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2008 Fall Wheat Disease Update

FUNGICIDE SEED DRESSINGS, RESISTANT VARIETIES, TAKE-ALL, LOOSE SMUT

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Alabama saw a sizable upturn in 2008 in the acreage of wheat grown for grain. Harvested wheat acreage was somewhere in the 400,000 acre range. A combination of cooler temperatures with adequate to sometimes below average rainfall resulted in bin busting wheat yields across much of Alabama. With the exception of the Gulf Coast region, drier and cooler weather patterns suppressed the activity of leaf rust and *Stagnospora* (leaf and glume) blotch over much of the state. Occurrence of other diseases such as powdery mildew was also minimal in many locations. Problems with take-all disease were reported in the Tennessee Valley. Right now, 2009 wheat planting intentions for Alabama are up in the air. If soybean prices stay high and cotton acreage shifts to soybeans, then a lot of wheat will be sown for grain this fall, particularly in North Alabama.

Fungicide Seed Dressings – All wheat seed planted for grain should be treated with a fungicide seed dressing that controls loose smut and bunt diseases as well as suppress *Fusarium* scab. While the old standard Vitavax-PCNB is gone, RTU-BAYTAN-THIRAM, RAXIL-THIRAM, and one of several formulations of DIVIDEND will not only control the above seed borne diseases but also have some residual activity against late fall to early winter outbreaks of rust diseases and powdery mildew. In addition, RTU-BAYTAN-THIRAM and DIVIDEND also have some suppressive activity against take-all. GAUCHO XT, which has activity against all of the above diseases except for take-all, also contains an insecticide for the suppression of Hessian fly. CRUISER MAXX CEREALS is a new wheat seed dressing that combines a fungicide for controlling seed rots and seedling diseases along with take-all suppression with an insecticide for the control of Hessian fly. Refer to the small grains chapter in the Alabama Pesticide Handbook for more information on wheat seed dressings <http://www.aces.edu/pubs/docs/A/ANR-0500-A/VOL1-2008/smallgrains.pdf>.

Disease Resistant Wheat Varieties - Planting disease resistant wheat varieties is the cornerstone to a wheat disease management program. Since leaf rust and Stagnospora leaf and glume blotch year in and year out have the greatest negative impact on grain yields, choosing a variety with at least partial resistance is critical, particularly in South Alabama, to managing these diseases. Other foliar diseases that occasionally can cause sizable yield losses are stripe rust and powdery mildew. Of these two diseases, powdery mildew is much more common but yield losses only occur when the flag leaf and seed head are heavily colonized by the causal fungus. Light colonization of the lower leaves will not cut wheat yields. Although the above diseases are usually occur statewide, stripe rust outbreaks have been seen in the past only in the Tennessee Valley and Northwest Alabama. While barley yellow dwarf continues to be a concern, the impact of this virus disease on wheat yields is difficult to determine. Soilborne wheat mosaic virus (SWWMV) and spindle streak mosaic virus (SSMV) were found in wheat in Baldwin Co. in the mid-1980's. All wheat varieties are equally susceptible to take all. Monocultures where wheat is grown year after year for grain or winter cover for no-till summer crops may greatly increase the occurrence of the above virus diseases as well as take-all.

Table 1. Reaction of Wheat Varieties to Common Diseases^z.

Wheat Variety	Disease					
	Leaf Rust	Stripe Rust	Glume Blotch	Powdery Mildew	BYDV ^y	WSMV ^x
AGS 2000	fair	poor	fair	fair	fair	poor
AGS 2031	good	good	good	fair	fair	good
AGS 2010	good	good	good	good	fair	good
AGS 2060	good	good	fair	fair	fair	good
AGS 2020	good	good	good	good	fair	good
AGS 2026	good	good	good	good	fair	good
Coker 9533	fair	good	fair	good	fair	fair
Dominion	good	good	good	good	fair	good
Fleming	good	good	fair	good	fair	poor
McIntosh	good	good	fair	good	fair	good
Ogelthorpe	good	good	good	fair	fair	good
Panola	fair	good	fair	fair	fair	good
Pioneer 26R61	fair	good	fair	fair	fair	good
SS8641	good	good	fair	good	fair	good
Terral LA 482	fair	--	fair	good	--	--
Terral LA 841	good	--	good	good	--	--
USG 3209	fair	good	fair	good	fair	good
USG 3592	good	poor	good	good	fair	good
USG 3295	good	good	fair	good	fair	good

^zAdapted in part from Recommended Wheat Varieties for Fall Planting 2008, Dewey Lee, UGA Agronomist.

