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Pest&Crop 2018 Survey

Dear Pest&Crop reader,

We need your help (aka, VOTE). Following is a link to a simple, short online survey. Please consider doing this right now, as we need your evaluation of this newsletter. Too, we need to show our funding agencies whether or not this information from Purdue specialists throughout the season is meaningful to you and the industry. Thanks in advance for your support.

https://purdue.ca1.qualtrics.com/jfe/form/SV_8vHUrij0Rkus9IF

Dicamba Use in Soybean – General Information

Authors: Bill Johnson, Joe Ikley, Aaron Hager, Univ. of Illinois, and Mark Loux, The Ohio State University

Ohio, Indiana, and Illinois are heavily infested with weeds resistant to glyphosate (group 9), PPO inhibitors (group 14), and ALS inhibitors (group 2). This has greatly reduced the number of effective postemergence herbicides for controlling these weeds in Roundup Ready 2 (RR2) soybeans. Adoption of Roundup Ready 2 *Xtend* (glyphosate and dicamba resistant – RR2 Xtend) soybeans and use of dicamba-based herbicides is one option for managing resistant weed populations. Keep in mind that selection for dicamba resistance occurs each time dicamba is applied, and over reliance on this technology will lead to the development of dicamba-resistant weed populations.

Concurrent with the development of dicamba-resistant soybean varieties, Bayer and BASF developed new formulations of dicamba herbicides for use in RR2 Xtend soybeans that are supposed to be lower in volatility compared with previous dicamba products. These products are Xtendimax (Bayer), FeXapan (same thing as Xtendimax, but sold by Corteva), and Engenia (BASF). The federal labels for these herbicides contain very detailed application instructions to reduce risk of off-target movement. However, in 2017 and 2018, there were thousands of cases of off-target movement affecting millions of acres throughout the soybean growing region of the US. As a result, we provide information here to help reduce risk of off-target movement of dicamba applied to RR2 Xtend varieties. The information provided here is not necessarily inclusive, or meant to replace a thorough knowledge of herbicide labels and other information provided by manufacturers.

In late October 2018, the EPA approved revised labels for Xtendimax, FeXapan, and Engenia. All three products are restricted use pesticides, meaning an applicators license must be held in order to purchase and apply these products. It is no longer acceptable to simply operate under the supervision of someone with a license. The labels continue to require applicators to attend an annual dicamba or group 4 herbicide-specific training prior to using the products. In addition to becoming restricted use pesticides, these revised labels have more restrictions outlining how the products should be applied. The language regarding buffers and applications near sensitive crops has also been rewritten for clarification on what constitutes sensitive areas and crops, and how the products should be applied.

Important label restrictions

1) **Use only approved dicamba products** – As of early November 2018, there were only three dicamba-containing products approved for preplant, preemergence, or postemergence use in Roundup Ready Xtend soybeans. The approved products are Xtendimax, FeXapan, and Engenia. It is a violation of federal and state law to use anything but approved formulations of dicamba on Roundup Ready Xtend soybeans. Other dicamba products can be used at least 14 days preplant, if the appropriate waiting interval is followed per the label for non-Xtend soybeans.

2) **Wind direction** – The labels state that a buffer is required if wind is blowing towards a sensitive area, and that dicamba should not be applied at all if the wind is blowing toward a sensitive crop. In 2017 and 2018, it appeared that many applicators did not follow this restriction, perhaps because a specific distance to the sensitive crop was not specified and sensitive areas were not well defined. Realistically, if the sensitive crop is within a 0.5 mile or less of the target field, common sense would suggest it might not be a good idea to apply to that field. If wind is blowing towards extremely sensitive vegetation, such as non-Xtend soybean varieties, we recommend not to spray until the wind is blowing away from the sensitive crop on the day of application, and also for the next 2 to 3 days after application.

3) **Wind speed** – The labels allow spray applications when wind speeds are between 3 and 10 mph, and these wind speeds are to be measured at the boom height. In 2017 and 2018, a key aspect overlooked by many was the speed of wind gusts, and many applicators may have focused more attention on average wind speed rather than wind gust speed. As a result, many spray applications were made during days when average wind speeds were less than 10 miles an hour, but in many instances wind gusts were in excess of 10 miles an hour. We strongly recommend not applying on days when wind gusts exceed 10 miles an hour even if sustained wind speeds are less than 10 miles an hour. It is not always easy to find a window with these lower wind speeds. The reality is that some years can be challenging to make applications of dicamba products that have very strict label precautions with regard to wind.

