2014 PEANUT UPDATE

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INTRODUCTION

The members of the University of Georgia Extension Peanut Team are pleased to present the 2014 Peanut Update. The purpose of this publication is to provide peanut producers with new and timely information that can be used in the upcoming growing season to make cost-effective management decisions. Contact your local county extension agent for additional publications, information, or field problem assistance.

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2014 PEANUT OUTLOOK

Nathan B. Smith

Peanut Supply and Demand Highlights

- **Growers Respond to Low Prices With Drop in Acreage in 2013** – After a large planted acreage in 2012 of 1.638 million acres, U.S. peanut acreage fell by 35% in 2013 to 1.058 million. This is the smallest planted acreage since 1914. Harvested acreage is pegged at 1.030 million acres, the lowest since 1926. Georgia growers reduced plantings by 41.5% to 430,000 acres last year. The Southeast (AL, FL, GA, MS) decreased by 39% to 739,000 acres. The Southwest (NM, OK, TX) decreased by 23% to 141,000 acres. The Virginia-Carolina (NC, SC, VA) area reduced planted acres by 25% to 178,000 acres.

- **2013 Another Strong Year for Yields** – 2012 set the bar very high for peanut yields in the Southeast which drove the US average yield above a two ton average at 4,192 pounds per acre. While, 2013 peanut yields were not at the previous year's level, the average was still strong historically. Georgia averaged over two tons at 4,150 according to USDA NASS and the US average yield is estimated at 3,787 pounds per acre, the second highest average yield on record.

- **Domestic Use Expected to Rebound** - Total use of peanuts jumped last year due to a sharp increase in exports. The lack of Chinese exports will drop total use as exports return to more normal level. Domestic use rebounds with growth in snacks and candy use.

- **Sizable Carryover Stocks** – Stocks of peanuts carried over into the next marketing year are still at an above average level as a result of high yields. While production is less than consumption for the 2013/14 marketing year, projected carryover stocks still represents a six month supply.

- **Peanut Prices Not Expected to Move Much** – Shelled peanut prices have traded in the low 50 cents range for much of 2013. Farmer stock prices have ranged from $450 to $500 per ton for runners in the Southeast and were offered at $550 per ton in the Virginia/Carolina region. Prices for 2014 are expected to be at similar levels.

Peanut Supply Situation

The final 2013 peanut production figures will end up being bigger than projected due to above average yields. After a record setting year in 2012, yields were expected to return to normal. New varieties are out-performing expectations and yield models based on crop conditions, particularly in the Southeast. The runner variety Georgia-06G was grown on over 80 percent of the peanut acreage in Georgia, Alabama and Florida this past year. Total production for 2013 is pegged by USDA at 1.95 million tons and the Federal State Inspection Service tonnage report shows 2 million tons have been graded. Therefore, the supply pipeline is still pretty full with peanuts.

Peanut producers responded to low prices in 2013 by reducing acreage 35% to a ninety nine year low of 1.06 million acres in the US. Alabama (140,000), Florida (135,000), and Mississippi (34,000) each dropped plantings by 36% while Georgia dropped even more to 430,000 acres for a 41% decline. The SE planted 739,000 acres in total for a 39% decline in planted acreage in 2013. Yields were down compared to the record levels last year by 11% for the SE with Florida down 8% to 3,600 pounds per acre, Georgia down 9% to 4,150 pounds per acre, Alabama down 15% to 3,400 pounds per acre and Mississippi down 27% to 3,200 pounds per acre. Georgia's yield could be adjusted up since FSIS tonnage report shows tons inspected in Georgia equal to a 4,500 yield. However, some of those tons have come across state lines to Georgia buying points.

The Southwest (NM, OK, TX and AR) peanut region reduced acres by 23% for a total of 141,000 acres. Texas planted the majority at 117,000 acres, a 22% drop from last year. Oklahoma planted 25% fewer acres at 18,000, New Mexico planted 40% fewer at 6,000 acres, and Arkansas planted 11,500 acres dropping by 36% and likely to become a "peanut" state in the official statistics soon. Average yields were the same as last year at 3,500 pounds per acre for Texas, 3,800 pounds per acre in Oklahoma, and 3,200 pounds per acre in New Mexico.

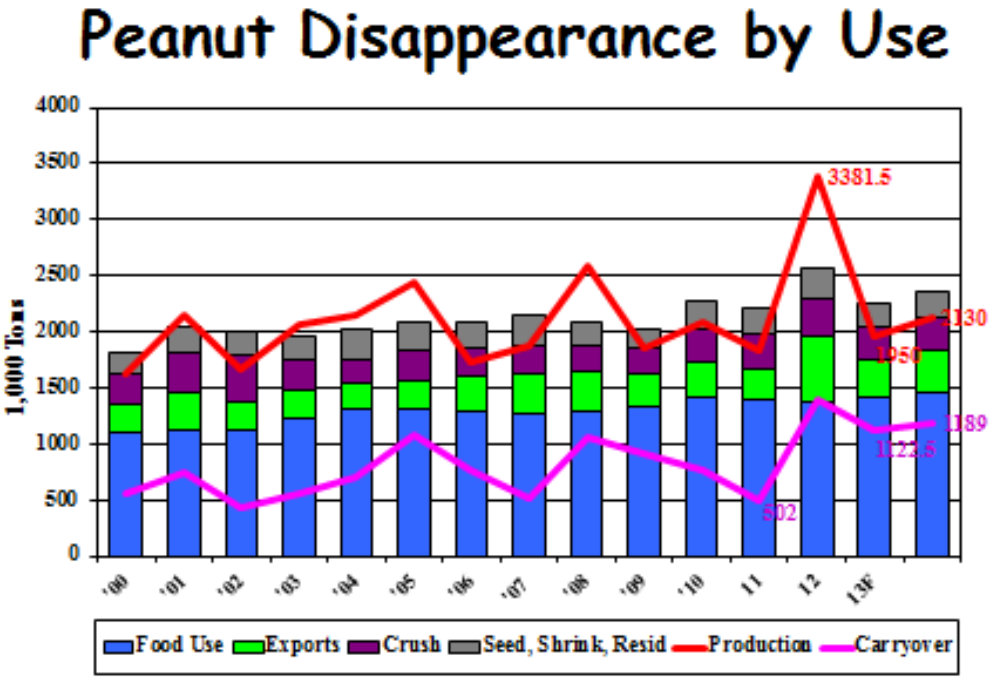
The Virginia-Carolina (NC, SC, VA) region reduced acreage by 25% for a total of 178,000 acres. The largest adjustment came from South Carolina falling 26% to 81,000 acres. North Carolina planted 81,000 acres, the same as SC. Virginia dropped 20% to 16,000. The average yield in the VC region fell 8% to 3,660 led by North Carolina at 3,900 pounds per acre, followed by Virginia at 3,700 pounds per acre. South Carolina is estimated to average 3,400 pounds in 2013.

The US average yield will not break two tons but will still be the second best on record. NASS pegged it at 3,787 pounds per acre in November. The US average will likely be raised to over 3,800 pounds per acre at the end of January. As a result, total production is estimated at nearly 2 million tons on 1.03 million harvested acres. Thus, peanut growers produced a larger crop than expected even with the lowest acreage going back to 1914.

Peanut Demand

Peanut use has experienced ups and downs the past year. Exports doubled and domestic use fell 2.5%. The drop in domestic use was a result of very tight stocks in 2011 and 2012 leading to higher prices for shelled edible kernels. Peanut butter and other products raised prices at the retail level as a result and demand was hurt leading to the effects still being felt in the peanut butter market. Manufacturers were slow to move in purchasing shelled edible kernels a year ago even with a bumper crop and prices falling to the upper 40 cents range. The stagnant market and special circumstances in India and China opened the door for new peanut exports to China in early 2013. India had a shortage of peanuts and suspended exports to China for a period and then China came looking to the US to fill a short term shortage. The China market is centered on oil production rather than edible kernels. Thus, low price is a major factor for China and the timing was favorable for the US. China's purchases were timely in helping reduce some of the surplus stocks, supporting the price of edibles in the US and bringing manufacturers to the table to purchase 2012 crop peanuts. China purchased over 70,000 tons which was slightly more than the US's number one export market, Canada. As quickly as China appeared in January 2013, they exited the market at planting time. India is looking at a bigger crop and exports to China resuming. The jump in exports boasted total use to a record level of 2.557 million tons for the 2012/13 marketing year. All major categories increased except domestic use. Domestic use ended the marketing year down 2.5% at 1.367 million tons. Exports more

than doubled to 600,000 tons while crush increased 9% to 328,000 tons and seed and residual increased 12% to 264,000 tons.



Source: Oil Crops Outlook, ERS, USDA

Growth in the domestic market is expected in the 2013/14 marketing year led by candy and snack consumption. Peanut butter consumption should rebound too with lower shelled prices and positive health news of peanuts. The carryover going into the 2013/14 marketing year beginning August 1 was just less than 1.4 million tons. This would fill the domestic market consumption by itself. The 2 million ton crop of 2013 will drop the stocks level by at least 250,000 tons. Domestic food use is projected to rise by 3% to 1.408 million tons. Exports will fall back without China's presence to 350,000 tons. Crush and seed/residual categories are expected to shrink with a smaller crop of 2013. The net effect will be a drop of 12% from record consumption of last year to 2.25 million tons. If realized, this would leave a carryover of 1.12 million tons representing 80% of domestic use and 50% of total use. Ironically, this is very close percentage wise to the situation heading into 2013. A large buffer of stocks still fills the pipeline and consumption needs to be increased to continue to work the surplus down.

Projections for 2014

The outlook for 2014 is not much different than last year on the peanut market side. The biggest difference is the other spring crops that compete for acres or are in rotation with peanuts. Corn, cotton and soybean prices are projected lower for 2014 and costs continue to climb except for fertilizer. Peanut prices to farmers are expected to be in the same range as 2013. Contracts will likely begin for runners at $425 to $450 on limited tons. Flexible price contracts were reintroduced in 2013 that work similar to a minimum price contract. Shelled prices have continued to trade in low 50 cents per pound range for runners.

				2014/15	
	USDA			3,735 lb Yld	3,735 lb Yld
	2011/12	2012/13	2013/14	1.14 MA	1.19 MA
			1,000 Tons		
Beginning Stocks	758	502	1,386	1,386	1,386
Production	1,830	3,382	1,950	2,130	2,221
Total Supply	2,714	3,943	3,368	3,548	3,639
Total Use	2,213	2,557	2,246	2,359	2,359
Ending Stocks	502	1,386	1,123	1,189	1,280

2014 COST AND RETURNS OUTLOOK

Nathan B. Smith and Amanda Smith

The biggest factor that will impact the cost and returns outlook for 2014 is the output price of peanuts and competing crops corn, cotton and soybeans. Cost of seed should not change much for peanuts as shelled prices are around 50 cents per pound. They actually could go lower based on the relationship with the shelled market. However, costs are usually sticky, 70 to 75 cents per pound is the likely range. Variable costs are expected to be less for crops except for peanuts. Fertilizer prices are expected to average less in 2014 as well as diesel fuel. These cost categories affect cotton and corn more than peanuts. Chemicals and seed will see increases in the more popular products and varieties while others will decrease. The peanut budgets are being revised for 2014 with updates to equipment size and yields. Preliminary estimates are given below in the crop comparison Table 1 and Table 2. The budgeted yield will be raised to 3,400 for non-irrigated and 4,700 for irrigated practice. The budgets will be posted on the UGA peanut commodity website (www.ugapeanuts.com).

The table below summarizes the preliminary budget estimates for peanuts, cotton, corn, grain sorghum and soybeans. The budget estimates are intended as only a guideline as individual operations and local input prices vary across the state. Growers are encouraged to enter their own numbers into the budgets to determine their expected costs and returns. The table below gives an example of expected returns for peanuts at an average price of $440 per ton compared to what the market potential is indicating for cotton, corn and soybeans in late December. Given these expected prices and costs, peanuts look to be the highest return above variable cost for 2014. The main reason is the increase in yield expectations. However, prices for cotton, corn and soybeans have been in a downtrend and are looking for the bottom. Where they are at planting time may be different. Actual returns would change as price, yield and cost changes.

Table 1. Comparison of Per Acre Return Above Variable Cost for Non-Irrigated Crops.

	Expected Price	Expected Yield	Variable Cost*	Return Above VC
Peanut	$440	3400	$554	$194
Cotton	$0.75	750	$419	$144
Corn	$4.60	85	$285	$106
Sorghum	$4.17	65	$229	$40
Soybean	$10.80	30	$227	$97

Table 2. Comparison of Per Acre Return Above Variable Cost for Irrigated Crops.

	Expected Price	Expected Yield	Variable Cost*	Return Above VC
Peanut	$440	4700	$670	$364
Cotton	$0.75	1200	$532	$368
Corn	$4.60	200	$630	$290
Sorghum	$4.17	100	$354	$60
Soybean	$10.80	60	$328	$320

2014 University of Georgia ***preliminary*** cost enterprise budgets.

*Remember these are *returns above variable costs*, fixed costs including land rent/cost and a management return must be paid out of the remaining income.

The UGA crop comparison tool enables a grower to compare the costs and expected returns of the major row crops in Georgia in a side-by-side manner. The cost and return estimates in the tool are based upon the UGA Row Crop Enterprise Budgets. Contact your local county Cooperative Extension agent for help in accessing and using these tools for your operation.

UPDATE ON FACTORS AFFECTING PEANUT REPLANT DECISIONS

R. Scott Tubbs and Jason Sarver

The University of Georgia Extension recommendation for optimum plant stand in peanut (*Arachis hypogaea* L.) is 4.0 plants per foot of row, although recent research has shown that yield potential can be maintained at plant stands lower than optimum with new high yielding cultivars like Georgia-06G, Florida-07, and Tifguard. The unpredictable and sometimes extreme weather, plus the ubiquity of soil-borne pathogens can contribute to poor emergence and result in a poor plant stand. When plant stand is adversely affected, a point is reached where replanting the field becomes economically viable.

Several research trials in multiple locations in South Georgia and North Florida have been conducted over the last few years to address plant stand and factors affecting the decision to replant peanut. Most of these experiments had similar primary objectives, consisting of determining the plant stand at which a peanut field fails to maintain yield and economic viability, and the best method for replanting peanut when an adequate stand is not achieved. In these trials, plant stands were controlled at a specified level and replanted by supplementing the original plant stand with additional seed at a reduced seeding rate, or by terminating the original plant stand with herbicide and replanting at a reduced seeding rate. For comparison purposes, a treatment with each original plant stand was maintained without any replanting as well. When a supplemental replant occurs, there are cost savings by using a reduced seeding rate, but there are several drawbacks also. Disadvantages include reduced residual control of at-plant herbicides because of the extended emergence timeframe, and having peanut plants of two different maturities growing in the field at the same time which makes it challenging to have proper timing on fungicide applications and determining the most appropriate time to dig a field. When the original stand is terminated and replanted at a full seeding rate, there are additional expenses involved from additional herbicide application, doubled seed cost, and planting later in the season which often will be beyond the optimal planting window and likely compromise maximum yield potential compared to an earlier planting.

