2016 PEANUT
UPDATE

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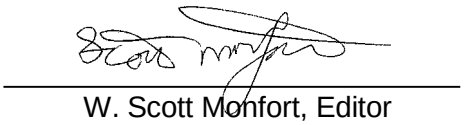
INTRODUCTION

The members of the University of Georgia Extension Peanut Team are pleased to present the 2016 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.



W. Scott Monfort, Editor

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La Nina May Bring Better Than Average Yields in 2016

Pam Knox, UGA Extension Climatologist

December 2015 ended with a deluge of moisture for much of the Southeast due to the impacts of El Nino and a persistent storm track. In those areas, farmers are faced with saturated soils that are not likely to dry out quickly over the winter. That will make winter field work difficult and may delay planting in some areas this spring. The biggest exception to the wet conditions is in southeast Georgia, where rainfall has been well below normal as the storm track has been locked in place over more northern areas.

For those of you who are tired of the exceptionally warm weather we had over Christmas, the good news is that January and February should be much closer to seasonal values, and some cold outbreaks are likely later in January and into February. While we can't predict winter precipitation far in advance, it seems likely that many areas will see some snow or ice before February is over.

While El Nino remains strong, most climatologists feel that it has peaked and that it is now ebbing towards neutral conditions. In five out of six past events, a strong El Nino was followed by the opposite phase, La Nina, which could occur by mid-summer if the most likely scenario takes place. Historically, La Nina summers and falls are generally dry across most of the Southeast, so soil moisture and rainfall could be scarce later in the summer. But La Nina is also associated with an increase in Atlantic tropical activity, so if a storm passes over your location, you could see a lot of rain in a short period of time.

You can see how La Nina affects peanut yields at http://agroclimate.org/tools/Regional-Yield-Maps/ and then click on Residuals and choose the La Nina phase. The maps show that a La Nina provides better yields than neutral years, so that is good news for peanut farmers going into next growing season.

2016 Peanut Outlook and Cost Analysis

Nathan B. Smith and Amanda R. Smith

Peanut Supply and Demand Highlights

- **Acreage Up Again for 2015** – Georgia increased plantings in 2015 by 32 percent to 790,000 acres. The U.S. planted acreage increased by 20 percent to 1.62 million acres. The acreage increase reflects lower relative prices of corn, cotton and soybeans and the ability to plant peanuts on generic base acres as part of the farm safety net outlined in the 2014 farm bill.

- **Yield Improved to Stable** – The average yield in Georgia is up 6.4 percent to 4,400 pounds per acre. The U.S. average yield is just shy of the 2014 average by one pound at 3,922 pounds per acre. The 2015 Georgia yield is the 2nd best on record. The U.S. average yield would have been higher had there not been significant flooding in South Carolina and dry weather in the Southwestern part of the peanut belt.

- **Total Use Grows** - Total use of peanuts was projected to be up from last year. Domestic use grew during the 2014/15 marketing year by 3.8% to 1.33 million tons led by peanut butter and use in other products.

- **Plenty of Peanuts to Carryover** – Stocks of peanuts carried over into the next marketing year are large as a result of increased acres and good yields the last two years. Production in 2015 exceeded consumption leading to 1,050,000-ton carryover on August 1, 2015.

- **Peanut Prices Expected Lower** – Average farmer stock prices settled around $415 per ton for runners in the Southeast and Georgia for 2014/15. Prices for 2016 are expected to be down around $370 per ton.

Peanut Supply Situation

A record peanut crop of 1.7 million tons is estimated for Georgia by the National Agricultural Statistics Service. Georgia growers planted 32 percent more acres and harvested 780,000 acres resulting in a 4,400 pound per acre average yield in 2015. Georgia's record large crop represents 54 percent of the total U.S. production. Growers cut back on cotton and corn planted acres to increase peanut acreage. The shift was noticeable in the Southeast (AL, FL, GA, MS) where each state increased peanut plantings leading to a 24 percent increase at 1.22 million acres. The Southeast pushed US plantings up by 20 percent to 1.62 million acres in 2015. While Georgia and Southeast yields are up overall, the Southwest and Virginia/Carolina region is down in 2015 resulting in about the same U.S. average yield as 2014 of 3,922 pounds per acre. This yield combined with the increase in acres has total U.S. production pegged at 3.16 million tons on 1.582 million harvested acres, up 22 percent from 2.6 million tons in 2014. The U.S. record for peanut production is 3.37 million tons harvested in 2012. The 2015 production estimate could end up closer to 3 million tons due to the flood losses in South Carolina, which could drop production by 100,000 tons or more.

Peanut Use Situation

Total peanut use for the 2014/15 crop is estimated to have ended below the previous year. Seed use increased so the residual category is the source of total use dropping by 70,000 tons to 2.518 million tons. The 2015 marketing year began on August 1st and shelled edible use is up over 4 percent for the first three months with snacks leading the way. The 2015/16 peanut marketing year is projected to total 2.8 million tons, an increase of 11.5 percent. Domestic use is projected to increase 4.6 percent to 1.54 million tons. Exports are projected to increase 5 percent from last year's 540,000 tons. However, early indications are that exports will hold steady. With the larger crop, crush is projected to rise 17 percent to 790,000 tons.

2016 Forecast

A record carryover of peanut stocks is projected for 2016. The current record is 1.385 million tons from the 2012 crop. Edible use increases appear to be shifting from peanut butter to snack peanuts, likely due to the surplus from 2015. A new record carryover of 1.45 million tons is projected by USDA but it likely will be less than the 2012 record given lower production in South Carolina. Peanut grade inspections also indicate a trend of lower yields than expected so the big crop could shrink with the final crop size reported in January.

The 2016 outlook faces a large surplus of peanuts and low prices for peanuts and other crops. Georgia growers can expect prices below $400 per ton, likely $375-$385 range. Uncertainty surrounds contracts for 2016 as producers will be concerned about the issue of beneficial interest in respect to redeeming loans when there is a market loan gain (MLG) or loan deficiency payment (LDP). Growers may be wary of signing a contract at low prices if they are at risk of MLGs and LDPs counting against their peanut payment limit and reducing their PLC payment. Ninety nine percent of peanut base acres elected the Price Loss Coverage (PLC) program. The 2014 PLC payment rate ended up at $95 per ton and adjusting for the 85 percent payment factor and 6.8 percent sequestration, the payment per base acre was $75.26 per ton. The PLC payment for the 2015 crop should be higher as prices for 2015 peanuts were lower. Current U.S. average market price is about $400 per ton which would result in $140 per ton payment rate.

Peanut acres need to be reduced in 2016 from a supply and rotation standpoint. Warehouse space will be a major concern in the Southeast. Growers who plant peanuts without a contract could risk not having a "home" to store loan peanuts if there is not enough warehouse space. There could be 600,000 tons of 2015 peanuts in storage at harvest time creating a shortage of space. Rotations will be shortened if adjustments are not made in 2016 impacting the yield prospects in the longer run. Planting decisions will be more difficult due to the low price, surplus supply situation, and growers facing a cash flow challenge in 2016. The PLC program will help, but growers need to look at planting acreage that result in the optimum price when considering rotation, payment limits and the PLC payments.

2016 Cost and Returns Potential

Peanut production costs are projected to be less than 2015 due to lower seed, energy, and fertilizer costs. Cost of seed is projected at 70 cents per pound as an average. Certified non-hi oleic seed is expected to be 67 cents per pound. Three cents is added for the carry charge or finance charge for paying at harvest. Equipment costs show a two percent rise for 2016. Crop comparison estimates are given below in the crop comparison Table 1 and Table 2. The budgeted yield for non-irrigated peanuts is 3,400 pounds per acre and 4,700 pounds per acre for irrigated practice. The budgets are posted at www.uga.agecon.edu/extension and 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 a guideline as individual operations and local input prices will 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 $370 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 2016 on dryland acres and second best on irrigated. 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	$370	3400	$521	$109
Cotton	$0.70	750	$446	$79
Corn	$4.25	85	$296	$65
Sorghum	$3.95	65	$200	$57
Soybean	$8.60	30	$219	$39

2016 University of Georgia cost enterprise budgets.

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

	Expected Price	**Expected Yield**	**Variable Cost***	**Return Above VC**
Peanut	$370	4700	$601	$268
Cotton	$0.70	1200	$550	$290
Corn	$4.25	200	$593	$257
Sorghum	$3.95	100	$302	$93
Soybean	$8.60	60	$281	$235

2016 University of Georgia 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.

Another factor in the planting decision on about 1.5 million acres in Georgia is the 2014 Farm Bill. This is roughly how many generic base acres are in Georgia. The generic base acres can be temporarily assigned to a covered commodity base if planted to the covered commodity. There are 21 covered commodities including corn, grain sorghum, peanuts, soybeans and wheat. Other small grains and oilseeds are included such as canola, barley, oats, sunflowers and sesame. Each of these crops with the exception of oats has a good possibility of triggering a payment in 2016. Peanuts could have a $140 per ton PLC payment. This may encourage more peanuts to be planted than the market is calling for. The worry is overplanting peanuts in Georgia and abandoning three and four year rotations. Looking at recent planted acres in Georgia, the major row crops of corn, peanuts, sorghum, soybeans and wheat average 1.5 million acres over the last five years. The average mix shows 375,000 acres of corn, 560,000 acres of peanut, 50,000 acres of grain sorghum, 235,000 acres of soybeans, and 285,000 acres of wheat totaling 1.5 million acres. This would cover the generic base but the mix will swing toward more peanuts and less corn and wheat given cost and returns outlook. However, corn, grain sorghum, soybeans and wheat are expected to trigger program payments under ARC-CO in 2016. This will hopefully limit some of the incentive to overplant peanuts.