4) **Time of day** – The labels now allow applications to be made only between 1 hour after sunrise and 2 hours before sunset. This is to restrict applications to when temperature inversions are less likely to occur. If the time of day restriction was in place in 2018, there would have been substantially fewer hours in June where applications could be made. Accounting for conditions that allowed equipment traffic, West Central Indiana would have had only 39 hours in June with wind speeds between 3 and 10 mph between the legal application hours.

5) **Temperature inversion** – During a temperature inversion, very small spray droplets remain suspended in the air and do not settle on plants or the soil surface. These droplets will move when wind speed increases later in the day. We strongly recommend that you use an app like Spray Smart or something similar to determine whether or not a temperature inversion exists. If there is a temperature inversion, do not spray until the inversion has lifted.

6) **Buffers –** Another frequent violation of the label in 2018 was failure to implement buffers near sensitive areas. Many applicators took the approach that if the wind was blowing away from the sensitive crop, dicamba could be applied right up next to the sensitive crop. These buffers have become more restrictive heading into 2019. In addition to the downwind buffer to sensitive areas, there is now a 57 foot in-field buffer around the perimeter of fields if an endangered specie is present in your county. It is the applicator's responsibility to check the appropriate sources for the presence of endangered species. University research has demonstrated that even the new formulations of dicamba

can volatilize and move on dust particles for up to three days following application. Wind directions can change on day two or day three and move volatilized dicamba or dicamba dust to sensitive vegetation. So the establishment of buffers is extremely important if you are near a sensitive area.

7) **Nozzles** – Consult the websites for the respective herbicides to find the list of approved nozzles and spray pressures to apply the approved dicamba products to Xtend soybeans.

8) **Spray additives and tank-mix partners** – The list of approved spray additives changes frequently, so it is important to regularly check the websites. All approved dicamba products require the use of a drift control agent from the list of approved drift control agents on their respective website. The addition of any other product, including foliar fertilizers, insecticides, herbicides, or fungicides, that is not listed on the website for the respective herbicide constitutes a label violation. Do not add ammonium sulfate or anything containing ammonium sulfate as this produces more of the volatile form of dicamba. There are approved non-ammonium sulfate based water conditioners to reduce hard water antagonizing glyphosate that is tank-mixed with an approved dicamba formulation. Finally, use of a pH buffer may be necessary to keep spray solution pH above 5. A pH below 5 can increase volatility of dicamba products.

Websites for the approved dicamba products:

www.engeniatankmix.com

www.xtendimaxapplicationrequirements.com

www.fexapanapplicationrequirements.dupont.com

Additional suggestions to reduce offsite movement

The following are a number of additional suggestions to implement if you are concerned about offsite movement. Keep in mind that one can do everything "per the label" but still have offsite movement. This happens because: 1) even these new dicamba formulations have the capability of volatilizing and moving on dust particles; 2) fine spray particles can remain suspended in inversions; and 3) and dicamba can move with runoff water after heavy rainfall events. To reduce the probability of both primary and secondary dicamba movement events, consider the following recommendations:

1) Do not spray when the forecast indicates wind gusts will exceed 10 mile per hour. It is impossible to predict when a gust of this magnitude will happen nor how long it will last. Gusts that reach 30 mph can move spray particles and vapor for great distances.

2) Reduce boom heights to the 24-inches above the target height limit specified on the label. Simply reducing the boom height from 48 to 24 inches has been shown to reduce the distance traveled by drift particles by 50%. One of the most effective ways to safely lower the boom height without running the boom into the ground is to reduce sprayer travel speed. Also remember that any travel speed over 15 mph is off-label. The labels also now recommend that travel speeds be reduced to 5 mph when making applications on the field edges.

3) Avoid application when temperature exceeds 80 degrees. Assuming that these dicamba products have some potential for volatility, the risk of this occurring increases with temperature.

4) Consider applying dicamba only preplant, preemergence, or very early postemergence. Over 90% of the offsite movement complaints resulted from postemergence applications. Our assumption is that applications earlier in spring will have less likelihood to cause problems even where dicamba moves, due to the absence in many cases of any developed vegetation to injure. Temperatures are also likely to be lower when applied preplant/preemergence versus postemergence, possibly reducing the risk of movement via volatility.