One of the experiments was established in single row pattern at the Southwest Georgia Research and Education Center in Plains, GA in 2011 and 2012 and at the Lang-Rigdon Farm in Tifton, GA in 2012. Six plant stands (1.0, 1.5, 2.0, 2.5, 3.0, and 3.5 plants per foot of row) were tested using the three methods described above (replanted with reduced seeding rate, terminated and replanted fully, or left as is), along with a 4.0 plants per foot of row treatment as the recommended standard. The supplemental seeding rate was arbitrarily determined using the UGA Extension target plant stand (4.0 plants per foot) minus the plant stand in the field, and multiplying by 2. To achieve maximum yield, a minimum plant stand of 1.0, 2.0, and 3.0 plants per foot were needed at Plains-2011, Tifton-2012, and Plains-2012, respectively. Replanting by supplementing the original stand provided a yield increase at 1.0 plants per foot at Tifton-2012 and at 1.0 and 1.5 plants per foot at Plains-2012. ***In all replicates of the study, replanting by supplementing the original stand at a reduced seeding rate was more beneficial than terminating the original stand and completely replanting at a full seeding rate.***

An additional two field trials (one irrigated and one non-irrigated) were established at the Lang-Rigdon farms in Tifton, GA in 2012 to evaluate twin-row peanut production at four plant stands (2.25, 3.0, 3.75, and 4.5 plants per foot of row) and five replant methods (supplemental reduced seeding rate planted in a single row between the original twin rows, supplemental reduced seeding rate planted in a single row beside original rows, supplemental reduced seeding rate planted in twin rows with one row between and one row beside the original rows, terminate the

original stand and replant at a full seeding rate, or leave stand as is). In the irrigated trial, there was no yield increase from replanting in any scenario. However, in the non-irrigated trial, yield was improved when a supplemental replant occurred, whether between (763 lb/ac), beside (475 lb/ac), or both (364 lb/ac) when the plant stand was 2.25 plants per foot of row. Yields also increased by approximately 3 to 4% for each 0.75 plant per foot increment in stand in the irrigated trial. ***A full replant of the original stand was never advantageous when compared to the no replant and supplemental replant treatments.***

Based on these results, the decision to replant a peanut field when a poor plant stand is initially achieved still needs further investigation (additional field replicates were completed in 2013, but results were not available at time of press for this publication). There was consistency among multiple trials that a burndown herbicide application followed by replanting at a full seeding rate of peanut was not a successful practice and was much more costly than a supplemental replant scenario, or even than leaving the original stand alone. Thus, if a replant decision is triggered, the most optimal results were observed from supplementing the original plant stand with additional seed, despite the hardships with timing and maturity that must be endured. However, yield and economic benefits from replanting were not often observed unless plant stands dropped below 2.0 plants per foot of row. Additional management and timing variables are under investigation and will be reported in the future.

UNIVERSITY OF GEORGIA PEANUT BREEDING PROGRAM

Bill Branch

In the U.S., there are four market types of peanut: runner, Virginia, Spanish, and Valencia. Historically, all four market types have been grown in the southeast. However, the runner-type has been predominately grown for the past several decades. Within the runner U.S. market type, there are several new and improved varieties that have been developed and released from the University of Georgia Peanut Breeding Program.

RUNNER-TYPE:

"GEORGIA-06G" is a new high-yielding, TSWV-resistant, runner-type peanut variety that was released in 2006. It was developed at the University of Georgia, Coastal Plain Experiment Station in Tifton, GA. Georgia-06G has a high level of resistance to tomato spotted wilt virus (TSWV). In multi-location tests conducted in Georgia during the past several years, Georgia-06G was likewise found to be among the lowest in TSWV disease incidence and highest in yield, grade, and dollar value return per acre compared to all of the other runner-types. Georgia-06G is a large-seeded runner-type variety with growth habit and medium maturity similar to Georgia Green. It also has very good stability and a wide-range of adaptability.

"GEORGIA GREENER" is a new high-yielding, TSWV-resistant, runner-type peanut variety that was released in 2006. It was developed at the University of Georgia, Coastal Plain Experiment Station in Tifton, GA. Georgia Greener has a high level of resistance to tomato spotted wilt virus (TSWV) and CBR resistance. In multi-location tests conducted in Georgia during the past several years, Georgia Greener was found to be among the lowest in TSWV disease incidence and highest in yield, grade, and dollar value return per acre compared to all of the other runner-types. Georgia Greener is more of a regular runner-type seed size variety with growth habit and medium maturity similar to Georgia Green. It also has very good stability and a wide-range of adaptability.

"GEORGIA-07W" is a new high-yielding, TSWV-resistant, white mold-resistant, runner-type peanut variety that was released in 2007. It was developed at the University of Georgia, Coastal Plain Experiment Station in Tifton, GA. Georgia-07W has a high level of resistance to both diseases, tomato spotted wilt virus (TSWV) and white mold or stem rot. In multi-location tests conducted in Georgia during the past several years, Georgia-07W was found to be among the lowest in TSWV incidence and total disease incidence, highest in yield, grade, and dollar value return per acre. Georgia-07W is a large-seeded runner-type variety with a runner growth habit and medium maturity. It also has very good stability and a wide-range of adaptability.

"GEORGIA-09B" is a new high-yielding, high-oleic, TSWV-resistant, medium-seeded, runner-type peanut variety that was released in 2009. It was developed at the University of Georgia, Coastal Plain Experiment Station, Tifton, GA. Georgia-09B originated from the first backcross made with **'Georgia Green'**, as the recurrent parent. During past years averaged over several multi-location tests in Georgia, Georgia-09B had significantly less TSWV disease incidence, higher yield and percent TSMK grade, larger seed size, and greater dollar value return per acre compared to Georgia Green. Georgia-09B has also showed significantly higher TSMK grade percentage than Florida-07 and higher dollar value. It was also found to have a medium runner seed size as compared to the larger high-oleic, runner-type variety, Florida-07. Georgia-09B combines the excellent roasted flavor of Georgia Green with the high-oleic trait for longer shelf-life and improved oil quality of peanut and peanut products.

"GEORGIA-10T" is a high-yielding, TSWV-resistant, large-seeded, runner-type peanut variety that was released by the Georgia Agricultural Experiment Stations in 2010. It was developed at the University of Georgia, Coastal Plain Experiment Station, Tifton, GA. During three-years averaged over multi-location tests in Georgia, Georgia-10T had significantly less mid-season TSWV incidence and late-season total disease (TD) incidence, higher yield, grade, and dollar value return per acre compared to Georgia-01R. However, Georgia-10T is most similar to **Georgia-01R** in later maturity. During the past few years at multi-locations in Georgia when planted early (mid-April) to increase TSWV disease pressure, Georgia-10T was again found to be among the lowest in TSWV incidence and TD incidence, highest in pod yield, highest in TSMK grade, and highest in dollar value return per acre compared to many other runner-type varieties, respectively. Georgia-10T should be an excellent variety for an earlier planting option in the southeast.

"GEORGIA-12Y" is a high-yielding, TSWV-resistant and white mold-resistant, medium-seeded, runner-type variety that was released by the Georgia Agricultural Experiment Stations in 2012. It was developed at the University of Georgia, Coastal Plain Experiment Station, Tifton Campus. During three-years averaged over multi-location tests in Georgia, Georgia-12Y had significantly higher yield, dollar value return per acre, and number of seed per pound compared to Georgia-10T. However, Georgia-10T has a higher TSMK grade than Georgia-12Y. Georgia-12Y is most similar to Georgia-10T in later maturity. Both should be excellent varieties for an early-planting date option in the southeast U.S. peanut production area.

"GEORGIA-13M" is a new high-yielding, high-oleic, TSWV-resistant, small-seeded, runner-type peanut variety that was released by the Georgia Agricultural Experiment Station in 2013. It was developed at the University of Georgia, Coastal Plain Experiment Station, Tifton, GA. During three-years averaged over multiple location tests in Georgia, Georgia-13M had significantly less total disease incidence and greater dollar value return per acre compared to four other high-oleic, runner-type varieties. Georgia-13M was also found to have a smaller runner seed size as compared to these larger high-oleic, runner-type check varieties, Florida-07, FloRun™ '107', Georgia-09B, and Georgia-02C. Georgia-13M combines high-yield, TSWV-resistance with the excellent roasted flavor of Georgia Green and the high-oleic trait for longer shelf-life and improved oil quality of peanut and peanut products.

Multiple years and multiple locations are recommended for variety comparisons. The following tables present such combined variety test results in Georgia across years and locations.

Table 1. THREE-YEAR AVERAGE DOLLAR VALUE RETURN PER ACRE OF 13 RUNNER-TYPE PEANUT VARIETIES ACROSS MULTILOCATIONS IN GEORGIA, 2011-13.

Runner	Gross Dollar Values ($/a)			3-Yr
Variety	2011	2012	2013	Mean
*Georgia-13M	903	945	1036	963
Georgia-12Y	913	946	1001	955
Georgia-06G	906	974	969	951
Georgia-07W	896	941	961	934
Georgia Greener	875	910	882	890
Georgia-10T	823	884	917	877
*TUFRunner™ '727'	862	825	929	874
*Georgia-09B	819	877	909	870
*Florida-07	824	857	898	861
*FloRun™ '107'	827	852	855	845
Tifguard	789	821	836	816
*Georgia-02C	751	776	890	807
Georgia Green	757	814	834	803

* High-Oleic Varieties

Table 2. THREE-YEAR AVERAGE YIELD (LB/A) OF 13 RUNNER-TYPE PEANUT VARIETIES UNDER IRRIGATION AND NONIRRIGATION AT MULTILOCATIONS IN GEORGIA, 2011-13.

Runner	Tifton		Plains		Midville	
Variety	Irrig.	Nonirrig.	Irrig.	Nonirrig.	Irrig.	Nonirrig.†
Georgia-13M	5616	4890	5971	4500	6652	5314
Georgia-12Y	6082	5775	5472	4098	6481	5182
Georgia-06G	5408	5265	5902	4429	6022	5164
Georgia-07W	5471	5009	5694	4444	6106	4708
Georgia Greener	5222	5114	5430	4072	6100	4520
Georgia-10T	5715	5065	4352	3338	5778	4458
TUFRunner ™ '727'	5177	4513	5212	3831	6046	5408
Georgia-09B	5239	4622	5332	3929	6446	4552
Florida-07	5566	5215	5459	3946	6159	4796
FloRun™ '107'	5450	4559	5302	3881	5880	4496
Tifguard	5253	4818	4757	3577	5791	4254
Georgia-02C	4833	3951	5200	3741	5555	4994
Georgia Green	5069	4608	5055	3568	5523	4814

† Only 2-yr data, missing 2011.

Table 3. THREE-YEAR (29-TESTS) AVERAGE DISEASE INCIDENCE, POD YIELD, TSMK GRADE, SEED COUNT, AND DOLLAR VALUES OF TWELVE RUNNER-TYPE PEANUT VARIETIES AT MULTILOCATIONS IN GEORGIA, 2010-12.

Runner Variety	TSWV (%)	TD (%)	Yield (lb/a)	TSMK (%)	Seed (no./lb)	Value ($/a)
Georgia-06G	3	10	4787	74	648	877
Georgia-12Y	4	9	4901	71	723	873
Georgia-07W	4	10	4658	75	662	854
*Georgia-13M	4	10	4658	73	828	845
Georgia Greener	5	12	4528	74	669	832
Georgia-10T	4	8	4338	76	689	813
*Georgia-09B	5	14	4423	74	717	807
*Florida-07	10	20	4539	71	631	791
*FloRun^{TM} '107'	11	22	4353	72	729	778
Tifguard	8	15	4241	72	647	760
Georgia Green	7	20	4084	73	788	741
*Georgia-02C	6	14	3977	73	778	722

* High-Oleic

PEANUT INSECT MANAGEMENT

Mark R. Abney

Thrips

A cool, wet spring slowed the early progress of the 2013 peanut crop in Georgia. Late planting, delayed emergence, slow growth, and an intense and later than usual thrips flight led to heavy thrips infestations and very noticeable thrips feeding damage in many fields. The most common thrips species found in GA peanut fields is the tobacco thrips. This insect spends the winter months feeding and reproducing on winter annual weeds. As temperatures rise in the spring, winter weeds begin to die, and thrips leave to find new host plants. The size of thrips populations and the timing of thrips movement from overwintering hosts are determined largely by environmental conditions. In South Georgia, peak tobacco thrips flights generally occur in late April or early May, but in 2013 thrips movement peaked in late May. After several years of mild thrips pressure, the intensity of thrips feeding damage in 2013 was alarming to many growers. Fortunately, the combination of warmer June temperatures and abundant moisture resulted in good growing conditions in many fields, and peanuts quickly grew out of any visible damage.

The impact of early season thrips feeding on time to maturity and yield is difficult to determine. In the absence of additional stress such as drought or herbicide injury, the direct damage caused by thrips feeding is not likely to result in significant yield loss in peanut. Nevertheless, reductions in yield have been observed in research trials when thrips damage is accompanied by one or more of these added stressors. The greatest concern with high thrips numbers in peanut is the threat of increased tomato spotted wilt virus (TSWV). This potentially devastating virus is transmitted by tobacco thrips. The Peanut Rx program developed by the University of Georgia and cooperating institutions will help growers assess their disease risk. Practices such as planting between the 11th and 31st of May and the use of phorate insecticide in-furrow have the added effect of reducing the risk of TSWV and reducing the risk of thrips feeding damage. Currently we cannot accurately predict when thrips flights will occur or how intense they will be in a given year. Growers should keep this in mind when planning thrips management strategies for 2014.

Three-Cornered Alfalfa Hopper

Three-cornered alfalfa hoppers (TCAH) were numerous in many GA peanut fields in 2013. The economic impact of this insect on modern cultivars has not been quantified, and growers are forced to use judgment calls and best guesses when making treatment decisions. Additional research is needed to determine the economic threshold for this pest in runner peanut, and studies are planned for 2014. Research has shown that treatment of TCAH populations within 30 days of digging is unnecessary. When TCAH is present more than 30 before digging, decisions about whether or not to treat will be based on numbers and distribution of the insect in the field, overall health of the crop and current growing conditions, and a grower's personal tolerance for insect presence. Since the immature stages (nymphs) are

thought to be more damaging than the adults, controlling early colonizing TCAH adults before they lay eggs may be a useful strategy to reduce damage.

Other Insects

After an early bout with thrips, insects were generally not a major problem in most Georgia peanut fields in 2013. Caterpillar pests were scarce, and two of our most serious and difficult to control insect adversaries, the lesser cornstalk borer (LCB) and burrower bug, were virtually nonexistent. Both LCB and burrower bug thrive under dry soil conditions, and 2013 was anything but dry in much of South Georgia. The two spotted spider mite, another drought loving, difficult to control pest, was also not a problem for GA growers. Indications are that we saw more southern corn rootworm damage than usual; this is not surprising given that this pest prefers high soil moisture conditions. Some fields with very high potato leaf hopper (PLH) populations and severe hopper burn were reported. Potato leaf hopper is another insect whose economic impact on modern peanut cultivars is not well understood. One of our research trials in Tift County experienced high PLH pressure and the associated hopper burn but still achieved excellent yields. Since we are not able to predict what insect pressure will be like in 2014, growers should remain vigilant in scouting peanut fields for potential insect problems.

2014 PEANUT DISEASE UPDATE

Bob Kemerait, Tim Brenneman, and Albert Culbreath

Note: Recommendations for use of specific fungicides follows introductory sections on disease and nematode management for 2014 in this chapter.

Effective management of diseases that affect the peanut crop is essential to peanut production in Georgia. Use of effective fungicides and nematicides to protect the peanut crop and maximize yields add to production costs; however such costs are far outweighed by the profit potential to the grower.

It is imperative that growers carefully plan an effective strategy to manage diseases and nematodes; a plan that includes the use of crop rotation, selection of more-resistant varieties (**see Peanut Rx section in the 2014 Peanut Update**), selection of cost-effective fungicide and nematicide programs, and other factors that are a part of an overall integrated pest management program.

The "best" management program may not be the least expensive, but rather is the program that gives the best return on investment to the grower. A perfect example relates to the use of "tebuconazole" in a fungicide program to manage soilborne diseases like white mold and Rhizoctonia limb rot. Tebuconazole is a "good" fungicide for the management of white mold and limb rot and is sold at price that is attractive to nearly every peanut grower in the state. Nonetheless, growers may increase the value of their peanut crop by investing in a fungicide that, although more expensive, provides better total disease control increased yields.

From research conducted in recent years at the University of Georgia, it is becoming increasingly clear that **an early start to the management of soilborne diseases like white mold can have a real impact** on the efficacy of the fungicide program. Whether through use of Proline within weeks after emergence or early-season use of a tebuconazole tank-mixed with a fungicide for leaf spot, these treatments often benefit and supplement the control of white mold provided by our standard programs beginning 60 days after planting.

