2003
GEORGIA PEANUT RESEARCH EXTENSION REPORT

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THE UNIVERSITY OF GEORGIA – U.S. DEPARTMENT OF AGRICULTURE COOPERATING, TIFTON, GA

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Gale A. Buchanan
Dean and Director

University of Georgia College of Agricultural and Environmental Sciences and
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2003 Georgia Peanut
Research-Extension Report

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Georgia Agricultural Experiment Stations

Georgia Cooperative Extension Service

University of Georgia College of Agriculture and
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2003 PEANUT CROP YEAR IN REVIEW

John P. Beasley, Jr., Crop and Soil Sciences - UGA

The 2003 peanut crop will go down in the record books as the highest yielding crop ever on a per acre basis. The final crop estimate from the USDA-National Agricultural Statistics Service indicated there were 545,000 planted acres and 540,000 harvested acres in Georgia. The final yield estimate was 3450 lbs/A, eclipsing the 1984 crop, which yielded 3375 lbs/A. The USDA Federal State Inspection Service tonnage report, as of the middle of February, indicated there had been slightly less than 920,000 tons graded in Georgia. When applied against the 540,000 harvested acres, the 920,000 tons would average 3407 lbs/A. Regardless of which figure you use, the 2003 peanut crop was a record breaker. The table at the end of this article provides the harvested acres, yield, and tons produced in each of the major peanut producing states.

In addition to the record yield, the 2003 Georgia peanut crop was also a very high quality crop. In a normal year there is about one percent of the crop that is graded as Seg. 3, or in which visible *Aspergillus flavus* mold is found. However, in the 2003 crop, only 66 of 920,000 tons were graded as Seg. 3 and slightly less than 1,000 tons were graded as Seg. 2, or damaged kernels. Less than 1,100 tons were graded as Seg. 2 and Seg. 3 combined. The 2003 crop was one of the cleanest and highest quality crops ever produced in Georgia.

Rainfall frequency in June, July and August was the key to such a successful crop. Most locations in the Georgia peanut belt that measure rainfall recorded rain events on at least 46 days out of the 92-day period of June through August. Many locations recorded rain events on 50 or more days. In other words, it was raining, on average, every other day during those three critical months. There were some areas that received excess rainfall during portions of the growing season. As a result, some portions of fields suffered yield loss due to too much water. It was too wet to plant for some areas, especially the eastern part of the Georgia peanut belt in May, and as a result, there was a higher percentage of the crop planted after May 25th. According to Georgia Agricultural Statistics Service data, only three percent of the crop was planted in April and 30% was planted after May 25th. On average, less than 10% of the Georgia peanut crop is planted after May 25th.

Spotted wilt disease, caused by tomato spotted wilt virus (TSWV), was much less of a problem in 2003. It was estimated that percent yield loss to TSWV was less than three percent and dollar loss was less than four million. Producers across the state followed the TSWV Risk Index very closely, thereby greatly reducing their risk of TSWV severely affecting their fields. Foliar and soil-borne diseases were prevalent due to the ideal conditions for disease development and spread. White mold (southern stem rot, southern blight) was particularly troublesome for many producers. When not sprayed on a timely basis, some fields had above average levels of leaf spot. Cylindrocladium black rot (CBR) continued to be a major yield-limiting factor in some fields.

Insect problems were minimal on average but many fields had significant damage from Three-cornered alfalfa hopper. Foliage-feeding insects were sporadic, though some fields required treatment. Velvetbean caterpillar was a problem in some fields late in the year. Because of the wet year, southern corn rootworm (SCR) was found more frequently in the heavier textured soils. Some fields did require treatment for SCR.

Weed control was very good in 2003, despite the ideal growing conditions. Because of the wide array of herbicides now available and the better activity of many of the newer herbicides, producers had cleaner fields. The one exception was in the southern most counties in the Georgia peanut belt where tropical spiderwort continues to spread and become more troublesome.

Approximately 60-70% of the acreage was planted in the cultivar ‘Georgia Green’. Other cultivars planted in 2003 included: ‘C-99R’, ‘Georgia-02C’, ‘ViruGard’, ‘Carver’, ‘ANorden’, ‘Andru II’, and ‘DP-1’. Approximately 60% of the acreage was planted in the twin row pattern.

Harvest weather was very cooperative. It was dry for the most part, but the later planted acreage was well into late October or early November before it was harvested. Some fields that were planted in late May or early June and were not irrigated were affected by the dry weather in October.

