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1. Will Global Warming Affect Yields in 2009?

D.B. Egli, Soybean Physiologist
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Global warming was a hard to imagine for many Kentuckians during the freeze that occurred in late January over most of the state. At the time of this edition, crews are still trying to replace broken power lines and poles in western Kentucky.

Worrying about global warming and its potential effects on our lives has become a national pastime. Climate extremes – floods, droughts, hurricanes, and tornados – are often blamed on global warming and taken as harbingers of a changing climate. Increasing levels of carbon dioxide and other greenhouse gases that trap long-wave radiation from the earth's surface (the greenhouse affect) may lead to higher temperatures and changes in rainfall amounts and distribution. Some areas may get more rainfall while others get less. Some reports predict that the Midwest will be one area that will see a decline in summer rainfall over the next 100 years. These predictions are made with large-scale computer models of the atmosphere; models that are related to those used to produce the daily weather forecast. It is difficult to be sure that these models accurately depict all the complexities of the world-wide climate which is one reason why there is still debate about the potential impact of the increased greenhouse effect.

UNIVERSITY OF KENTUCKY, KENTUCKY STATE UNIVERSITY, U.S. DEPARTMENT OF AGRICULTURE, AND KENTUCKY COUNTIES, COOPERATING

Will global warming affect corn and soybean yields in Kentucky in 2009? It is impossible to answer this question. As every farmer knows, there is a lot of variation in the weather from one year to the next in Kentucky (see Figure 1). For example, there was more than 15 inches of rain in the wettest summers at Henderson, KY (3 out of 31 years), but only about 5 inches (2 out of 31 years) in the driest years. Maximum temperature was a boiling hot 94°F in 1980 but it was almost chilly at less than 84°F as recently as 2004. These year-to-year fluctuations are much larger than the small yearly changes predicted by the global warming models. The 31 years of data from Henderson and other locations in western and central Kentucky don't show any evidence that summers are getting any warmer, wetter or drier.

Yields in 2009 will depend upon the weather this summer. If we have plenty of rain yields will probably be high, if we don't yields will be low. We don't need global warming to get this variation. At the time this article when to press (Feb. 12, 2009) the long-range National Weather Service forecast for this summer is not very helpful, giving an equal chance of above- or below-normal precipitation and air temperature for June, July and August in Kentucky. No one knows for sure what the weather will do this summer, but if it turns out to be a bad year we shouldn't blame it on global warming.

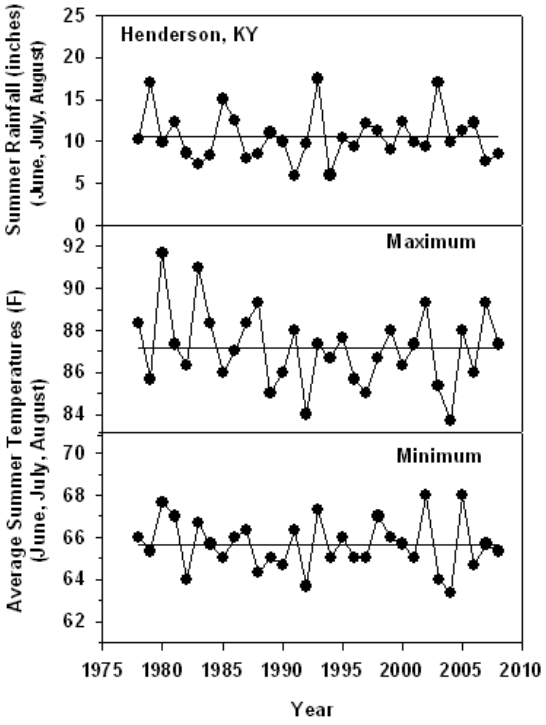

Fig. 1. Summer (June, July, August) temperature and rainfall from 1978 through 2008. Henderson, Kentucky. The flat lines represent the 31-year average. Data from the University of Kentucky Agricultural Weather Center website (http://wwwagwx.ca.edu/).

2. To Bt or Not to Bt Corn

Ric Bessin, Extension Entomologist
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Few crops, particularly major field crops, have seen such a dramatic evolution in pest management tactics is such a short period of time as what we have witnessed with field corn. Last year the acreage of Bt exceeded that of non-Bt nationally and within Kentucky. It is nearly impossible for growers to find corn seed that has not been treated with one of the systemic neonictinoid insects, c*lothianadin* or *thiamethoxam*, to control soil insect pests and help with stand establishment. Fifteen years ago we were much more reliant on field scouting, use of action and economic thresholds, and applying soil insecticides and sprays as needed. Growers now have the opportunity to select corn hybrids with stacked Bt traits that will control European corn borer, southwestern corn borer, black cutworm, corn earworm, fall armyworm, western corn rootworm, and northern corn rootworm. With the added protection of the seed treatment, seedcorn maggots, corn flea beetle, white grubs and wireworms are also managed.