The section below is written to provide growers with a detailed overview of many aspects of disease management in 2014.

Highlights from 2013 and notes for 2014.

1. **Tomato Spotted Wilt.** Losses to tomato spotted wilt were estimated to be higher in 2013 than in recent years. Reasons for this increase are unknown but could be related in some way to the relatively late flush of thrips that affected the peanut crop. Though tomato spotted wilt has been of only minor importance to disease loss in recent years, it is still a disease that demands attention from the grower. **IMPORTANT NOTES: A)** Although the severity of tomato spotted wilt has been in decline over the past several years, this disease continues to be a potential threat to peanut production in Georgia. Growers must continue to incorporate the lessons spelled out in Peanut Rx to minimize the threat from this disease. **B)** The University of Georgia continues to recommend that growers consider planting a portion of their peanut crop in the latter part of April. Spreading the peanut crop over April and May offers many advantages to peanut producers. Although there continues to be some increase in risk to tomato spotted wilt for peanuts planted in April, **this risk is of minimal importance when our newer, more**

resistant, varieties are planted. In short, most growers who plant more-resistant varieties over late-April through May will enjoy significant benefits with minimal risk.

2. Because the winter of 2012-2013 was so warm and rainfall was abundant in 2013, I had predicted that **white mold**, which was severe in numerous fields in 2011, would be severe again last season. Very warm, even hot, soil temperatures early in the season can lead to aggressive development of the disease when the crop was still young. Though white mold was a problem in numerous fields last season, the outbreak was not as severe or as widespread as I had anticipated. Quite simply, ample rainfall and cooler temperatures prevailed in 2013 and white mold was slow to develop. Still, management of this disease will always be critical for growers. Below are points that are critical for growers to remember as they develop a plan for reducing loss to white mold.
    a. The most commonly asked questions from agents, consultants, and growers about disease control over the past three years continue to be management of white mold.
    b. As a reminder, the basic steps to minimizing the impact of white mold in a field include:
        i. Rotation away from peanuts and soybean; it is recommended that peanuts not be planted in a field more than one out of three years.
        ii. Selection of newer peanut varieties with improved resistance to white mold, for example 'Georgia-12Y' (see the chapter on the 2014 Peanut Rx). **Note:** The points assigned to Georgia-07W for risk to white mold were increased from 10 to 15 points for the 2013 version of Peanut Rx. Simply, Georgia-07W remains one of our more-resistant varieties to white mold; however with continued research it seems that the resistance is not quite as strong as once believed.
        iii. Use of a disease management program that has an appropriate compliment of fungicides for white mold and leaf spot control recognizing that some fungicides offer the potential for better control than others.
        iv. Appropriate timing of fungicide applications to correspond with the growth of the crop, the threat from white mold (based upon soil temperature and rainfall/irrigation) and the anticipation of rain events or irrigation to help move the fungicide from the foliage to the crown of the plant.
        v. Until recently, it was generally recommended to begin the soilborne component of a fungicide program approximately 60 days after planting. However, with continued research and a better understanding of white mold, it is now believed that there is merit to beginning management of white mold earlier in the season. Such programs could include an early emergence application of Proline or Abound (0.4-0.8 fl oz/1000 ft) or they could include early applications of tebuconazole (see below) followed by the standard white mold program beginning approximately 60 days after planting.
        vi. Growers whose standard white mold program includes Abound, Headline (for soilborne disease control), Fontelis, Evito, Artisan, or Convoy may wish to consider an application of tebuconazole (7.2 fl oz/A) + cholorothalonil (1.0 pt/a) approximately 44 days after planting to get an "early jump" on white mold control. Such an application would be followed by the full-season white mold program. For fungicide resistance management concerns, use of early-season applications of tebuconazole is not advised where a grower will later use a Provost program.
        vii. Application of fungicides for the control of white mold at night or in the early morning hours when the leaves are still folded. Such allows better

penetration of the canopy so that more of the fungicide reaches the crown of the plant.

viii. Use of Proline 480SC (5.7 fl oz/A) or Abound (0.4-0.8 fl oz/1000 ft) during the period of "early emergence". Research efforts at the University of Georgia in 2010, 2011and 2012 have documented that applications of Proline (5.7 fl oz/A "broadcast rate" BANDED over young plants 2-5 weeks after planting) can have a significant and season-long benefit for management white mold. See next point for initial information on an early emergence application of Proline. Abound is also labeled for such early-season applications and research continues to compare efficacy of Proline versus Abound.

3. The active ingredient in **Proline 480SC** is prothioconazole. (Note: Prothioconazole and tebuconazole are the active ingredients in Provost fungicide.) Applied in-furrow at planting, Proline aides in the management of Cylindrocladium black rot (CBR). However, when applied to the peanut crop AFTER emergence at a broadcast rate of 5.7 fl oz/A BANDED at the full rate over the young peanuts, Proline can provide season long benefits to the management of white mold and possibly Rhizoctonia limb rot as well. As the early-season application of Proline for disease control is a new recommendation from the University of Georgia (and also a significant financial investment early in the season), growers should **carefully** consider the following points:
    a. An early season application of Proline contributes to the overall management of white mold; however it is unlikely to provide all of the control that is needed. Early-season applications of Proline should be followed by a standard soilborne fungicide program. **NOTE:** If Proline is applied during the early season growers may need to include fungicides like Artisan, Convoy, Abound, Headline or Evito to full-season "triazole" programs for fungicide resistance management.
    b. Once again, the rate of Proline is 5.7 fl oz/A. This FULL RATE should be banded over the young peanuts planted in either single rows or in twin rows (10-40 GPA). If planted in twin rows, the fungicide can be applied with either a single nozzle covering both twins at once (10-40 GPA) or with a single nozzle over each of the twin rows (10-20 GPA/nozzle). Growers should use an "even flat-fan" tip for this application.
    c. Timings for early-season applications of Proline have been evaluated between two weeks and five weeks after planting. Although each of these timings can offer increased white mold protection, in 2011 the level of white mold control and subsequent yield benefits on early planted peanuts increased as the application was delayed; i.e., the best results were observed five weeks after planting. The value of specific timings is likely to vary from season to season based upon planting date and weather conditions early in the season.
    d. Early-season applications of Proline can provide protection against leaf spot as well as against white mold.
        i. For growers following a 4-5 week-after-planting application of Proline with a Provost program, Bayer CropScience recommends waiting 21 days and then simply making the first Provost application (approximately 55-60 days after planting).
        ii. For general fungicide programs, an early season application of Proline can be followed 2-3 weeks later with a fungicide application for management of leaf spot. The full-season white mold program should commence at about 60 days after planting.
4. **Cylindrocladium black rot (CBR)** has been scarce in recent years and the disease was uncommon in 2013 as well. In years like 2011 and 2012, the lack of CBR was likely the

result of extremely warm soil temperatures early in the season. Cooler and wetter conditions prevailed early in the 2013 season; why CBR was not more of a problem is a mystery.

5. **"Prescription"** fungicide programs with 4, 5, or 7 fungicide applications continued to be effective even in a heavy white mold year when used in fields with appropriate risk (based upon Peanut Rx). In 2014, Peanut Rx prescription fungicide programs will be supported by Syngenta Crop Protection, Nichino-America, Arysta LifeScience, BASF, Bayer CropScience, DuPont and Sipcam Agro. **Peanut Rx**, with a few modifications for 2014, can be found elsewhere in the 2014 Peanut Update.

Specific Fungicide Notes for 2014

1. **New Fungicide for 2014**: Peanut growers in Georgia continue to be blessed with an increasing arsenal of fungicides for use in protecting the crop against disease. This is especially encouraging as much of the country views peanut as a "minor" crop. Fungicides that you may encounter for the first time in 2014 include:
    a. **Alto (cyproconazole)** from Syngenta will be promoted as a mix partner with Abound (azoxystrobin) to promote resistance management (azoxystrobin goes off-patent this year) and to further enhance control of leaf spot diseases.
    b. **Priaxor (a pre-mix of Headline and Xemium (fluxapyroxad))** is labeled by BASF for use on peanuts; however we will know more about this product in 2015.
    c. **Custodia (a pre-mix of azoxystrobin and tebuconazole)** will likely be available from MANA in the 2014 season.
    d. **Muscle ADV (a premix of tebuconazole and chlorothalonil)** will be available from SipCam in 2014.
2. **Fontelis** (penthiopyrad) is a newer fungicide and was available to growers in 2012 and 2013. Researchers at the University of Georgia have conducted extensive field tests with this product and have found it to be an effective fungicide against common peanut diseases such as white mold and leaf spot. Fontelis is applied in three applications (16 fl oz/A each) during the season for management of soilborne and leaf spot diseases. Below are specific reasons why growers should consider using Fontelis in 2014.
    a. Fontelis has broad-spectrum activity and can be used in the management of leaf spot diseases, white mold, Rhizoctonia limb rot, and CBR.
    b. Penthiopyrad, the active ingredient in Fontelis, is in a different fungicide class than are fungicides like Provost, Proline, Quash, tebuconazole, Abound, and Evito. Because of this, Fontelis will play an important role in fungicide resistance management.

2. Generic tebuconazole products (tebuconazole was the active ingredient in Folicur and is the active in many products such as Tebuzol, Monsoon, Savannah, Muscle, Orius, etc.) are among the most popular fungicides used on peanuts today. The popularity of tebuconazole last season was certainly enhanced by the lower cost of an application versus the cost of other products. **In 2014, growers should note the following about tebuconazole:**
    a. The cost of tebuconazole fungicides will keep them popular with growers.
    b. Tebuconazole remains an effective fungicide for management of soilborne diseases and, when tank-mixed with another fungicide, for control of leaf spot diseases.

c. Overuse of tebuconazole without regards to fungicide resistance management will likely lead to a continued decline in the efficacy of this important fungicide.
d. Tebuconazole is often an effective tool but is not the best fungicide available for the management of any of our important diseases. In selecting an appropriate fungicide, growers should weigh the cost of tebuconazole against the value of enhanced disease control with other fungicides.
e. Growers commonly asked about the potential benefits of significantly increasing the rate of tebuconazole (beyond 7.2 fl oz/A) to take advantage both of the "expected" benefits of the higher rate and the cost of the product. The University of Georgia Cooperative Extension in NO WAY condones the use of tebuconazole products at rates beyond 7.2 fl oz/A. Not only is this application rate off-label and thus illegal, but we have no data to support improved efficacy anyway with a rate higher than 7.2 fl oz/A. In short, growers who choose to use tebuconazole MUST use it at the 7.2 fl oz/A rate.

Management of peanut root-knot nematodes in 2014

1. Peanut root-knot nematodes are frequently under-managed in Georgia, either because the symptoms are not recognized or because growers are reluctant to take the steps needed to ensure adequate control.
2. Rotation with a crop such as cotton (not a host for peanut root-knot nematode) is a very effective management tool.
3. Growers planting peanuts in fields with damaging levels of peanut root-knot nematodes MUST consider planting 'Tifguard'. Tifguard is nearly immune to the peanut root-knot nematode, does NOT need to be treated with a nematicide, and performs exceptionally well as compared to other varieties that are treated with nematicides.
4. In 2013 unexpected damage was found in fields planted to seed sold as Tifguard. The reason for such damage is not clearly understood; however extensive effort is underway to explain what happened last year and what can be expected in the future.
5. Growers who plant Tifguard can expect excellent control of nematodes. Note: the concern that some have expressed over "weak peg strength" in Tifguard remains unproven; growers should give significant importance to the near-immunity of this variety to peanut root-knot nematodes and keep any concerns about peg-strength in proper perspective.
6. Fumigation with Telone II (4.5-6 GPA) is our most aggressive treatment to manage peanut root-knot nematodes and provides our best opportunity to manage nematodes affecting peanut IF the grower does not plant Tifguard.
7. Temik 15G (if available), applied both at planting and at-pegging stages, is a critical tool in many areas. Growers who use Temik 15G in 2011 need to carefully familiarize themselves with new use requirements such as maxim use amounts, pre-harvest application intervals, distance from well-heads and water sources, and requirement for irrigation or rainfall within 24 hours after a pegging-time application.
8. Research continues to evaluate the use of Vydate C-LV for management of nematodes on peanut. Results will be presented to peanut growers as they are generated.
9. NemOut, a biological nematicide, will no longer be available to peanut growers.
10. "Enclosure" (iprodione) and GOS Neem 7-Way are being sold for the management of plant parasitic nematodes on peanut.

Tools for Disease Management

Peanut growers will have the opportunity to use some new and/or updated tools again in 2014 to further their battle against diseases and nematodes.

1. **Early-season applications of Proline and Abound** fungicides are discussed at the beginning of this section for enhanced management of white mold and Cylindrocladium black rot.
2. **"Day versus Night spraying":** Research began in 2007 and was continued in 2008, 2009 and 2010 (both in small plots and in large, on-farm studies) to assess the benefits and potential consequences of spraying fungicides at night for control of soilborne diseases. Because the peanut leaves "fold up" when it is dark, thus opening the interior of the canopy, it is thought that fungicides applied at such time would have better chance of reaching the crown of the plant. For management of soilborne diseases like white mold and Rhizoctonia limb rot, the crown of the plant is targeted for optimum control. Also, it is thought that by spraying fungicides directly into the crown of the plant, the fungicide residues are protected to some degree from sunlight, thus reducing photodegradation and extending the period of efficacy. Below is a summary of findings from the University of Georgia with regards to spraying at night.
    a. Control of white mold can be significantly improved by spraying the peanuts at night or in the early morning hours before sunrise. Provided that the fungicide applied at night has systemic activity, i.e. moves within the leaf tissue, there is no significant reduction in leaf spot control, and yields can be significantly improved with night sprays. When sprayed at night, "protectant" fungicides like chlorothalonil and Elast (dodine) will not provide adequate control of leaf spot diseases.
    b. Improvement of white mold control is more evident in non-irrigated plots than in irrigated plots when fungicides are applied in darkness, though there is likely to be benefit in both situations.
    c. Spraying in the early morning hours before dawn tends to offer slightly better results than in spraying in early evening. It is believed that the dew in the early morning further aids in the relocation of the fungicide.
    d. It is believed that applying fungicides at night will either maintain yields and control of white mold and leaf spot diseases or improve white mold control and yields as compared to daytime applications. There is believed to be little risk to the grower by applying appropriate fungicides at night, other than loss of a sound sleep!
    e. Note: Only fungicides applied for control of soilborne diseases should be considered for application at night. Fungicides applied only for control of leaf spot diseases and rust should continue to be applied during the day.
    f. **Final note: growers must ensure that any fungicide or combination of fungicides applied at night has systemic activity against leaf spot diseases.** Without systemic activity (e.g. a mix of Convoy and chlorothalonil which does not have systemic activity) applying a fungicide at night could lead to a reduced level of leaf spot control. In the previous example, a more appropriate combination would be Convoy a fungicide such as Stratego, Headline, Topsin M + chlorothalonil, Tilt/Bravo, etc.
3. **The 2014 "PEANUT Rx" Disease Risk Index** is now available and has been thoroughly reviewed and revised as needed by researchers, breeders, and Extension specialists from the University of Georgia, the University of Florida, and Auburn University.

4. **"Prescription Fungicide Programs",** i.e. specific disease management programs with an increase or decrease in fungicide applications based upon the 2012 "PEANUT Rx", continues to gain support from the agrichemical industry. In 2013, Syngenta Crop Protection (Abound, Bravo WeatherStik, Tilt/Bravo), Nichino (Artisan, Convoy), Arysta LifeScience (Evito), BASF (Headline), Bayer CropScience (Provost), DuPont (Fontelis) and possibly Sipcam Agro will support prescription programs (4, 5, and 7 applications) for fields determined to be at low, moderate, or high risk according to PEANUT Rx. Prescription programs using fungicides not promoted by the companies mentioned above can also be used successfully by growers; however they would not be endorsed or supported by any company.
5. **Recommendations for the management of CBR** continue to develop as new tools become available. PROLINE (5.7 fl oz/A) is a promising component of a complete fungicide program to reduce the impact of Cylindrocladium black rot (CBR) in a field. With the availability of PROLINE, a good integrated pest management program for growers who wish to manage CBR is to
    a. practice good crop rotation (i.e. rotation away from peanuts and soybeans),
    b. consider planting a variety with some resistance to CBR such as Georgia-02C and Georgia Greener,
    c. use PROLINE, 5.7 fl oz/A in-furrow, at planting, followed by
    d. 4-block program of PROVOST or at least use of a fungicide program that offers suppression of CBR (e.g. Folicur, Abound, or Headline).

