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Louisiana Crops NEWSLETTER

CORN • COTTON • GRAIN SORGHUM • SOYBEANS • WHEAT

IN THIS ISSUE

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CORN DISEASE UPDATE

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Northern corn leaf blight

It has been a very busy month with field calls concerning northern corn leaf blight (NCLB). Prolonged events of rainy weather resulted in a significant increase in NLCB in the past several weeks. Susceptible hybrids following corn sustained severe outbreaks in isolated areas in the northeastern part of the state (**Figure 1**).

Most corn in the state is out of the woods when it comes to NCLB outbreaks, and the crop will outrun the disease in the vast majority of cases. That being said, some younger corn in the northernmost part of Louisiana should be scouted weekly for the presence of NCLB (**Figure 2**).

Figure 1. Severe NCLB

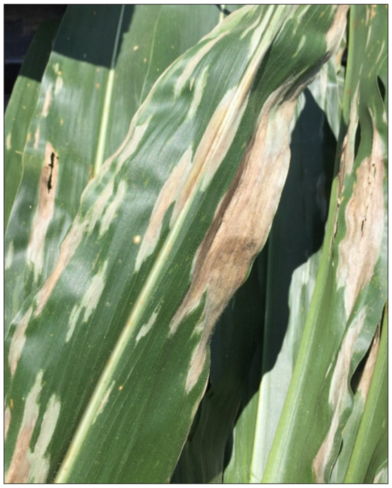

Figure 2. Active NCLB outbreak

Fungicide application decisions should be carefully made on a field-by-field basis. You should consider disease severity (**Figure 3**), crop stage (**Table 1**), hybrid susceptibility ([link]()), fungicide efficacy (**Table 2**), tillage regime, prevailing environmental conditions, previous experience and the probability of a return on the investment. If applications are warranted, apply at labeled rates using maximum (5 GPA by air) water volume.

Figure 3. NCLB disease severity scale

Most of the time, fungicide applications are not needed for NCLB. The corn crop usually fills out before the disease is severe enough to threaten yield. However, severe disease may occur in susceptible hybrids that are following corn in reduced tillage situations. These fields need to be watched closely.

Please contact your county agent or specialist for more information.

Table 1. Percent yield loss (in blue) as a result of defoliation by crop stage. For example, 30 percent defoliation at dent stage results in a 2 percent yield loss. Consider only ear leaf -1 and above when determining disease severity.

	% Defoliation									
Growth Stage	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Tassel	3	7	13	21	31	42	55	68	83	100
Silked	3	7	12	20	29	39	51	65	80	97
Silks Brown	2	6	11	18	27	36	47	60	74	90
Pre-Blister	2	5	10	16	24	32	43	54	66	81
Blister	2	5	10	16	22	30	39	50	60	73
Early Milk	2	4	8	14	20	28	36	45	55	66
Milk	1	3	7	12	18	24	32	41	49	59
Late Milk	1	3	6	10	15	21	28	35	42	50
Soft Dough	1	2	4	8	12	17	23	29	35	41
Early Dent	0	1	2	5	9	13	18	23	27	32
Dent	0	0	2	4	7	10	14	17	20	23
Late Dent	0	0	1	3	5	7	9	11	13	15
Nearly Mature	0	0	0	0	1	3	5	6	7	8

Table 2. The Corn Disease Working Group (CDWG) has developed the following information on fungicide efficacy for control of major corn diseases in the United States. Efficacy ratings for each fungicide listed in the table were determined by field testing the materials over multiple years and locations by the members of the committee. Efficacy ratings are based on the level of disease control achieved by the product and are not necessarily reflective of yield increases obtained from product application. Efficacy depends on proper application timing, rate and application method to achieve optimum effectiveness of the fungicide as determined by labeled instructions and overall level of disease in the field at the time of application. Differences in efficacy among fungicide products were determined by direct comparisons among products in field tests and are based on a single application of the labeled rate as listed in the table. This table includes systemic fungicides available that have been tested over multiple years and locations. It is not intended to be a list of all labeled products.

Efficacy categories include NR = not recommended; P = poor; F = fair; G = good; VG = very good; E = excellent; NL = not labeled for use against this disease; and U = unknown efficacy or insufficient data to rank product.