Southern Corn Leaf Beetle


Stink Bug


Wireworm


Corn Leaf Aphid

All photos by Ric Bessin.

Despite these advances in pest management options, a large proportion of our corn acreage is planted with conventional corn hybrids. This may be due to market restrictions, production of food grade corn, production of corn for the bourbon industry, or just growers selecting cheaper seed to reduce input costs. What we have now is two different crops in terms of insect management, Bt corn and non-Bt corn, each with different insect pest concerns. With the non-Bt crops, we have the traditional key insect pests of corn including corn borers and rootworms. But with the Bt crop, primary pests are for the most part controlled well. Instead of the more common primary pests, there are a few uncommon secondary pests that growers of Bt corn need to watch for, and this includes, excessive wireworms, stink bugs, corn leaf aphids, and southern corn leaf beetle.

Generally, wireworms are controlled with the neonicotinoid seed treatments and this is the case with nearly all of the acreage within the state. However, in some areas and with some rotations, we have wireworm levels that can overwhelm the control provided by seed treatments, particularly the lower 'secondary pest' rates. In these uncommon situations with excessive wireworms, growers are advised to not rely on the lower seed treatment rates and consider soil insecticide treatments or high rates of the seed treatments that target primary pests, and delay planting until soil temperatures promote rapid germination and seedling emergence. Since most of the common wireworms have extended life cycles lasting two or more years, pest problems can be an indicator of future problems.

Brown and green stink bugs are both pests of seedling corn, particularly with reduced tillage. Stink bug feeding on the seedlings can injure the growing point and cause tillering, greatly reducing the yield of the injured plant. There is some evidence that seed treatments help to reduce damage caused by the southern green stink bug, but information on effects on brown stink bugs is limited. Shortly after seedling emergence, growers should monitor fields for stink bugs, particularly around the field margins. Stink bugs are usually found at the base of the seedling just above the soil line. Keep in mind that visual signs of stink bug damage take some time to appear and the stink bug may be long gone by then. Where stink bugs are found to be actively feeding, basal sprays can be used for management.

Corn leaf aphid is an uncommon pest that does have the ability to explode in numbers when the conditions are correct. Excessive corn leaf aphids on the upper leaves, particularly the flag leaf, and covering the tassel can lead to pollination interference and yield loss. Drought stress during this period can compound the impact of corn leaf aphids at this critical period. While many growers often don't recognize corn leaf aphid infestations until tassel emergence or later, these infestations begin several weeks prior to tassel emergence. Approximately two weeks prior to tassel emergence, growers can sample for corn leaf aphids by pulling and examining the whorl leaves. Growers should consider treating for corn leaf aphids if an average of 15 or more aphids (10 with stressed plants) per whorl are found 3 weeks before tassel emergence or 30 or more aphids (15 with stressed plants) per whorl one week later. Closer to tassel emergence, greater numbers can be tolerated without loss of yield. In tasseled corn, corn leaf aphids usually have done most of their damage and killing them often provides little savings to producers. There are few guidelines for making control decisions for tasseling corn. However, if less than 50 percent of pollination has occurred, aphids and honeydew are covering tassels, and plants are stressed, an insecticide may be necessary to ensure adequate pollination.

Another uncommon and difficult to recognize pest is the southern corn leaf beetle. This small beetle is less than ¼ inch in size and dark in color. When disturbed they fall to the ground and blend in with the soil making then very difficult to find. They feed on the emerging leaves of small seedling and chew a notch in the side of the leaves before they unfurl. This often resembles damaged caused by cutworms. When examining suspected cutworm damage, particularly with very small seedlings, carefully search around the base of the plant to determine which pest is causing the damage. Fortunately with southern corn leaf beetle the damaged caused is usually well above the growing point and the potential for yield loss is less that that with cutworms.

In summary, while many growers are using stacked Bt hybrids that also include systemic seed treatments to manage soil pests, there are still a few secondary insect pests that need to be monitored and controlled in some situations.

3. Is Early Planting the Key to High Soybean Yields?

D.B. Egli, Soybean Physiology
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Should Kentucky producers who are looking for higher soybean yields be in the field planting soybeans in April? Usually they are not; less than 10% of the crop is planted by May 1 according to the 5-year average from the National Agriculture Statistics Service. But some farmers think that pushing planting dates into April will increase yield.