CROP ROTATION

The practice of good crop rotation has always been at the foundation of optimum disease management in peanut, affecting not only nematodes and soilborne diseases, e.g. white mold, Rhizoctonia limb rot, and Cylindrocladium black rot, but leaf spot diseases as well. For this reason, Extension specialists at the University of Georgia stress the importance of avoiding planting peanuts in the same field more often than once every three years and rotating with a grass crop, e.g. bahiagrass or corn, if at all possible.

Since the recent change in the Peanut Farm Program, peanut farming in Georgia has expanded into "non-traditional" production areas in the southeastern portion of the state. Growers in this area frequently ask "Can I grow peanuts on my land in back-to-back seasons as I have not grown them here before?" The simple answer is, of course, you can plant peanuts on your land whenever you want to. However, even growers who are planting peanuts on "new peanut ground" should be discouraged from back-to-back peanuts if possible. Reasons for this include:

1. Many peanut growers around the state would love to have access to "new peanut ground" as populations of pathogens attacking the crop should be initially low. Therefore, it does not make much sense to lose this competitive edge in pursuit of the short-term goal of growing two or three crops of peanuts in succession.

2. Many new peanut growers are producing peanuts on land that has been cropped to cotton in recent years. Although cotton is not affected by the peanut root-knot nematode, early or late leaf spot, or Cylindrocladium black rot (CBR), and is only slightly affected by white mold, it is susceptible to diseases caused by *Rhizoctonia solani*. It is likely that despite previous cropping in a field, there will be significant populations of *R. solani* and perhaps smaller populations of *Sclerotium rolfsii* (white mold) in the field when peanuts are first planted. Without effective crop rotation, these populations may increase quickly.

3. In 2005, we observed an outbreak of CBR in a field in southeast Georgia planted for two consecutive years to peanut, but had not been planted to peanut at any other time. Earlier crops of soybean had introduced this disease to the field and back-to-back years of peanut had intensified the problem.

One of the greatest benefits of crop rotation is that it increases the effectiveness of all disease management programs. Effective crop rotation takes some of the "pressure off" of a fungicide program to minimize the impact of disease. Any fungicide program will be more effective where good crop rotation is practiced. In some situations, fields that are well rotated will require fewer, or at least less expensive, fungicide applications by the grower.

Recommendations from the University of Georgia for crop rotation and peanut production include the following:

1. Avoid planting peanut in the same field more than once out of every three years. Longer rotations, for example once every four years, are even better.

2. The best crops to rotate with peanut are grass crops, such as corn, sorghum, and bahiagrass. These crops will help to reduce the severity of diseases caused by Rhizoctonia solani, as well as CBR, white mold, and leaf spot diseases. Although corn and sorghum are alternate hosts for the peanut root-knot nematode, they are less affected than peanut is. Therefore, planting corn and sorghum should help to reduce populations of peanut root-knot nematode, though perhaps not as fast as when a non-host such as cotton is planted. Bahiagrass is susceptible to the lesion nematode, which can reduce the pod brightness important for the green peanut market.

3. Cotton is a very good rotation crop with peanut and should help to reduce the severity of white mold, leaf spot diseases, and CBR on future crops. Cotton is not a host for the peanut root-knot nematode, so this will be a beneficial effect as well. Cotton is a host for *Rhizoctonia solani*, so diseases caused by this pathogen will remain a concern in peanut-cotton rotations, especially in conservation tillage where crop debris remains on the surface.

4. Soybeans, other leguminous crops, and many vegetable crops are not preferred for rotation with peanut. Although such rotations are likely to reduce the severity of leaf spot diseases, they may not reduce the severity of white mold, Rhizoctonia limb rot, the peanut root-knot nematode, or, in the case of soybean, CBR.

DISEASE MANAGEMENT IN 2014

Tomato Spotted Wilt. Every year growers are reminded that the goal of PEANUT Rx is to minimize their risk point total for a specific production field. PEANUT Rx does not dictate when a grower *must* plant peanuts, for example in the middle of May. The purpose of the index is to allow growers to determine how to minimize their point totals given their own needs. For example, if a grower needs to plant in late April, he or she can still achieve a satisfactory point total by making adjustments to other parts of the index, such as selection of a more resistant variety.

Fungal Diseases. Good crop rotation remains the cornerstone of a good disease management program. We recommend that a grower plant peanuts in a field only once every three years,

and once every four years is even better. Grass crops, such as bahiagrass and corn, are the best rotation crops with peanuts because they do not share the same diseases or pathogens. (Note: Bahiagrass is a host for the lesion nematode, which does affect peanuts, especially green peanut growers.)

Early and Late Leaf Spot Diseases. Both early and late leaf spot are commonly observed across Georgia's peanut production region.

Management Points for Leaf Spot

1. Practice good crop rotation.
2. Destroy any volunteer peanuts that may grow in a field and bury/remove old peanut hay that can serve as a source of spores for leaf spot diseases.
3. Do not delay the start of a leaf spot fungicide program.
    a. When using chlorothalonil (e.g. Bravo Ultrex, Bravo WeatherStik, Echo, Equus, or other generics), Tilt/Bravo, Echo-PropiMax, Stratego, Elast 400F, Eminent 125SC + Echo, or Headline (**at 6 fl oz/A**), and you have adequate crop rotation, your first leaf spot spray will typically be applied somewhere between 30 and 35 days after planting (unless weather has been dry and unfavorable for development of foliar diseases.
    b. In fields where risk to leaf spot has been calculated as low-to-moderate, we have maintained good control of leaf spot when using a single application of Tilt/Bravo (2.5 pt/A) 40 days after planting
    c. Growers who use the AU-pnut forecasting system, automated at www.AWIS.com, can more effectively time their first application based upon environmental conditions.
    d. If you are planting peanuts after peanuts, you will likely need to begin your leaf spot program earlier than 30 days after planting because of the increased risk of disease.
    e. If you are using Headline (**at 9 fl oz/A**) for your first leaf spot spray, it is appropriate to combine your first two fungicide applications for leaf spot control (for example at 30 and 44 days after planting) into a single application of 9 oz of Headline at 38-40 days after planting.
4. Traditionally, fungicides are applied on a 14-day calendar schedule beginning after the first application. This 14-day interval may be modified for reasons such as those below:
    a. The interval should be **shorter** than every 14-days if conditions:
        i. Rainfall has been abundant and conditions are favorable for leaf spot.
        ii. You are using the AU-PNUT leaf spot advisory and it calls for an early application.
        iii. Peanuts follow peanuts in a field and leaf spot is expected to be severe.
        iv. Rainfall came on quickly after your last leaf spot spray and you are concerned that some of the fungicide may have been washed off the plants in the field too quickly.
        v. You are planting a variety that has poor resistance to leaf spot diseases.
        vi. Peanut rust appears in your field prior to the end of the season.
    b. It may be possible to extend the spray interval **beyond** 14-days if:
        i. Conditions have been dry and unfavorable for leaf spot, especially if you use the AU-PNUT advisory for spray guidance.

ii. You are using a variety with increased resistance to leaf spot. For example, if pressure from soilborne diseases is not severe, the spray interval for such varieties could be every 21 days and it is possible to treat the most resistant varieties only three times during the season. (Additional information can be obtained from your local Extension Agent).
iii. **You use Peanut Rx and determine that the predicted risk of fungal disease in a field is low to moderate** and rainfall has not been excessive since your last spray (additional information can be obtained from your local Extension Agent).
iv. Since many fungicide applications are used to manage leaf spot diseases and soilborne diseases, one must consider the effect that an extended spray schedule would have on both types of disease (foliar and soilborne) BEFORE shifting from a 14-day schedule.

5. The "**funky leaf spot**", whose cause is still unknown, typically affects peanut plants very early in the season and can look very much like early leaf spot. It may also cause considerable defoliation of early season foliage. Because this disease typically disappears by the middle of the season, it has not been found to be of real concern. Funky leaf spot has been found to be most severe on peanut varieties such as Georgia-02C and Georgia-03L, but is not thought to cause yield loss for either.
6. Current fungicides DO NOT control **funky leaf spot**; so do not be unduly alarmed by the appearance of leaf spots on your peanuts early in the season. Stay on a good fungicide program and have confidence that this program will control the more important early and late leaf spot diseases.
7. Finding some leaf spot in a field at the end of the season is usually not a problem. As long the diseases are controlled throughout the season, limited defoliation (up to about 30-40%) is not likely to affect your yield. The appearance of leaf spot at the end of the season typically does not mean that your program was ineffective or a failure.
8. Some growers in Florida are mixing chlorothalonil with Topsin-M or Topsin 4.5F or copper fungicides such as Kocide for their final leaf spot sprays to increase peg strength prior to harvest. What do we recommend in Georgia?
    a. Combinations of chlorothalonil and Topsin-M currently provide excellent control of leaf spot.
    b. Combinations of chlorothalonil and copper are also effective in the control of leaf spot.
    c. Data collected at Clemson University demonstrates that peg strength is not increased with use of Topsin-M, Topsin 4.5F, or copper (e.g. Kocide).
9. Failures in leaf spot management in a peanut field are often linked to:
    a. Unacceptable delays in starting your program.
    b. Improper calibration of equipment (not enough material was applied).
    c. Unacceptable delays between applications, such as when weather conditions keep the grower out of the field.
    d. Rain events immediately after a fungicide application have washed the fungicide away too quickly.
10. Use of Chlorothalonil.
    a. **Chlorothalonil** is the active ingredient in Bravo products, Echo products, and a number of generics. It is quite effective in the management of leaf spot diseases. Key points:

i. All chlorothalonil products for peanut appear to be effective. Differences between one brand and another are related to the "stickers" and other substances that are added to the active ingredient to increase effectiveness.
ii. There is no difference in efficacy between a flowable and dry-flowable formulation of chlorothalonil.
iii. Two likely benefits from chlorothalonil products when compared to other products for leaf spot control are:
    1. Price.
    2. Use for fungicide resistance management.
iv. The typical rate for a 720-F formulation is 1.5 pt/A; for a 90-DF formulation is 1.4 lb/A.
v. Chlorothalonil products are not systemic and must be applied to the leaf surface prior to infection by the fungus.
vi. Generally, chlorothalonil products have been on the foliage long enough prior to a rain event IF they have had time to dry completely.
vii. If you feel that your chlorothalonil application may not have had enough time to dry before rain, consider timing your next fungicide application a little earlier to compensate for any reduction in efficacy.
viii. When conditions have been very favorable for leaf spot (a lot of rain), it is generally true that research plots treated with chlorothalonil will have more leaf spot at the end of the season than plots treated with a systemic fungicide for leaf spot control. This increase in leaf spot rarely results in a reduction in yield.
ix. Tank mixing Topsin M with chlorothalonil provides a good option for growers who are looking for a "rescue treatment" when leaf spot is developing too quickly in their field.

11. Use of **Elast 400F**:
    a. Elast (dodine) is in a fungicide class different than others used in peanut production. Thus when used in a peanut program it can help to reduce the chances of fungicide resistance that occur with overuse of certain "at risk" fungicides.
    b. Elast is a "protectant" fungicide like chlorothalonil and must be applied before infection by leaf spot pathogens has occurred. If infection has already occurred, application of Elast will be of minimal benefit for disease control.
    c. Elast is used at either 15.0 fl oz/A alone or at 12.8 fl oz/A when tank-mixed with a product like tebuconazole (7.2 fl oz/A) for additional leaf spot control.
    d. Use of Elast is most appropriate where chlorothalonil would be used.
    e. Elast is MOST effectively used earlier in the season. Full-season use of Elast has been found in some trials to lead to reduced management of leaf spot diseases when compared to other fungicides applied for leaf spot control
12. **Tilt/Bravo, Echo-PropiMax, Eminent-Echo and Stratego:**
    a. Propiconazole + chlorothalonil is marketed as two products, Tilt/Bravo and Echo-PropiMax.
        i. The rate of this combination is 2.0 fl oz of propiconazole and 1.0 pt of chlorothalonil/A.
        ii. Tilt/Bravo is now marketed as a pre-mix which when applied at 1.5 pt/A, offers the same level of product as described above.
        iii. Tilt and PropiMax are systemic, which means that they can be absorbed into the leaf tissue offering some limited curative activity for recent infections.

iv. Fungicide resistance management: improper use of Tilt/Bravo or EchoPropiMax with Folicur or Stratego may increase the risk of resistance to the sterol-inhibitor class of fungicides.

b. Propiconazole + trifloxystrobin is marketed as Stratego.
   i. Stratego is also a systemic fungicide with limited curative activity.
   ii. For leaf spot control, Stratego is applied at a rate of 7.0 fl oz/A.
   iii. Fungicide resistance management: improper use of Stratego with Folicur, Tilt/Bravo, Echo-PropiMax, Abound or Headline will increase the risk of resistance to the sterol-inhibitor and strobilurin classes of fungicides.

c. Eminent 125SC (tetraconazole) + Echo is a new co-pack from Sipcam and offers leaf spot control similar as other products mentioned in this section.

d. Where do we see the best fit for these products?
   i. Even though these fungicides have a systemic component, they should be applied BEFORE infection occurs in order to obtain maximum benefit.
   ii. When conditions for leaf spot are favorable, use of Tilt/Bravo, Echo-PropiMax, Eminent 125SC + Echo or Stratego often provides for better leaf spot control than with chlorothalonil alone.
   iii. If growers plan to use one of these fungicides, they are often used early in the season to help insure a good start to leaf spot management.
   iv. If conditions have been favorable for leaf spot (abundant rainfall), a grower has been delayed in spraying for leaf spot, or leaf spot is beginning to appear in the field, use of Tilt/Bravo, Echo-PropiMax, or Stratego may provide benefits beyond chlorothalonil.

13. **Topsin-M** (thiophanate methyl) is a fungicide in the benzimidazole class.
   a. Topsin-M can be a very effective part of a leaf spot management program.
   b. Growers who use a 4-block tebuconazole program can increase the control of leaf spot by tank-mixing 5.0 fl oz/A Topsin-M with 7.2 fl oz of tebuconazole in alternating applications (either 1 & 3 or 2 & 4).
   c. Growers who use a 4-block Artisan program (13-16 fl oz/A on each of four applications, may also want to consider using Topsin as described above.
   d. Growers who are looking for an effective fungicide treatment, should leaf spot become a problem in a field, can make an application of Topsin-M (5.0-10.0 fl oz/A) tank-mixed with 1.5 pt/A chlorothalonil. This can be followed up with a second application of the same tank-mix or with an application of Tilt/Bravo.
   e. Growers should make no more than two tank-mix applications of Topsin-M pert season in order to avoid fungicide resistance problems.

