks of maximum planting progress for corn (Fig. 1), soybean (Fig. 2), and the two crops combined (Fig. 3) for Indiana during the past 25 years.

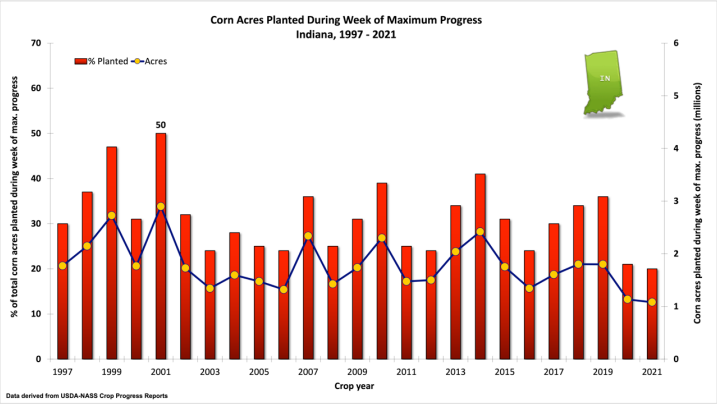



Fig. 1. Acres (actual and percent of total) of field corn planted during the week of maximum planting progress in Indiana, 1997-2021. Derived from USDA-NASS crop reporting data. Note that the exact weeks of maximum corn planting progress may not be the same weeks as those of maximum soybean planting progress.

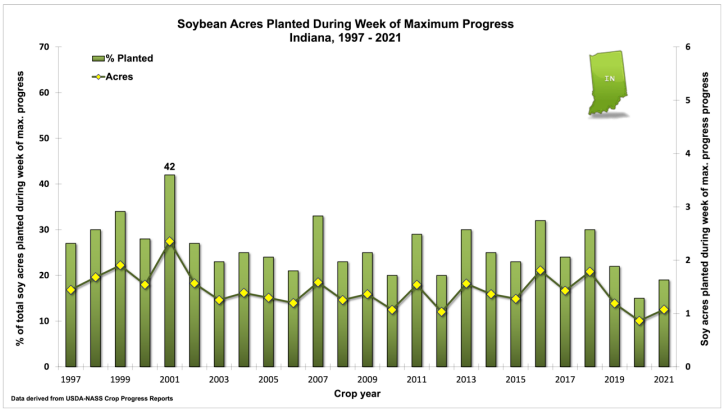



Fig. 2. Acres (actual and percent of total) of soybean planted during the week of maximum planting progress in Indiana, 1997-2021. Derived from USDA-NASS crop reporting data. Note that the exact weeks of maximum soybean planting progress may not be the same weeks as those of maximum corn planting progress.

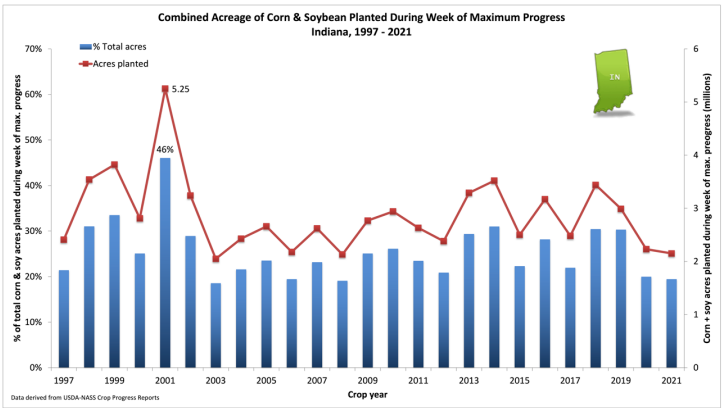



Fig. 3. Acres (actual and percent of total) of field corn plus soybean planted during the week of maximum total planting progress for both crops in Indiana, 1997-2021. Derived from USDA-NASS crop reporting data. Note that the exact weeks of maximum single crop progress may differ from the weeks of maximum two-crop progress.

The greatest number of corn acres planted in a single week in Indiana during the past 25 years occurred in 2001 when 2.9 MILLION acres or 50% of the total acreage for that year were planted in a single week (Fig. 1). Since 2001, the closest Indiana farmers have come to matching that progress was during the 2014 planting season, when 41% of the total crop or 2.4 million acres were planting during a single week.

The most soybean acres planted in a single week in Indiana during the past 25 years also occurred in 2001 when 2.4 million acres or 42% of the total acreage for that year were planted in a single week (Fig. 2). Since then, the closest Indiana farmers have come to matching that progress was during the 2016 planting season, when 1.8 million acres or 32% of the total crop were planted during a single week.