PEANUT CULTIVAR OPTIONS FOR 2016

W. Scott Monfort

Cultivar selection is one of the most important decisions you will make for 2016. With peanut acres likely to remain elevated due to the structure of the current farm bill and suppressed prices of other commodities, growers need to take several things into account before selecting a cultivar such as yield and grade potential, **rotation, field history for diseases and nematodes**, irrigated/non- irrigated, high oleic contract premiums, and maturity. The cultivars commercially available this year are: Georgia-06G, Georgia Greener, Georgia-14N, Georgia-13M, Georgia-12Y, Georgia-09B, Tifguard, Florida-07, FloRun™ '107', TUFRunner™ '727', and TUFRunner™ '511'. Like the last few years, a majority of the peanut acreage produced for seed was planted in Georgia-06G. Seed supply for all other cultivars will be limited.

Based on the figures from the Georgia Crop Improvement Association, the largest percentage of acreage planted (90%) in 2014 for seed production was Georgia-06G (Table 1 below) followed by Tifguard, Georgia-09B, FloRunTM '107', and Georgia-13M at 3.4, 2.1, 1.6 and 1.2%, respectively. The table below provides the acreage planted in 2014 in Georgia for Foundation, Registered, and Certified seed supply in 2015.

Table 1. Acreage Planted in Georgia in 2015 to produce Foundation, Registered, and Certified Seed for 2016 (Source: Georgia Crop Improvement Association).

Cultivar	Acreage	% of Acreage
Georgia-06G	125,033.2	83
Georgia Greener	45	<1
Tifguard	4818.61	3.4
Georgia-09B	2991.2	2.1
Georgia-12Y	639.5	<1
Georgia-14N	633.9	<1
Georgia-04S	61	<1
Georgia-13M	1695.16	1.2
TIFNV-High O/L	2	<1
Florida-07	443	<1
TUFRunner™ '511'	851	<1
TUFRunner™ '727'		<1
FloRun™ '107'	651	1.6
ACI 236	65	<1
ACI 808	307	<1
ACI 883	35	<1
other	92	<1
TOTAL	138,437.49	

For the most part, cultivar selection has been an easy decision over the last few years (Georgia - 06G). Very few cultivars have made their mark like Georgia-06G in overall performance until recently. Growers now have more choices of high yielding and disease resistant cultivars including high oleic cultivars from which to select. For the second year, Georgia-12Y has performed remarkably well compared to Georgia-06G in high pressure white mold fields. Georgia-12Y is one of the first runner cultivars released with superior resistance to both white mold and TSWV compared to other previously released runners, and is available for limited acres in 2016. Please remember based on trials conducted by Bob Kemerait and Tim Brenneman, Georgia-12Y is more susceptible to Rhizoctonia Limb Rot. For the growers interested in producing High Oleic cultivars, there are several cultivars performing very similarly to Georgia-06G. Like with Georgia-12Y, some of the new cultivars may be more susceptible to select diseases than Georgia-06. For example, Georgia-13M and TUFRunnerTM '511' were noted to be more susceptible to leafspot than Georgia 06G. Please refer to the **Peanut Rx Section** below for more information on disease risk for all of the available cultivars.

Another factor that may be important to consider in 2015 as crop prices continue to be suppressed is seed size. In the last 5 to 7 years, seed size of the popular cultivars have increased causing growers to plant in excess of 150 pounds per acre compared to that of Georgia Green at 110 pound per acre to get the same 6 seed per foot. The good news is seed size has decreased in many of the newer cultivars available in 2015 allowing growers a chance to trim some their input costs (Table 2).

Table 2. Average Seed Per Pound for Statewide Variety Testing Trials in Tifton, GA in 2015.

Cultivar	Seed Per Pound	Pounds Seed/A to Plant 6 Seed Per Foot
Georgia-06G	669	130.2
Georgia Greener	679	128.3
Tifguard	610	142.8
Georgia-09B	684	127.4
Georgia-12Y	712	122.4
Georgia-14N	845	103.1
Georgia-13M	718	121.3
TIFNV-High O/L	670	130.0
Florida-07	667	130.6
TUFRunner™ '727'	660	132.0
TUFRunner™ '511'	596	146.2
FloRun™ '107'	709	122.9

Maturity range is also an important attribute to consider while selecting a cultivar. Georgia Greener, Georgia-06G, and Tifguard have what we call the "normal" or medium maturity range of approximately 135-140 days after planting. Georgia 14N, Georgia-13M, Georgia-12Y, Florida-07, and TUFRunnerTM '727', and TUFRunnerTM '511' all mature about 7-14 days later than Georgia Greener. Knowing and understanding maturity in 2016 will be extremely important with an increase in acres and a potentially expanded planting window.

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, Georgia. 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-12Y" is a new 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, Georgia. 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.

"GEORGIA-14N" is a new high-yielding, high-oleic, TSWV-resistant, RKN-resistant, small-seeded, runner-type peanut variety that was released by the Georgia Agricultural Experiment Station in 2014. It was developed at the University of Georgia, Coastal Plain Experiment Station, Tifton, Georgia. During three-years averaged over multiple location tests in Georgia, Georgia-14N had significantly less TSWV and total disease incidence, higher yield, grade, and dollar value return per acre compared to Tifguard. Georgia-14N was also found to have a smaller runner seed size as compared to the larger runner-type check cultivar, Tifguard. Georgia-14N combines high-yield, TSWV-resistance and RKN-resistance with smaller seed size 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 11 RUNNER-TYPE PEANUT VARIETIES ACROSS MULTI-LOCATIONS IN GEORGIA, 2013-15.

Runner	Gross Dollar Values ($/a)			3-Yr
Variety	2013	2014	2015	Mean
*Georgia-13M	1036	824	1072	974
Georgia-12Y	1001	876	1022	964
Georgia-06G	969	862	1070	963
Georgia-07W	961	824	1008	928
*Georgia-09B	909	824	1058	926
*TUFRunner™ '727'	929	816	980	906
*Georgia-14N	915	817	965	896
Georgia Greener	882	803	995	890
*Florida-07	898	784	950	874
*FloRun™ '107'	855	799	942	863
Tifguard	836	760	945	844

* High-Oleic Varieties

Table 2. THREE-YEAR AVERAGE YIELD (LB/A) OF 11 RUNNER-TYPE PEANUT VARIETIES UNDER IRRIGATION AND NONIRRIGATION AT MULTI-LOCATIONS IN GEORGIA, 2013-15.

Runner	Tifton		Plains		Midville	
Variety	Irrig.	Nonirrig.	Irrig.	Nonirrig.	Irrig.	Nonirrig.
Georgia-13M	5548	5353	5733	5187	6778	4561
Georgia-12Y	6061	5572	5918	4620	6665	4830
Georgia-06G	5621	5579	6042	4818	6269	4320
Georgia-07W	5644	5248	5208	5107	6180	4235
Georgia-09B	5591	4669	6054	4860	6756	4138
TUFRunner ™ '727'	5324	5242	5353	4909	6482	4661
Georgia-14N	4944	5131	5292	4802	6244	4318
Georgia Greener	5521	5166	5449	4673	5895	3874
Florida-07	5313	4976	5445	4822	6437	4534
FloRun™ '107'	5469	4862	5341	4505	6088	4173
Tifguard	5331	4834	5214	4594	6075	4206

Table 3. THREE-YEAR (30-TESTS) AVERAGE DISEASE INCIDENCE, POD YIELD, TSMK GRADE, SEED COUNT, AND DOLLAR VALUES OF TWELVE RUNNER-TYPE PEANUT VARIETIES AT MULTI-LOCATIONS IN GEORGIA, 2012-14.

Runner Variety	TSWV (%)	TD (%)	Yield (lb/a)	TSMK (%)	Seed (no./lb)	Value ($/a)
Georgia-12Y	3	8	5280	73	700	941
Georgia-06G	3	8	5095	75	624	935
*Georgia-13M	3	8	5140	74	800	935
Georgia-07W	4	9	4952	75	636	909
*Georgia-14N	3	9	4687	76	787	874
*Georgia-09B	5	13	4770	75	685	870
Georgia-10T	4	8	4645	77	673	869
Georgia Greener	4	10	4729	75	676	865
*TUFRunner™ '727'	12	24	4755	73	634	856
*Florida-07	10	20	4864	71	614	846
*FloRun™ '107'	10	22	4648	73	688	835
Tifguard	7	13	4496	73	620	806

* High-Oleic

Peanut Rotations Update

R. Scott Tubbs and W. Scott Monfort

Peanut acreage in Georgia has been highly variable since 2005 (Table 1). Just within the three most recent growing seasons, we have seen the highest acreage over the last 25 years (790,000 in 2015) and the lowest acreage over the last 90 years (430,000 in 2013). The fluctuations have been extreme, such as a 55% increase in acreage from 2011 to 2012, followed immediately by a 41% decrease in acreage the very next year, only to rebound by 40% in 2014, and an additional 32% increase into 2015. These large variations are often driven by supply (and demand), and influenced greatly by price. It is not only the price of peanut, but the price of potential alternative crops that affects what is planted. Peanut has had a better potential for cash flow in recent years, partially due to interpretations of the current Farm Bill, and also because of improved yield potential increasing average production per acre (state average yield from 2012-2015 = 4390 lb/ac; state average yield from 2008-2011 = 3530 lb/ac; state average yield from 2004-2007 = 2930 lb/ac).