14. Pyraclostrobin is sold as **Headline**.
   a. Headline has been the most effective fungicide labeled on peanut for management of leaf spot.
   b. **NOTE:** Because Headline is our current standard for control of leaf spot diseases, some growers forget that Headline at rates of 12-15 fl oz/A is also an effective white mold/Rhizoctonia limb rot material as well. Growers who incorporate a higher rate of Headline into their fungicide program can expect excellent leaf spot control and effective soilborne disease control as well.
   c. Headline has the best curative activity of any fungicide for control of leaf spot.
   d. Fungicide resistance management: improper use of Headline with Abound, Evito, or Stratego will increase the risk of resistance to the strobilurin class of

fungicides. In most cases, Headline should not be used in a fungicide program that contains Abound, Evito, or Stratego.

e. For leaf spot control, Headline is typically used as follows:
    i. Two applications at 6.0 fl oz/A at approximately 30 and 44 days after planting. We generally do not spend much time with this pattern, as the one below is a much better option for the grower.
    ii. Combine two traditional leaf spot fungicide applications into a single application at 9.0 fl oz/A approximately 38-40 days after planting.
    iii. Note: Because of its power to control leaf spot, some growers have used Headline as a "salvage" treatment late in the season when leaf spot appears out-of-control in a field. Remember:
        1. It would have been better to use the Headline earlier to try and avoid the problem entirely.
        2. Headline may slow the epidemic of disease, but it will not cure the problem. You will still have leaf spot; perhaps not as much as you would have had if you had not treated with Headline.
        3. Using a selective fungicide, such as Headline, when disease is present and severe will increase the risk for the development of fungicide resistance.

15. Abound, Evito, Provost, Fontelis, Quash (metconazole) and tebuconazole products are typically considered to be for control of soilborne diseases; however they must also control leaf spot diseases as well. Provost, Abound, Fontelis and Evito provide effective leaf spot protection alone. Although Quash (metconazole) alone may also provide adequate leaf spot control, where growers who have experienced leaf spot problems when using tebuconazole can assume that similar problems will exist with Quash unless it is tank-mixed with another fungicide for increased leaf spot control. Problems associated with tebuconazole and leaf spot are usually related to fungicide resistance issues or are traced back to rain or irrigation soon after application. To maximize leaf spot and white mold/limb rot control with Folicur/tebuconazole, it is best that the crop dry for 24 hours before irrigation. Where rainfall is abundant and/or resistance is likely, most growers will add a half-rate of chlorothalonil or Topsin to 7.2 fl oz/A of tebuconazole for added leaf spot protection.
16. Abound + Alto (azoxystrobin + cyproconazole) is a new combination of fungicides promoted to both improve leaf spot efficacy and also protect against fungicide resistance. Abound should continue to be applied at the standard rate (typically 18.5 fl oz/A) and Alto should be applied at 5.5 fl oz/A. The Alto/Abound combination will offer excellent control of leaf spot diseases.

SOILBORNE DISEASES

White Mold and Rhizoctonia Limb Rot Diseases: White mold will likely to occur in nearly every peanut field in Georgia; Rhizoctonia limb rot can be an important problem in some fields. Losses caused by these diseases can be severe and they are much more difficult to control than leaf spot diseases. Prior to 1994 when Folicur was first labeled, growers did not have any truly effective fungicides to control theses diseases. Since 1994, growers now have six different fungicides from three different classes that can effectively control both white mold and Rhizoctonia limb rot. Still, white mold and limb rot remain troublesome to growers. Two of the reasons for difficulty in control are 1) it can be tough to tell when you need to begin spraying, and 2) it is not easy to get the fungicide to its target where it can affect the pathogen.

Management points for white mold and Rhizoctonia limb rot.

1. Practice good crop rotation.
    a. Corn, grass crops, and bahiagrass are good rotation partners reducing effect of white mold and Rhizoctonia limb rot.
    b. Cotton will reduce the risk of white mold but will have less benefit on Rhizoctonia limb rot.
2. Choose resistant varieties when available.
    a. Some new varieties, such as Georgia-12Y, have increased resistance to white mold over Georgia Green.
    b. Georgia Green appears to have better resistance to Rhizoctonia limb rot than many other varieties.
3. Consider an application of Proline 480SC (5.7 fl oz/A) or Abound (0.4-0.8 fl oz/1000 ft) early in the season (2-5 weeks after planting) and follow it with a traditional fungicide program. More information is available at the first of this section.
4. Apply fungicides for control of soilborne diseases at night when leaves are folded to allow greater penetration to the crown of the plant. Soilborne diseases are most effectively controlled when the fungicide reaches the crown and lower limbs of the plant.
    a. Fungicides applied in late evening for management of soilborne diseases are at least as effective, and often more effective, then the same fungicides applied during the day.
    b. Fungicides applied for management of soilborne diseases appear to be most effective when applied early in the morning after dew set, but before daylight. The moisture from the dew seems to further help in the re-distribution of the fungicide on the crown and limbs of the crop.
    c. Because fungicides applied for control of soilborne diseases must also protect against leaf spot diseases as well, it is important that the grower use a fungicide, or tank-mix an additional fungicide, that has systemic movement in the leaf.
    d. All “leaf spot only” fungicide applications should be applied during the day to achieve maximum coverage of the leaves.
5. Use appropriate fungicides.
    a. NOTE: No fungicide program will give the grower complete control of soilborne diseases in a field. We estimate that, at best, a good soilborne fungicide program will give 60-70% control under ideal conditions.
    b. Initiating fungicide applications is often imprecise and is based upon experience.
    c. The timing of fungicides for controlling white mold and limb rot must be early enough to protect the crop when the disease first appears. However, growers should avoid applying soilborne fungicides too early so that they will be available when needed later in the season.
    d. Initial appearance of soilborne diseases is related to the soil temperature, the growth of the crop, and rainfall/irrigation.
    e. In Georgia, we generally start spraying for soilborne diseases approximately 60 days after planting. At this time in the season, the growth of the crop and the environmental conditions are suitable for disease to occur. Because white mold and Rhizoctonia limb rot can occur earlier than this, the grower should watch his fields carefully to determine when the diseases appear.
    f. Example: In 2003, rainfall was abundant and we predicted that severe white mold would occur early in the season. However, white mold did not appear

until later in the season and was much of a late-season problem. The most probable reason for this was temperature. Although the moisture was suitable for white mold (and limb rot), the cooler-than-normal summer temperatures delayed the onset of white mold. In 2006, white mold was severe across much of the production region of Georgia despite dry conditions. Again, the warm soil temperatures resulted in outbreaks of white mold, though the drought reduced the severity of Rhizoctonia limb rot.

g. Fungicides are applied to the foliage, but must reach the crown and limbs of the plant in order to be effective against soilborne diseases.
    i. The fungicides can be moved by rainfall and irrigation. If rainfall or irrigation occurs too quickly after application, the fungicide may not provide enough protection for leaf spot.
    ii. If the rainfall or irrigation is delayed, absorption of the fungicide into the foliage may reduce the amount available to fight soilborne disease.
    iii. In a dryland situation, lack of rainfall, and thus movement down the plant, will reduce the effectiveness of a soilborne fungicide. Still, the fungicide was probably not wasted; some of the product likely reached the desired target with the spray mix.
    iv. If fungicides are applied during the night after the leaves have folded, more fungicide will reach the crown of the plant where it is needed to control soilborne disease.
h. Management with **tebuconazole**.
    i. Tebuconazole is marketed as Folicur, Tebuzol, Orius, Tri$um, Integral, Muscle, Tebustar, etc.
    ii. Tebuconazole is effective against white mold and Rhizoctonia limb rot.
    iii. Tebuconazole remains effective against early and late leaf spot; however the fungicide is not as effective as it once was due to development of resistance by the fungal pathogens.
    iv. It is recommended that tebuconazole remain on the leaf surface for 24 hours after application to insure enough is absorbed for leaf spot control.
    v. If tebuconazole is washed from the leaves too quickly, leaf spot control may suffer, though the grower may get maximum control of white mold and limb rot.
    vi. In extremely wet weather, or when the threat from leaf spot diseases is elevated or where resistance has developed, growers should choose to mix 0.75-1.0 pt of chlorothalonil or 5 fl oz Topsin with 7.2 fl oz of tebuconazole to insure leaf spot control. At one time the addition of chlorothalonil was thought to impede the movement of Folicur from the foliage; however this has not found to be a problem. Note: Topsin is added to two alternating applications of tebuconazole in a 4-block program.
    vii. Tebuconazole is applied at a rate of 7.2 fl oz/A, beginning approximately 60 days after planting.
    viii. In the most traditional program, tebuconazole is applied in a four-block program, on a 14-day interval.
    ix. Fewer than four applications of tebuconazole may be sufficient in some low disease situations; however this will be an off-label program.

x. Improper use of tebuconazole with Stratego, Tilt/Bravo, or Echo-PropiMax could increase the risk of fungal resistance to the sterol-inhibitor fungicides.

i. Management with **Quash** (metconazole)
   i. Quash is a triazole fungicide that is in the same chemical class as tebuconazole.
   ii. Quash is sold by Valent and is used at rates between 2.5 and 4 oz/A.
   iii. Ideally, when Quash is applied at rates of 2.5 to 4 oz/A, a grower should not need to tank-mix additional materials for enhanced leaf spot control. However, where leaf spot resistance to tebuconazole has developed, growers can expect that leaf spot resistance to Quash may also exist. In such cases, it may be important to find a leaf spot tank-mix partner to ensure adequate control when using Quash.
   iv. **Quash** at 2.5 oz/A should be sufficient for control of white mold and Rhizoctonia limb rot under "normal" conditions. Where conditions are favorable for severe outbreaks of white mold, e.g. poor rotation, favorable weather, growers should use the higher rate at 4.0 oz/A.

j. Management with **Provost** (tebuconazole + prothioconazole)
   i. Provost is available to peanut growers in 2010 from Bayer CropScience.
   ii. Based upon results from the University of Georgia, Provost appears to have better systemic activity than other soilborne fungicides. This means that Provost can be more easily translocated within the plant from where it was applied to other regions for greater protection.
   iii. Bayer CropScience recommends that Provost be used in a 4-block program like Folicur.
   iv. The standard rate for Provost is 8.0 fl oz/A; however the rate can be effectively increased to as much as 10.7 fl oz/A when pressure from white mold or limb rot is severe.
   v. Because Provost is a combination of two fungicides within the same chemical class (triazoles/DMI fungicides), it is EXTREMELY important that growers practice good fungicide resistance management principals with this product in order to maintain its efficacy over an extended period of time.
   vi. From University data, Provost has provided excellent control of leaf spot diseases and control of white mold, Rhizoctonia limb rot, and CBR that is at least as good as that of Folicur.
   vii. To avoid causing injury to the foliage, growers should carefully read the Provost label before tank-mixing this product with other fungicides.

k. Management with azoxystrobin.
   i. Azoxystrobin is marketed as **Abound** and is typically applied at 60 and 90 days after planting at 18.5 fl oz/A.
   ii. A lower rate (12.0 fl oz/A) is allowed by label in dryland situations or in reduced-risk "Prescription Programs"; however it must be used with caution, as it will not have the "power" of the full rate. We typically do not recommend this rate unless each Abound application is alternated with applications of tebuconazole at 7.2 fl oz/A OR a grower is carefully using a prescription program in a reduced risk field.
   iii. Abound is effective against leaf spot diseases, white mold, and is excellent for management of Rhizoctonia limb rot.

iv. For maximum efficacy against white mold and limb rot, the field should receive irrigation or rainfall within 72 hours after application.
v. Fungicide resistance management: To avoid problems with fungicide resistance, Abound should not be used in the same program with Evito, Absolute, Stratego or Headline.
vi. Abound + Alto (azoxystrobin + cyproconazole) is a new combination of fungicides promoted to both improve leaf spot efficacy and also protect against fungicide resistance. Abound should continue to be applied at the standard rate (typically 18.5 fl oz/A) and Alto should be applied at 5.5 fl oz/A. The Alto/Abound combination will offer excellent control of leaf spot diseases.

l. Management with fluoxastrobin.
i. Fluoxastrobin is marketed as **Evito** 480SC.
ii. Evito is in the same chemical class (strobilurins) as are Headline, Abound, Stratego, and Absolute and should not be used in the same fungicide programs as these products.
iii. Recommended use for Evito is two applications of product (5.7 fl oz/A) timed approximately 60 and 90 days after planting.
iv. Evito is an effective component of a peanut disease management program; however it may not be quite as effective against leaf spot and soilborne diseases as are other fungicides.
v. Evito is NOT “generic Abound”.
vi. Evito T (a combination of Evito and tebuconazole) is also available as a pre-mix from Arysta Lifesciences and should provide good management of peanut diseases.

m. Management with **Fontelis**.
i. Based upon research results, Fontelis appears to be a very strong fungicide for the management of white mold, leaf spot, Rhizoctonia limb rot and the suppression of CBR.
ii. Fontelis is in the same chemical class as are Artisan and Convoy.
iii. The typical use pattern for Fontelis is 3 applications at 16 fl oz each to be applied beginning 60 days after planting.

n. Management with flutolanil.
i. Flutolanil is an excellent fungicide for the management of white mold and is also effective against Rhizoctonia limb rot. It is not effective against leaf spot diseases.
ii. Flutolanil is marketed as **Artisan** and **Convoy**.
1. Convoy, contains only flutolanil and must be mixed with the full-rate of another fungicide for control of leaf spot. Convoy is typically applied at 26 fl oz/A twice (60 and 90 days) or at 13 fl oz/A in a four-block program.
2. Artisan is a combination of flutolanil and propiconazole. Therefore, it will control leaf spot, white mold, and limb rot. Artisan can be applied at a rate or 26 or 32 fl oz/A.
3. Convoy and Artisan are typically applied at 60 and 90 days after planting, though Artisan and Convoy can also be applied in a 4-block program.
4. When using Artisan in a 4-block program, it is applied at rates between 13 and 16 fl oz/A and tank-mixed with an additional leaf spot material, e.g. 1.0 pt chlorothalonil/A or perhaps an alternation of chlorothalonil with Topsin at 5 fl oz/A.

5. As a final note, the flutolanil products Artisan and Convoy have performed exceptionally well in field trials where white mold was severe.

o. Management with pyraclostrobin.
   i. Pyraclostrobin is sold as **Headline** (as discussed in the leaf spot section).
   ii. Headline is effective in a soilborne disease management program against white mold and limb rot when applied at the 12-15 fl oz/A rate.
   iii. Headline is not used as a "stand-alone" soilborne fungicide, but rather is used in combination with tebuconazole, or perhaps Artisan or Moncut.
   iv. Headline is not used with Evito, Absolute, Stratego or Abound for fungicide resistance management concerns.
   v. Use of Headline at 12.0 fl oz will provide adequate control of white mold and limb rot when used as a part of a soilborne program and will provide exceptional leaf spot control.
   vi. An ideal use of Headline would be 9 fl oz/A at 40 days after planting, 7.2 fl oz/A Folicur at 60 days after planting, and 12.0 fl oz/A Headline at 74 days after planting.
   vii. Results suggest that growers can greatly improve management of white mold with Headline when it is applied at NIGHT.

p. Management with mixed programs. Some peanut growers in Georgia are experimenting with fungicide programs that mix different fungicides for the control of soilborne diseases and the results can be outstanding. The goal in mixing fungicides is to capture the best control available through the use of multiple chemistries. While some of these programs, like the alternate use of Folicur and Abound, for a total of four soilborne fungicide applications, appear to be quite effective, the grower must accept all responsibility if his program is off-label.

q. **Managing White Mold with Lorsban 15G.** Prior to Folicur, the insecticide Lorsban 15G was one of the only chemicals that growers had to manage white mold. As Folicur and then Abound were labeled, growers turned away from Lorsban for control of white mold. However, results from field trials in 2003 demonstrate that application of Lorsban 15 G (13.6 lb/A) in conjunction with fungicides may provide control of white mold beyond that of the fungicides alone. It appears that Lorsban 15G may still have a place in white mold control.

Cylindrocladium Black Rot (CBR): CBR is a very challenging disease to control and of increasing importance to growers across the state. Crop rotation away from peanut and soybean is an important management tool. Also, it is important that growers not introduce infested soil from fields where CBR occurs to fields where it is not yet present. This can be done best by cleaning equipment and vehicles before traveling between fields. In recent years, it has been proven that CBR can be transmitted via seed, though at a very low rate. Growers should try to obtain seed produced in fields free of CBR. They should also recognize that much of the seed for Virginia varieties is produced in the Virginia-Carolina region where CBR is of even greater importance than it is in Georgia.