Final U.S. Peanut Crop Estimate – January, 2004 – USDA-NASS

	Harvested Acres (1,000 acres)		**Yield (lbs/A)**		**Tons**	
	2002	**2003**	**2002**	**2003**	**2002**	**2003**
Alabama	185,000	185,000	2050	2750	189,625	254,375
Florida	86,000	115,000	2300	3000	98,900	172,500
Georgia	**505,000**	**540,000**	**2600**	**3450**	**656,500**	**931,500**
New Mexico	18,000	17,000	3000	2700	27,000	22,950
North Carolina	100,000	100,000	2100	3200	105,000	160,000
Oklahoma	57,000	35,000	2800	2800	79,800	49,000
South Carolina	8,700	17,000	2200	3400	9,570	28,900
Texas	280,000	270,000	3100	3000	434,000	405,000
Virginia	57,000	33,000	2100	2900	59,850	47,850
U.S. Total	1,296,700	1,312,000	2561	3159	1,660,245	2,072,075

National Center for Peanut Competitiveness, University of Georgia

DOES THE US NEED THE PEANUT TARIFF RATE QUOTA UNDER THE 2002 US FARM ACT?

Stanley M. Fletcher, Cesar L. Revoredo
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Situation:

US peanuts are currently protected from the world market competition by tariff rate quotas (TRQs) under the North America Free Trade Agreement (NAFTA) and the Uruguay Round Agreement of Agriculture (URAA) of GATT (now WTO). In the past, the role of border measures has been to allow the existence of the US domestic peanut program with above-world market prices for farmers. After the elimination of the marketing quota for peanuts and its replacement for a marketing loan assistance program (MLP), the question to analyze is whether such a border protection is still needed and if so, what its role in the new policy environment is. This question is important in the context of the current Doha Round of WTO trade discussions, where market access is one of the main topics.

Response:

To analyze the elimination of the TRQs a bi-annual simulation model of the US domestic supply and demand market for peanuts, including the stocks carried by the government, and a US demand for foreign peanuts was developed. We use the model to compare three possible situations: with and without peanut TRQs, and the expansion of the TRQs' minimum access.

Results:

The study found that TRQs have the role of enforcing the USDA-set repayment rate when the import price is below the domestic equilibrium price. In terms of the impact from the elimination of the TRQ on the different market participants, we found that exporters of peanuts to the US will reduce their profits if the degree of substitution between foreign and domestic peanuts is high (most probable scenario). US peanuts growers are protected by the marketing loan program. However, the trade liberalization would reduce the prices in all those cases where, because the price is high, farmers do not use MLP. US processors would gain from the elimination of the TRQ since they would be able to purchase peanuts at international prices. If TRQs are eliminated then, under MLP, USDA would have to pay the difference between the loan rate and the international price of groundnuts. However, in this case, USDA would not need to carry stocks.

Acknowledgement:

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SUPPLIER REPUTATION AND PRICE PREMIUM: THE CASE OF PEANUTS IN ROTTERDAM

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Situation:

Europe, together with Canada, is the main market for US shelled peanut exports, which is the main peanut category exported. To this date, US peanuts have been quoted with a premium with respect to peanuts from other origins in the Rotterdam market (the main entry port for peanuts to Europe). This premium has been taken as a fact, and although some explanations have been advanced, it has not been studied. The determinants of export prices are important to understand for forecasting export income.

Response:

We formulated two models, one theoretical and the other empirical. The theoretical model had the purpose to show how even when peanuts from two different origins have the same characteristics, other factors such as reliability of the exporter, may produce a price premium in favor of the product of the most reliable exporter. The empirical analysis used hedonic price analysis applied to data from a major trader of groundnuts in Rotterdam. The data allow us to analyze the prices while controlling for grade and other groundnut characteristics.

Results:

Perceived reliability seems to be an important component of the observed peanuts price, and suspicion of lack of reliability may imply a discount on the paid price. We test this hypothesis by taking into account the characteristics of the groundnuts marketed and by computing the price premium paid for groundnuts from different origins. The analysis showed a price premium for US groundnuts. However, this premium is not constant over time but it may differ with other factors such as the relative availability of each origin.

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We wish to gratefully acknowledge the Georgia Peanut Commission for partial funding of the research effort.