Fungicide active ingredient (%)	Product/trade name	Rate/A (fl oz)	Anthracnose leaf blight	Common rust	Northern leaf blight	Southern rust	Harvest restriction
Azoxystrobin 22.9%	Quadris 2.08 SC Multiple Generics	6.0 – 15.5	VG	E	G	G	7 days
Pyraclostrobin 23.6%	Headline 2.09 EC/SC	6.0 – 12.0	VG	E	VG	VG	7 days
Picoxystrobin 22.5%	Aproach 2.08 SC	3.0 – 12.0	VG	VG – E	VG	G	7 days
Propiconazole 41.8%	Tilt 3.6 EC Multiple Generics	2.0 – 4.0	NL	VG	G	F – G	30 days
Prothioconazole 41.0%	Proline 480 SC	5.7	U	VG	VG	G	14 days
Tebuconazole 38.7%	Folicur 3.6 F Multiple Generics	4.0 – 6.0	NL	U	G – VG	F – G	36 days
Tetraconazole 20.5%	Domark 230 ME	4.0 – 6.0	U	U	U	G	R3 (milk)
Azoxystrobin 13.5% Propiconazole 11.7%	Quilt Xcel 2.2 SE Multiple Generics	10.5 – 14.0	VG	VG – E	G – VG	VG	30 days
Benzovindiflupyr 10.27% Azoxystrobin 13.5% Propiconazole 11.7%	Trivapro A 0.83 + Trivapro B 2.2 SE	A = 4.0 B = 10.5	U	U	G – VG	E	7 days (A) 30 days (B)
Cyproconazole 7.17% Picoxystrobin 17.94%	Aproach Prima 2.34 SC	3.4 – 6.8	U	U	G – VG	G – VG	30 days
Flutriafol 19.3% Fluoxastrobin 14.84%	Fortix 3.22 SC Preemptor 3.22 SC	4.0 – 6.0	U	U	VG	VG	R4 (dough)
Pyraclostrobin 28.58% Fluxapyroxad 14.33%	Priaxor 4.17 SC	4.0 – 8.0	U	VG	U	E	21 days
Pyraclostrobin 13.6% Metconazole 5.1%	Headline AMP 1.68 SC	10.0 – 14.4	U	E	VG	G – VG	20 days
Trifloxystrobin 32.3% Prothioconazole 10.8%	Stratego YLD 4.18 SC	4.0 – 5.0	VG	E	VG	G – VG	14 days
Tetraconazole 7.48% Azoxystrobin 9.35%	Affiance 1.5 SC	10.0 – 14.0	U	U	U	G – VG	7 days

Southern rust

Southern rust was found the first week of June in the southernmost production areas of Louisiana. At that time, disease incidence and severity was very low. Since then, the disease has progressed slowly enough to allow most of the crop to reach dent stage without losses.

Last week, southern rust was found as far north as West Carroll Parish, and low disease incidence and severity has been observed thus far. Current temperatures (77 F to 90 F) are optimal for southern rust development, and the pathogen prefers leaf wetness of 9 to 16 hours. Light rain with light wind favors infection; conversely, heavy rains with high winds do not favor infection as infecting spores are washed from corn leaves.

Figure 4. No lodging at the end of the season due to late (hard dough), severe southern rust infection.

Just because southern rust appears in a corn field does not mean a fungicide application is necessary. As stated in the previous section, fungicide application decisions must take in to account a number of factors. Fungicide applications for southern rust are not recommended after the dent stage. If the crop has reached dent stage and you have low southern rust incidence and severity, walk away from the field and do not come back without a combine.

Some stakeholders fear lodging due to southern rust. This has never been observed by me or my colleagues within the state or surrounding states, nor am I aware of any data or publications documenting lodging due to southern rust.

Last year at the Dean Lee Research Station, southern rust began to develop at hard dough stage in a fungicide trial. The disease progressed to very high levels (9 on a 0 to 9 scale, with 9 representing severe disease), and there was no lodging observed in the trial. Additionally, southern rust developed to severe levels in the official hybrid trial at Dean Lee last year. No lodging was observed. The same situation is developing this year. We will continue to collect useful data for our producers.