^yBarley yellow dwarf virus.

^xWheat soilborne mosaic virus.

Wheat Variety Trial at GCREC – In 2008, the most intense rust and leaf blotch pressure on wheat was noted in the GCREC variety trial. As indicated in Table 2, wheat varieties differ considerably in their reaction to destructive diseases such as leaf rust and Stagnospora leaf blotch as well as BYD. Summary results for the 2007 to 2008 wheat variety trial can be found at <http://www.ag.auburn.edu/agrn/alabamavarietytesting>.

Table 2. Yields and response of wheat varieties to diseases at the Gulf Coast Research and Extension Center in 2008.

Wheat Variety	Disease Rating			Yield Bu/A
	Leaf Rust ^z	Leaf Blotch ^z	BYDV ^y	
AGS 2020	0.0	3.0	50.0	69.5
AGS 2060	0.7	3.3	33.3	73.7
Coker 9553	4.0	1.7	35.0	54.5
Fleming	0.0	3.0	43.3	69.8
GA02603CT-7	4.0	2.0	40.0	73.4
GA 951231-4E25	0.7	2.0	5.3	66.7
GA Gore	1.3	3.0	43.3	50.4
Jamestown	2.0	1.7	33.3	67.6
Magnolia	3.3	2.0	50.0	71.9
McIntosh	1.7	2.3	8.7	52.8
Terral LA482	3.3	3.0	31.7	77.7
Terral LA841	1.0	2.0	26.7	74.7
USG 3209	2.0	2.3	15.0	62.5
USG 3592	1.7	2.0	3.7	52.9
USG 3665	3.0	3.0	20.0	48.5
VA01W-205	0.0	2.0	20.3	46.0

^zSeverity of leaf rust and Stagnospora (Septoria) leaf blotch on the flag leaf was assessed on a 0 to 10 scale where 0 = no disease and 10 = severe disease (flag leaf withered or dead).

^yPercentage of plants displaying symptoms of BYD (barley yellow dwarf virus).

CRUISER MAXX CEREALS – Cruiser Maxx Cereals is a new seed dressing that is formulated as a commercial machine-applied product to protect small grain seed and seedlings from several insect pests as well as selected seed borne and seedling diseases. This product is **not** formulated to be applied as a hopper box treatment. Insect targets include wireworms, aphids (some species transmit BYDV), and Hessian fly. Residual activity against insect pests probably is the same as Cruiser. Diseases controlled include loose smut, common and dwarf bunt, and damping off caused by *Fusarium* and *Pythium* fungi. This product also will suppress take-all and several other root rot diseases of wheat but does not have activity against early season powdery mildew and rust outbreaks.

Take-All ‘*Is Baaack*’

Initially, the appearance of take-all in wheat this past spring on wheat in the Tennessee Valley came as a complete surprise. Last time that I saw damaging take-all outbreaks was in the 1980’s when there was sizable winter wheat acreage statewide. Then, damaging outbreaks of take-all

are directly tied to continuous wheat production. Since the karnal bunt scare about a decade ago, the statewide acreage of wheat harvested for grain has hovered about 100,000 acres. With so little acreage devoted to wheat grown for grain over the past decade, damaging outbreaks of take-all should be a thing of the past. Or should they? Over that same period, most cotton (and now soybean) producers in the Tennessee Valley and elsewhere abandoned their moldboard plows and went no-till. The cover crop of choice on a lot of Alabama's no-till cotton and soybean acreage is wheat. So, a lot of crop land in Alabama has actually been in a wheat monoculture for the better part of a decade. That could be a perfect set up for take-all outbreaks in wheat. Odds are that same scenario will be repeated this coming season.

There is a flip side to the wheat cropping frequency issue. The 'take-all decline' phenomenon, where disease severity gradually declines the longer a field is in a wheat monoculture, is well documented. The buildup of a soil microflora that suppresses the activity of the causal fungus is responsible to the decline and eventual near disappearance of take-all disease in wheat. Conceivably, the scenario where wheat has been monocultured as a cover crop or for grain for a decade or more should favor the occurrence of take-all decline in no-till fields. There is however no way to determine in a given field whether the population density of suppressive soil microflora is sufficient to trigger the take-all decline phenomenon or what level of disease suppression will occur. Rotation sounds like a better option than depending on 'take all decline' for managing this disease in wheat.