Looking at the historical planting progress of each crop individually (Fig's 1 and 2) suggests that little improvement has been made in our ability to plant a lot of crop acres quickly. Some have countered that the potential TOTAL number of combined crop acres planted per week has increased because farmers are increasingly planting soybean at the same time as they are planting corn, when historically soybean planting occurred near the end of corn planting. Well, that turns out to be a bit of "fake news", also.

During the past 25 years in Indiana, the greatest number of corn AND soybean acres planted in a single week was also 2001, when 5.25 million acres of the two crops were planted in a single week, or 46% of the total acres planted that year (Fig. 3). From a historical perspective, such an achievement over a week's time borders on phenomenal.

During the ensuing twenty years, Indiana farmers have not come close to matching that planting record. In fact, looking at just the 20 years since 2001 (Fig. 3), the maximum number of corn plus soybean acres planted in a single week has averaged 2.7 million acres, has been very erratic year to year, and shows no appreciable increase over time.

So, given the realities of ever larger planting equipment and the fact that farmers are frequently planting both crops at the same time these days, the conundrum is this… Why has the actual weekly planting progress of the two crops changed very little over the past 25 years? The answer does not appear to be related to changes in total crop acres planted in Indiana because that number has remained fairly constant in during that time period (Fig. 4).

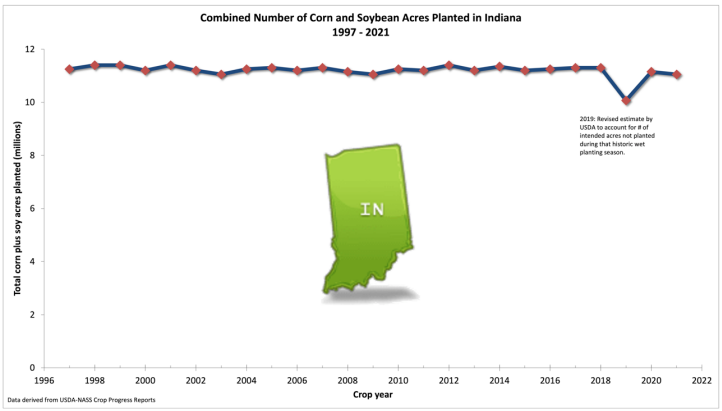



Fig. 4. Combined number of acres planted to corn and soybean in Indiana, 1997-2021. Derived from USDA-NASS crop reporting data.

One answer to the large planter vs. planting progress conundrum may be the fact that the number of corn and soybean growers in Indiana has decreased over time and those remaining are farming more acres than they did 25 years ago. Even though farm machinery is larger today and cover more acres per day than 25 years ago, fewer farmers are farming more acres and so total planting progress in terms of percent of total acres per week remains fairly unchanged. Coupled with that thought is the reality that weather and soil conditions dictate the number of days available during any given week for field work and planting. Several articles from Scott Irwin and Todd Hubbs at the Univ. of Illinois (2019, 2020a, 2020b listed below) provide more thoughtful insight in this line of reasoning.

## Related reading


Irwin, Scott and Todd Hubbs. 2019. Here We Go Again: How Many Days Does It Take to Plant the U.S. Corn Crop? farmdocDAILY, Univ. of Illinois. https://farmdocdaily.illinois.edu/2019/04/here-we-go-again-how-many-days-does-it-take-to-plant-the-u-s-corn-crop.html [accessed Apr 2022].

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# Historical Corn Grain Yields In The U.S

*(Bob Nielsen)*

- Corn grain yields in the U.S. have steadily increased since the late 1930's.
- Only two major shifts in U.S. corn yield trends have occurred since statistics were first published in 1866.
- Year-to-year departures from trend yield are influenced primarily by year-to-year variability in growing conditions.

Historical trends of grain yield improvement offer us a glimpse of yields yet to come, although, like the stock markets, past performance is no guarantee of the future. The historical yield data for corn in the U.S. illustrate the positive impact of improved crop genetics and improved crop/soil management practices.

American farmers grew open-pollinated corn varieties until the rapid adoption of hybrid corn began in the late 1930's. From 1866, the first year USDA began to publish corn yield estimates, through about 1936, yields of open-pollinated corn varieties in the U.S. were fairly stagnant and only averaged about 26 bu/ac (1.6 MT/ha) throughout that 70-year period (Fig. 1).