The planting date that produces the highest yield varies a lot from year to year depending on when it rains and when it doesn't. To get a clearer picture of the average response, I did a combined analysis of 10 planting date experiments, each conducted for several years at one or more locations in the Upper South (Arkansas, Kentucky, Missouri, and Tennessee). The experiments included planting dates from mid-April to late July and varieties from maturity group III to VII.

The yield of the April plantings was the same, on the average, as the May plantings (Fig.1); the line representing the change in yield with planting date was flat in April and May. There was no advantage from early planting; putting forth the extra effort to get the soybean crop in the ground in April will not put more beans in the bin.

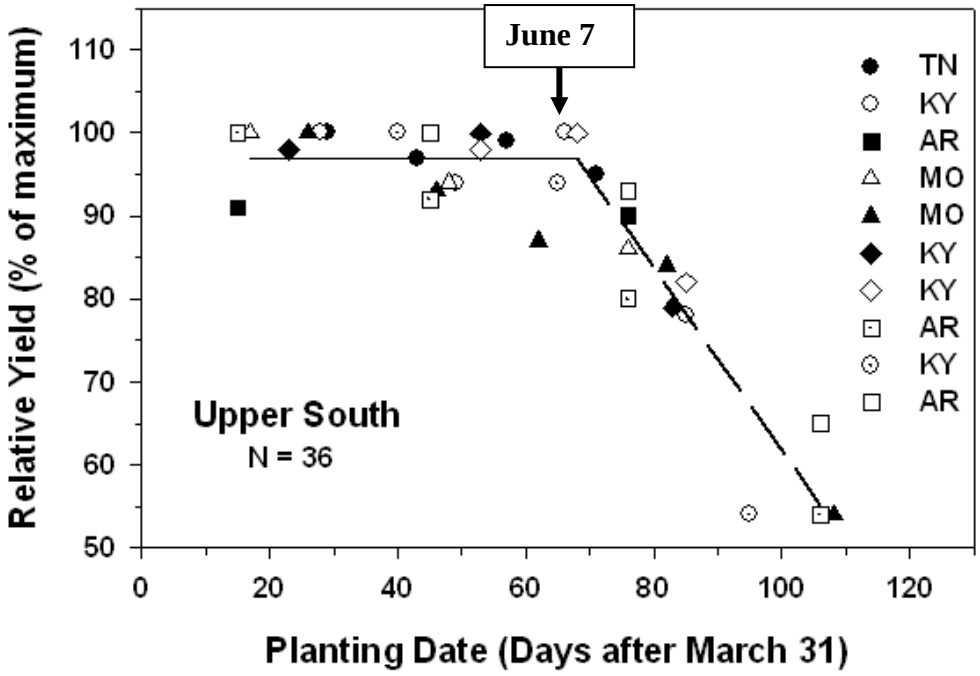

Fig. 1. The relationship between planting date and average yield of 10 experiments in the Midsouth region. Yield in each experiment was expressed as a percent of the maximum yield (i.e., maximum yield = 100%). April 15 = day 15, May 1 = day 31, May 15 = day 45, June 1 = day 62, June 15 = day 76 and July 1 = day 92.

On the other hand, there was no yield loss associated with April plantings, so if the fields are ready in late April, you can plant, just don't expect higher yields. There are, unfortunately, some potential

problems associated with April plantings that can take money out of your pocket. Planting in cold wet soils will slow germination, increase the chances of seedling diseases and may reduce seedling emergence and stand. If stand is reduced below the minimum, replanting may be necessary to avoid yield reductions. Poor stands are more likely if seeding rates have been cut back to save on seed costs. Early planting and the slower growth associated with the lower temperatures in April may also increase the chances of other disease problems, such as sudden death syndrome, that could reduce yields.

There may be no yield advantage for early planting, but there is a big disadvantage for late planting. Yield in our analysis started decreasing when planting was delayed after June 7 at 1% per day for each day after June 7. Yield from a June 27 planting would be only 80% of the maximum (20 days after June 7 at 1% per day = 20% loss). This late planting penalty limits yield of double-crop soybean planted after wheat in mid- to late- June.

Is early planting the key to high soybean yield? The answer is no for April plantings, but if early means avoiding the late-planting penalty, the answer is yes. If you are not double cropping, planting after early June will take beans out of your bins and profits out of your pockets.

4. Going Paperless

The Corn and Soybean Newsletter will likely go to an online only version by July of 2009. If you have been receiving the hard copy, please go online to: www.uky.edu/Ag/CornSoy/ and sign up for the electronic version. We apologize for any inconveniences that this may cause you.

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