Management points for CBR

1. Crop rotation away from peanut and soybean. Unfortunately, once CBR is established in a field, it is very difficult to eliminate. Not only can the fungal pathogen survive for long periods of time in the soil, but it can also infect common weeds such as beggarweed and coffee weed.
2. **Proline 480SC** (prothioconazole) is a fungicide that is labeled to be applied in-furrow at planting time for management of CBR. The in-furrow rate is 5.7 fl oz/A. The in-furrow application of Proline promises to be a critical component for the management of CBR when followed by foliar application of the effective fungicides noted below. From numerous studies, it is demonstrated that liquid inoculants can be mixed with Proline without loss of efficacy of the fungicide or the inoculant.
    a. Where peanuts are planted in single-row patterns, the Proline is applied at 5.7 fl oz/A beneath the row.
    b. Where peanuts are planted in twin-row patterns, the Proline rate must be split under each row so that the TOTAL rate remains at 5.7 fl oz/A. Where twin rows are planted, the grower can come back an additional 5.7 fl oz/A to the seedlings 14 days after cracking.
3. Provost, Folicur, Abound, and Headline are labeled for the "suppression" of CBR. This means that these fungicides may reduce the symptoms of disease and possibly increase yields above other fungicides. Growers who are battling CBR may choose to use Provost, Folicur, Abound, or Headline for CBR suppression, though results are variable and sometimes disappointing.
4. Varieties with some level of resistance were not available to growers until recently. In the past several years, varieties Georgia-02C, Georgia Greener and Carver, have been released and appear to have at lest some level of resistance to CBR. (Note: Tifguard is no longer recognized as resistant to CBR.) Growers who have fields where CBR is found may want to consider planting these varieties.
5. It has been found that CBR is more severe in fields where the peanut root-knot nematode also occurs. Therefore, growers who manage nematodes with either Telone II or Temik 15G may find some suppression of CBR as well.
6. Fumigation with metam sodium (e.g. Vapam) at 10 gal/A directly beneath the row 10 days prior to planting is currently our best management strategy for the control of CBR. Results can be quite dramatic and can allow growers to plant peanuts in fields where it would otherwise be nearly impossible to grow a crop.

Prescription Fungicide Programs

"Prescription fungicide programs" are defined as strategies designed to maximize yields and maintain disease control in a field using the appropriate number and type of fungicide applications based upon the risk to disease in the field. The goal of prescription fungicide programs is too use the right amount of fungicide for the level of disease expected in a field and to modify the fungicide use as the risk of disease increases or decreases as the season progresses.

Fields where the risk to disease is high, for example where fields have shorted crop rotation, are planted to less resistant varieties, and weather favors disease development should receive at least seven fungicide applications during the season, and perhaps more.

Fields where the risk to disease is reduced to a low or moderate level, for example where fields have longer rotations and are planted to more resistant varieties, typically do not need the same fungicide program as a higher risk field in order to maximize yields. Research data from many on-farm and small plot studies conducted at the University of Georgia have demonstrated that

growers who manage their crop so as to reduce the risk to leaf spot, white mold, and Rhizoctonia limb rot can also reduce the number of fungicide applications and increase the value of their crop by cutting production costs. In low risk fields, it is quite possible to reduce the number of fungicide applications from seven to four, so long as the grower is willing to watch the field to insure that disease does not begin to develop unnoticed.

Growers interested in developing prescription programs should first assess the risk in their field(s) using the PEANUT Rx Disease Risk Index and then contact their local county agent for guidance on a suitable fungicide program. Syngenta Crop Protection, Nichino-America, BASF, Arysta LifeSciences, DuPont and Bayer CropScience have developed their on prescription programs with input from University researchers. Growers who use an industry-sponsored prescription program in reduced risk fields can have the confidence that the company will "stand behind" these programs as long as risk level has been appropriately assessed and the appropriate fungicide program has been used.

Managing Seedling Diseases: Seedling diseases were typically not a concern for peanut growers in Georgia prior to the arrival of the tomato spotted wilt virus. Even if some plants were lost in a stand, the neighboring peanut plants were often able to compensate for the loss by growing into the vacated space. However, it is clear that spotted wilt can be devastating when fields have poor stands. For this reason, getting a good stand has become critical for growers. Below are some management techniques to reduce seedling diseases (primarily caused by *Rhizoctonia solani* and *Aspergillus niger*).

1. Rotate peanuts with grass crops to reduce the populations of *Rhizoctonia solani.*
2. Plant the peanut crop when soil temperatures are warm enough to produce rapid, vigorous germination and growth. This can help protect the plants from disease. Excessive moisture at planting will also increase the risk of seedling diseases.
3. Use quality seed that has a good germination rating and will grow vigorously.
4. Choose varieties that are known to germinate and emerge uniformly and with vigor.
5. Use only seed treated with a commercial fungicide seed treatment. The seed treatments that are put on commercial seed prior to purchase are outstanding and provide protection for the seed and seedling. Seed treatments include:
    a. Vitavax PC
    b. Dynasty PD (azoxystrobin + mefenoxam + fludioxonil)
6. Use an in-furrow fungicide where the risk of seedling disease is great or where the grower wants increased insurance of a good stand.
    a. Abound at 6.0 fl oz/A in the furrow at planting can provide increased control of seedling diseases, including Aspergillus crown rot.
    b. Terraclor (64 fl oz/A) also provides additional control of seedling diseases when applied in-furrow.
    c. Growers who are most likely to yield benefits from these in-furrow fungicides are those that have poor crop rotation and a history of seedling disease in the field.

MINIMIZING DISEASES OF PEANUT IN THE SOUTHEASTERN UNITED STATES

The 2014 Version of the Peanut Disease Risk Index

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Losses to tomato spotted wilt across the peanut production region of the southeastern United States were the lowest recorded since estimates began in 1990. It is estimated that losses associated with spotted wilt were approximately 2% in 2013. Though this was an increase over recent years, perhaps due to our unusual weather last season, it is believed that growers were able to achieve excellent management of this disease in large part through combined use of Peanut Rx and varieties with improved resistance.

The Spotted Wilt Index and the Peanut Fungal Disease Risk Index were successfully combined in 2005 to produce the Peanut Disease Risk Index for peanut producers in the southeastern United States. The Peanut Disease Risk Index, developed by researchers and Extension specialists at the University of Georgia, the University of Florida, and Auburn University, is now officially known as “PEANUT Rx”. The 2014 version of PEANUT Rx has been fully reviewed and updated by the authors based upon data and observations from the 2013 field season.

There have been a few updates to PEANUT Rx, 2014 from the 2013 version. The changes that have been made can be found in the cultivar/variety section of Peanut Rx where varieties no longer available have been deleted and two new varieties, Georgia-12Y and TUFRrunner™ ‘427’, have been added. Additionally, under the section “Row Pattern” the number of points for risk to tomato spotted wilt for single row plantings has been reduced from 15 to 10. Finally, we

have eliminated the term “Phorate 20G” from our category of “At-plant insecticides” as only Thimet 20G is now available.

As in the previous versions of the Disease Index, growers will note that attention to variety selection, planting date, plant population, good crop rotation, tillage, and other factors, can have a tremendous impact on the potential for disease in a field.

Spotted Wilt of Peanut
When tomato spotted wilt virus (TSWV) infects a host plant, it can cause a disease that severely weakens or kills that plant. This particular virus is capable of infecting an unusually large number of plant species including several that are important crops in the southeastern United States. In recent years, peanut, tobacco, tomato and pepper crops have been seriously damaged by TSWV. The only known method of TSWV transmission is via certain species of thrips that have previously acquired the virus by feeding on infected plants. The factors leading to the rapid spread of this disease in the Southeast are very complicated and no single treatment or cultural practice has been found to be a consistently effective control measure. However, research continues to identify factors that influence the severity of TSWV in individual peanut fields.

Peanuts and fungal diseases: an unavoidable union
Successful peanut production in the southeastern United States requires that growers use a variety of tactics and strategies to minimize losses to disease. Weather patterns in Georgia and neighboring areas during the growing season, including high temperatures, high humidity and the potential for daily rainfall and thunder storms, create the near-perfect environmental conditions for outbreaks of fungal diseases. Common fungal diseases include early and late leaf spot, rust, Rhizoctonia limb rot, southern stem rot (referred to locally as “white mold”), Cylindrocladium black rot and a host of other diseases that are common, but of sporadic importance. If peanut growers do not take appropriate measures to manage fungal diseases, crop loss in a field may exceed 50%.

Strategies for managing fungal diseases of peanut are typically dependent on the use of multiple fungicide applications during the growing season. Fungicide applications are initiated approximately 30 days after planting, as the interaction between the growth of the crop and environmental conditions are likely to support the development of leaf spot diseases. The length of the effective protective interval of the previous fungicide application determines the timing for subsequent applications. The length of time in which a fungicide can protect the peanut plant from infection is dependent on the properties of the fungicide and on weather conditions. Many growers will begin treating for soilborne diseases approximately 60 days after planting. With attention to proper timing of applications and complete coverage of the peanut canopy, growers can expect good to excellent control of leaf spot and reasonable control of soilborne diseases. Although control of leaf spot may approach 100%, growers typically can only expect about 60-70% control of soilborne diseases with effective fungicide programs.

Weather plays a major role in the potential for disease. Most fungal diseases will be more severe during periods of increased rainfall and of less concern during drier periods. **When weather conditions are very favorable for disease, severe epidemics may occur in fields where disease was not thought to be a problem. When weather conditions are unfavorable for fungal growth, disease severity may be low even in fields where it has been common in the past.** The AU-pnut leaf spot advisory that has been used to effectively manage diseases in peanut is based on this relationship between disease and weather. Even

those growers who do not use AU-pnut recognize the need to shorten the time between fungicide applications in wet weather.

Factors Affecting the Severity of TSWV on Peanut

Peanut Variety

No variety of peanut is immune to TSWV. However, some varieties have consistently demonstrated moderate levels of resistance. In addition to resistance, (reduced disease incidence), some varieties appear to have some degree of tolerance (reduced severity in infected plants) as well. Higher levels of resistance and tolerance are anticipated since peanut breeding programs are now evaluating potential new varieties for response to TSWV.

Peanut varieties can have a major impact on fungal disease. The variety 'Georgia Green' is currently planted on much of the peanut acreage in the Southeast. However, newer varieties from breeding programs at the University of Georgia and the University of Florida not only have improved resistance to spotted wilt, but to fungal diseases as well. For example, the variety 'Georgia-07W' has resistance to white mold that is better than that found in Georgia Green. Variety 'Georgia-Greener' has a level of resistance to Cylindrocladium black rot (CBR) that is superior to that of Georgia Green. Just as none of the current varieties is immune to spotted wilt, none are completely immune to fungal diseases either. However, improved resistance will likely lead to reduction in disease severity. It is important to remember that improved resistance to one disease does not mean that the variety also possesses superior resistance to other diseases.

Planting Date

Thrips populations and peanut susceptibility to infection are at their highest in the early spring. The timing of peanut emergence in relation to rapidly changing thrips populations can make a big difference in the incidence of TSWV for the remainder of the season. Optimum planting dates vary from year to year, but in general, early-planted and late-planted peanuts tend to have higher levels of TSWV than peanuts planted in the middle of the planting season. Note: In recent years, peanut planted in the second half of May and in June have been less affected by spotted wilt than in previous years.

It is important for larger acreage peanut farmers to spread their harvest season. Some staggering of planting dates may be necessary, but to avoid spotted wilt pressure, it may be more effective to plant varieties with different time-to-maturity requirements as closely as possible within a low-risk time period. If peanuts must be planted during a high-risk period, try to minimize the risk associated with other index factors.

Planting date can affect the severity of fungal diseases in a field. Earlier planted peanuts (April-early May) tend to have more severe outbreaks of white mold than do later planted peanuts. Earlier planted peanuts are likely to be exposed to longer periods of hot weather, favorable for white mold, than later planted peanuts which will continue to mature into late summer or early fall. However, the threat from leaf spot is generally more severe on peanuts planted later in the season than earlier. Reasons for this include the warmer temperatures later in the season that are more favorable for the growth and spread of the leaf spot pathogens and because the level of inoculum (number of spores) in the environment increases as the season progresses. Thus, later planted peanuts spend a greater portion of their growth exposed to increased leaf spot pressure than do earlier plantings.

NOTE: Because of the reduction of tomato spotted wilt in recent years, the increased resistance in new varieties, and the need for timely harvest of the peanut crop, growers are encouraged to consider planting a portion of their crop in April, assuming the risk to tomato spitted wilt is appropriately managed. Growers who plant the MORE RESISTANT peanut varieties in the latter part of April are not at a significant risk to losses from tomato spotted wilt in the 2013 season.

Plant Population

An association between skippy stands and higher levels of TSWV was noted soon after the disease began to impact peanut production in Georgia. More recently, research has confirmed the impact of plant population on TSWV incidence. Low and high plant populations may actually have the same number of infected plants, but the percentage of infected plants is greater in low plant populations. In other words, a higher plant population may not reduce the number of infected plants, but it will increase the number of healthy plants that can fill in and compensate for infected plants. In some cases, low plant populations may result in increased numbers of thrips per plant thereby increasing the probability of infection. When plant populations are as low as two plants per foot, severe losses to TSWV have been observed even when other factors would indicate a low level of risk. Getting a rapid, uniform stand with the desired plant population is a function of not only seeding rate but also seed quality, soil moisture, soil temperature and planting depth.

NOTE: In the 2014 Version of Peanut Rx, peanut varieties with a risk to TSWV at 25 points or less have a reduced risk (10 points) when planted at 3-4 seeds per foot than do varieties with a risk of 30 points or greater (15 points). This is based upon recent research conducted at the University of Georgia by Dr. Scott Tubbs.

Plant population has less effect on fungal diseases than on spotted wilt. However, it is now known that the severity of white mold increases when the space between the crowns of individual plants decreases. This is because the shorter spacing allows for greater spread of the white mold fungus, *Sclerotium rolfsii*.

Insecticide Usage

In general, the use of insecticides to control thrips vectors has been an ineffective means of suppressing TSWV. In theory, lowering overall thrips populations with insecticides should effectively reduce in-field spread of TSWV. However, insecticides have proven to be ineffective at suppressing primary infection, which accounts for most virus transmission in peanut fields. Despite the overall disappointing results with insecticides, one particular chemical - phorate (Thimet 20G), has demonstrated consistent, low-level suppression of TSWV. The mechanism of phorate's TSWV suppression is not known, but the level of thrips control obtained with phorate is <u>not</u> greater than that obtained with other insecticides. Phorate may induce a defense response in the peanut plant that allows the plant to better resist infection or inhibits virus replication.

Row Pattern

Seven to ten-inch twin row spacing, utilizing the same seeding rate per acre as single row spacing, has become increasingly popular in Georgia. Research on irrigated peanuts has shown a strong tendency for significantly higher yields, a one to two point increase in grade and reductions in spotted wilt severity that have averaged 25-30%. The reason for this reduction in spotted wilt is not fully understood.

Row pattern, either single or twin row plantings, also has some effect on the potential for disease in a field. Work done at the Coastal Plain Experiment Station has led to the observation that white mold is more severe in single rows (six seed per foot) than in twin rows (three seed per foot). White mold often develops in a field by infecting sequential plants within the same row. Planting the seed in twin rows rather than single rows increases the distance between the crowns of the peanut plants and delays the spread of white mold from plant to plant. The difference in leaf spot between single and twin row peanuts appears to be negligible.