It is amazing to me that there was no appreciable change in productivity over that 70-year time period, even though farmers' seed-saving practices represented a form of plant breeding that one would have expected to result in small increases in yield over 70 years. Kutka (2011) suggests that the absence of significant yield improvement in these open-pollinated varieties was not so much a result of ineffective plant breeding by farmers as it was the inability to produce, or maintain, high quality seed for the next year's planting and farmers' generally low adoption of agronomically sound crop and soil management practices.

Rapid adoption of double-cross hybrid corn by American farmers began in the late 1930's, in the waning years of the Dust Bowl and Great Depression. Within a very few years, the national yield statistics indicated that a genuine "miracle" of corn grain yield improvement had occurred. The annual rate of yield improvement, which heretofore had been about zero, increased to about 0.8 bushels per acre per year from about 1937 through about 1955 (Fig. 1). This dramatic improvement in yield potential must have truly seemed like a miracle to American farmers.

**Hybrid Adoption Trivia:** An interesting premise put forward by Sutch (2011) is that even though early hybrids had been shown to yield better than open-pollinated varieties prior to the 1930s, "*…the drought of 1936 sped the process of adoption after it revealed the drought resistance of hybrid corn.*" In other words, the yield advantage of hybrids over open-pollinated varieties under severe drought stress was nothing short of "miraculous". The author further states… "*After 1937, a new dynamic was set in motion. The explosion of demand for hybrid corn generated large profits for the major hybrid seed companies: Pioneer, Funk, and DeKalb. As a result, the companies invested heavily in research with new hybrid strains. They not only perfected the drought resistance of the plant but also found ways to permit increased planting density, increase the resistance to lodging, and increase responsiveness to artificial fertilizer. The result was a steady improvement in the yields per acre that hybrid corn could achieve. Once these post-1937 improvements were recognized, adoption of hybrid corn became economically advantageous; before 1937, it had not been so.*"

The second "miracle" of corn grain yield improvement began in the mid-1950's (Fig. 1) in response to continued improvements in genetic

yield potential and stress tolerance plus increased adoption of nitrogen fertilizer, chemical pesticides, agricultural mechanization, and overall improved soil and crop management practices. The annual rate of corn yield improvement more than doubled to about 1.9 bushels per acre per year and has continued at that steady annual rate ever since, sustained primarily by continued improvements in genetics and crop production technologies (Fig. 1).

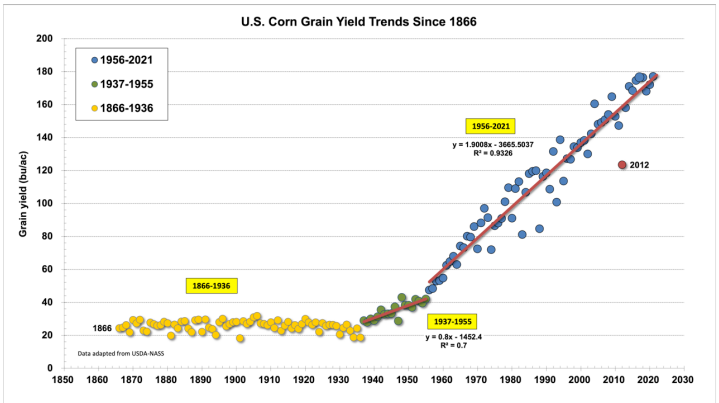


Fig. 1. Annual U.S. Corn Grain Yields and Historical Trends Since 1866. Data derived from annual USDA-NASS Crop Production Reports.

Some speculated that a third "miracle" of corn grain yield improvement began in the mid-1990's with the advent and rapid adoption of transgenic hybrid traits (insect resistance, herbicide resistance) by U.S. corn farmers. In fact, a number of seed industry 'experts' confidently promised that average US corn grain yield would approach 300 bushels per acre by 2030 due to these advances in biotechnology (Schill, 2007). However, the USDA-NASS yield data show little to no evidence that yield trend over the past 25 years has deviated from the long-term 1.9 bushels per acre per year (Fig. 1). Indeed, these data simply reflect the fact that currently available transgenic hybrid traits do not literally increase genetic yield potential above and beyond "normal" genetic improvements in corn hybrids. Rather, these traits simply protect the inherent yield potential of modern hybrids while potentially reducing farmers' reliance on chemical pesticides. A true third "miracle" of corn yield improvement remains "somewhere over the rainbow".