Acreage is expected to decrease nominally, but not drastically heading into the 2016 growing season. With a large carryover supply that does not match with current demand and usage, prices will continue to be suppressed. Average price per ton of peanuts in 2014 was below $400 per ton for the first time since 2006, with 2015 value still pending at time of publication (according to USDA-NASS data). Continued large-scale production will not only affect price, but will also put stress on yield and grade factors, further reducing net revenue potential in the long-run.

The ratio of legume row crops to non-legume row crops can sustain the recommended 3-year rotation between legume crops when the ration remains around 0.50. However, when that ratio increases closer to 1.0, it is impossible to keep the recommended rotation length on a large proportion of the peanut crop. The ratio in 2015 was 0.77 (Table 2), which suggests that on average, only about half of the peanut acres in the state can continue in a 3-year rotation, while the other half will be forced into a 2-year rotation. If this ratio stays high for several consecutive years, it becomes even more difficult to find land suitable for good rotation practices, and peanut pest pressures increase substantially. It is predicted that the ratio in 2016 will remain considerably higher than 0.50. The last time the ratio remained elevated above this level for two consecutive years was in 2008-2009. The extent of how that affected peanut production is difficult to predict, although it can be noted that once the ratio leveled out and had a chance to rebound after the 2010-2011 seasons, that was when yield records skyrocketed to unprecedented levels. If the combined peanut + soybean acreage in Georgia stays close to the combined cotton + corn acreage, it could cause an unbalance in future rotations for peanut. When an unbalance occurs and peanut is planted on shorter rotations, an increase in pest incidence can threaten yield potential and put pressure on methods of pest suppression, including genetic resistance and chemical modes of action. Loss of either genetic resistance or certain classes of fungicides, herbicides, or insecticides could be devastating to peanut production.

Table 1. Planted acreage in Georgia for major row crops, 2005-2015.

	Peanut	Cotton	Corn	Soybean
Year	---------- Planted Acres x 1,000 ----------			
2005	755	1,220	270	180
2006	580	1,400	280	155
2007	530	1,030	510	295
2008	690	940	370	430
2009	510	1,000	420	470
2010	565	1,330	295	270
2011	475	1,600	345	155
2012	735	1,290	345	220
2013	430	1,370	510	235
2014	600	1,380	350	300
2015	790	1,120	330	330

Source: USDA – National Agricultural Statistics Service

Table 2. Combined planted acreage in Georgia for leguminous (peanut and soybean) and non-leguminous (cotton and corn) row crops, 2005-2015.

	Peanut + Soybean	Cotton + Corn	Ratio
Year	Planted Acres x 1,000		
2005	935	1,490	0.63
2006	735	1,680	0.44
2007	825	1,540	0.54
2008	1,120	1,310	0.85
2009	980	1,420	0.69
2010	835	1,625	0.51
2011	630	1,945	0.32
2012	955	1,635	0.58
2013	665	1,880	0.35
2014	900	1,730	0.52
2015	1,120	1,450	0.77

Source: USDA – National Agricultural Statistics Service

Research from Tifton crop rotation experiments were presented in the 2015 edition of the Peanut Update. A brief recap of those results included average yields as follows:

2013 Tifton
Continuous peanut = 2671 lb/ac
Average of 2 YR rotations = 4588 lb/ac
Average of 3 YR rotations = 4836 lb/ac
Average of 4 YR rotations = 4904 lb/ac

2014 Tifton
Continuous peanut = 3507 lb/ac
Average of 2 YR rotations = 5333 lb/ac
Average of 3 YR rotations = 6006 lb/ac
Average of 4 YR rotations = 5970 lb/ac

In both cycles, the continuous peanut rotation resulted in the lowest yield, and highest incidence of leaf spot in 2013 and root-knot nematode in 2014 were observed in continuous peanut plots.

A separate rotation experiment was conducted in Attapulgus, GA comparing continuous peanut with 2, 3, 4, or 5-year rotations of peanut with cotton grown in the years between peanut. Average yield for this cycle of data was:

2014 Attapulgus
Continuous peanut = 5489 lb/ac
2 YR rotation = 5627 lb/ac
3 YR rotation = 5675 lb/ac
4 YR rotation = 6308 lb/ac
5 YR rotation = 5924 lb/ac

The 4-year rotation had significantly better yield than all other rotations. The 5-year rotation was likewise significantly better than continuous peanut. There was also an improvement in grade (78.5% total sound mature kernels [TSMK]) in the 4-year rotation than the other rotations, which were all less than 78.0% on average (data not shown).

In summary, rotation is still a vital component of any cropping system strategy for long-term peanut yield goals and keeping pest incidence under control. The UGA extension recommendation for a minimum of a 3-year rotation is validated with the most recent rotation data presented here, and the data from one experiment supports a 4-year rotation for best results. Exercise caution when planning for peanut planting in 2016, and adhere to traditional row crop rotations including corn and cotton, with a minimum of two of these crops between the next planting of peanut. If you are considering planting a field to peanut that was planted to peanut in either 2014 or 2015, it is strongly recommended that you investigate other alternatives for the sake of long-term production goals, keeping pest pressure at a minimum, and relieving stress on pesticide modes-of-action so resistance does not develop.

2016 PEANUT IRRIGATION UPDATE

Wesley M. Porter

Weather Conditions

Weather conditions from year to year are variable, can be difficult to plan for, and have a large impact on crop growth, development, and yield. So we must find ways to adapt to changing conditions and manage our crop to these conditions. 2014 was a prime example of variable weather conditions, we had a very wet early season. This was good to build soil moisture, but heavy rains in late April and early May caused split plantings in the peanut crop. This is a major problem because the crop had to be managed for two maturity levels. Then later in the season the rain amounts were greatly reduced and dryland crops suffered tremendously. However, the 2015 season brought the opposite in many regions of the state. While there were areas throughout the state of sporadic drought, overall more than ample rainfall throughout the season was received. At my research site near Camilla, GA the weather station reported 22.65 inches of rain from May 18 until October 12, or the time from planting until harvest on these peanut plots. Based on the UGA Peanut Production guide, peanut only requires 23 inches of water for production. This main goal of this update is to discuss how to manage irrigation in varied weather conditions from year to year.

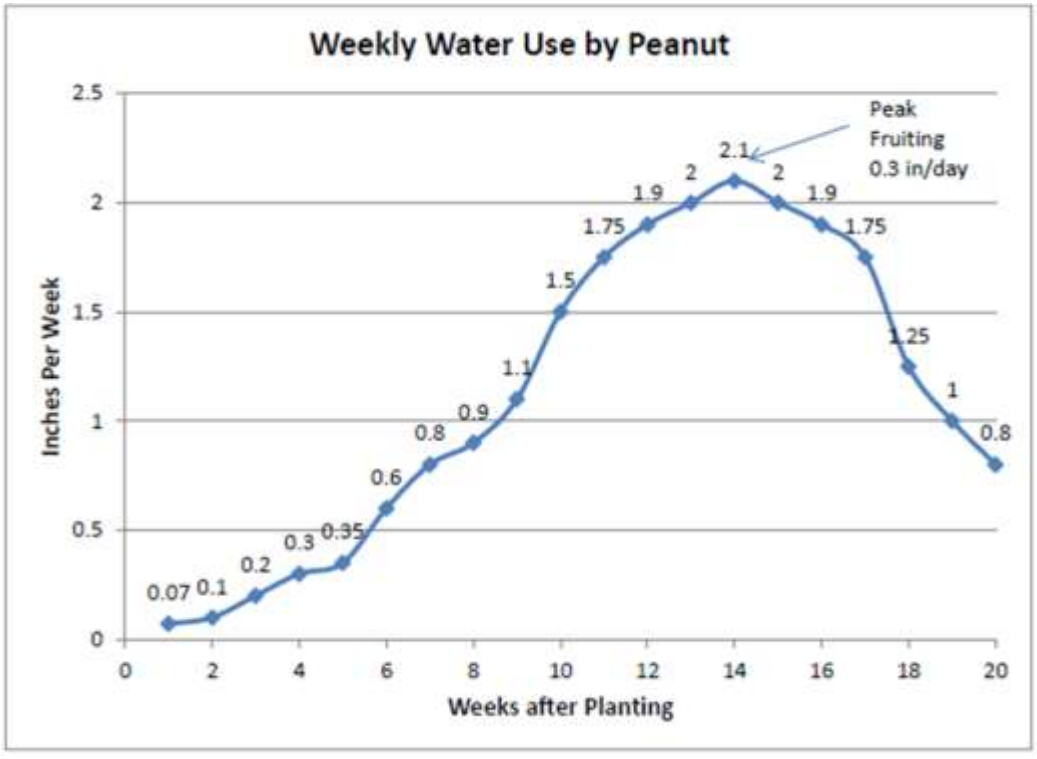

Figure 1. Water Use of Peanut by Week

Figure 1 is a water use curve developed in Georgia years ago, which follows crop growth as a function of weeks after planting. The total estimated water requirement based on this crop growth curve is 23 inches. This curve is commonly known as the UGA Checkbook Irrigation

scheduling method. It was developed based on historical evapotranspiration estimations over a number of years and is typically a very conservative method, (meaning it will typically "over-water") when compared to the actual crop requirement. However, in most cases the penalty for under-irrigating is typically more detrimental than the penalty for over-irrigating.

