

TIMELY INFORMATION

Agriculture & Natural Resources

Rust Diseases in Field Corn

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Two rust diseases of corn occur in Alabama; common rust, caused by *Puccinia sorghi*, and southern (polysora) rust, caused by *Puccinia polysora*. Of the two, common rust is seen most often on early corn but this disease rarely causes yield loss. In contrast, southern rust can occasionally cause sizable yield loss in early corn and is likely to heavily damage later-planted or double crop corn. Severe southern rust outbreaks, which typically occur once every three to four years, have been linked with up to a 50% reductions of anticipated yields.

As of June 21, 2010, southern rust has been found on corn in Baldwin, Conecuh, Henry, Houston, and Pike Co as well as counties across the southern half of Georgia. This disease was not found in sentinel plots at PBU in Elmore Co. and farm fields in Macon Co. Southern rust is most likely to appear in the next week or two in irrigated corn statewide.

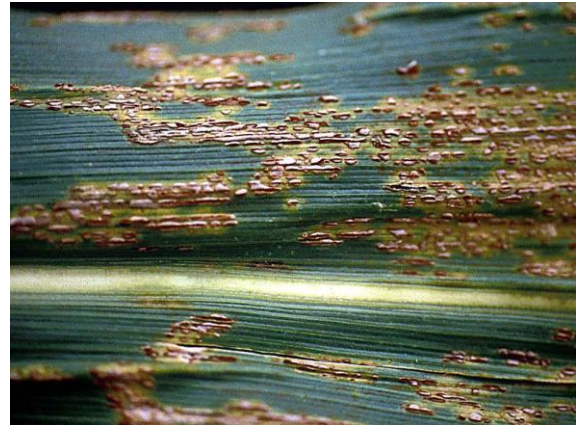


Figure 1. Common rust pustules.

Crop growth stage greatly impacts disease effect on yield and the need for protective fungicides. The earlier that southern rust hits the ear and ear-1 leaves, the greater the yield loss. At this point, late February – early March corn, which has reached the milk (R3) to soft dough (R4) stages, is too mature to be damaged by southern rust. If rust shows up in corn in the tassel stage (VT) or silking (R1), sizable yield losses are likely given favorable weather for disease development and lack of protective fungicide treatments. Double crop corn is a sitting duck for southern rust.



Figure 2. Southern rust pustules with halo.

The causal fungi of common and southern rust do not overwinter in Alabama. Spores (uredospores) of both fungi are moved on wind currents from Cuba, Mexico, and Central America. While common rust is considered a 'cool-season' disease, southern rust outbreaks are favored by high temperatures, high humidity, and frequent rain showers.

With common rust, pustules, which occur on both sides of the leaf, are more elongated than circular in shape and are cinnamom-brown to brown in color (Figure 1). Often, the leaf epidermis peels back to give the edge of pustule a 'ragged' appearance. Common rust rarely if ever is found on the ear husks and corn stalks.

Southern rust pustules, which are distinctly orange in color, are circular to oval in shape and smaller compared with common rust (Figure 2). Southern rust pustules appear in tight clusters on a portion of the leaf (Figure 2), while those of common rust tend to be scattered across the leaf. A light green to yellow halo or border may surround newly formed pustules. While pustules are so numerous that they may cover the upper leaf surface, heavy pustule formation may be seen on the leaf sheaths, stalks, ear husks, and to a lesser extent on the leaf underside along the mid-vein. Severely rusted leaves will quickly yellow, wither, and die. Yield losses are linked with poor grain fill due to premature death of the ear leaf as well as lodging prior to harvest (Figure 3).

Resistant varieties are not a particularly practical control for southern rust. Currently, only the corn variety resistant to southern rust is Pioneer 33M52. However, a new race of the southern rust fungus, which recently moved into the Southeast U.S., can partially defeat this resistance. Last fall, a low level of southern rust was found on this variety planted in a double crop fungicide trial at the Brewton Agricultural Research Unit. Similar 'slow rusting' symptoms have also been already been seen on this cultivar in Georgia this year.

Fungicides can give effective control of southern rust in corn and for protecting corn yields. When rust pressure has been high, yield gains of 20 to 30 bu/A have been obtained with timely fungicide treatments. Yield gains with fungicides in the absence of significant rust pressure have been erratic. In trials at the Gulf Coast Research and Extension Center under no disease pressure, a significant yield gain was seen with two applications of Headline 2.09EC at 9 fl oz/A in 2008 but not in 2009. In the same studies, other recommended fungicides failed to boost corn yields in either year.



Figure 3. Severe southern rust on double crop Pioneer 31P40 corn.