5) Have conversations with neighbors to know what crops and technologies are being planted around Xtend soybean fields. Many offsite movement cases in 2018 occurred where neighbors planted Xtend and non-Xtend soybean adjacent to each other. Knowing what sensitive crops are in the vicinity of your Xtend fields will enable better decision-making about use of dicamba in a given field.

Dicamba Precautions_2018 Update(2)

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Update on Dicamba Labels for Use in RRXtend Soybean in 2019

Authors: Joe Ikley and Bill Johnson

On October 31st, the EPA approved revised labels for Xtendimax, Engenia, and FeXapan for the 2019 and 2020 growing seasons. The labels will expire in December of 2020. We are still awaiting the interpretation of the labels by the Office of the Indiana State Chemist to know how Indiana applicators can apply these products in 2019. At this time, we do know two things:

1 – Training will once again be mandated to use these products in 2019 and these trainings will NOT be given by Purdue Extension this year.

2 – Anyone who sprays, mixes, or loads the products MUST have a certified applicator's license. A non-certified person working under the supervision of a certified applicator is no longer allowed.

We will provide updates as we learn more about these labels. For now, we have updated our Dicamba Precautions document that we wrote in conjunction with Ohio State and University of Illinois to reflect some of the label changes. This document contains recommendations on how to use these products, but it is not our interpretation of the label.

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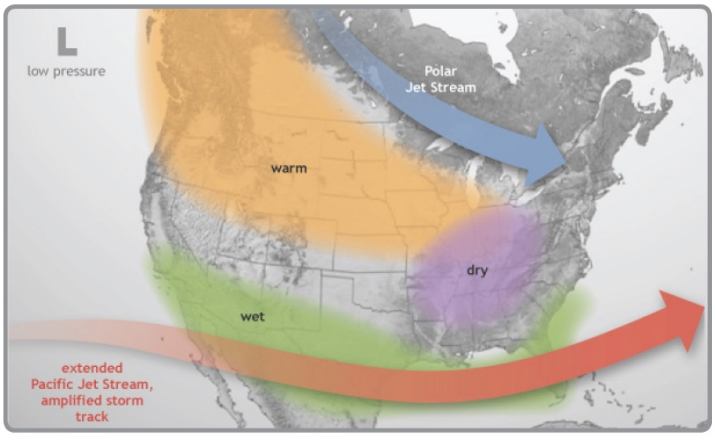
El Niño Impacts and Outlook

Author: NOAA's Regional Climate Services Program

Typical El Niño Winter Pattern

Highlights for the Great Lakes

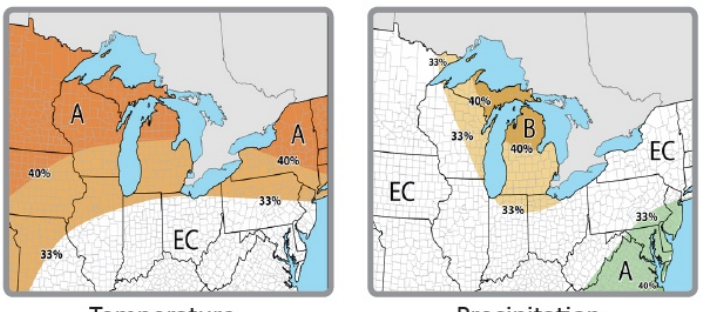
An El Niño develops when sea surface temperatures are warmer than average in the equatorial Pacific for an extended time. This is important to North America because El Niño can impact our weather patterns, especially in the winter. Although each El Niño is different, there are some general patterns that are predictable. For instance, the polar jet stream is typically farther north than usual, while the Pacific jet stream remains across the southern U.S. This pattern brings above-normal temperatures to much of the Great Lakes region, particularly across the north. This does not mean cold weather will not happen this winter, but extreme cold weather events may be milder and less frequent.



The image above shows the typical pattern in the winter during El Niño events. The polar jet stream tends to stay to the north of the Great Lakes region, while the Pacific jet stream remains across the southern U.S. With the Great Lakes positioned between the storm tracks, warmer and possibly drier conditions can develop during El Niño events. (Image courtesy of the National Oceanic and Atmospheric Administration.)

