LOUISIANA CROPS NEWSLETTER

Cotton, Corn, Soybeans, Sorghum, and Wheat

Inside this issue:

Issue

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The Value of Neonicotinoid Seed Treatments in Louisiana Row Crops

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The most common insecticide seed treatments (ISTs) include neonicotinoid-based insecticides that coat the outer layer of the seed. They offer protection from below and above-ground early season insect pests. These ISTs are water soluble, highly systemic, and facilitate the vascular movement of the insecticide into plant tissue.

The value of ISTs in Louisiana varies among crops and environmental conditions. Crops may not benefit from ISTs when planted under optimal environmental conditions (adequate soil temperature, optimal soil moisture and low pest pressure). However, certain crops, such as cotton, benefit from the use of ISTs almost every year due to the high probability of thrips infestations. Soybeans benefit from ISTs less frequently. Insecticide seed treatments will typically produce an economic benefit when environmental conditions during planting and early seedling development are sub-optimal including: 1) very late or early planting, 2) reduced tillage fields, 3) double-cropped systems (soybeans behind wheat), 4) l pests that are present every year and 5) consecutive plantings (ie. corn behind corn). Insecticide seed treatments are a preventative insecticide application that is essentially a risk management tool that may not be needed every year. However, poor field management prior to planting (heavy plant residue on seedbeds) and unpredictable environmental conditions in Louisiana highlight IST's for risk management.

Figure 1. Cotton with seed treatment vs no seed treatment. Photograph courtesy D. Cook, Mississippi State University

Cotton

Cotton production in Louisiana is plagued with insect pests from planting until harvest. Insects including thrips, aphids and wireworms can inflict significant injury to seedling cotton that often is not recoverable as the season progresses. Cotton in Louisiana is host to several species of thrips with tobacco and western flower thrips being most prevalent. Thrips are one of the most devastating early season cotton insect pests and have the capability of causing seedling mortality, delaying maturity and reducing yield. Aphids are common early season pests that often colonize seedling cotton with no safe, effective prophylactic applications available other than ISTs. Injury to early season cotton by aphids is usually manifested as delayed maturity. Finally, cotton is occasionally injured by a below ground spectrum of pests that are primarily composed of wireworms. Since the loss of Temik (aldicarb), ISTs are our only protection against below ground insects.

The broad-spectrum insect protection and systemic nature of neonicotinoid seed treatments in cotton translates into an average of 18 – 20 % increase in yield where a seed treatment is used (Figure 2.)

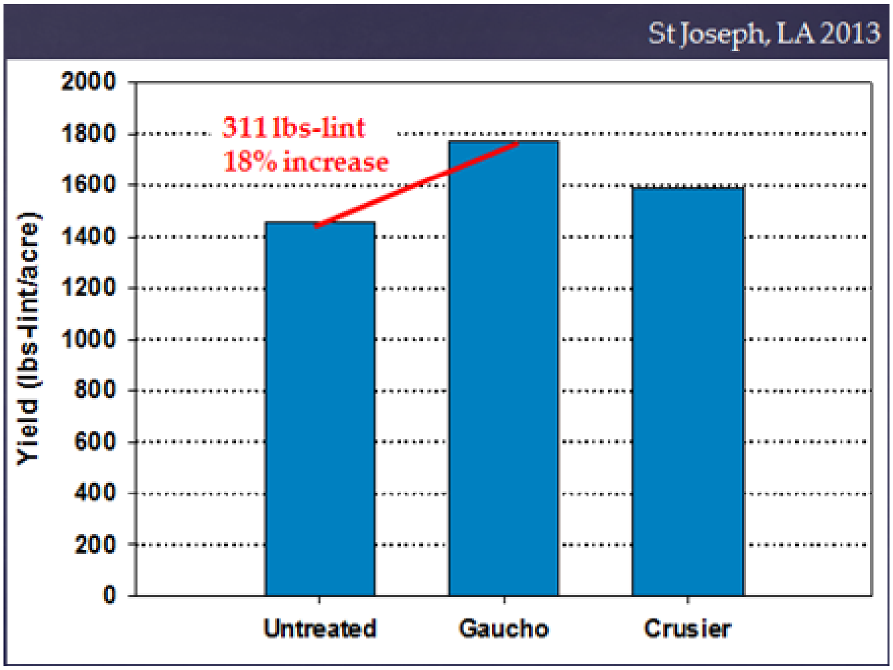


Figure 3. Severe wireworm injury in corn where no IST was used. Photo courtesy LSU AgCenter