Irrigation Scheduling

There are many options available to producers to determine when and how much to irrigate their peanuts. Some of these methods include the UGA Checkbook method, the UGA Easypan, online scheduling tools, and soil and/or crop sensors. The UGA Checkbook Method follows Figure 1 from above and it is up to the producer to monitor rainfall, and subtract that amount from the total amount required by the crop for each week. The total amount required minus rainfall would be the crop requirement.

The UGA Easypan, (http://extension.uga.edu/publications/detail.cfm?number=B1201) is a simple cheap method to estimate in field evapotranspiration. The above link provides a factsheet with detailed information on construction and use of the UGA Easypan. There are online scheduling tools available two such tools that work very well in both GA and FL are the USDA's IrrigatorPro (http://irrigatorpro.org/farm/) and University of Florida's UF PeanutFarm (http://agronomy.ifas.ufl.edu/peanutfarm/). Both methods use local weather stations to estimate peanut maturity through growing degree day models, track rainfall and evapotranspiration, and estimate irrigation requirements. IrrigatorPro even has an option of incorporating either soil temperature or Watermark soil moisture sensors with its irrigation model to better refine irrigation estimations. More advanced irrigation scheduling methods include soil and plant sensors. For example in a research trial I performed this past season I used two different sensor platforms the UGA Smart Sensor Array (UGA SSA), which uses Irrometer's Watermark sensors, and SmartField's SmartCrop canopy temperature sensors. There are a wide variety of sensor options that would be easily integrated into a producers practice. Any method is based on the producer's comfort level with technology and irrigation management.

Irrigation Scheduling Trial at Stripling Irrigation Research Park in Camilla, GA.

I have now completed two years of irrigation scheduling trials at Stripling Irrigation Research Park (SIRP) which compared seven different irrigation scheduling methods to dryland or rain-fed produced peanut. The treatments tested were UGA SSA, SmartCrop utilizing a Crop Water Stress Index (CWSI), UGA Checkbook, UGA EasyPan, UF PeanutFarm, IrrigatorPro, 50% UGA Checkbook, and dryland. Each of these methods can be employed by producers in Georgia and are relatively easy to use and determine irrigation requirements. In a similar trial during 2015 tillage methods and irrigation scheduling were also compared. Both conventional and strip tillage methods were used in combination with UGA SSA, UF PeanutFarm, UGA Checkbook, UGA EasyPan.

Irrigation Scheduling Results

Just as a quick refresher of where we stood last year, let's quickly revisit a relatively dry production year. Table 1 contains the mean yields listed by irrigation scheduling treatment. There were slight variations based on each of the treatments tested, but the more definitive differences were between the scheduling treatments, thus those are what are shown.

Table 1. Mean Results from all varieties tested in 2014.

Irrigation Scheduling Treatment Differences			
Irrigation Treatment	Rainfall (in.)	Irrigation Amount (in.)	Yield (lbs/ac)
Dryland	12.33	0.40	465.2
UGA SSA	12.33	9.40	6052.3
SmartCrop	12.33	6.40	5642.0
UGA EasyPan	12.33	11.65	5725.0
UGA Checkbook	12.33	15.02	5025.5
UF Peanut Farm	12.33	7.90	4802.5

As you can see in 2014 when less than half the amount of required rainfall was received, even a very conservative methods such as the UGA Checkbook did not seem to perform as well as more advanced methods, even with the addition of 75% more irrigation applied. 2014 was a very good year to encourage the utilization of irrigation, especially since the dryland yield was basically equivalent to 0 due to the weight being comprised mainly of immatures.
During 2015 22.65 inches of rainfall was received on both research trials, they were both planted on May 18, dug on October 5 and harvested on October 12. Table 2 shows the irrigation scheduling treatment mean plot results (all variety yields were averaged by irrigation scheduling treatment).

Table 2. Mean Irrigation Scheduling Results 2015.

Irrigation Scheduling Treatment Differences			
Irrigation Treatment	Irrigation Amount (in.)	Total Water (in.)	Yield (lbs/ac)
Dryland	0.5	23.30	5193.6
UGA SSA	4.45	27.25	5478.6
SmartCrop CWSI	3.55	26.35	5172.8
UGA Checkbook	12.50	35.30	5313.4
UGA EasyPan	5.20	28.00	5404.9
UF PeanutFarm	5.20	28.00	5327.3
IrrigatorPro	2.80	25.60	5542.6
50% Checkbook	6.76	29.56	5176.1

As can be seen from Table 2, there were no major differences between irrigation scheduling treatment during 2015, and what we could call a wet year. IrrigatorPro was the highest yielding trial with the UGA SSA a close second. It should be noted that the version of IrrigatorPro used for this trial incorporated Watermark soil moisture sensors thus was operated very similar to the UGA SSA treatment. It should be noted that even though the UGA Checkbook method yielded very well during 2015, it also applied three to four times more irrigation than did the most of the other irrigation scheduling treatments which used a sensor.
It is also important to note that irrigation pumping cost for 2015 can be estimated in the range of $6/ac-inch for electric and $12/ac-inch for diesel, thus the additional 9 inches of irrigation applied by the UGA Checkbook over that of IrrigatorPro would have cost in the range of $54 to $108 per acre just to pump this additional water. Even if we assume since there is no statistical difference that the yields between the two treatments were the same, this is a significant input cost for no additional gain.

The yield differences between tillage methods of the two trials was not significant when only evaluating tillage method, the conservation or strip-tillage treatment had 7.14 inches of irrigation applied on average across treatments and yielded 4737.3 lbs/ac, while the conventional tillage

treatment had 6.95 inches of irrigation applied on average across treatments and yielded 4804.4 lbs/ac. The conservation tillage plots have been in a strip tillage treatment for multiple years, thus there should be not residual treatment effect. This shows that there is little to no agronomic benefit to planting in a conventional tillage scenario.

Table 3. Conventional versus strip tillage irrigation treatment differences.

Irrigation Scheduling Differences Conventional vs. Strip Tillage 2015			
Irrigation Treatment	Irrigation Amount (in.)	Total Water (in.)	Yield (lb/ac)
Dryland	0.50	23.15	4800.3
UGA SSA-Strip	5.00	27.65	4639.1
UGA SSA-Con.	4.25	26.90	4721.2
PeanutFarm-Strip	5.75	28.40	4766.8
PeanutFarm-Con.	5.75	28.40	5069.5
Checkbook-Strip	12.05	34.70	4563.8
Checkbook-Con.	12.05	34.70	4611.6
EasyPan-Strip	5.75	28.40	4916.6
EasyPan-Con.	5.75	28.40	4815.4

Based on the irrigation scheduling method, typically the conventional tillage plots yielded higher than the strip-tilled plots. Overall, there were no significant yield differences between tillage or irrigation scheduling method. Similar to the other trial the largest difference was between the UGA Checkbook method and other scheduling methods. On average the UGA Checkbook required double the amount of irrigation compared to the other treatments, but had the lowest numerical yields. As implied in the other scheduling trial, this additional irrigation required increased input costs with no additional benefit.

As represented in Tables 4-7 some varieties performed better than others based on the irrigation scheduling method utilized. In general an irrigation scheduling treatment that included a sensor typically was the highest yielder. By evaluating the total yield, the varieties ranked as follows: GA-06G, TUFRunner-511, TUFRunner-727, GA-12Y. However, these differences are not significant. The excessive amount of rainfall during the 2015 production season masked yield differences from irrigation scheduling treatments very well.

Table 4. GA-06G Irrigation Scheduling Results 2015.

Irrigation Scheduling Treatment Differences			
Irrigation Treatment	Irrigation Amount (in.)	Total Water (in.)	Yield (lbs/ac)
Dryland	0.5	23.30	5268.7
UGA SSA	4.45	27.25	5700.2
SmartCrop CWSI	3.55	26.35	5729.7
UGA Checkbook	12.50	35.30	5829.1
UGA EasyPan	5.20	28.00	5769.8
UF PeanutFarm	5.20	28.00	5533.1
IrrigatorPro	2.80	25.60	5439.9
50% Checkbook	6.76	29.56	5937.0

Table 5. GA-12Y Irrigation Scheduling Results 2015.

Irrigation Scheduling Treatment Differences			
Irrigation Treatment	Irrigation Amount (in.)	Total Water (in.)	Yield (lbs/ac)
Dryland	0.5	23.30	5030.1
UGA SSA	4.45	27.25	5829.3
SmartCrop CWSI	3.55	26.35	5076.9
UGA Checkbook	12.50	35.30	4879.4
UGA EasyPan	5.20	28.00	5456.1
UF PeanutFarm	5.20	28.00	5456.1
IrrigatorPro	2.80	25.60	5620.9
50% Checkbook	6.76	29.56	4479.1

Table 6. TUFRunner-511 Irrigation Scheduling Results 2015.

Irrigation Scheduling Treatment Differences			
Irrigation Treatment	Irrigation Amount (in.)	Total Water (in.)	Yield (lbs/ac)
Dryland	0.5	23.30	4868.3
UGA SSA	4.45	27.25	5632.4
SmartCrop CWSI	3.55	26.35	5236.3
UGA Checkbook	12.50	35.30	5300.7
UGA EasyPan	5.20	28.00	5449.3
UF PeanutFarm	5.20	28.00	5189.5
IrrigatorPro	2.80	25.60	6213.3
50% Checkbook	6.76	29.56	5245.8

Table 7. TUFRunner-727 Irrigation Scheduling Results 2015.