El Niño Outlook

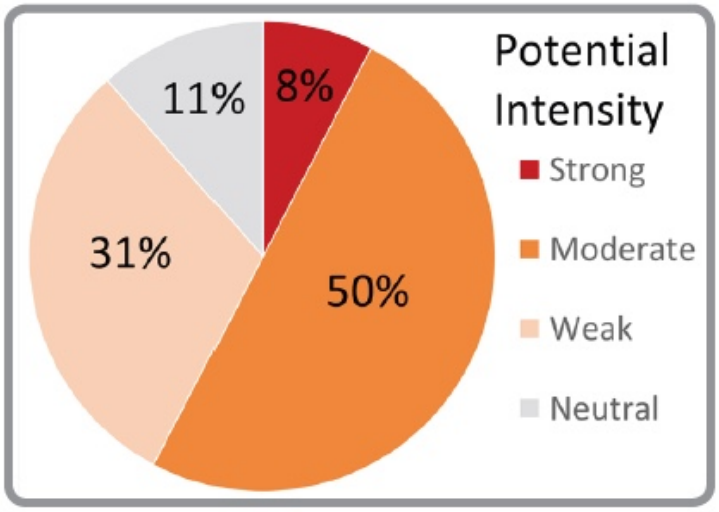
As of October, the winter outlooks for the region show that below-normal precipitation is favored for the central and western portions of the basin. This can result in reduced snowpack that could impact spring runoff and may have negative implications for many sectors. The temperature outlook indicates that the basin could have above-normal temperatures, especially further north. Warmer temperatures could have positive implications, such as reduced heating costs, fewer transportation costs and delays, and increased retail sales. Negative implications from warmer temperatures include reduced winter recreation and increased survival through the winter of agricultural pests.



Temperature Precipitation

Winter temperature and precipitation outlooks valid for Dec. 2018 – Feb. 2019 (EC: Equal chances of above, near, or below normal; A: Above normal; B: Below normal)

According to the Climate Prediction Center, ENSO-neutral conditions are present. Outlooks favor the development of a weak to moderate El Niño event in the next few months, which could continue through the winter (70-75% chance). An El Niño Watch is in effect. The chart below shows the potential intensity of this winter's El Niño, with data from the International Research Institute for Climate and Society.



El Niño strength, winter 2018-19

Potential Winter and Spring Impacts

For the Great Lakes, most of the winter impacts are beneficial. Milder winter weather could benefit winter wheat, forage crops, cover crops, and fruits. However, because an El Niño winter typically results in reduced snowpack, this could expose these crops to occasional cold air outbreaks and harsh wind. Milder winter temperatures should be beneficial for livestock producers by reducing operating costs and stress to animals while improving production.

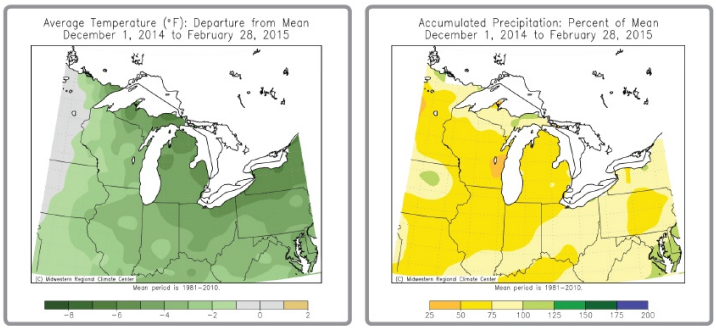
Mild and dry winters with decreased snowfall can have a significant overall positive impact on the economy. The largest positive impacts are reductions in heating costs and increased retail sales. Economic losses are suffered by those sectors that depend on normal winter weather, such as winter recreation, snow removal businesses, towing companies, and road salt sales. In addition, less ice on the Great Lakes could potentially lead to an extended navigation season for shipping.

Above-average temperatures could lead to reduced snowpack accumulation this winter season and a chance for decreased runoff into the lakes during the spring since runoff is typically a major contributor to increasing water levels. Since the lakes are mostly above average levels right now, this could lead to a return to normal water level conditions in the spring. Warmer winter temperatures may also contribute to reduced ice cover on the Great Lakes.