Corn

Seedling corn in Louisiana is often adversely affected by many factors including excess moisture, cold temperatures and a complex of above/below ground insect pests. The complex of underground insects includes southern corn rootworm, wireworms and white grubs. These insects often build up to damaging levels most often where corn is planted behind corn and reduced tillage fields. There are few reliable protective treatments outside of ISTs. Insecticide seed treatments also offer protection against several post emergence pests such as sugarcane beetles, chinch bugs and suppression of cutworm injury. Seed treatments afford producers the ability to protect their corn crop from injury when adverse field conditions (excess moisture) preclude them from making foliar applications or rescue treatments to seedling corn. Louisiana producers may typically experience an average of 10% increase in yield and significant increases in stand where a seed treatment is used (Figure 3.) Data compiled from the LSU AgCenter shows an average increase of 14.4 bushels/acre when an IST is used in corn.

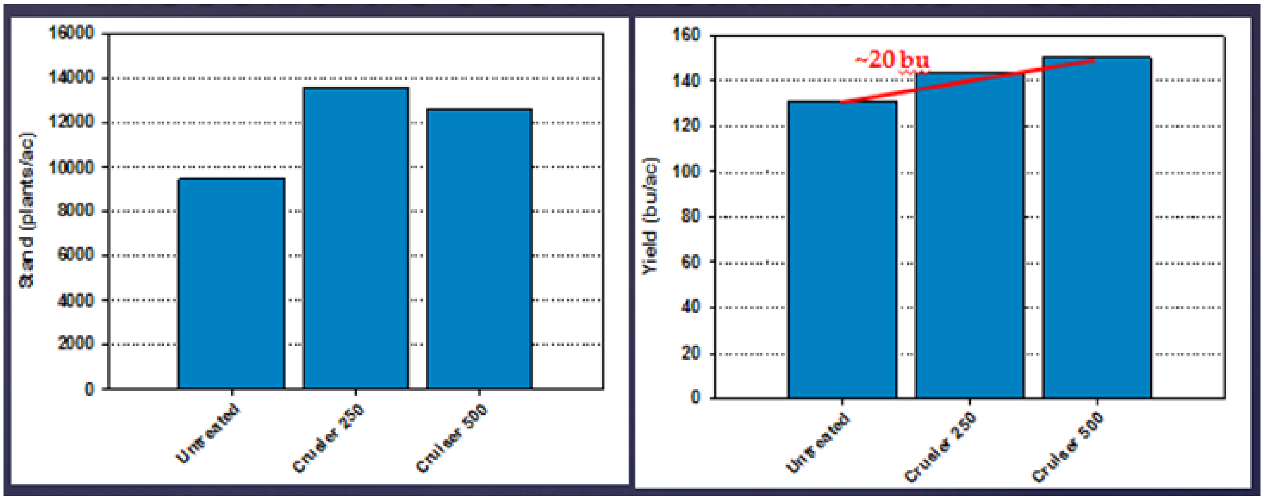


Figure 3. Effect of ISTs on corn stand and yield

Figure 4. Soybeans with (right) and without (left) IST. Photo courtesy LSU AgCenter