**Trend Line Trivia:** Historical trend lines offer a useful way to visualize changes over time. The historical trend yield lines shown in Fig. 1 are technically linear regression lines and represent the best "fit" method for describing the changes in U.S. corn yields over time. The equation associated with the trend line that begins in the 1950s can be used to predict U.S. corn yield for the current cropping year under "normal" growing conditions. Year-to-year departures (changes) from the trend line are caused primarily by year-to-year variability in growing conditions. However, significant changes in the trend line itself (i.e., the slope of the line) are usually caused by significant changes in the adoption of farming technologies (e.g, hybrids, pest control, soil management, mechanization, precision ag. technologies). Irwin and Hubbs (2020) offer an interesting read on how these trend lines are affected by what year you choose to begin the estimation. In particular, one must be cautious when using short time periods because of the greater effects unusual individual years (e.g., drought of 2012) can have on that estimation. My personal preference is to use the time period beginning with 1956, which accounts for 93% of the variability in corn grain yields between then and now (Fig. 1).

Reliance on corn yield trend lines to estimate future corn grain yields is inherently not precise. Annual corn yields fluctuate above and below their respective historical trend lines (Fig. 2), primarily in response to variability in growing conditions year to year (e.g., weather and pests).

The "Great Drought" of 2012 certainly resulted in dramatic and historic reductions in corn grain yield relative to trend yield (-22%), but the greatest negative departure from trend yield actually occurred more than 100 years earlier during the "Great Drought" of 1901 (-30%). Conversely, the greatest single positive departure from trend yield occurred in 1906 when the corn crop that year yielded 23% higher than the expected trend yield. The magnitude and range of annual departures from trend yield since the mid-1950's reinforce the evidence from Fig. 1 that the adoption of transgenic hybrid traits beginning in the mid-1990's has not resulted in yields unusually higher than the long-term yield trend.

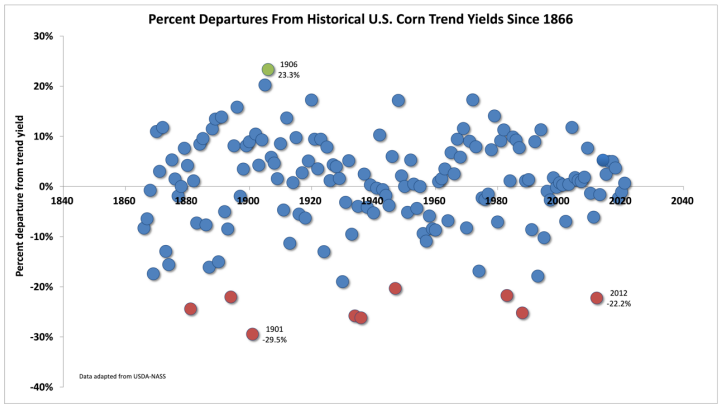


Fig. 2. Annual percent departures from estimated corn trend yields in the U.S. since 1866. Data derived from annual USDA-NASS Crop Production Reports with respect to historical trend lines depicted in Fig. 1.

## Bottom Line

The GOOD NEWS is that corn grain yields in the U.S. have steadily increased since the 1950's at almost 2 bushels per acre per year. The SOBERING NEWS is that, in order to support the ever-burgeoning world population in the years to come, a third "miracle" that dramatically shifts the annual rate of corn yield improvement will be required.

## Related Reading


Irwin, Scott and Darrel Good. 2012. The Historic Pattern of U.S Corn Yields, Any Implications for 2012? farmdoc daily (2):21, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign. https://farmdocdaily.illinois.edu/2012/02/the-historic-pattern-of-us-cor-1.html [accessed Apr 2022]

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# Abnormal Ear Development In Corn: A Review

*(Osler A. Ortez), (Anthony J. McMechan), (Thomas Hoegemeyer), (Ignacio A. Ciampitti), (Bob Nielsen), (Peter R. Thomison) & (Roger W. Elmore)*