SOUTHERN RUST: DEVELOPMENT, RISK AND MANAGEMENT

Clayton Hollier, Department of Plant Pathology and Crop Physiology

Southern corn rust, caused by the fungus *Puccinia polysora*, is a disease that affects the Louisiana corn crop annually but at different incidences and severities. The total impact varies based on weather conditions, the presence of viable, wind-blown spores, and corn prices. Risk can be determined by a combination of factors investigated over a 12-year period from plots grown in strategic areas of Louisiana. The 12-year study has allowed Southern corn rust to be studied under various development levels.

Spores of *P. polysora* enter Louisiana annually in winds blowing from the Caribbean region, southern Florida and southern Mexico. These spores can survive the journey because of their hardiness, high pigment content and low sensitivity to UV light. With high survivability and potential infectivity, the inoculum poses a threat to all Louisiana-grown corn hybrids.

The only resistance historically available in commercial hybrids came from the *Rpp9* gene, which was available in only a few hybrids. That gene was overcome by the disease in 2010 in southwestern Georgia and is no longer available as a resistance tool against *P. polysora*. As a result, all commercially available hybrids grown in Louisiana have some level of susceptibility to the pathogen.

Southern corn rust development is dependent on several factors: conducive environment (temperature, leaf wetness, rainfall intensity), susceptible corn hybrids (most available hybrids have a Southern corn rust rating of 4 to 8 on a 0 to 9 rating scale, where 0 represents no disease and 9 represents a fully rusted plant or plant desiccation) and virulent *P. polysora* spores. All three of these factors must occur at the same time for Southern corn rust to develop.

Southern corn rust development risk is greatest when temperatures remain consistently within the 77 F to 104 F range, leaf wetness is greater than four hours and, if raining, the rain intensity is light, with the duration less than three hours. Heavy rains with high winds tend to wash the spores out of the air and off the corn leaves. Spore germination and Southern corn rust development can occur in an air temperature of up to 104 F. Leaf wetness encourages spore germination and eventual infection. Four hours is the minimum amount of time necessary for this to happen. Research has shown that increasing the hours of leaf wetness enhances germination and subsequent infection rate. Leaf wetness refers to the free water that resides on the leaf surface. The sources of free water are rainfall, dew and overhead irrigation. The leaf wetness period (dew period) is influenced by relative humidity. High relative humidity lengthens the dew period.

Southern corn rust management has been a guessing game for generations. With the lack of resistance, often-experienced conducive environmental conditions and the usual presence of the pathogen on some level, Southern corn rust can occur annually. Measured yield losses in a five-year loss study in Louisiana were 15.2 percent in 2010, 1.0 percent in 2011, 3.2 percent in 2012, 3.9 percent in 2013 and 18.9 percent in 2014.

In this situation, growers are left with a two-pronged approach: scout the corn often for Southern corn rust development and, under the right conditions for development, apply a rust-managing fungicide.

Questions remain, however. How much Southern corn rust can corn endure before it needs an application of a fungicide? Yield losses have been measurable when 5 percent of the leaf area is covered with Southern corn rust. Therefore, the ear leaf, in particular, must be protected against further Southern corn rust development.

At what growth stage is it too late to make that application? The dent (R5) growth stage is the latest stage at which one can benefit economically. At dent, total yield has not been determined, but making an application of a Southern corn rust fungicide past the beginning of growth stage R5 will benefit only biologically — not economically. Fungicide actions are not immediate. Depending on the stage in the infection cycle that the Southern corn rust pathogen is in, additional rust development might occur before the fungicide takes full effect.

Table 1 is a risk assessment tool for Southern corn rust. It is based on 12 years of Louisiana research and verification. The assumptions are:

— The corn was planted on time (late-planted corn enhances the chances of greater Southern corn rust production).

— The target corn field has adequate stand and yield potential.

— The target field should be scouted weekly from tasseling until dent.

— The target field has been thoroughly scouted for Southern corn rust.

— No decision aid is perfect and some decisions are still subjective.