Soybeans

One of the most significant decisions producers must make when planting soybeans in Louisiana is planting date. Soybeans have the utility to be planted in early March to late June. This wide variation in planting dates exposes seedling soybeans to a multitude of insect pests that affect both above and below ground plant structures. Early planted soybeans are affected by a soil insect complex that often build up to damaging levels in soybeans planted behind soybeans and reduced tillage fields with few reliable protective treatments outside of ISTs. Injury will be most pronounced under sub-optimal conditions such as cool temperatures. Late planted soybeans, often behind wheat, are plagued by insects such as threecornered alfalfa hoppers. These insects have the potential to cause significant yield loss to susceptible soybean cultivars when ISTs are not used. Data compiled by the LSU AgCenter demonstrates a range of 0 to 8 bu/A increase when an IST is used in soybeans. Mid-South soybean IST trials show an average return of 3.3 bushels/acre 79% of the time across soybean growing regions of Arkansas, Mississippi, Missouri, Tennessee, and Louisiana.

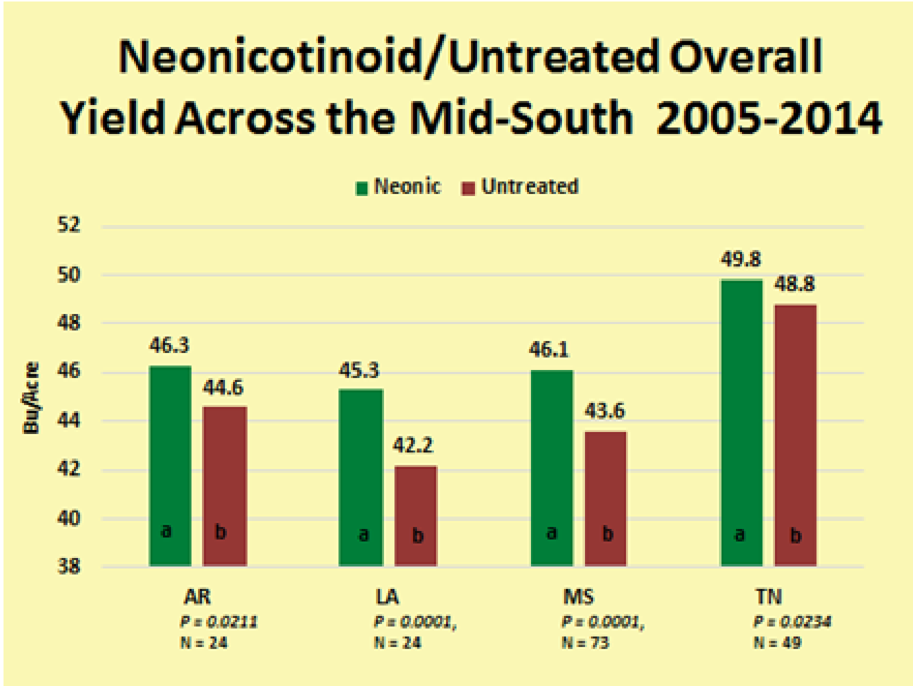


Figure 5. Average Soybean Yields for Mid-South States

Figure 6. Grain sorghum with IST (right) vs without (left). Noticeable stunting caused by sugarcane aphids affects grain sorghum with no IST. Photo courtesy Melanaphis task force

Grain Sorghum

Grain sorghum production is similar to corn with many of the same pests reducing yield and causing injury in the seedling stage. However, a new pest, the sugarcane aphid (SCA), highlights the importance of protecting seedling grain sorghum. The initial occurrence of the SCA in 2013 resulted in late season infestations and excessive honeydew accumulation that choked combines, resulting in significant harvest issues and lost grain. Sorghum production in 2014 was plagued with SCA from pre-boot to harvest, resulting in reduced crop yields, harvest efficiency losses, and catastrophic crop losses. Sugarcane aphids have the ability to kill seedling grain sorghum and research from the LSU AgCenter has demonstrated SCA control by neonicotinoid insecticides for upwards of 40 days after planting (Figure 7.) Furthermore, insecticide treated seed result in an average of a 20% increase in yield when compared to non-treated seed.