## Abstract

Intensive study for more than 100 yr has resulted in a good understanding of corn's (*Zea mays* L.) growth and development. However, abnormal development of ears in corn was reported in several U.S. states, including Texas, Colorado, Kansas, Nebraska, Iowa, and Illinois, during 2016, stretching our understanding. A comprehensive review of the literature was conducted to identify abnormal ears' symptoms, causes, and timing of development. This study aimed to (a) describe and summarize previously reported ear symptoms, (b) document recent widespread symptoms of major concern, and (c) describe our current understanding of the potential cause(s) and expected development timing for abnormal ears. In total, 10 previously reported symptoms of corn ears were found, including tassel, fasciated, arrested, pinched, blunt, silk-balled, incomplete kernel set, banana-shaped, zipper, and tipped-back. Three additional recent widespread symptoms of major concern associated with significant yield reduction across a wide area in 2016 were described: multi-ears, barbell-ears, and short-husk ears. The information available on several of the symptoms was limited, and the specific causes were unknown, highlighting the need for more research in this area. Despite this and based on existing knowledge, possible causal factors and postulated development timing (i.e., when the stress may have occurred) are presented for all symptoms. Abnormal ear development can be seen as the response to complex interactions among genetics, environment, and management practices. Ear abnormalities are detrimental to grain yield and quality, and their mitigation is imperative to efficient corn systems, crop resiliency, and sustainability.

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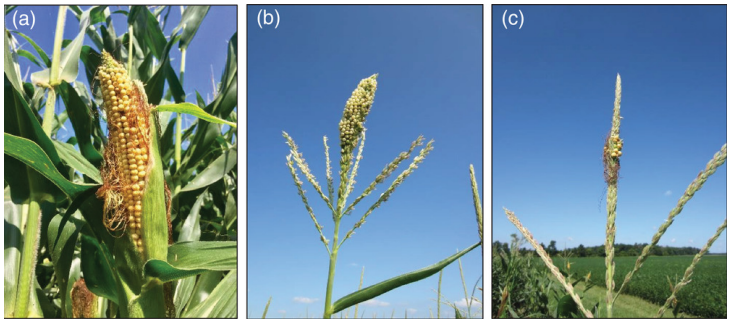


FIGURE 1. (a) Complete replacement of tassel and (b–c) partial replacement of tassel on tillers in an end row. Images: (a) Osler Ortez, (b–c) (Photo Credit: Robert Nielsen)

# Cool And Wet Conditions Now Predicted Over Next Few Months

*(Beth Hall)*

On the third Thursday of every month, the national Climate Prediction Center releases their 3-month climate outlook for temperature and precipitation. These outlooks are presented as the level of confidence (i.e., probability of occurrence) for conditions to be above or below normal. Since last fall, these outlooks have been consistently favoring above-normal temperatures and precipitation for Indiana. This suggested significant influence from the La Niña phase of oceanic temperatures over the tropical Pacific Ocean that has global impacts. Earlier models assumed that this La Niña event would weaken, transitioning to a more neutral phase by late spring. However, it has not shown much weakening, suggesting significant confidence that La Niña will continue into late summer. While this has happened in the past, the few cases coupled with the significant changes in global climates have made it difficult to draw strong comparisons for what to expect over the next few months. Regardless, the variety of climate models that contribute to the final climate outlooks have provided some guidance. For May, the climate outlooks are favoring cooler-than-normal temperatures and above-normal precipitation. Now that the temperature outlook has flipped from favoring above-normal temperatures to below-normal temperatures, there is increased concern that the number of favorable field days will be reduced. Lower temperatures will reduce evapotranspiration rates causing soil conditions to remain wetter for longer. The May-June-July climate outlook for temperature is indicating that the various climate models were inconsistent on whether temperatures would be above, near, or below normal (Figure 1). However, the 3-month climate outlook for precipitation is still favoring above-normal amounts (Figure 2). It is important to note, however, that if that outlook is correct, it only means that the 3-month total amount of precipitation is likely to be above normal with little-to-no guidance on its timing.

The recent cooler temperatures across Indiana has led to a slow start for accumulated modified growing degree days (MGDD) with a start date of April 1. Figure 3 shows accumulated MGDDs ranging from the upper 30s in the northern counties to the lower 100s in southern Indiana. This is anywhere from 30 to 90 units below normal with the

greatest differences occurring in southern Indiana (Figure 4).