FACTORS AFFECTING SCHOOL STUDENTS' CONSUMPTION OF PEANUT BUTTER SANDWICHES

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Situation:

Peanut butter sandwiches have enjoyed a great popularity in the United States for a long time. A recent nationwide survey commissioned by the J.M. Smucker Company in Ohio indicates that the peanut butter sandwich has become a gastronomic icon in the United States. The survey results indicate that on average, an American consumes 1,500 peanut butter sandwiches before graduating from high school. Information about school students' consumption of peanut butter sandwiches is useful for food policymakers and school food services. Further, since peanut butter is mostly used to make sandwiches and school students are the major consumers of peanut butter sandwiches, such information may help to better understand and exploit the market for peanut butter.

Response:

Research has been conducted to investigate factors influencing school students' consumption of peanut butter sandwiches, using data from a survey of 1,259 students from 46 elementary schools, 18 middle schools, and 11 high schools in four counties in Georgia. Econometric models were estimated to explore factors affecting consumption and consumption frequency.

Results:

Consumption and consumption frequency were estimated jointly to account for possible correlation between them. Econometric results indicate that, compared with elementary school students, middle school students are more likely to participate in the consumption of peanut butter sandwiches and tend to consume them more frequently. On the other hand, high school students are less likely to do so. It could be that high school students, in a transition period from teenagers to adults, begin to adopt the dietary style of adults, hence, begin to reduce consumption of such food products as candies and peanut butter.

Residence place affects both frequency and consumption. Students from counties of high per capita income are less likely to consume peanut butter sandwiches and tend to eat them less frequently.

Jelly is usually considered to be a good companion of peanut butter in making a sandwich. But whether the use of jelly with peanut butter affects the consumption frequency of peanut butter sandwiches remains unknown. The results indicate that those who use jelly with peanut butter to make sandwiches tend to eat peanut butter sandwiches more frequently than their counterparts.

Those who purchase a school lunch tend to eat peanut butter sandwiches less frequently. School lunch usually offers more choices than home prepared lunch. More choices imply lower probability to choose peanut butter sandwiches for lunch; hence, they eat peanut butter sandwiches less frequently.

Taste preference was found to have a statistically significant effect on consumption frequency. Those who like the taste of peanut butter sandwiches served at school tend to eat the peanut butter sandwiches more frequently. This implies, together with the facts that 82%

of the students eat school lunch and only 41% like the taste of the peanut butter sandwiches served at their schools, that consumption of peanut butter sandwiches can be increased substantially by taste improvement.

Acknowledgement:

We wish to gratefully acknowledge the Georgia Peanut Commission for partial funding of the research effort.

TOMATO SPOTTED WILT VIRUS: ECONOMIC IMPACT OF MANAGEMENT OPTIONS USING A RESISTANT AND SUSCEPTIBLE CULTIVAR

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Situation:

In 1995, Tomato Spotted Wilt Virus (TSWV) became the most damaging disease problem in peanuts in Georgia and Florida. To aid in the management of the financially devastating disease, the University of Georgia developed a tool, the TSWV Risk Index for peanuts, which considers the key components that have been found to have a relationship with the incidence and severity of the disease. These factors include cultivar selection, planting date, final plant population, at plant insecticide use, row pattern, tillage practice and Classic® herbicide use. The index provides guidelines for a producer to choose options to help minimize the risk of TSWV. Given constraints of time, equipment, and other management issues, the question arose, as to what the impact would be if a producer attempted to minimize his risk of TSWV by using all the suggested guidelines of the Index except for one component, i.e., what would be the impact of pushing one of the components to the extreme if all other components were chosen to minimize the risk? A key concern was what the impact would be if a producer chose all components to minimize the risk expect planting date. What would be the impact of planting “outside the window”?

Response:

To answer this question, an “Index Extremes” study was carried out in 2001 and 2002 in Midville and Tifton, GA to characterize the combined effects of susceptible and resistant cultivars in twin rows using strip tillage, with and without in-furrow systemic insecticides at two planting dates on TSWV severity and the resulting yield and grade. Net returns to land and management were calculated for the various treatments in the study to determine the overall profitability of using the index approach to managing TSWV. Returns were calculated based on the pricing and grading structure of the 2002 Farm Security and Rural Investment Act. Costs were determined based on the 2003 UGA/CES irrigated peanut budget and was adjusted for the various direct inputs actually applied to each test using current costs.