Irrigation Scheduling Treatment Differences			
Irrigation Treatment	Irrigation Amount (in.)	Total Water (in.)	Yield (lbs/ac)
Dryland	0.5	23.30	5268.7
UGA SSA	4.45	27.25	4752.6
SmartCrop CWSI	3.55	26.35	5148.4
UGA Checkbook	12.50	35.30	5626.5
UGA EasyPan	5.20	28.00	5033.0
UF PeanutFarm	5.20	28.00	5467.1
IrrigatorPro	2.80	25.60	5156.6
50% Checkbook	6.76	29.56	5442.4

Conclusions and Recommendations

The 2015 production season near Camilla, GA can be considered a very wet production year. The dryland treatment yielded similar to any of the irrigation scheduling treatments in most of the trials. This implies that irrigation was not necessarily required during 2015, especially, if like in Camilla, over 20 inches of rain was received. However, what is still important from the data is that the amount of applied irrigation between treatments is significantly different. Based on these results I would suggest that from a profitability standpoint, that irrigation scheduling is just as critical during wet years as it is during dry years. During a dry year over irrigating seemed to reduce yield potential, while on average there were lower yields during 2015 than 2014, over-irrigating did not seem to have the detrimental effect as it did during 2014. Perhaps the overall lower yields during 2015 were a result of the excessive amount of rainfall. This is not certain at this point however. But, what is certain is that profit will be reduced by over irrigating in either a dry or a wet year. Yields were not reduced in 2015 from using the UGA Checkbook method compared to more advanced methods, but profitability was reduced by the addition cost of pumping irrigation water to the crop when it was not required.

Clear differences between varieties were not represented during 2015, thus, in a year of plentiful rainfall it variety selection does not seem as critical. It is strongly suggested that producers implement some sort of irrigation scheduling strategy beyond a checkbook, or historical evapotranspiration replacement method. There are free methods such as UF PeanutFarm and IrrigatorPro that perform very well and do a great job at estimating irrigation timing and requirements. There are benefits from employing more advanced methods that include sensors, in both wet and dry years.

Peanut Disease Management Update

Bob Kemerait, Tim Brenneman, and Albert Culbreath

The objective of this section is to provide growers both with a primer for the management of diseases and nematodes affecting the peanut crop and to update recommendations for 2016 based upon developments over the past season.

El Niño of 2015-2016: Weather has a huge impact on diseases affecting the peanut crop. Beginning late in 2015 and continuing into 2016, the "El Niño" phenomenon has had a tremendous impact on weather in the southeastern US. It is unclear how long weather will be impacted into 2016; however conditions cooler and wetter than normal at planting would increase the risk of Cylindrocladium black rot (CBR) and some seedling diseases. Wetter conditions could also delay planting and make applications of a fumigant like Telone II more troublesome. Growers are encouraged to include weather forecasts into their pre-season planning and to incorporate appropriate management strategies to insure protection from diseases and nematodes.

Tools for management of diseases and nematodes new (or relatively new) for 2016 will include:

Peanut Rx Smartphone app: The Peanut Rx app (available for free as "Peanut Rx" at the iTunes APP Store and "UGA Peanut Rx" at GOOGLE PALY) will be completely updated for 2016 as will the prescription fungicide programs.

Priaxor fungicide (BASF, premix of SDHI/fluxapyroxad and strobilurin/pyraclostrobin fungicides). Priaxor will typically be used twice in a cropping season; early (~ 45 days after planting) at 6 fl oz/A to initiate a strong leaf spot program and then again on the third spray (~ 74 DAP) for leaf spot and soilborne disease control. Fungicides like Convoy, Artisan and tebuconazole are among fungicides recommended to compliment soilborne disease control.

Elatus fungicide (Syngenta, premix of SDHI/solatenol and strobilurin/azoxystrobin fungicides). Elatus is likely to be used twice (~60 and 90 DAP) for management of soilborne and foliar diseases.

Velum Total nematicide/thrips (Bayer CropScience, premix of SDHI/fluopyram and imidacloprid for nematode and thrips control) Velum Total (16-18 fl oz/A) will be applied in-furrow at planting for management of nematodes affecting peanuts. In numerous field trials, Velum Total at 18 fl oz/A has performed as Temik (10 lb/A) for management of nematodes. Velum Total can be mixed with fungicides for use in-furrow and for in-furrow applications of Rhizobium inoculants

'Georgia-12Y' peanut variety: good resistance to tomato spotted wilt and leaf spot; very good resistance to white mold. Georgia-12Y may have increased susceptibility to Rhizoctonia limb.

'Georgia-14N' peanut variety: limited seed availability in 2016; very high resistance to the peanut root-knot nematode as well as very good resistance to tomato spotted wilt, leaf spot and white mold.

NOTE: Disease information on other varieties can be found in the "**Peanut Rx**" section of the 2016 Peanut Update.

Note: Recommendations for use of specific fungicides follows introductory sections on disease and nematode management for 2016 in this chapter.

Fundamentals for disease and nematode management in 2016

1. **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.

2. 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 2016 Peanut Update**), selection of cost-effective fungicide and nematicide programs, and other factors that are a part of an overall integrated pest management program.

3. **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.

4. 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.

5. Management of white mold is often difficult and requires integration of crop rotation, resistant varieties (if available) and fungicides. Timing of fungicide applications is becoming ever-more important. For example, a banded early-season application of a fungicide like Proline (3-5 weeks after planting) can be an important addition to white mold program. It is becoming increasingly clear that white mold control can be very difficult in a non-irrigated field, as irrigation and/or rainfall is important for translocating the fungicide to the crown of the plant.

6. Management of root-knot can be difficult, especially since the loss of Temik 15G. In fields with high nematode populations the resistant cultivars (Tifguard, Georgia-14N) are strongly recommended, and they do not require the use of a nematicide. However, with low to moderate populations, growers can also consider using nematicides such as Velum Total and/or Telone, and still plant susceptible cultivars such as GA-06G.

Highlights from 2015 and notes for 2016.

1. **Tomato Spotted Wilt.** Losses to tomato spotted wilt in 2015 were estimated to be 3%; the same as in 2014. 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 had been in decline until 2014, 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. **White Mold.** 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 2016 Peanut Rx).
        iii. **NEW: White mold can be particularly difficult to control in "dryland" or "non-irrigated" fields.** Although the fungus (*Sclerotium rolfsii*) that causes white mold may thrive in irrigated fields with vigorously growing peanut plants that produce a thick canopy of foliage; white mold may be MORE difficult to control in dryland fields. Growers should remember that it is CRITICAL to get help from irrigation (or rainfall) to move fungicides from the leaves to the crown and limbs of the plant for white mold control. In dryland fields, growers should consider spraying white-mold materials at night or increasing spray volume to better relocate fungicides.
        iv. 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.
        v. 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.
        vi. 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.
        vii. Growers whose standard white mold program includes Abound, Elatus, Headline or Priaxor (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.

viii. 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. **This is an especially important consideration in non-irrigated fields**.

ix. 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, Elatus, Priaxor, 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 2015 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 2016, 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 2016, can be found elsewhere in the 2016 Peanut Update.

Specific Fungicide Notes for 2016

1. **Azoxystrobin** (active ingredient in Abound and in the same chemical class as Headline and Evito) is now off-patent and will be available in generic formulations.
    a. Generic formulations may or may not be less expensive than Abound.
    b. Azoxystrobin (and all strobilurin fungicides) are AT-RISK to development of fungicide resistance.
    c. Growers MUST use generic formulations of azoxystrobin CAREFULLY in order to protect the entire class of strobilurin fungicides.
    d. Growers MUST be careful not to overuse strobilurin fungicides in a field as such could increase the risk for leaf spot disease.
2. The "Succinate Dehydrogenase Inhibitor" (**SDHI, FRAC** #7) class of fungicides becomes increasingly important for peanut producers. Flutolanil, the active ingredient in Moncut and Convoy and one of the ingredients in Artisan, was an early fungicide in the SDHI class to be used to protect against white mold and Rhizoctonia limb rot. Flutolanil, however, was not effective against leaf spot diseases. New fungicides Elatus (solatenol + azoxystrobin), Priaxor (fluxapyroxad + pyracolostrobin) and Fontelis (penthiopyrad) all include an SDHI fungicide as a portion (or all) of their formulation. Like flutolanil, these fungicides are active against soilborne diseases. Unlike flutolanil, they are also active against leaf spot diseases as well.
3. **SDHI fungicides (FRAC Group 7)** are effective because they disrupt a specific biochemical process in the mitochondria (power plants) of the fungal pathogens. Strobilurin fungicides work in the same way, but at a DIFFERENT site in the biochemical pathway in the mitochonrida power plants. **Like other fungicides, resistance to SDHI fungicides can develop in the fungal pathogens.** Growers must take management steps to reduce the risk for development of this resistance.
4. **VELUM Total** is a combination of fluopyram and imidicloprid from Bayer CropScience for management of nematodes and thrips. Fluopyram also is a member of the SDHI class and affects nematodes in the same way SDHI fungicides affect fungal pathogens.
5. **New and "Newer" Fungicides for 2015**: 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 2015 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. **Elatus fungicide (solatenol + azoxystrobin)** is labeled for the 2016 season and is an effective fungicide for the management of leaf spot and soilborne diseases of peanut. It will likely be used twice in a season, 9.5 fl oz/A at 60 and 90 days after planting.
c. **Priaxor (a pre-mix of Headline and Xemium (fluxapyroxad))** is labeled by BASF for use on peanuts.
    i. From field studies conducted in 2014, Priaxor was quite effective in the management of foliar and soilborne diseases and the product can be used very successfully by growers.
    ii. The combination of pyraclostrobin and fluxapyroxad should help to reduce the risk of fungicide resistance.
    iii. The rate of Priaxor is 4-8 fl oz/A, depending upon targeted disease and severity of disease.
d. **Custodia (a pre-mix of azoxystrobin and tebuconazole)** will be available from MANA in the 2016 season.
e. **Muscle ADV (a premix of tebuconazole and chlorothalonil)** will be available from SipCam in 2016.