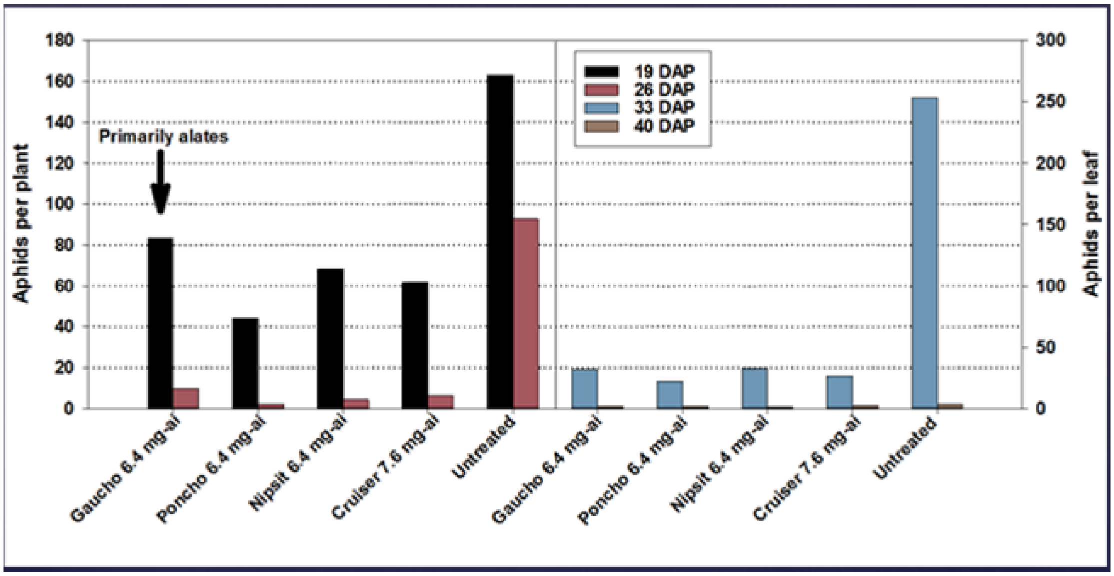


Figure 7. Aphids on Sorghum

Neonicotinoid seed treatments provide early season protection for agricultural commodities in Louisiana. Seed treatments provide several attributes including low mammalian toxicity, systemic nature and persistence, efficacy and ease of adoption. The use of seed treatments helps protect and enhance the yield potential of many agricultural crops and helps safely and economically ensure producer's crops get off to a good start.

Using Resistance to Manage Nematodes in Soybean

Charles Overstreet, Extension Nematologist

Nematodes are still important pests of soybean in Louisiana. Although their damage can be quite severe, these pests are often overlooked by producers. It is very easy to mistake nematode injury for some other type of problem that occurs in soybean fields.

Across most of the U.S., soybean cyst nematode (SCN) is by far the most important nematode. However, SCN began to seriously decline during the past 20 years in Louisiana and is currently considered only a minor problem. There have not been any problem fields detected for a number of years now. The two most important nematodes of soybean in Louisiana are the Southern root-knot and reniform. Both of these nematodes are extremely widespread and occur in most areas where soybeans are produced. The Southern root-knot nematode is typically found in sandy soils and can really be destructive (Figure 1). Large areas of a field may be severely stunted or prematurely killed by this nematode. The reniform nematode is not as particular about soil texture and occurs in both coarse and fine textured soils. Although severe stunting can occur, often it is difficult to recognize reniform damage in a field.

Resistance and rotation are probably the best methods of managing nematode problems. Most of our producers have done a fairly good job of rotating between different types of crops such as corn, soybean, or cotton. Corn is a good rotation crop to use to manage reniform. Unfortunately, all three of these crops are good hosts for southern root-knot. Although soybean varieties change rapidly, there are at least a few varieties with some levels of resistance this year. Since SCN is not currently an important nematode in Louisiana, I am not including varieties with resistance to this pest. Table 1 lists the soybean varieties that have been reported to have at least some level of resistance against either Southern root-knot or reniform nematode from nematode trials conducted in Arkansas. These varieties were also included in variety trials in Louisiana during 2014 and yield well.