Table 1 includes the risk factors for Southern corn rust development and spread that can be used to determine whether fungicides are needed. First, consider the temperature. If temperatures are consistently within the listed ranges of the first row of the table, then assign the associated point value in the subtotal points column. For example, 50 F to 76 F would be assigned 0 points, while the 77 F to 90 F range would be assigned 3 points and the 91F to 104 F range would be assigned 1 point.

The same principle is used for the leaf wetness (dew period) and storm intensity factors. After determining the point values for each environmental category, simply add the points. If the total point value is less than 7, it will not pay to apply a Southern corn rust fungicide because some conditions for rust development are missing. If the total point value is 7 or greater, the crop could benefit from a Southern corn rust fungicide application.

Table 1. Risk factors to determine management action for southern corn rust

Temperature (Point Value)	50 – 76 degrees (0)	77 – 90 degrees (3)	91 – 104 degrees (1)		**Subtotal Points**
Enter point value →					
Leaf Wetness (Dew Period hrs.) (Point Value)	0 – 3 (0)	4 – 8 (2)	9 – 16 (3)		
Enter point value →					
Storm Intensity (Point Value)	Light Rain/No Wind (2)	Light Rain/Light Wind (3)	Intermediate Rain/Wind (1)	Heavy Rain/Wind (0)	
Enter point value →					
Total					

Recommendation: Begin scouting for Southern corn rust at tasseling stage.

Suggestion: If total points are less than 7, do not apply fungicide because some conditions for Southern corn rust development are missing.

Suggestion: If total points are 7 to 9, then applying Southern corn rust fungicide is recommended, especially if rust is present and the corn growth stage is R2 to R5.

Note: No decision aid or risk evaluation tool is perfect, and some decisions are still subjective.

ESTIMATING YIELD POTENTIAL OF CORN

Dan Fromme, associate professor and state corn specialist
Josh Copes, assistant professor and field crop production specialist
Trey Price, assistant professor and plant pathologist

Every year around the milk or “roasting ear” stage, we begin to wonder how good the corn crop is going to be. This especially holds true in years that corn yields are looking really good.

There are several yield prediction methods. The most popular is the yield component method, which can be used well ahead of harvest. This method can be used beginning at the roasting ear or milk (R3) stage of kernel development. Under normal conditions, the kernel milk stage occurs about 18 to 22 days after pollination. Estimates made earlier than the R3 stage could overestimate yield.

The yield component method was first described by the University of Illinois. It is based on or includes ears per acre, number of kernel rows per ear, number of kernels per row and weight per kernel. The first three yield components (ear number, kernel rows, kernels per row) are easily measured in the field.

However, final weight per kernel cannot be measured until the grain has reached harvest moisture. Therefore, an average value for kernel weight is used in the yield estimation equation. Kernel weight will vary depending on growing conditions for a particular field or year. The original equation used 90,000 kernels to equal a bushel of corn or 56 pounds. However, kernel size has increased as hybrids have improved over the years. Currently, 75,000 kernels per bushel is used if growing conditions were excellent during the season.

Also, issues with non-uniform plant populations and low spots across the field could impact the accuracy of your yield estimation. For more accurate estimations in non-uniform fields, take more samples throughout the field.

Procedure for the yield component method

Step 1. At each estimation site, measure a length of row equal to one-thousandth of an acre. For a 40-inch row (3.33 feet) row width, this equals 13.1 feet. For other row widths, divide 43,560 by the row spacing in feet and then divide that result by 1,000 (**Table 1**).

Table 1. Determining row length to equal 1/1,000 acre

Row Width (inches)	Length of Single Row to Equal 1/1,000 Acre
20	26 feet, 2 inches
30	17 feet, 5 inches
36	14 feet, 6 inches
38	13 feet, 9 inches
40	13 feet, 1 inch

Step 2. Count and record the number of harvestable ears in the thousandth acre. Make sure you count ears and not plants. Many times, a plant will not have an ear present due to emerging later than the surrounding plants. Avoid counting lodged plants unless you are confident the combine header will be able to gather them.

Step 3. On every fifth ear, count the number of complete kernel rows and the average number of kernels per row (**Figures 1, 2, and 3**). Multiply the number of rows on each ear by the number of kernels per row to calculate the total number of kernels per ear.

Figure 1. Sampling every fifth ear keeps you from selecting only the larger ears.