6. **Fontelis** (penthiopyrad) is a newer fungicide and is in the SDHI class. 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 2016.
    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.

7. **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 2016, 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 2016 and expected introduction of Velum Total.

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' or 'Georgia-14N'. These two varieties are nearly resistant to the peanut root-knot nematode, do NOT need to be treated with a nematicide, and perform exceptionally well as compared to other varieties that are treated with nematicides.
4. Growers who plant the new peanut variety 'Tifguard' and 'Georgia-14N can expect excellent control of nematodes.
5. 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 a resistant variety.
6. Velum Total is a combination of fluopyram and imidicloprid. Velum Total is an effective tool for the management of nematodes and thrips. Important points to remember when considering Velum Total include:
    a. In studies at the University of Georgia, use of Velum Total has effectively reduced nematode damage to the peanut plants.
    b. Use of Velum Total has effectively increased yield versus plots not treated with a nematicide.
    c. The performance of Velum Total has been similar (or better than) Temik 15G, 10 lb/A at plant.
    d. Velum Total will be applied as a liquid formulation to the open-furrow at planting time.
7. 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.

Tools for Disease Management

Peanut growers will have the opportunity to use some new and/or updated tools again in 2016 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. **This is especially important in dryland/non-irrigated production.** 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 2016 "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 continue to gain support from the agrichemical industry. In 2015, Syngenta Crop Protection (Abound, Alto, Bravo WeatherStik, Tilt/Bravo), Nichino (Artisan, Convoy), Arysta LifeScience (Evito), BASF (Headline, Priaxor), Bayer CropScience (Proline, 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. use PROLINE, 5.7 fl oz/A in-furrow, at planting, followed by
    c. 4-block program of PROVOST or at least use of a fungicide program that offers suppression of CBR (e.g. Folicur, Abound, Fontelis 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 2016

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**) or Priaxor (6 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 6 oz of Priaxor 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. Planting a peanut variety that is very susceptible to leaf spot.
    b. Unacceptable delays in starting your program.
    c. Improper calibration of equipment (not enough material was applied).
    d. Unacceptable delays between applications, such as when weather conditions keep the grower out of the field.

e. Rain events immediately after a fungicide application have washed the fungicide away too quickly.

f. Possibly, over-use of strobilurin fungicides in a management program.

10. Use of Chlorothalonil.

a. Chlorothalonil has been in short supply over the past two seasons. Growers should work with distributors to insure an adequate supply.

b. **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:

a. Price.

b. 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**. **Priaxor** is a combination of Headline and fluxapyroxad. Priaxor, at appropriate rates, can be used effectively and in much the same way as described below for headline. The leaf spot rate for Priaxor is 4.0-8.0 fl oz/A. The rate for management of soilborne diseases is 8.0 fl oz/A
    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 exsit 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 these 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 (and 2013), 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 (and 2014), 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 Elatus.

i. Elatus is a combination of azoxystrobin and solatenol. This mixure provides additional resistance management for the at-risk azoxystrobin.

ii. Elatus has performed very well in UGA research trials and will likely be applied twice during the season (9.5 fl oz/A at 60 and 90 DAP).

l. Management with azoxystrobin.

i. Azoxystrobin is marketed as **Abound and new generic formulations.** It 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.

m. 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.

n. 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.

o. 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.

p. Management with pyraclostrobin (**Headline**) and pyraclostrobin + fluxapyroxad (**Priaxor**).

i. 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. Priaxor is effective in a soilborne disease management program against white mold and limb rot when applied at a rate of 8 fl oz/A.

ii. Headline and Priaxor are typically not used as “stand-alone” soilborne fungicides, but rather is used in combination with tebuconazole, or perhaps Artisan or Moncut.

iii. Headline and Priaxor are not used with Evito, Absolute, Stratego, Abound or generic formulations of azoxystrobin for fungicide resistance management concerns.

iv. Use of Headline at 12.0 fl oz and Priaxor at 8.0 fl oz/A 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.

v. 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. Priaxor could be used in a similar fashion at rates of 4.0 and 8.0 fl oz/A.

vi. Results suggest that growers can greatly improve management of white mold with Headline when it is applied at NIGHT.

q. 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.

r. **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 least some level of resistance to CBR. (Note: Tifguard is no longer recognized as resistant to CBR.) Though these varieties are typically not available now, growers who have fields where CBR is found may want to consider planting CBR-resistant varieties as they become available.
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 Telone II 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 own 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 2016 Version of the
Peanut Disease Risk Index

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In 2015, losses to tomato spotted wilt across the peanut production region of the southeastern United States stabilized and were similar to estimated losses from 2014. Losses associated with spotted wilt were approximately 3% in 2014 and 2015, though tomato spotted wilt was more severe in some fields than in others. Growers can achieve excellent management of this disease, and other important diseases, using Peanut Rx. This disease risk index can help growers better understand how careful selection of production practices can reduce the risk to disease losses.

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 officially known as “PEANUT Rx”. It allows growers to assess their risk to tomato spotted wilt, leaf spot diseases and white mold. It also notes which varieties have some resistance (or increased susceptibility) to the peanut root-knot nematode (*Meloidogyne arenaria*), Cylindrocladium black rot (CBR) and Rhizoctonia limb rot. The 2016 version of PEANUT Rx has been fully reviewed and updated by the authors based upon data and observations from the 2015 field season.

Updates to the 2016 Peanut Rx
There have been a few updates to PEANUT Rx 2016 from the 2015 version. Most of the changes that have been made can be found in the cultivar/variety section of Peanut Rx. There is also new discussion on the impact of irrigation on management of white mold and on steps to take to reduce the risk of losses to the peanut root-knot nematode.

With additional data, risk points for "leaf spot" assigned to variety 'Georgia-12Y' have been reduced from "20" to "15". Such a change indicates that Georgia-12Y has leaf spot resistance similar to that of Bailey, Tifguard, and TUFRunner™ '727'.Three new varieties have been added to the 2016 version of Peanut Rx; all have "hi oleic" chemistries. These varieties include TURunner™ '297', 'Georgia-13M' and 'Georgia-14N'. In addition to having hi-oleic oil chemistry, Georgia-14N is notable for its very high resistance to the peanut root-knot nematode.

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, has a tremendous impact on the potential for diseases 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 a large number of plant species to include several that are important crops in the southeastern United States. 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 nearly 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 during 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 diseases as well as TSWV incidence. The variety 'Georgia-06G' is currently planted on much of the peanut acreage in the Southeast and it has a significant level of resistance to tomato spotted wilt. However, newer varieties may have improved resistance. For example, the variety 'Georgia-12Y' has resistance to tomato spotted wilt and to white mold that is better than that found in Georgia-06G. Variety TUFRunner™ '727' has a level of resistance to white mold and leaf spot better than that found in Georgia-06G; however it is less resistant to tomato spotted wilt. Just as none of the current varieties is immune to spotted wilt, none is completely immune to fungal disease either. However, improved resistance will likely lead to a 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 may 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 should not be at a significant risk to losses from tomato spotted wilt in the 2016 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 2016 version of Peanut Rx, peanut varieties with a risk of 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, the insect that transmits or "vectors" the tomato spotted wilt virus, has been an ineffective means of suppressing tomato spotted wilt disease. In theory, lowering overall thrips populations with insecticides should effectively reduce in-field spread of TSWV and growers now have a selection of products that are effective in killing thrips. However, most 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 not 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**. IMPORTANT NOTE:** In Peanut Rx, use of Thimet 20G, but not other insecticides, reduces risk of tomato

spotted wilt. However this does not mean that other products offer good-to-excellent control of thrips which is also an important production consideration.

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.