Results/Outcome:

In prior analysis, two of the key components that have continually been validated to have significant impact on TSWV incidence and severity are cultivar and planting date. To answer the question of planting outside the window, the net returns of the TSWV susceptible cultivar Sunoleic 97R and the resistant cultivar C99R planted in strip till, twin rows with Thimet insecticide at planting at two different planting dates—one in April and one in May were compared. When the returns are considered over both years and locations of the study, the net returns above specified costs for the April planting date were $73/acre and the returns for the May planting date are $76/acre for C99R as seen in Table 1. When using the resistant cultivar there was no significant difference when the peanuts were planted at the early planting date, given all other measures taken to minimize the risk of TSWV. However, if the susceptible cultivar Sunoleic 97R is considered, i.e. more than one component is pushed to the extreme, there is a difference when the planting date component is considered. For the Sunoleic 97R planted in April, net returns are a loss of $141/acre. For the May planting date of the susceptible cultivar the net returns are a loss of $41/acre. These returns can also be compared to the returns for the resistant C99R cultivar. The results further validate the importance of both the cultivar selection and the planting date, especially when more than one component of the index is pushed to the extreme.

Acknowledgement:

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Table 1. Comparison of Yields and Returns for Index Extreme Cultivars and Planting Date under Twin Row, Strip Till, peanuts using Thimet insecticide

Treatment	Yield	Returns
C99R, April Planting	4263	$ 73.19 a
C99R, May Planting	4233	$ 75.81 a
Sunoleic 97R, April Planting	3020	$ -140.79 c
Sunoliec 97R, May Planting	3519	$ -41.29 b

Returns followed by different letters denote a difference at 5% significance level based on ANOVA.

COMPARISON OF RETURNS ABOVE VARIABLE COST GIVEN POTETIAL 2004 COMMODITY PRICE SCENARIOS FOR THE SOUTHEASTERN REPRESENTATIVE PEANUT FARMS

Allen E. McCorvey, Audrey S. Luke-Morgan, Stanley M. Fletcher
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Situation:

The 2003 growing season will be remembered as the first full season a crop was produced under the Farm Security and Rural Investment Act of 2002. It was also the year that the Southeast broke, or came close to breaking, record high yields on many crops. This non-typically coincided with a late season rally of commodity prices for many of the same crops produced in the Southeast. Seldom can producers enjoy abundant production coupled with increased market prices in the same growing season.

January, February, and March is the time of the year that Southeastern peanut producers are making decisions for their farms' 2004 crop mix and acreage to be planted. Producers may find themselves in a situation where these decisions are made more difficult given the fluctuating market prices coupled with the uncertainties of the Southeastern weather patterns. As sustainable agri-businessmen, Southeastern producers have to make decisions as to what crop mix and acreage will generate the most profit per acre for their farming operations in the 2004 season while maintaining certain rotational constraints. The integrity of the land is difficult to place a monetary value on, but upholding this integrity through proper rotational practices is vital given the diversified Southeastern crop mix. The key to determining how much and what to plant is centered on understanding the variable costs per acre so that producers can best estimate their expected returns above their variable cost.

Response & Background:

To address this issue, the National Center for Peanut Competitiveness (NCPC) used the Southeastern representative peanut farms database to compare various potential commodity prices of peanuts, cotton, and corn given the variable costs of producing irrigated and dryland peanuts, irrigated and dryland cotton, and irrigated and dryland corn. For these comparisons, no fixed costs were used in this study. It was assumed that producers already own or rent the equipment and land that is required for their farming operation, excluding a significant acreage expansion and/or a major crop mix change. Therefore, these costs will not vary based on the decision made. In addition, no government payments were included in this study. Government payments, more specifically Counter-Cyclical Payments (CCP) and Direct Payments (DP), are assumed not to affect planting decisions since these payments are tied to the historical yields and acreage of the land not the current planted acreage and/or current production. Given the projected commodity prices for this study are higher than the current corresponding loan rates, no Loan Deficiency Payments (LDP) were included.

The variable cost for the Southeastern representative farms range as follows: irrigated peanuts ($295/ac--$485/ac), dryland peanuts ($217/ac--$378/ac), irrigated cotton ($298/ac--$473/ac), dryland cotton ($167/ac--$375/ac), irrigated corn ($235/ac--$321/ac), and dryland corn ($124/ac-- $134/ac). The yields for the Southeastern representative peanut farms range as follows: irrigated peanuts (3400 lbs/ac – 4500lbs/ac), dryland peanuts (2250 lbs/ac—3500 lbs/ac), irrigated cotton (850 lbs/ac –1000lbs/ac), dryland cotton (455 lbs/ac—750 lbs/ac), irrigated corn (170 bu/ac – 175 bu/ac), and dryland corn (70 bu/ac).