Figure 1. Root-knot damage to soybean that showed up during 2014.

Table 1. Soybean varieties that have resistance against the major nematodes in Louisiana during 2015.

Variety	Southern root-knot nematode	Reniform nematode
Armor A4450	S*	R
Armor AX4500	MR	S
Asgrow AG5535 GENRR2Y	S	R
Delta Grow DG4940RR	S	R
Delta Grow DG5230 GENRR2Y	S	R
Dyna-Gro S52RY75	S	R
GO Soy 4713 (LL)	MR	S
HALO 4:97 (LL/STS)	MR	S
MPG 5214NRR	MR-MS	R
NK S47-K5 Brand	MR	S
REV®52A94™	MR	S

*S= susceptible, MS= moderate susceptible, MR= moderate resistance, and R= resistant

Soybean Planting Dates – Optimal

Because weather conditions are different from year to year, seeding dates can be affected by environmental conditions. Early or late planting can cause reduction in plant height in many varieties. Generally late plantings have less chance of success unless irrigation is available or optimal weather and timely rains occur throughout the growing season. Soybeans can be planted in Louisiana as early as March 15 and as late as July 4 if weather conditions are favorable. If planting is delayed beyond June 15, soybeans become more of a risk. Yields of soybeans have been shown to decline approximately 1/2 bushel per day for each day planting is delayed past June 15. Soybeans planted later than this should use a variety geared toward a tall, spreading type that will give maximum branching and node formation to allow as much room for vegetative and pod development as possible. Soybeans should not be planted until soil temperature reaches 60 degrees Fahrenheit. Wet conditions may also prevent soils from warming sufficiently for ideal early growth. Because emergence may also be affected by cool soil temperatures after planting, early planting decisions should also consider the forecast. Early planting of soybeans has increased in Louisiana over the last several years because of grower success. Despite cold soil temperatures and slow plant growth of seedlings, producers have seen a yield advantage from early planting.

There are many advantages to early planting. Germination and emergence are slower in cooler soil temperatures but soybean plants are less sensitive after first trifoliate (V1) producing about two nodes per week. Later planted soybeans simply cannot catch up with soybean node development of earlier planted soybeans. Earlier soybean planting increases crop yield potential by allowing plants to generate more stem nodes. Plants need to produce as many stem nodes as possible, simply because stem nodes are where the plant produces flowers, then pods, and ultimately seeds within those pods.

In order for plants to acquire carbon dioxide to produce dry matter, the stomates in the leaves must open, allowing water inside the leaf to escape and carbon dioxide to be taken in for photosynthesis. Crop water use includes evaporation loss directly from the soil, and water lost as transpiration from the leaves. Crop water use efficiency can be improved by reducing evaporative water losses. Early planting helps reduce water loss because the cooler soil and air temperatures in early plantings reduce water evaporation compared to temperatures in late May and early June plantings. Canopy closure earlier in the season reduces solar radiation on the soil surface, lessening soil water evaporation and helps to reduce weed germination. Higher humidity in a closed canopy also minimizes soil water loss.

Earlier canopy closure will cover the ground sooner in the growing season, collecting nearly all of the incoming sunlight for use in photosynthesis. For highest yields, the soybean crop should collect as much of the available solar radiation as possible, simply because plants require the energy of sunlight to convert carbon dioxide into carbohydrates, protein, and lipids (oils). Later planted soybeans will not have the opportunity to collect as many hours of sunlight compared to earlier planted crops reducing yield potential. Remember the longest day is June 21, summer solstice.