Figure 2. There are 16 rows on this ear.

Figure 3. This ear has about 35 kernels per row.

Step 4. Calculate the average number of kernels per ear by adding the values for all the sampled ears and dividing by the number of ears.

Step 5. Estimate the yield for each site by multiplying the number of ears by the average number of kernels per ear. Next, divide that result by number from the growing conditions list (**Table 2**). For the field you are estimating, select the number from the list that best represents the current year's kernel set and grain fill conditions. The values in the table represent the range in numbers of kernels (thousands) in a 56-pound bushel of corn.

Table 2. Growing conditions, range in kernel number per bushel

Excellent	less than 75[1]
Average	75 to 85
Poor	more than 90

[1] The values above represent the range in number of kernels (thousands) to equal a bushel of corn, which is equal to 56 pounds.

Example: You counted 33 harvestable ears at the first one thousandth-acre sampling site. The average number of kernels per ear, based on sampling every fifth ear in the sampling row, was 420. Next, we assume that growing conditions during grain fill were excellent. To estimate yield for that site, we would multiply 33 by 420, then divide that value by 75, which equals 185 bushels per acre.

$$\frac{(\text{ear \#}) \quad \times \quad (\text{avg. kernel \#})}{\text{value from above list}}$$

This method for estimating pre-harvest grain yield in corn provides only an estimate. Kernel size and weight will vary depending on the hybrid and environment. Depending on the year, you can easily overestimate or underestimate grain yields. Another factor is field variability related to plant stands and maturity. The more ears you sample in a field, the more accurate your harvest yield estimate.

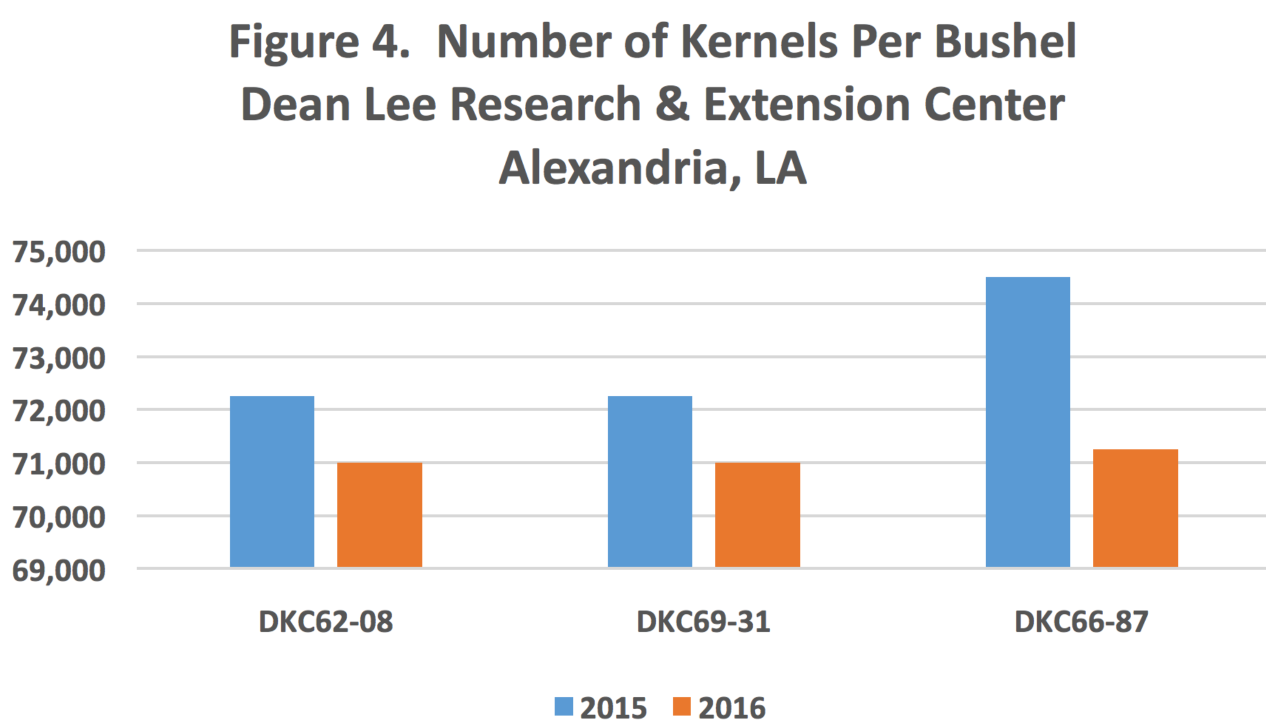

Figure 4. This graph includes kernel number data collected in 2015 and 2016 in Alexandria.