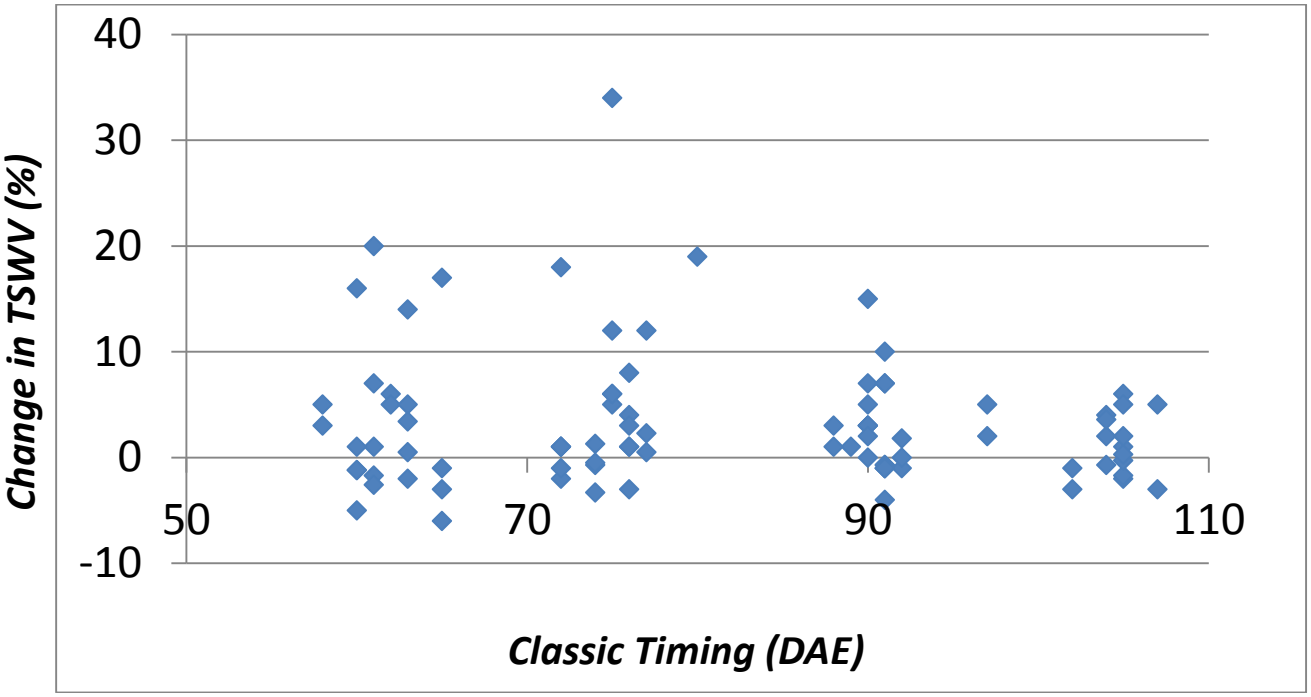
Row pattern, either single or twin row plantings, also has some effect on the potential for disease in a field. Work done at the Coastal Plain Experiment Station has lead to the observation that white mold is more severe in single rows (six seed per foot) than in twin rows (three seed per foot). White 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 corroborated 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. Results from 23 field trials conducted from 2000 to 2012 are presented in the following graph:

Classic Effects on TSWV in Peanut (2000-2013)



Since 2000, the effect of Classic Herbicide 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.

NOTE: Although not related to tomato spotted wilt or any other disease, the University of Georgia now recommends that Classic herbicide **not** be applied to the Georgia-06G variety. Research conducted by Dr. Eric Prostko has determined that use of Classic herbicide is associated with a reduction in yield with this single variety.

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.

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.

Special note on irrigation and risk to white mold: From the discussion above, irrigation (and ample rainfall) can create conditions that favor outbreaks of white mold- to include more

abundant moisture for growth and also greater humidity within a canopy which favors growth and spread of white mold. However, rainfall and, especially, irrigation are essential in the movement of foliar-applied fungicides from the leaves to the limbs and the crown of the plant where protection is needed from white mold.

Under non-irrigated conditions, growers may actually observe MORE white mold than for irrigated peanuts, largely because effective fungicides are not "washed" to the parts of the plant that must be protected from this disease.

Growers can use several strategies to improve efficacy of fungicides for management of white mold in non-irrigated fields.

1. Apply fungicides for control of soilborne diseases ahead of anticipated rain events to facilitate movement of fungicides.
2. Apply fungicides for control of soilborne diseases at night when the leaves are folded; such timing of application will increase coverage of the limbs and crowns of the plants.

Reducing Risk to Losses from Peanut Root-knot Nematodes

Peanut root-knot nematode is not specifically included in Peanut Rx; however several of the factors that affect risk to other diseases also affect risk to losses from nematodes. These factors include the following.

1. Variety selection: Varieties 'Tifguard' and 'Georgia-14N' are highly resistant to infestation from the peanut root-knot nematode (*Meloidogyne arenaria*). Growers who plant these varieties in a root-knot nematode infested field will not need to use a nematicide. Use of nematode-resistant varieties not only protects the crop in the field, but also reduces nematode populations for the next peanut crop as compared if a susceptible variety like 'Georgia-06G' was planted.
2. Crop rotation: Like risk to other diseases, the threat from peanut root-knot nematode is greatly reduced by rotating fields away from peanut and other susceptible crops like soybeans. Cotton and corn are excellent rotation crops to reduce the risk of peanut root-knot nematodes in a field. Corn is also a host for the peanut root-knot nematode, but is a better rotation crop than either peanut or soybeans.
3. Tillage: Though much research is still needed, there is some indication that there is higher risk to nematodes in fields are prepared with reduced tillage than with conventional tillage. This effect is much less important than variety selection or crop rotation, and is not always observed. However, there is some evidence that disrupting the soil, such as occurs in conventional tillage, could help to disperse nematode populations present in the root zone of the developing seedling.
4. UGA Extension recommends that with high populations of root-knot nematodes growers are strongly recommended to plant nematode resistant varieties, and these varieties do not require the use of a nematicide. However, with low-to-moderate populations, growers could also consider using Velum Total or Telone II, and still plant susceptible cultivars such as GA-06G.

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 to produce 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”.

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[5]	5	15	10
Georgia-13M[1,2]	10	30	25
Georgia-14N[1,2,4]	10	15	15
Georgia Green	30	20	25
Georgia Greener[3]	10	20	20
Tifguard[4]	10	15	15
TUFRunner™ '297'[1,2]	15	25	20
TUFRunner™ '727'[2]	20	15	15
TUFRunner™ '511'[2]	20	30	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 and Georgia 14-N have excellent resistance to the peanut root-knot nematode.*
[5]*Georgia-12Y appears to have increased risk to Rhizoctonia limb rot and precautions should be taken to protect against this disease.*

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.*
Note: *While Thimet is the only insecticide documented to reduce the risk of TSWV, other insecticides may offer good-to-excellent control of early season thrips.*

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. Cotton is an excellent crop to reduce risk to the peanut root-knot nematode; however corn is a host for this pest. 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, peanut root-knot nematode and CBR. Rotation with grass crops will decrease the potential risk of limb rot; tobacco and vegetables will not.

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[1,2]	10

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

[2]*Special note: There are times when peanuts grown in non-irrigated fields are at greater risk to white mold than are peanuts planted in irrigated fields. Although (as discussed earlier) irrigation may produce the environmental conditions more favorable for white mold to develop, efficacy of fungicides may be reduced in non-irrigated fields where the water from irrigation could have facilitated relocation of the fungicide to the crown of the plant.*

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 detemined**
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

2016 Peanut Insect Management Update

Mark Abney

Thrips

Thrips are present every year in Georgia, but it is impossible to predict how severe infestations will be in a given growing season. Peanut growers have experienced three consecutive years of moderate to heavy thrips pressure. The pattern during this time has been for adult thrips move into peanut fields in early to mid-May. These adults lay eggs, and it is the immature thrips from these eggs that cause most of the feeding injury we see on the foliage. Most growers will use an at-plant insecticide or seed treatment to control thrips. Applying a foliar insecticide can reduce damage when no at-plant treatment is made or when the residual activity of at-plant products begins to diminish, but timing is important. Treatments should be applied when adult thrips are present but before severe damage is observed. This is not as easy as it sounds, and many foliar sprays targeting thrips are applied too late. Growers should be aware that thrips flights can occur anytime from mid-April to early June. It is important that we continue to use the recommendations found in Peanut Rx for reducing thrips pressure and *Tomato Spotted Wilt Virus*. Phorate (Thimet®) is still the only insecticide that has been shown to reduce TSWV incidence in peanut, and it provides good protection against direct feeding damage. In-furrow applications of liquid imidacloprid (Admire Pro®) have shown good efficacy against thrips in a number of University trials in recent years. To date, seed treatments in peanut have not provided adequate thrips suppression in years with heavy pest pressure.

It is common to see some thrips feeding injury on peanut seedlings regardless of what at-plant insecticide is used; no insecticide will be completely effective 100% of the time. The impact of direct thrips feeding on yield and time to maturity is not well understood. Until economic thresholds are available, minimizing crop stress will continue to be an important consideration in making thrips management decisions.

Caterpillars

Foliage feeding caterpillars were abundant in peanut fields across Georgia in 2015. Many fields hosted a complex of several species, but the most common were soybean looper (SBL) and velvetbean caterpillar (VBC). VBC showed up earlier than “normal” for Georgia, and populations remained active until harvest. This pest can be a voracious feeder, but fortunately it proved to be easy to control in 2015. Pyrethroid tolerant/resistant VBC populations have occurred in Georgia in the past, but there were no reported cases of pyrethroid failure in 2015. Growers should always use caution when applying a pyrethroid to peanut due to the possibility of secondary pest outbreaks. Pyrethroids should be avoided when spider mites are present or when hot, dry conditions favor the development of spider mite infestations.

Soybean loopers were more challenging and more costly to control than VBC. Very rank vine growth in many fields made achieving good insecticide coverage problematic; this made an already difficult to control pest even more challenging. In UGA trials, SBL was adequately controlled with insecticides recommended in the Georgia Pest Management Handbook.

Early season tobacco budworm infestations have been relatively rare the last two seasons, but this pest can be very destructive to seedling peanut. Growers in 2016 should be monitoring caterpillar populations and only treating fields when economic thresholds are reached.