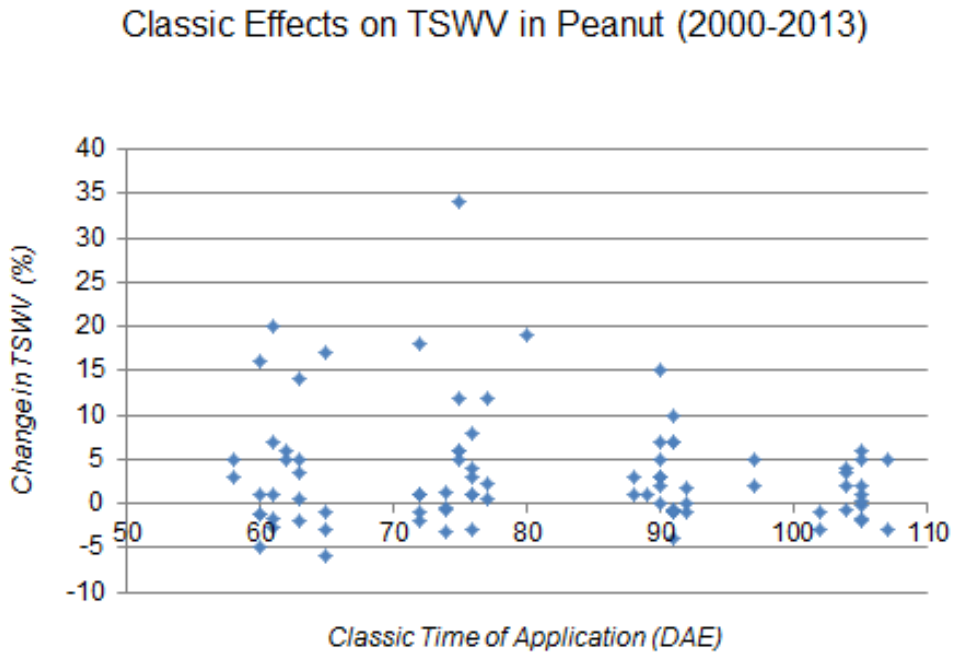
Tillage

The tillage method that a grower utilizes can make a big difference in peanut yields. There are many different methods to choose from, each with its own merits and disadvantages for a given situation. Strip tillage has been shown to have some strong advantages (including reduced soil erosion and reduced time and labor required for planting), but in some situations, yields have been disappointing. Unbiased tillage research is difficult to accomplish, but studies have consistently shown that peanuts grown in strip till systems have less thrips damage and slightly less spotted wilt. On-farm observations have confirmed these results, but more studies are needed in order to characterize the magnitude of the reduction. We do not suggest that growers should change their tillage method just to reduce spotted wilt, but we have included tillage in the risk index in an attempt to better identify total risks.

Conservation tillage, such as strip tillage, can reduce the amount of disease in a peanut field. For a number of years it has been recognized that spotted wilt is less severe in strip-tilled fields than in fields with conventional tillage. However, in results from recent field trials, it has been documented that leaf spot is also less severe in strip-tilled fields than in conventionally tilled fields, so long as peanut is not planted in consecutive season. Although the exact mechanism is currently unknown, the appearance of leaf spot is delayed in strip-tilled fields and the severity at the end of the season is significantly lower than in conventional tillage. Use of conservation tillage does not eliminate the need for fungicides to control leaf spot, but helps to insure added disease control from a fungicide program. Additional studies have found that white mold may be slightly more sever in strip tillage above conventional tillage; deep turning the soil may help to reduce the treat to white mold by burying initial inoculum (sclerotia). Rhizoctonia limb rot was not evaluated; however cotton is a host for *Rhizoctonia solani* and the cotton debris would likely serve as a bridge between crops. Disease management is only one of many factors that a grower must consider when choosing to practice either conventional or conservation tillage. However, if a grower decides to practice conservation tillage with peanut production, he can expect lower levels of leaf spot in many instances.

Classic® Herbicide

Research and field observations over the past several years have confirmed that the use of Classic (chlorimuron) can occasionally result in an increased expression of tomato spotted wilt of peanut. Since 2000, the effect of Classic on tomato spotted wilt in peanut has been assessed in 27 field trials resulting in 90 data points. Classic caused an 8% or less increase in tomato spotted wilt about 88% of the time and an increase of more than 8% about 12% of the time. Consequently, these results indicate that the effects of Classic on TSWV are minimal in comparison to the other production practices that influence this disease. Consequently, late-season Florida beggarweed populations that have the potential to reduce harvest efficiency and fungicide spray deposition should be treated with Classic. To date, other peanut herbicides have not been shown to have an influence on spotted wilt. Although not related to tomato spotted wilt or any other disease, the University of Georgia now recommends that Classic herbicide ***should not*** be applied to Georgia-06G and Tifguard.



Crop Rotation

Crop rotation is one of the most important tactics to reduce disease severity in peanut production, or any other cropping situation for that matter. Increasing the number of seasons between consecutive peanut crops in the same field has been shown to reduce disease levels and increase yield. The fungal pathogens that cause leaf spot, Rhizoctonia limb rot, and white mold survive between peanut crops on peanut crop debris, as survival structures in the soil, and on volunteer peanuts. The time that passes between consecutive peanut crops allows for the degradation of the peanut crop debris, thus depriving the fungal pathogens of a source of nutrition. Also, fungal survival structures and spores that are present in the soil have a finite period of viability in which to germinate and infect another peanut plant before they are no longer viable. Fields with longer crop rotations will have less pressure from leaf spot diseases, Rhizoctonia limb rot, white mold, and perhaps CBR, than fields with shorter rotations, or no rotation at all. In Georgia, the Cooperative Extension recommends at least two years between peanut crops to help manage diseases.

Choice of rotation crops, along with the length of the rotation, will have an impact on the potential for disease in a field. Rotation of peanut with ANY other crop will reduce the potential for early leaf spot, late leaf spot, and peanut rust. The pathogens that cause these diseases do not affect other crops. Rotation of peanuts with cotton, or a grass crop such as corn, sorghum, or bahiagrass, will reduce the potential for white mold because the white mold pathogen does not infect these crops, or at least not very well. Rotation of peanut with a grass crop will reduce the risk of Rhizoctonia limb rot. However, because cotton is also infected by *Rhizoctonia solani*, rotation with this crop will not help to reduce Rhizoctonia limb rot. Other crops, such as tobacco and many vegetables are quite susceptible to diseases caused by *Rhizoctonia solani* and will not help to reduce the severity of limb rot in a peanut field.

Special note: Soybean may be a popular crop for some growers in 2012. Growers must remember that soybeans and peanuts are affected by many of the same diseases. Planting soybeans in rotation with peanuts will not reduce the risk for CBR or peanut root-knot nematodes and will have only limited impact of risk to white mold and Rhizoctonia limb rot.

Field History

The history of disease in a field can be an important hint at the possibility of disease in the future, for much the same reason as noted in the crop rotation section above. Fields where growers have had difficulty managing disease in the past, despite the implementation of a good fungicide program, are more likely to have disease problems in the future than are fields with less histories of disease.

There is some difference between white mold and Rhizoctonia limb rot with regards to field history. Where white mold has been a problem in the past, it can be expected to be again in the future. Without effective crop rotation, outbreaks of white mold can be expected to become increasingly severe each season. Rhizoctonia limb rot is a disease that is more sensitive to environmental conditions, especially rainfall and irrigation, than white mold. Therefore, the severity of Rhizoctonia limb rot is likely to be more variable than white mold from year to year based upon the abundance of moisture during the season.

Irrigation

Irrigation is a critical component of a production system and can result in large peanut yields. However, the water applied to a crop with irrigation is also beneficial for the fungal pathogens that cause common diseases such as leaf spot, Rhizoctonia limb rot, and white mold. Rhizoctonia limb rot is likely to be more severe in irrigated fields with heavy vine growth; the increase in white mold may be less obvious. High soil temperatures as well as moisture from irrigation affect the severity of white mold.

Fungi causing leaf spot diseases need water for several important reasons, including growth, spore germination and infection of the peanut plant, and in some cases, spread of the fungal spores. Use of irrigation may extend the period of leaf wetness and the time of conditions favorable for leaf spot diseases beyond favorable conditions in a non-irrigated field. In two otherwise similar fields, the potential for disease is greater in the irrigated field.

Measuring TSWV Risk

Many factors combine to influence the risk of losses to TSWV in a peanut crop. Some factors are more important than others, but no single factor can be used as a reliable TSWV control measure. However, research data and on-farm observations indicate that when combinations of several factors are considered, an individual field's risk of losses due to TSWV can be estimated. There is no way to predict with total accuracy how much TSWV will occur in a given situation or how the disease will affect yield, but by identifying high risk situations, growers can avoid those production practices that are conducive to major yield losses. The University of Georgia Tomato Spotted Wilt Risk Index for Peanuts was developed as a tool for evaluation of risk associated with individual peanut production situations. When high-risk situations are identified, growers should consider making modifications to their production plan (i.e. variety, planting date, seeding rate, etc.) to reduce their level of risk. **Using preventative measures to reduce risk of TSWV losses is the only way to control the disease. After the crop is planted, there are no known control measures.**

The index combines what is known about individual risk factors into a comprehensive, but simple, estimate of TSWV risk for a given field. It assigns a relative importance to each factor so that an overall level of risk can be estimated. The first version of the index was developed in 1996 and was based on available research data. Small plot studies and on-farm observations have been used to evaluate index performance each year since release of the first version. In research plots where multiple TSWV management practices were used, as little as 5% of the total row feet were severely affected by TSWV compared to over 60% in high-risk situations. Yield differences were over 2000 lbs. per acre in some cases. Results of these and other validation studies have been used to make modifications in all subsequent versions of the index. Future changes are expected as we learn more about TSWV.

Keep in mind that the risk levels assigned by this index are relative. In other words, if this index predicts a low level of risk, we would expect that field to be less likely to suffer major losses due to TSWV than a field that is rated with a higher level of risk. A low index value does not imply that a field is immune from TSWV losses. Losses due to TSWV vary from year to year. In a year where incidence is high statewide, even fields with a low risk level may experience significant losses.

Measuring Risk to Fungal Diseases of Peanut

The index presented here is based upon better understanding of factors that affect disease incidence and severity. It is designed to help growers approximate the magnitude of the risk that they face from foliar and soilborne diseases in the coming season. More importantly, it should serve as an educational tool that allows the grower to predict the benefits of different management practices he makes in hopes of producing a better crop.

The risks associated with leaf spot, white mold and Rhizoctonia limb rot diseases are to be determined independently in the index system to be presented here. The magnitude of points associated with each variable is not linked between soilborne and foliar disease categories. However, the points allotted to each variable in the PEANUT Rx are weighted within a disease category according to the importance of the variable (such as variety or field history) to another variable (such as planting date). For example, within the category for leaf spot diseases, a maximum of 30 points is allotted to the variable “variety” while 0 points is allotted to the variable “row pattern”. The magnitude of points assigned within each category and to each variable has been checked to ensure that the total number of points assigned to a field is consistent with research and experience. For example, while it would be possible for a non-irrigated field planted to Georgia Green to fall in the lowest risk category, a field of irrigated Georgia Green could be in a category of “medium risk” but not “low risk”.

NOTE: When weather conditions are favorable for fungal diseases, especially when rainfall is abundant, even fields at initial “low risk” to fungal diseases may become “high risk”.

PEANUT Rx

For each of the following factors that can influence the incidence of tomato spotted wilt or fungal diseases, the grower or consultant should identify which option best describes the situation for an individual peanut field. An option must be selected for each risk factor unless the information is reported as "unknown". A score of "0" for any variable does not imply "no risk", but that this practice does not increase the risk of disease as compared to the alternative. Add the index numbers associated with each choice to obtain an overall risk index value. Compare that number to the risk scale provided and identify the projected level of risk.

Peanut Variety

Variety[1]	Spotted Wilt Points	Leaf Spot Points	Soilborne Disease Points
			White mold
Bailey[3]	10	15	10
Florida-07[2]	10	20	15
Florida Fancy[2]	25	20	20
FloRun™ '107'[2]	20	25	20
Georgia-06G	10	20	20
Georgia-07W	10	20	15
Georgia-09B[2]	20	25	25
Georgia-12Y[1]	5	20	15
Georgia Green	30	20	25
Georgia Greener[3]	10	20	20
Tifguard[5]	10	15	15
TUFRrunner™ '427'[1,2]	15	15	15

[1]*Adequate research data is not available for all varieties with regards to all diseases. Additional varieties will be included as data to support the assignment of an index value are available.*
[2]*High oleic variety.*
[3]*Varieties Georgia Greener, and Bailey have increased resistance to Cylindrocladium black rot (CBR) than do other varieties commonly planted in Georgia.*
[4]*Tifguard has excellent resistance to the peanut root-knot nematode.*

Planting Date

Peanuts are planted:	Spotted Wilt Points[1]	Leaf Spot Points	Soilborne Disease Points	
			White mold	Limb rot
Prior to May 1	30	0	10	0
May 1 to May 10	15	0	5	0
May 11-May 31	5	5	0	0
June 1-June 10	10	10	0	5
After June 10	15	10	0	5

Plant Population (final stand, not seeding rate)

Plant stand:	Spotted Wilt Points[1]	Leaf Spot Points	Soilborne Disease Points	
			White mold[2]	Limb rot
Less than 3 plants/ft	25	NA	0	NA
3 to 4 plants/ft[3]	15	NA	0	NA
3 to 4 plants/ft[4]	10	NA	0	NA
More than 4 plants/ ft	5	NA	5	NA

[1]*Only plant during conditions conducive to rapid, uniform emergence. Less than optimum conditions at planting can result in poor stands or delayed, staggered emergence, both of which can contribute to increased spotted wilt. Note: a twin row is considered to be one row for purposes of determining number of plants per foot of row.*
[2]*It is known that closer planted peanuts tend to have an increased risk to white mold.*
[3]*This category (15 risk points for spotted wilt) is only for varieties with a risk to spotted wilt of MORE THAN 25 points.*
[4]*This category (10 risk points for spotted wilt) is for varieties with 25 point or less for risk to spotted wilt.*

At-Plant Insecticide

Insecticide used:	Spotted Wilt Points*	Leaf Spot Points	Soilborne Disease Points	
			White mold	Limb rot
None	15	NA	NA	NA
Other than Thimet 20G	15	NA	NA	NA
Thimet 20G	5	NA	NA	NA

[*]*An insecticide's influence on the incidence of TSWV is only one factor among many to consider when making an insecticide selection. In a given field, nematode problems may overshadow spotted wilt concerns and decisions should be made accordingly.*

Row Pattern

Peanuts are planted in:	Spotted Wilt Points	Leaf Spot Points	Soilborne Disease Points	
			White mold	Limb rot
Single rows	10	0	5	0
Twin rows	5	0	0	0

Tillage

Tillage	Spotted Wilt Points	Leaf Spot Points	Soilborne Disease Points	
			White mold	Limb rot
conventional	15	10	0	0
reduced*	5	0	5	5

** For fungal diseases, this is does not apply for reduced tillage situations where peanut is following directly behind peanut in a rotation sequence. Limb rot can exist on some types of crop debris and use the organic matter as a bridge to the next peanut crop.*
***"Funky" or "irregular" leaf spot tends to be more severe in conservation tillage than in conventional tillage, though this malady is not typically associated with yield losses.*

Classic® Herbicide*

	Spotted Wilt Points	Leaf Spot Points	Soilborne Disease Points	
			White mold	Limb rot
Classic Applied	5	NA	NA	NA
No Classic Applied	0	NA	NA	NA

**Use of Classic is not recommended for fields planted to Georgia-06G. Research has documented a slight yet consistent yield reduction when Classic herbicide is applied specifically to Georgia-06G.*

Crop Rotation with a Non-Legume Crop.

Years Between Peanut Crops*	Spotted Wilt Points	Leaf Spot Points	Soilborne Disease Points	
			White mold	Limb rot
0	NA	25	25	20
1	NA	15	20	15
2	NA	10	10	10
3 or more	NA	5	5	5

**All crops other than peanut are acceptable in a rotation to reduce leaf spot. Cotton and grass crops will reduce the severity of white mold. Rhizoctonia limb rot can still be a significant problem, especially with cotton, under a longer rotation with favorable conditions, e.g. heavy vine growth & irrigation/ rainfall. Rotation with soybeans can increase risk to white mold, Rhizoctonia limb rot, and CBR. Rotation with grass crops will decrease the potential risk of limb rot; tobacco and vegetables will not.*

Note that rotation of peanuts with soybeans may lower the risk for leaf spot diseases, but it does not reduce the risk to CBR or peanut root-knot nematodes and only has minimal impact on risk to white mold or to Rhizoctonia limb rot.