Blindly applying fungicides to corn without regard to disease pressure, crop growth stage, and yield potential is a waste of money. To best target fields in need of protection, farmers need to scout or have a consultant check their fields, particularly those under irrigation, for early symptoms of southern rust as well as other diseases like northern corn leaf blight. Language on several fungicide labels specifies that the first application should be made when 'symptoms first appear'. For preventative rust control, make the first fungicide application at tasseling (VT) to silking (R1) and follow with a second as needed application about 14 days later if favorable weather patterns for disease development continue. Once corn reaches soft dough (R4), further fungicide treatments are not needed because rust no longer will reduce yield. Recommended fungicides are listed in Table 1.

Due to lower yield potential, it's harder to justify the additional cost of a fungicide on dryland compared with irrigated corn. In addition to the above factors, fungicide treatments to corn should only be considered when corn prices are good and yield potential is high (120+ bu/A). The distribution of southern rust on corn can be tracked at the IPM Pipe web site (http://sba.ipmpipe.org/cgi-bin/sbr/public.cgi?host=Corn&pest=southern_corn_rust).

Table 1. Fungicides registered for use on corn.

Chemical Name	Rate per Acre	Comments
azoxystrobin QUADRIS FLOWABLE	6.2-9.0 fl.oz.	For control of common rust, northern corn leaf blight, southern corn leaf blight, gray leaf spot, and anthracnose on field corn. Apply when symptoms first appear on lower leaves and repeat 7 to 14 days later as needed. Do not make more than two consecutive applications of Quadris.
azoxystrobin + propiconazole QUILT	7-14 fl.oz. 10.5-14 fl.oz.	For control of northern and southern corn leaf blight. Apply when disease first appears on leaves and make a second application 7 to 14 days later as needed to control disease. For control of southern rust, gray leaf spot, and eyespot. Apply when disease appears on leaves. If conditions favoring disease persist, make a second application 14 days later. See label for use restrictions and resistance management instructions.
azoxystrobin + propiconazole QUILT Xcel	10.5-14 fl.oz.	For control of northern and southern corn leaf blight, rust diseases, gray leaf spot, anthracnose, eyespot, and Diplodia ear rot, apply when disease first appears on leaves or at blister (R2) stage and make a second application 14 days later as needed. Use of a crop oil concentrate (COC) or other spray adjuvant is recommended for optimal disease control. Better results will be obtained if Quilt Xcel residues dry before a rain. Applications of Quilt Xcel made before tasseling may interfere with normal kernel formation and may ultimately reduce yield.
fluoxastrobin EXITO 480SC	2.0-5.7 fl. oz.	Target diseases on corn include common and southern rust, anthracnose, gray leaf spot, Northern corn leaf blight, Southern corn leaf blight, and eye spot. Make one or two applications with second application no later than dough (R4) stage. Do not apply more than 11.4 fl ounces per acre of Evito 480 SC per year.
propiconazole BUMPER 41.8 EC PROPIMAX TILT 3.6E	2-4 fl.oz. 2-4 fl.oz. 2-4 fl.oz.	For controlling diseases listed above. Apply when disease first appears. Continue at 7- to 14-day intervals. DO NOT exceed 16 fluid ounces per acre per season. DO NOT harvest corn for forage or grain within 30 days of application. Refer to label for recommended treatment rate for each disease.
propiconazole + trifloxystrobin STRATEGO 250EC	10-12 fl.oz.	For control of northern and southern corn leaf blight, eyespot, southern rust, and gray leaf spot on field corn. Apply at silking or milk stage and repeat 7 to 14 days later when conditions favor further disease development. DO NOT apply to corn grown for seed. DO NOT harvest corn for forage or silage within 30 days of application.
pyraclostrobin HEADLINE 2.09E	6-12 fl.oz.	For control of anthracnose, northern and southern corn leaf blight, yellow leaf spot, southern rust, and gray leaf spot, apply when conditions favor disease and repeat application 7 to 14 days later as needed to control disease. Apply at higher rate and shorter intervals when weather patterns favor disease. Make no more than two consecutive applications of Headline. See label for application and resistance management instructions.
pyraclostrobin + metconazole HEADLINE AMP	10-14 fl.oz.	For control of anthracnose, northern and southern corn leaf blight, Physoderma brown spot, southern and common rust, and gray leaf spot, apply prior to disease development and repeat at 7- to 14-day intervals as needed. Use higher rate at shorter interval when conditions favor disease. DO NOT make more than two consecutive applications of Headline AMP. Maximum product per acre per season is 57.6 fluid ounces.

tebuconazole
MONSOON
ORIOUS 3.6F
TEBUZOL 3.6F
TEBUSTAR 3.6F

4-6 fl.oz.

For control of rust, southern corn leaf blight, northern corn leaf blight, and gray leafspot. Apply as protective treatment when conditions favor disease or when symptoms first appear. Repeat applications at 7- to 14-day intervals. A maximum of 24 fluid ounces may be applied per year. See label for additional instructions.