ENTOMOLOGY UPDATE

Sebe Brown, entomologist

SOYBEANS

Insect issues in soybeans have been relatively unchanged since the last newsletter. Stinkbug populations are beginning to appear in more fields as they reach R3 and beyond. Scattered instances of corn earworms and grass strain fall armyworms also are being reported. However, as the corn begins to mature, earworms may migrate into susceptible soybeans, typically those between the R1 and R3 stages.

COTTON

With Louisiana experiencing warm days and adequate moisture, much of the cotton has grown out of the thrips susceptibility stage (one- to four-leaf cotton) and is beginning to put on squares. Square initiation results in an increased presence of a diverse cohort of plant bugs. Below is a guide to aid in identification of both nymph and adult plant bugs in cotton.

Tarnished plant bug

Tarnished plant bugs (TPB) are 1/4-inch-long insects that vary in color from yellowish brown to green with black markings. They have a conspicuous triangle located on the dorsal (back) side. Nymphs resemble the adults in general body shape and color but do not have wings. Tarnished plant bugs damage cotton from pinhead square to final boll set. Larger square damage affecting anthers, stigma and styles can cause fertilization problems and fruit shed. The Louisiana threshold for bloom to harvest is two to three TPB per 5 feet of black drop cloth, 10 TPB per 100 sweeps or 10 percent dirty squares. Pre-bloom threshold levels are 10 to 25 TPB per 100 sweeps.

Tarnished plant bug adult, left, and nymph, right (LSU AgCenter photos)

Cotton fleahopper

Fleahoppers are small, 1/8-inch-long insects that have an oval-shaped, elongated body. These insects are yellow to green and resemble other Hemipteran true bugs. They look like a very small green TPB. However, unlike TPB nymphs, fleahopper nymphs have dark spots on the hind legs.

Cotton should be scouted for fleahoppers the first three weeks of squaring. Detection can be difficult due to the flighty nature of these insects. Simply casting a shadow over the pest will often make them take flight. Louisiana pre-bloom thresholds for fleahoppers are 10 to 25 insects per 100 sweeps, with pre-bloom treatment levels adjusted to maintain between 70 and 85 percent first position square retention.

However, scouting small cotton with a sweep net is difficult and produces questionable results. Detecting small fleahopper nymphs in a sweep net is difficult as well. A better technique is to simply examine the terminal of plants, watching for adults taking flight and then examining the terminal very closely for small nymphs. Morning is the best time to scout for fleahoppers, and if the wind is blowing, they take shelter in the plant canopy.

Fleahopper adult, top, and nymph, bottom (LSU AgCenter photos)

Clouded plant bug

Clouded plant bugs (CPB) are 3/8-inch-long insects characterized by a thickened first antennal segment and hind legs that are noticeably larger than the first two pairs. Adult CPB are generally brown in color with mottled patches of black, yellow or white. Nymphs often are greenish-yellow in color with red and white horizontally striped antennae. Larger nymphs also can be identified by a dark spot on the dorsal side of the abdomen. Clouded plant bugs are an occasional pest in Louisiana cotton. Pre-bloom and bloom threshold levels are the same for tarnished plant bug, but each CPB should be counted as 1.5 TPB.

CPB injury is similar to TPB with square abscission, bloom injury and boll feeding (cat-facing) occurring mid- to late season. As with other plant bugs, monitoring square retention and sweep net sampling prior to bloom should be used to determine levels of CPB infestations. Sampling for plant bugs from bloom until harvest is aided by the use of a drop cloth because this technique is more suitable for detecting nymphs.

Clouded plant bug adult, top, and nymph, bottom (University of Tennessee photos)

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