Results and Discussion:

The NCPC compared three potential price scenarios for 2004 runner peanuts to four potential price scenarios for cotton ($0.65/lb, $0.70/lb, $0.75/lb, and $0.80/lb). The three price levels for peanuts reflect, before grade adjustments, the $355/ton peanut loan rate, the common $380/ton 2003-contract price, and the recently offered $400/ton contracts for the 2004 crop. At the time of this study, 2004 fall delivery contracts for cotton were around $0.65/lb. All three price scenarios for peanuts were compared to all four scenarios for cotton for both irrigated and dryland production, resulting in 24 separate comparisons. At $355/ton for peanuts, the analysis of the Southeastern representative farms show irrigated cotton becoming more competitive for land based on returns above variable cost as cotton exceeds $0.70/lb. At $380/ton for peanuts, irrigated cotton appears to become more competitive as cotton prices exceed $0.75/lb. Only as cotton prices approach and exceed $0.80/lb does irrigated cotton appear to become more competitive than irrigated peanuts at $400/ton. Given the fluctuation of the cotton market over recent months and the uncertainties of how the world cotton market may move this fall, the NCPC provided the comparisons of $0.70/lb, $0.75/lb, and $0.80/lb to help producers better understand how competitive their crop mix may be under many different marketing scenarios.

In this study, both irrigated and dryland corn showed no significant direct competition with cotton or peanuts with regard to returns above variable cost. In all scenarios, both irrigated and dryland corn generate less returns per acre above variable cost than do irrigated and dryland peanuts respectively. Irrigated corn challenges irrigated cotton on only one out of the five representative farms that plant both corn and cotton. The NCPC again would like to point out the difficulty in determining a monetary value of sustainable crop rotations, more specifically the benefits of corn in a cotton and peanuts rotational mix. The value of corn as a rotational crop for peanuts and cotton should be considered on an individual farm basis. The planting and harvesting dates of corn not coinciding with either peanuts and/or cotton can play a role in crop mix decisions as well. If peanut rotations have been pushed during recent years, corn may be an option or a competitor in the crop mix, although this study shows corn much less competitive for acres verses peanuts and cotton when considering returns above variable cost.

The soybean markets have also rallied in recent months. Many southeastern producers have expressed interest in the possibility of adding soybean acreage. Soybeans were not included in this study because of the eleven Southeastern representative farms only one farm has soybeans in the crop mix. The NCPC concluded that one representative farms' data was not sufficient to analyze the Southeast with regard to the competitiveness of soybeans in a peanut farm crop mix. In recent years soybeans have not been a major factor in the competition for acres in a typical Southeastern peanut farm crop mix. Hence there is only one current representative peanut farm that includes soybeans.

Summary and Conclusions:

This study allows producers to compare the variable cost per acre with the associated returns above variable cost per acre for many potential and current market prices for commodities in the Southeastern crop mix. Given the three peanut price scenarios of $355/ton, $380/ton, and $400/ton, this study shows irrigated cotton becoming more competitive in the Southeast for acres verses irrigated peanuts as cotton prices exceed $0.70/lb, $0.75/lb and $0.80/lb respectively. Again, the key to a competitive crop mix is centered on a producer understanding their variable cost per acre for all crops. With this understanding, Southeastern peanuts producers may better estimate and measure how competitive their own crop mix may actually be for 2004.

Acknowledgment:

We wish to gratefully acknowledge the Georgia Peanut Commission and the National Peanut Board through the Southeastern Peanut Research Initiative for partial funding of the research effort. Appreciation is also extended to the facilitators, cooperators, and panel participants of Southeastern Representative Peanut Farms.

IMPACT ON THE FINANCIAL VIABILITY OF SOUTHEASTERN REPRESENTATIVE PEANUT FARMS OF POTENTIAL YIELD RESTRICTING FACTORS

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National Center for Peanut Competitiveness

Situation

An area of concern in any business is its financial viability. A common question is how a change in policy, technological or regulatory issues might impact the long-term viability of an enterprise. The impact of such changes is key to peanut farms and the agribusiness industry.