In England, risk factors for take-all in wheat are cropping patterns [33%], climatic conditions (i.e. location and rainfall patterns) [34%], and soil factors such as texture [7%], pH [6%], and organic matter content [3%] as well as planting date, nitrogen form and rate, and low soil fertility (www.monsanto-ag.co.uk/layout/latitude/risk/latitude.asp).

As I've already mentioned, the highest risk cropping patterns included a wheat monoculture or alternating wheat with barley. Since some annual weedy grasses are also good hosts for the causal fungus of take-all, its survival may be greatly enhanced on fallowed land. Other grass cover crops that are good but not great hosts of the take-all fungus are annual ryegrass, perennial ryegrass, and rye. The host status of triticale, which is cross of wheat and rye, is somewhat ambiguous. While its parentage suggests that triticale would be a moderate or high risk host, one source mentions that triticale would be an acceptable alternative cover crop to wheat. Among the remaining cereal cover crops, oats is the only low risk host for the take-all fungus that could readily replace wheat in no-till production systems. Winter legume and crucifers are not hosts of the causal fungus and would also be good cover crop alternatives to wheat.

While there's been some suggestion that soybean may in some way increase the risk of take-all on the following wheat crop, looks like a summer cereal, oil seed, or fiber crop has little if any impact on the severity of take-all in wheat.

All wheat cultivars are equally susceptible to take-all.

As indicated above, certain climatic and soil factors may influence the severity of take-all in wheat. In the 1980's, take-all severity was much higher in the Tennessee Valley compared with any other part of Alabama. Disease severity quickly dropped off the further south that wheat

was grown. I rarely saw take-all in wheat south of US80. The combination of earlier planting dates with wet winters may have accounted for the higher incidence of take-all in Tennessee Valley wheat in the 1980's. A review of the risk factors in England cited in the above publication suggests that this disease should extensively damage wheat in South Alabama. So far, that scenario has not developed.

Outbreaks of take-all in wheat grown for grain can be avoided or suppressed by adopting the following production procedures.

- 1) Where a cover crop will not be harvested for grain and a winter cover crop is needed, plant oats in place of wheat in no- or reduced-till corn, cotton, peanut, and soybean production systems. Other alternative winter cover crops are sunn hemp, black oat, crimson clover, hairy vetch, and forage rape/crucifers.
- 2) Avoid applying high rates of lime before cropping wheat for grain. If lime is needed, apply enough to bring the pH up to 6.0 to 6.2, which is sufficient for growing high yield wheat.
- 3) Use of an ammonium form of nitrogen, particularly ammonium chloride will help suppress take-all. In contrast, nitrate nitrogen (i.e. ammonium nitrate or calcium nitrate) will increase take-all severity. Also do not apply excessive rates of any nitrogen fertilizer.
- 4) Maintain recommended soil potash and phosphorus fertility levels for wheat.
- 5) The machine-applied fungicide seed dressings RTU-BAYTAN-THIRAM, CRUISER MAXX CEREALS, and DIVIDEND EXTREME will give some take-all protection. Don't expect a high level of control with fungicide seed dressings when rotation patterns and weather conditions are highly favorable for disease development. Apparently, fungicide seed dressings with enhanced activity against take-all are being developed in Europe. Registration status of those products in the U.S. is unknown.
- 6) Plant as late as possible for optimum yields. Early planting increases wheat vulnerability to take-all.
- 7) Be aware that take all severity will be enhanced on wet-natured, compacted, or poorly drained soils where root system development will be restricted.

Loose Smut in Wheat and Oats

Loose smut is a common and usually minor disease on wheat, barley, and oats. Oats in particular seem to be vulnerable to loose smut. The causal fungi that attack wheat and oats are specific for each of those hosts. Since nearly all commercial wheat and oat seed is treated with a fungicide seed dressing, disease incidence in fields planted to treated seed is very low. Sizable reductions in yield and crop quality have been seen when bin run non-fungicide treated seed is grown for grain. While the fungus invades embryo in wheat and oat seed, this disease has no impact on

vegetative growth. So, the top growth of smut-infected wheat and oats strictly grown as winter cover is not affected.

A fungicide seed dressing is the only effective control for loose smut. For best results, apply a fungicide seed dressing for wheat and oats grown for grain when the seed is cleaned and bagged. All small grain fungicide seed dressings will control loose smut. Recommended machine-applied fungicide seed dressings have been reviewed elsewhere in this publication. A complete listing of these products can be found in <http://www.aces.edu/pubs/docs/A/ANR-0500-A/VOL1-2008/smallgrains.pdf>. The hopper box fungicide seed dressing DIVIDEND XL RTA is also available. Typically, machine applied products are more effective than hopper box products.