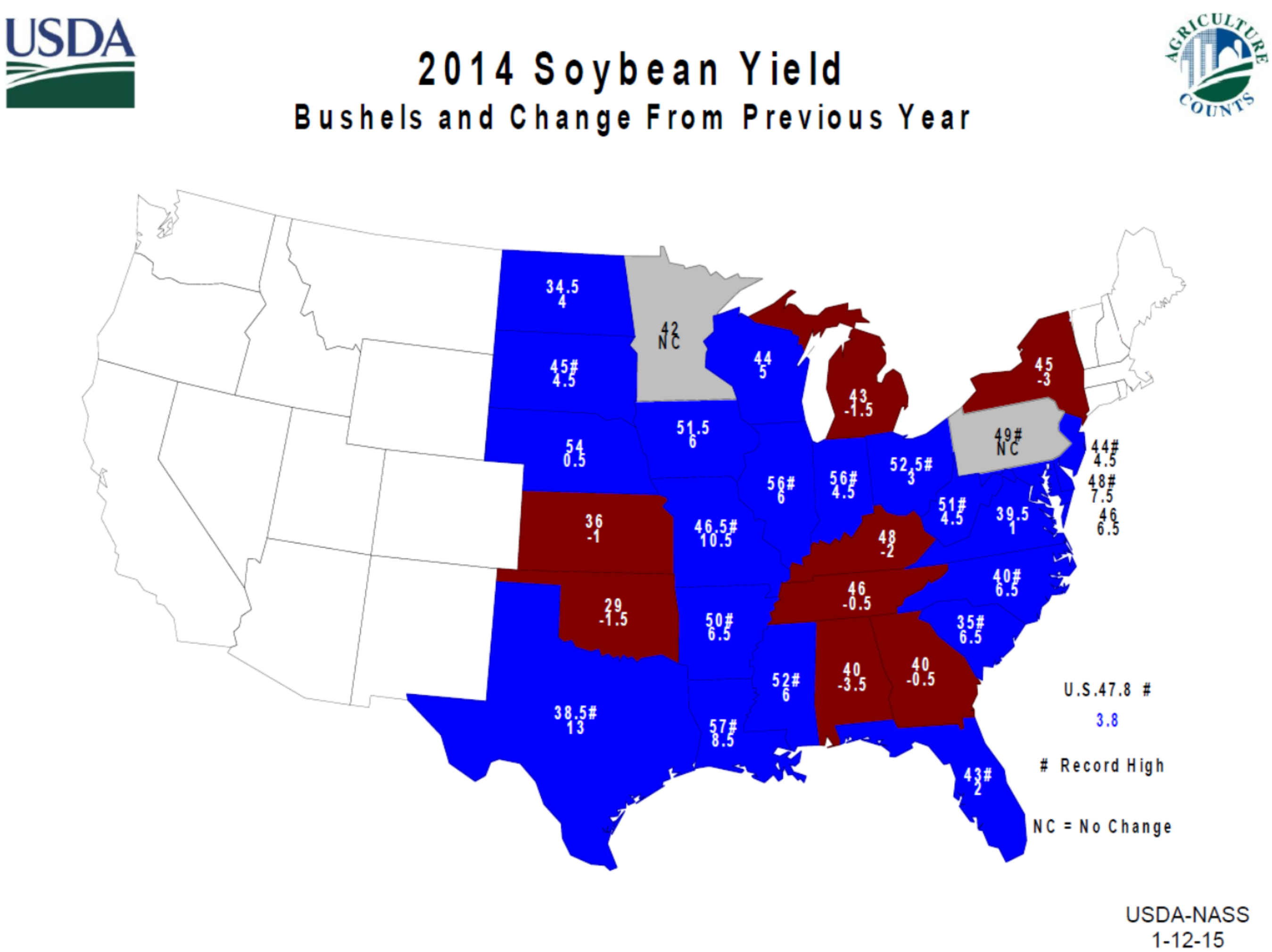
In the future, planting dates could be slightly earlier. In some years higher yields have been recorded from earlier than our optimum plantings date. Earlier planting dates will result from varieties developed to provide sufficient vegetative growth under cooler soil temperatures and adverse conditions. Planting date studies continue to answer questions concerning the optimum planting dates. It appears many of the new varieties are not as photoperiod sensitive as older varieties; therefore, early planting has contributed to increased yields. Late planting dates are usually the most damaging to yields. Yield losses are quite variable but decline rapidly as soybeans are planted beyond the optimum planting dates.