Comparisons and Limitations

The maps below illustrate the winter conditions of the most recent weak El Niño event that occurred in the winter of 2014-2015. The Great Lakes region was cooler than average and precipitation was near or below average, especially around Lake Michigan and Lake Huron. Each El Niño is different and other factors should be considered, such as antecedent conditions or the Arctic Oscillation, which trumped the El Niño during winter of 2009-2010. While past El Niño events can help inform

forecasters about certain conditions, there are some limitations. For instance, El Niño is not known to impact the track or intensity of any single weather system or the timing of freeze events in the fall or spring.

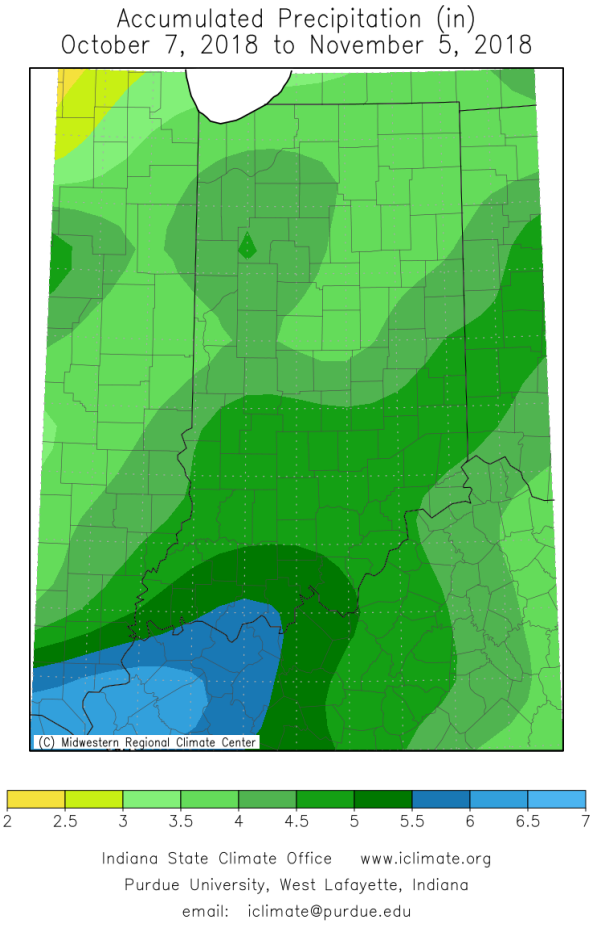


Maps courtesy of the Midwestern Regional Climate Center

Great Lakes Partners

Midwestern Regional Climate Center
National Oceanic and Atmospheric Administration
NOAA NCEI
Great Lakes Environmental Research Laboratory
NOAA NWS Climate Prediction Center
NOAA Great Lakes Sea Grant Network
North Central River Forecast Center
Ohio River Forecast Center
Great Lakes Integrated Sciences & Assessments
American Association of State Climatologists
National Integrated Drought Information System
USDA Midwest Climate Hub

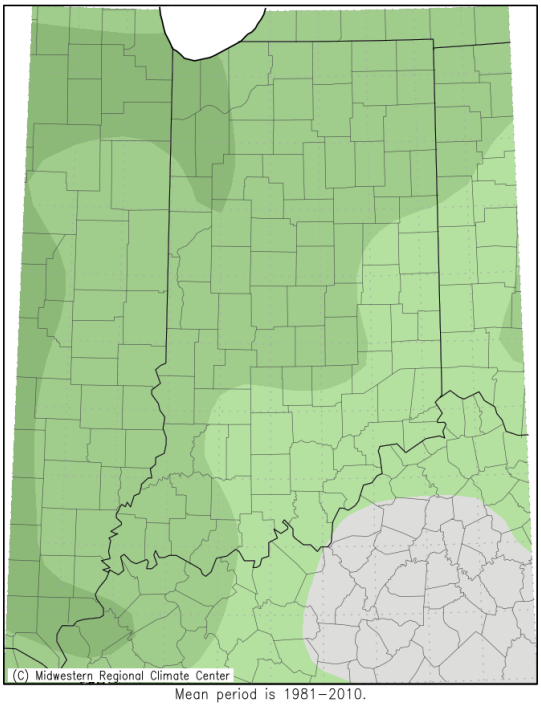
GreatLakesENSO 2018



Accumulated Precipitation Oct. 7-Nov. 5, 2018

Average Temperature from Mean, Oct. 7 – Nov. 5, 2018

Average Temperature (°F): Departure from Mean
October 7, 2018 to November 5, 2018



Mean period is 1981–2010.

−4 −3 −2 −1 0

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