Burrower Bug

Burrower bug damage was sporadic in 2015, but the insect continued to cause grade reductions and lost profit for some growers. The burrower bug thrives in hot, dry conditions. While sometimes a problem in irrigated fields, it is most prevalent and damaging in non-irrigated peanut. Granular chlorpyrifos (Lorsban® 15G) is the only insecticide that has been shown to have any efficacy against burrower bug, and it does not provide complete control. The factors that are known to increase the risk of burrower bug damage are conservation tillage and hot, dry soil conditions. Conversely, deep turning and irrigation reduce the likelihood of infestations. Many growers have asked the question, “Will abandoning conservation tillage in favor of a turning plow eliminate the burrower bug problem?” Previous research suggests that the risk of damage will decline, but there are no certainties. Burrower bug damage has been reported in GA from fields that were turned prior to planting. Work is currently underway to quantify the risk associated with different production practices, location, soil type, etc. In the near term, management options available to growers who have experienced significant losses due to burrower bug are limited to deep turning and application of granular chlorpyrifos.

Garden Fleahopper

The garden fleahopper is an insect that has been common in Georgia peanut fields late in the season over the last two years. There is no established economic threshold for this insect in peanut, but populations in some fields were high enough that insecticide applications were made in 2015. The tiny bugs feed by sucking plant juices from the leaves. The damage appears as a stippling of the leaves that is similar to that caused by two spotted spider mite. Garden fleahopper damage can be easily differentiated from mite damage by the tiny, tar colored fecal spots that the fleahoppers leave on the underside of foliage. While this insect is not expected to become a serious pest, growers need to be able to identify it and the damage it causes.

2016 Peanut Weed Control Update

Eric P. Prostko

Peanut Herbicide Applications: Done By 40 Days?

Peanut growers are strongly encouraged to complete the major portion of their weed control program by 40 days after planting (DAP). This strategy encourages more timely postemergence applications which should result in better weed control and limits herbicide applications during potentially sensitive stages of peanut growth. Historically, peanuts have been most sensitive to certain postemergence herbicides when applied between the R5 (beginning seed) and R6 (full seed) stages of growth.

Valor Update

Since its introduction into the peanut herbicide market in 2001 by Valent, Valor (flumioxazin) has become one of the most popular peanut herbicides. According to a recent USDA/NASS survey, Valor is used on 62% of the peanut acres in the U.S. In 2016, several generic formulations of Valor will be available including the following: Outflank (Adama), Panther/Panther SC (NuFarm) and Rowel (Monsanto). Panther SC is the only liquid formulation of flumioxazin.

Dual Magnum or Warrant + Valor at Planting?

Over the past few years, the use of Dual Magnum (*s*-metolachlor) and Warrant (acetochlor) has increased in Georgia due to the presence of Palmer amaranth and tropical spiderwort/Benghal dayflower. Generally, there is no advantage to using Dual Magnum or Warrant + Valor at planting for the control of Palmer amaranth. I would prefer to see either of these 2 herbicides used in combination with POST herbicides (Cadre, Cobra, Gramoxone, and Ultra Blazer) to improve the residual control of this troublesome weed. However, peanut growers with tropical spiderwort/Benghal dayflower problems, especially when planting later in May and June, could significantly benefit from a Dual or Warrant + Valor tank-mix.

Sicklepod and Herbicide-Resistance

Reductions in sicklepod control, especially late in the season, have many growers concerned about potential resistance to Cadre (imazapic). In 2014/2015, 30 sicklepod populations were collected from across the Georgia peanut belt. To date, 8 of these populations have been screened for resistance to Cadre with negative results (*i.e. not resistant*). Reductions in sicklepod control are most likely due to untimely applications (*weeds too big*), fast tractor speeds, high spray boom heights, and unfavorable environmental conditions (*too hot/dry*).

New Peanut Cultivars and Herbicide Tolerance

There is always plenty of interest in new peanut cultivars and how they respond to herbicides. Results from weed-free trials conducted in 2015 by UGA would suggest that GA-12Y and GA-13M have sufficient tolerance to the postemergence herbicides typically used in Georgia.

Nozzle Tips and Peanut Weed Control

It is very likely that Georgia cotton and soybean growers will transition into the production of auxin tolerant crops (2,4-D choline, dicamba) in the near future. Consequently, growers will be required to use nozzles that reduce drift potential (AIXR, TTI, etc.) in these crops. Generally, these nozzles produce larger droplets which can have a significant influence on spray coverage. Since many peanut herbicides are contact in nature (Cobra, Gramoxone, Storm, and Ultra Blazer) and require maximum coverage, the use of these low-drift nozzles is a concern. Research conducted in 2015 would suggest that there was no difference in the performance of peanut weed control systems when applied using 11002DG, 11002 AIXR, or TTI02 nozzles.

Thus, if growers are timely (*weeds < 3" tall*), reduce application speeds, and maintain optimum spray boom heights, it is very likely that these nozzles could also be used in peanut production systems.

Time of Day and Palmer Amaranth Control

Time of day has become an interesting topic of discussion in Georgia since it has been shown to influence both white mold control in peanut and Liberty (glufosinate) efficacy in cotton and soybeans. Results of weed control trials conducted in 2015 would suggest that time of day (7 am, 10 pm, 5 pm, 10 pm) has little effect on the performance of cracking or early-postemergence applications of Gramoxone + Storm + Dual Magnum for the control of Palmer amaranth in peanut.

Comments About 2,4-DB

- 2,4-DB and 2,4-D amine are not the same thing. 2,4-D amine is not labeled for use on peanut and can cause yield losses depending upon the rate and time of application.
- According to the labels, only 2 applications of 2,4-DB are permitted per year on peanuts (45-60 day PHI).
- Results from field trials conducted in 2015 would suggest that GA-06G has adequate tolerance to POST applications of 2,4-DB. Multiple applications of 2,4-DB + COC had no effect on peanut yield or pod size.

How Do the Top Georgia Peanut Growers Manage Weeds?

Survey results from the 2014 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 6312 lb/A):

- 10/10 – irrigated
- 8/10 - bottom plow
- 10/10 - twin rows

Peanut Rotation

- 1-4 years = 1/10; 1-3 years = 9/10

Herbicides

- 8/10 - Sonalan; 9/10 - Valor; 3/10 - Dual; 8/10 - Cadre; 6/10 - 2,4-DB; 3/10 - Strongarm; 2/10 - Prowl

Table 1. Recommended Herbicide Programs for Managing Weeds in Peanut. [1]

Preplant Incorporated	Preemergence[2]	Cracking or early postemergence[3] (weeds < 3") 15-25 DAP[10]	Postemergence[4] (weeds < 3") 30-40 DAP	Late Postemergence (as needed)
Prowl[5] or Sonalan	Valor[9] (Add Strongarm if annual morningglory is a concern)		Cadre or Cobra[7] or Ultra Blazer[7] + Dual Magnum[8] or Warrant[8] + 2,4-DB	2,4-DB[12]
Prowl[5] or Sonalan		Gramoxone SL or Firestorm or Parazone or Helmquat + Storm + Warrant or Dual Magnum[8]	Cadre, or Cobra[7] or Ultra Blazer[7] + Dual Magnum[8] or Warrant[8] + 2,4-DB	2,4-DB[12]

[1]ALS-resistant Palmer amaranth is a very serious concern. An aggressive management program is necessary to slow spread of the resistant biotypes and to reduce selection pressure in areas currently not infested with resistant biotypes. A combination of tillage, soil residuals, and postemergence herbicides will be required for optimum control.

[2]Strongarm can be tank-mixed with Valor to improve the control of broadleaf weeds especially annual morningglory.

[3]Apply cracking or early postemergence treatment only if weeds have emerged.

[4]Cadre may be tank-mixed with Cobra or Ultra Blazer if needed for control of other weed species. Cadre is an ALS- inhibitor. Because of concerns with weed resistance to ALS-inhibitors, a mixture of Cobra or Ultra Blazer with Cadre would be preferred over Cadre alone. When using Cadre, follow all labeled crop rotation restrictions.

[5]Generic brands of Prowl (pendimethalin) are available and perform similarly. Prowl or Sonalan can be used preemergence if 0.5-0.75" of water can be applied within 48 hours of application. They can be tank-mixed with Valor or Valor + Strongarm in this situation.

[6]If Valor is properly activated with 0.5-0.75" of rainfall or irrigation within 7 days of application, it is unlikely that an "at-cracking" treatment will be required. However, if control with Valor is unacceptable, an "at-cracking" treatment of Gramoxone or Firestorm or Parazone or Helmquat + Storm + Dual Magnum or Warrant should be applied.

[7]Valor, Cobra, Spartan Charge, Storm, and Ultra Blazer have the same mode of action (PPO inhibitor). Consequently, no more than 2 applications of these herbicides should be used in a season.

[8]Generic brands of metolachlor are available (Stalwart, Parallel PCS, Me-Too-Lachlor). However, these generic brands have not provided the same length of residual control as Dual Magnum (*S*-metolachlor) in some UGA field trials. When tank-mixing paraquat, Cobra or Ultra Blazer with Dual Magnum/generics, additional spray adjuvants (NIS, COC) are ***not*** recommended and will likely increase peanut injury. When using Warrant with POST application, add NIS.

[9]Generic formulations of Valor 51WG (flumioxazin) are also available including Outflank, Panther, and Rowel. Panther SC is a liquid formulation of flumioxazin but this formulation has not yet been adequately tested by UGA weed scientists.

[10]DAP = days after planting.

[11]DBH = days before harvest.

[12]Label restrictions permit only 2 applications of 2,4-DB per year. PHI for 2,4-DB is 45-60 days depending upon the label.

SPECIAL NOTE: Dual Magnum and Warrant are in the same herbicide family and have the same mode of action (inhibit very long chain fatty acids). Multiple applications (> 2) of these herbicides in a single year should be avoided to prevent or delay the evolution of resistance. These herbicides have no postemergence activity.