Optimal seeding dates for each maturity group planted in Louisiana based on research data are:

- Group III – April 15-May 10
- Group IV – April 15-May 10
- Group V – March 25-May 5
- Group VI – March 25-April 30

For more information on soybean production, contact your local County Agent.

Soybean Planting Date Study - Dean Lee Research and Extension Center 2014



2015 Corn Disease Management Update

Trey Price, Assistant Professor, Macon Ridge Research Station, Winnsboro, LA
Clayton Hollier, Professor, Department of Plant Pathology, Baton Rouge, LA

Seedling Disease Concerns

An important consideration when planting corn is the choice of fungicide seed treatment. There are many commercially available seed treatments from which to choose. If planting on the early side of the recommended planting window with less-than-ideal weather conditions (cool, wet), a fungicide seed treatment containing three modes of action may be warranted. A seed treatment containing the group 4 fungicides, metalaxyl or mefenoxam (or others), with activity on Pythium, Phytophthora, and other species can protect corn seedlings when rainy conditions prevail. Several hotspots of Pythium were noted in seedling corn during the 2014 season, and the same areas within fields tend to be affected from year to year (Photos 1 & 2). An addition of a group 3, M, 11, or 12 fungicide to the treatment may be necessary to manage other seedling pathogens such as: Fusarium, Rhizoctonia, and others. In problem areas in-furrow applications of fungicides at planting may be effective as well. If planting on the latter side of the recommended planting window with ideal weather conditions prevailing, a base seed treatment should be adequate for seedling disease management and may reduce production costs.

Photo 1. Thinned stand as a result of Pythium infections.

Photo 2. A dead corn seedling (right) as a result of Pythium infection.

Foliar Disease Concerns

Fungicides should not be applied to corn in the absence of disease. Results from many years of research conducted at multiple locations in Louisiana since 2006 do not indicate that fungicides provide yield benefits to corn if diseases are not present. Blanket applications of fungicides to corn may impose a selection pressure to low level pathogen populations resulting in fungicide resistance. Additionally, with lowered commodity prices, cutting out an unnecessary fungicide application may reduce costs.

Corn fields should be thoroughly scouted throughout the growing season for potentially damaging foliar diseases. Many factors must be considered including: the specific pathogen causing the problem (What are we dealing with?), disease incidence and severity (How bad is it?), crop maturity (How far-along is the corn?), prevailing environmental conditions (How's the weather?), efficacy (Will it work?), and economics (Will there be a return on the investment?). When disease epidemics are progressing in young corn (tasseling to blister) and prevailing environmental conditions are conducive for disease development, a fungicide may be needed to slow epidemics and protect yield and quality. **Make application decisions on a field-by-field basis.** There are many labeled products with broad spectrum activity available for corn. Please refer to the Plant Disease Management Guide available at www.lsuagcenter.com for more information.

Foliar Diseases of Corn Common to Louisiana

Common rust, caused by *Puccinia sorghi*, is a fungal disease usually found every year in Louisiana but rarely causes yield losses. Initial infections occur after spores are blown in from corn-producing areas in tropical and sub-tropical regions of the world. This disease may be evident early in the growing season prior to tasseling, and usually is the first disease present in Louisiana corn. Pustules are elongated, ragged looking, and occur on the **upper and lower leaf surfaces** (Photo 3). Spores within pustules are cinnamon-brown in color, and in some cases occur in bands because of infections that occurred while the leaf was in the whorl. Conditions that favor development are 60 to 77°F with at least 6 hours of leaf wetness and high relative humidity. Disease development of common rust will usually subside when temperatures exceed 77°F.

Photo 3. Foliar symptoms of common rust (Photo Courtesy of Boyd Padgett).