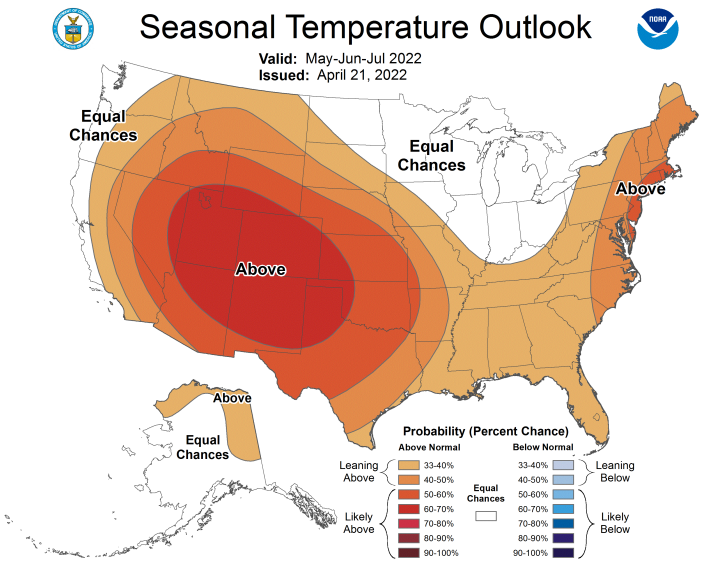


Figure 1. Temperature outlook for the May-June-July 2022 period. These are produced by the national Climate Prediction Center and illustrate confidence of favoring above- or below-normal conditions.

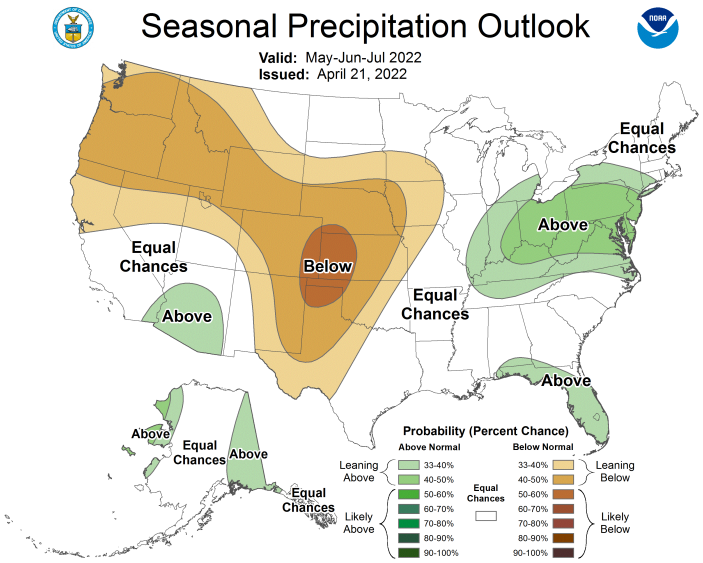


Figure 2. Precipitation outlook for the May-June-July 2022 period. These are produced by the national Climate Prediction Center and illustrate confidence of favoring above- or below-normal conditions.

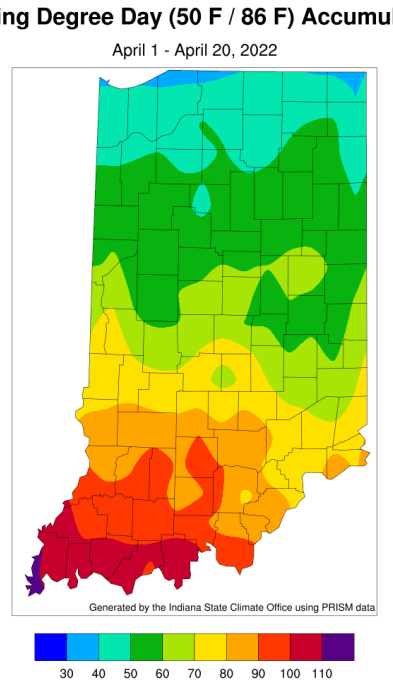


Figure 3. Modified growing degree day (50°F / 86°F) accumulation from April 1-20, 2022.

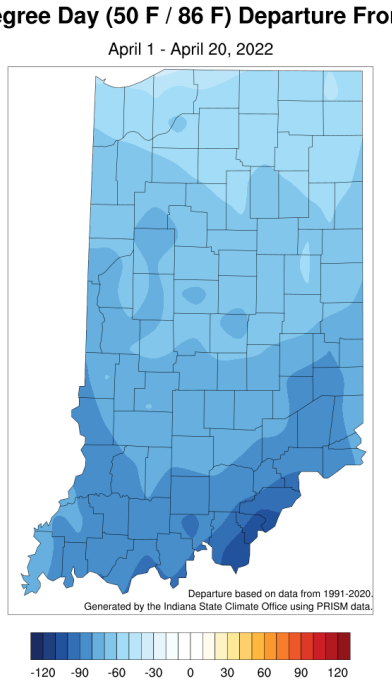


Figure 4. Modified growing degree day (50°F / 86°F) accumulation from April 1-20, 2022, represented as the departure from the 1991-2020 climatological average.

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