Field History

Previous disease problems in the field?*	Spotted Wilt Points	Leaf Spot Points	Soilborne Disease Points	
			White mold	Limb rot
NO	NA	0	0	0
YES	NA	10	15	10

** "YES" would be appropriate in fields where leaf spot and/or soilborne diseases were a problem in the field despite use of a good fungicide program.*

Irrigation

Does the field receive irrigation?	Spotted Wilt Points	Leaf Spot Points	Soilborne Disease Points	
			White mold	Limb rot
NO	NA	0	0	0
YES	NA	10	5*	10

** Irrigation has a greater effect on Rhizoctonia limb rot than on southern stem rot (white mold) or Cylindrocladium black rot.*

Calculate Your Risk

Add your index values from:

	Spotted Wilt Points	Leaf Spot Points	White Mold Points	Rhizoctonia Limb Rot Points
Peanut Variety				
Planting Date				
Plant Population		----		----
At-Plant Insecticide		----	----	----
Row Pattern				
Tillage				
Classic® Herbicide		----	----	----
Crop Rotation	----			
Field History	----			
Irrigation	----			
Your Total Index Value				

Interpreting Your Risk Total

Point total range for tomato spotted wilt = 35-155.
Point total range for leaf spot = 10-100.
Point total range for white mold = 10-95.
Point total range for Rhizoctonia limb rot = 15-75.

Risk

	Spotted Wilt Points	Leaf Spot Points	Soilborne Points	
			white mold	limb rot
High Risk	**≥115**	**65-100**	**55-80**	**To be determined**
High Risk for fungal diseases: Growers should always use full fungicide input program in a high-risk situation.				
Medium Risk	**70-110**	**40-60**	**30-50**	**To be determined**
Medium Risk for fungal diseases: Growers can expect better performance from standard fungicide programs. Reduced fungicide programs in research studies have been successfully implemented when conditions are not favorable for disease spread.				
Low Risk	**≤65**	**10-35**	**10-25**	**To be determined**
Low Risk for fungal diseases: These fields are likely to have the least impact from fungal disease. Growers have made the management decisions which offer maximum benefit in reducing the potential for severe disease; these fields are strong candidates for modified disease management programs that require a reduced number of fungicide applications.				

Examples of Disease Risk Assessment

Situation 1.
A grower plants **Georgia Green** (30 spotted wilt points, 20 leaf spot points, 25 white mold points) on **May 5** (15 spotted wilt points, 0 leaf spot points, 5 white mold points, 0 limb rot points), with **two years between peanut crops** (0 spotted wilt points, 10 leaf spot points, 10 white mold points, 10 limb rot points) on **conventional tillage** (15 spotted wilt points, 10 leaf spot points, 0 white mold points, 0 limb rot points), **single row spacing** (15 spotted wilt points, 0 leaf spot points, 5 white mold points, 0 limb rot points), in an **irrigated field** (0 spotted wilt points, 10 leaf spot points, 5 white mold points, 10 limb rot points) with **a history of leaf spot disease**, but **not soilborne diseases** (0 spotted wilt points, 10 leaf spot points, 0 white mold points, 0 limb rot points) using **Classic® herbicide** (5 spotted wilt points, 0 leaf spot points, 0 white mold points, 0 limb rot points), **Temik 15G at-plant insecticide** (15 spotted wilt points, 0 leaf spot points, 0 white mold points, 0 limb rot points) with a **final plant population** of 2.8 plants per foot of row (25 spotted wilt points, 0 leaf spot points, 0 white mold points, 0 limb rot points).

Points:
Spotted wilt: **120** (high risk) leaf spot: **60** (medium risk), white mold: **50** (medium Risk), Rhizoctonia limb rot: **20** (to be determined).

Situation 2.
A grower plants **Georgia-06G** (10 spotted wilt points, 20 leaf spot points, 20 white mold points) on **May 15** (5 spotted wilt points, 5 leaf spot points, 0 white mold points), with **three years between peanut crops** (0 spotted wilt points, 5 leaf spot points, 5 white mold points) on **strip tillage** (5 spotted wilt points, 0 leaf spot points, 5 white mold points), **twin row spacing** (5 spotted wilt points, 0 leaf spot points, 0 white mold points), in an **irrigated field** (0 spotted wilt points, 10 leaf spot points, 5 white mold points) with **no history of leaf spot disease or soilborne disease** (0 spotted wilt points, 0 leaf spot points, 0 white mold points) with **NO Classic® herbicide** (0 spotted wilt points, 0 leaf spot points, 0 white mold points), **Thimet 20G at-plant insecticide** (5 spotted wilt points, 0 leaf spot points, 0 white mold points) with a **final plant population** of 4.2 plants per foot (5 spotted wilt points, 0 leaf spot points, 5 white mold points).

Points:
Spotted wilt: **35** (low risk), leaf spot: **40** (medium risk), white mold: **40** (medium risk).

Situation 3.
A grower plants **FloRun™ '107'** (20 spotted wilt points, 25 leaf spot points, 20 white mold points) on **May 15** (5 spotted wilt points, 5 leaf spot points, 0 white mold points, 0 limb rot points), with **one year between peanut crops** (0 spotted wilt points, 15 leaf spot points, 20 white mold points, 15 limb rot points) on **conventional tillage** (15 spotted wilt points, 5 leaf spot points, 0 white mold points, 0 limb rot points), **twin row spacing** (5 spotted wilt points, 0 leaf spot points, 0 white mold points, 0 limb rot points), in an **irrigated field** (0 spotted wilt points, 10 leaf spot points, 5 white mold points, 10 limb rot points) with **a history of leaf spot disease, white mold, but not Rhizoctonia limb rot** (0 spotted wilt points, 10 leaf spot points, 15 white mold points, 0 limb rot points) with **NO Classic® herbicide** (0 spotted wilt points, 0 leaf spot points, 0 white mold points, 0 limb rot points), **Orthene insecticide** (15 spotted wilt points, 0 leaf spot points, 0 white mold, 0 limb rot points) with a **final plant population** of 3.5 plants per foot of row (10 spotted wilt points, 0 leaf spot points, 0 white mold, 0 limb rot).

Points:
Spotted wilt points: **70** (medium risk), leaf spot risk: **70** (high risk), white mold: **60** (high risk), limb rot: **25** (to be determined))

Situation 4.
A grower plants **Georgia-07W** (10 spotted wilt points, 20 leaf spot points, 15 white mold points) on **April 28** (30 spotted wilt points, 0 leaf spot points, 10 white mold points, 0 limb rot points) with **one year between peanut crops** (0 spotted wilt points, 15 leaf spot points, 20 white mold points, 15 limb rot points) on **strip tillage** (5 spotted wilt points, 0 leaf spot points, 5 white mold points, 5 limb rot points), **twin row spacing** (5 spotted wilt points, 0 leaf spot points, 0 white mold points, 0 limb rot points) in a **non-irrigated** field (0 spotted wilt points, 0 leaf spot points, 0 white mold points, 0 limb rot points) with **a history of leaf spot, white mold, and Rhizoctonia limb rot** (0 spotted wilt points, 10 leaf spot points, 15 white mold points, 10 limb rot points), with **NO Classic® herbicide** (0 spotted wilt points, 0 leaf spot points, 0 white mold points, 0 limb rot points), using **Thimet at-plant insecticide** (5 spotted wilt points, 0 leaf spot points, 0 white mold, 0 limb rot points) with a **final plant population** of 4.4 plants per foot of row (5 spotted wilt points, 0 leaf spot points, 5 white mold, 0 limb rot).

Points:
Spotted wilt risk: **60** (low risk), leaf spot risk: **45** (medium risk), white mold: **65** (high risk), limb rot: **35** (to be determined)

"Planting Windows" to Attain Low Risk for Spotted Wilt

If planting date were the only factor affecting spotted wilt severity, growers would have no flexibility in when they planted. Fortunately, other factors are involved and by choosing other low risk options, growers can expand their planting date window. Remember, the goal is to have a total risk index value of 65 or less, regardless of which combination of production practices works best for you. The following table demonstrates how the planting date window expands as other risk factors go down. For example, where a grower achieves a good stand, uses strip tillage and twin rows, and Thimet, but does not use Classic, he may plant a "10" or "15" point variety at ANY time in the season and still be at "Low" risk for spotted wilt.

	Points assigned to the peanut variety of interest		
	20	15	10
Production practices and final stand	**Planting date options to achieve a "LOW RISK" for Spotted Wilt using above varieties**		
Poor stand, conventional tillage, single rows, Temik, Classic is used	NONE	NONE	NONE
Average stand, twin rows, conventional tillage, Thimet, no use of Classic	May 11-25	May 11- June 5	May 1-June
Good stand, strip tillage, twin rows, Thimet, no use of Classic	After May 1	ANY	ANY

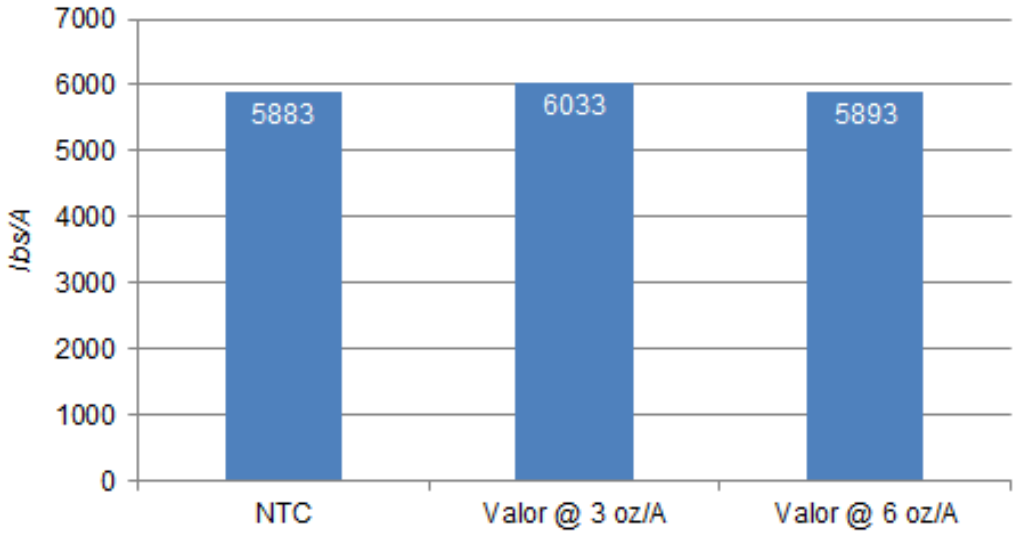
PEANUT WEED CONTROL UPDATE

Eric P. Prostko

Valor Injury and Peanut Yield

Some peanut growers are still concerned about the injury that Valor can cause when cool, wet conditions exist at emergence. If a significant rainfall event or a series of rainfall events occur at the time the peanuts begin to crack, Valor will almost always cause crop injury. Both research and field experience have demonstrated that as long as the peanut stand is not significantly reduced, a Valor damaged field will likely recover with no adverse effects on yield. In recent field trials, a good margin of crop safety was observed even at a 2X use rate (Figure 1). For the record, all 10 growers in the 2012 Georgia Peanut Achievement Club used Valor on their high yielding crop (6204 lb/A)!

Figure 1. Peanut Yield Response to Valor - 2013



PE-14-13
Averaged over 3 planting dates (April 16, April 29, May 13)
GA-06G

P = 0.8162

Generic Valor (flumioxazin) Formulations

With the recent expiration of its patent, be on the lookout for new generic formulations of Valor (Valent) such as **Outflank** (MANA) and **Panther** (NuFarm). In 2014, these "new" formulations should be used with caution until more UGA data can be collected regarding their use.

Paraquat/Peanut Variety Tolerance

Paraquat (Gramoxone, Parazone, Firestorm, etc.) is major component of many peanut weed control programs. Because paraquat treatments cause significant crop injury, growers are often concerned about potential yield losses. Results from numerous irrigated, weed-free trials conducted over the past several years would suggest that GA-06G has adequate tolerance to paraquat. In this research, paraquat treated peanuts have yielded 97-99% of non-treated peanuts. Thus, yield losses caused by weeds greatly exceed any potential yield loss caused by paraquat.

Gramoxone SL 2.0 (paraquat) Tank Mixing Guidelines for 2014

Occasionally, there have been compatibility problems when tank-mixing Gramoxone SL2.0 with other agrichemicals. Consequently, Syngenta has developed the following guidelines for Gramoxone tank-mixes:

1) Fill spray tank 1/2 full with clean water or other approved carriers such as clear liquid fertilizer.

2) Begin tank agitation and continue throughout mixing and spraying.

3) Add nonionic surfactant to tank.

4) Add dry formulations (WP, DF, etc.) to tank.

5) Add liquid formulations (SC, EC, L, etc.) to tank.

6) Add Gramoxone SL 2.0 to tank.

7) Add crop oil concentrate or methylated seed oil where needed

8) Fill remainder of spray tank.

9) Always refer to labels of other pesticide products for mixing directions and precautions which may differ from those outlined above.

10) It is always advisable to perform a jar test to check physical compatibility.

Georgia-09B and Classic

In 2013, Georgia-09B was evaluated for tolerance to Classic (chlorimuron). When Classic was applied 74 days after emergence (DAE), peanut yields were reduced 5.3%. Applications of Classic at 60, 92, and 105 DAE had no effect on peanut yield.

Sicklepod Control

Over the past 2 years, peanut growers in Georgia have experienced more problems with sicklepod (a.k.a. coffeeweed). Sicklepod can be very troublesome to control in peanut for several reasons including the following: 1) sicklepod plants produce a large number of seeds

(25,000 seeds/plant); 2) sicklepod seed can remain viable in the soil for at least 5 years; and 3) none of the residual herbicides labeled for use in peanut provide adequate control. Growers who continue battling this weed should consider planting in twin rows and making a timely application of Cadre (***3" tall plants or less***). 2,4-DB can be used to slow down the growth of sicklepod but rarely will it provide complete control. As a last resort, Gramoxone (paraquat) can be applied in a Non-Selective Applicator (rope-wick, wiper, or sponge).

Tropical Spiderwort/Benghal Dayflower Control

Growers with tropical spiderwort/Benghal dayflower problems should consider the following control strategies:

1) Tillage (Moldboard plow)
2) Twin Rows
3) 2 residual applications of Dual Magnum
4) POST treatments of Gramoxone, Cadre, Strongarm, or Basagran where appropriate. Dual Magnum can be mixed with any of these POST herbicides.

Potential New Herbicides

The UGA Peanut Weed Science Team is evaluating several new herbicides for their potential use. These include ***Brake*** (fluridone), ***Fierce*** (pyroxasulfone + flumioxazin), ***Warrant*** (acetochlor) and ***Zidua*** (pyroxasulfone). Information about the tolerance/efficacy of these herbicides will be made available if/or when peanut registrations are near completion. For numerous reasons, some of these herbicides might not ever make it into the peanut market. Of these, Warrant is the herbicide most likely to receive a peanut registration in the near future. Generally, peanut tolerance to Warrant has been excellent and Warrant will be used in a fashion similar to Dual Magnum (i.e. tank-mixed with Gramoxone + Storm or Cadre). *As a reminder, it is illegal to use any herbicide in a non-registered crop!*

How Do the Top Georgia Peanut Growers Manage Weeds?

Survey results from the 2012 Georgia Peanut Achievement Club winners indicated the following production practices were used to manage weeds on their farms (*average peanut yields on these 10 farms was 6204 lb/A*):

- 10/10- irrigated
- 8/10 – bottom plow
- 10/10 – twin rows
- Herbicides:
    - **9/10 - Sonalan**
    - **10/10 - Valor**
    - 3/10 - Dual
    - **9/10 - Cadre**
    - 2/10 - 2,4-DB or Strongarm
    - 1/10 – Prowl