Southern rust, caused by the fungus *Puccinia polysora*, may also be present in Louisiana corn, and may develop to damaging levels if infection occurs early (prior to tasseling). Similar to common rust, initial infections are caused by wind-blown spores. This is a warmer-season rust compared to common rust and usually occurs late season and does not have adequate time to impact yield. Southern rust produces small circular to oval pustules and contain orange to light brown spores lighter in color compared to common rust (Photo 4). Pustules are usually smaller and less ragged than common rust, and are **more abundant on the upper leaf surface**. Pustules also may be found on the leaf sheath when disease is severe. Conditions favoring development are 80 to 90°F with extended periods of high relative humidity or abundant rainfall.

Southern rust was prevalent in late-planted corn in 2014, and in situations where infection occurred from tasseling to blister, fungicide applications preserved yield.

Photo 4. Foliar symptoms of southern rust (Photo Courtesy of Boyd Padgett).

Northern corn leaf blight is caused by the fungus, *Exserohilum turcicum*, and was present at damaging levels in some fields during 2010 and a minor problem in 2014. The disease may be found in Louisiana corn fields during mid-season (tasseling/flowering) and may cause yield loss in some cases. Lesions of northern corn leaf blight usually begin in the lower canopy and progress upward. Lesions begin as small elliptical or spindle shaped lesions, and mature lesions may be six inches in length and about ½ to 1 inch wide (Photo 5). The lesions are grayish green in color. The fungus may survive on infected corn debris left on the soil surface from the previous growing season. Therefore, the risk of this disease increases in fields where reduced-tillage practices are used and corn is planted continuously. Corn debris from the previous season provides inoculum for disease initiation and establishment. Spores produced on this debris are disseminated by wind and rain splash infecting the current crop, and subsequent infection results from spores produced within lesions. There are several races of this pathogen; therefore, the effectiveness of genetic resistance may vary depending on the races present in a particular field. Conditions favoring development are 60 to 90°F with 6-18 hours of leaf wetness and high relative humidity.

Photo 5. Foliar symptoms of northern corn leaf blight (Photo Courtesy of Boyd Padgett).

Upcoming Calendar of Events

April 22, Wheat and Oat Field Day at the Macon Ridge Research Station, Winnsboro.

April 22, High Fence Deer Management Field Day at the Bob R. Jones-Idlewild Research Station, Clinton.

April 20-26, AgMagic, an agricultural awareness exhibit for youth at Parker Coliseum on the LSU campus, Baton Rouge.

April 28, Northeast Region Youth Field Day at the Sweet Potato Research Station, Chase.

April 28, Northwest Regional Beef and Forage Field Day at the Red River Research Station, Bossier City.

May 8, Master Gardener Appreciation Day at the Hammond Research Station, Hammond.

May 12, Southwest Region Youth Field Day at the Rice Research Station, Crowley.

May 13-16, AgMagic on the River, an agricultural awareness exhibit for youth at Docville Farms, Violet.

May 15, Nursery Industry Open House and Azalea Lecture at the Hammond Research Station, Hammond.

June 16, Hill Farm Poultry Field Day at the Hill Farm Research Station, Homer.

June 17, Northeast Research Station Pest and Crop Production Field Day, St. Joseph.

June 20, Garden Fest at the Botanic Gardens at Burden, Baton Rouge.

July 1, 106th Rice Research Station Field Day, Crowley.

July 9, Dean Lee Research and Extension Center Field Day, Alexandria.

July 15, Sugarcane Field Day at the Sugar Research Station, St. Gabriel.

Oct. 8, Landscape Horticulture Field Day at the Hammond Research Station, Hammond.

Oct. 15, Beef Cattle and Forage Field Day at the Dean Lee Research and Extension Center, Alexandria.

Oct. 22-Nov. 8, AgMagic, an agricultural awareness exhibit for youth at the State Fair, Shreveport.

For additional calendar information on LSU AgCenter Parish and Statewide events, visit our website at www.lsuagcenter.com/calendar

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