One area of interest considered by the NCPC this year included the impact on the financial viability of peanut farms assuming a reduction in yields that could be brought about by a regulatory type issue such as a water restriction. How would a potential yield restricting factor, such as restricted water usage, impact not only the income from an enterprise but also more long-term issues such as changes in net worth and the debt load for a farm?

Response

This analysis utilizes the eleven representative Southeastern peanut farms representing Georgia, Alabama, Florida and South Carolina that were developed by the NCPC. The information gathered from these representative farms is used to analyze the potential impact from yield reductions due to potential water restrictions.

Results/Outcome

In this study, two scenarios were considered which reduced irrigated yields for all irrigated crops on the Southeastern Representative Peanut Farms that could be brought about by future water restrictions. One scenario reduced irrigated yields by 10% in 2004 and held constant through 2007. The second scenario reduced irrigated yields by 20% in 2004 and held constant through 2007. These are modest yield reductions. The study stopped in year 2007 since that was the end of current Farm Bill. All but one of the Southeastern Representative Peanut Farms has irrigated acres associated with it. The farms range from 95% irrigated to 100% dryland with many various combinations within. For this study the scenario results are compared to the benchmark analyses that utilizes the full benefits of the Farm Security and Rural Investment Act of 2002, the reported expected yields from the grower panels and the February 2003 FAPRI Baseline.

The composite average Net Cash Farm Income (NCFI) of all farms in this study by the end of year 2007 due to the 10% irrigated yield reduction is $52,146, a $52,285 or 50.5% loss as compared to the benchmark analysis. The NCFI falls by $102,226 or 97% to a composite average of $3,205 in 2007 due to the 20% irrigated yield reduction. Note that NCFI does not include depreciation, family living expenses, federal, state and employment taxes, as well as long term and intermediate loan principal payments along with any operating loan carryovers. Any cash request for the outright purchase and/or down payments on any additional equipment, tools or assets would be paid out of NCFI.

The composite average Real Net Worth (RNW) due to the 10% irrigated yield reduction falls to $1,449,992, a loss of $139,603 or 8.8% by year 2007 as compared to the benchmark analysis. The average RNW falls to $1,296,984 when a 20% irrigated yield reduction is considered, an average loss of $292,611 or 18.4% by year 2007. The RNW is the value of all assets less liabilities, or what that "farm" is worth after all debts are accounted for.

When considering the impact that irrigated yield reductions may have on a farm's debt load, the study showed that due to the 10% irrigated yield reduction the debt to asset ratio increased to 22.11% from the benchmark 16.97%. The 20% irrigated yield reduction caused the debt to asset ratio to increase to 28.48% from the benchmark 16.97%.

The exact amount of yield loss associated with various levels of water restrictions is difficult to estimate. However, it is known that water restrictions, or more specifically for this study, irrigation restrictions, will cause an irrigated yield loss for all crops if normal weather patterns are considered. This study has provided the impact of a plausible range of irrigated yield loss that could be due to water or irrigation restrictions being implemented in future years. As can be seen form this study, both a 10% and 20% loss in irrigated yields can cause a significant impact on the economic viability of southeastern peanut farms.

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DOES THE EXISTENCE OF MARKET POWER AFFECT MARKETING LOAN PROGRAMS?

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Situation:

The Farm Security and Rural Investment Act of 2002 eliminated the peanut marketing quota system and introduced a marketing assistance loan program with direct payments and counter-cyclical payments among other policy measures. The effects of marketing loan programs (MLP) have only been analyzed in the context of perfect competitive markets, which is a shortcoming in the case of peanuts since the literature points out that US demand for peanuts is concentrated with few buyers.

Response:

To measure the effect of market power on the marketing loan program we built a simulation model that captures the main characteristics of the US peanut market. In addition, we estimated the main relations using historical time series data. We consider two market structures: competitive, and when the peanut buyer possesses market power. The structure under market power was further broken into the cases when USDA sets the repayment rate equal or not to the price that buyers are willing to pay. The results are presented as the effect that market power will have on prices, production, stocks, and government cost, in comparison with the competitive case.

Results:

(1) With respect to <u>prices</u>, under market power, farmer stock peanut prices paid by shellers are lower than in the competitive situation. In the case of shelled peanut prices it depends on how the repayment rate is determined, the initial price, and how fast peanut prices adjust to the excess of demand (i.e., discrepancy between the supply and demand). (2) With respect to <u>production</u>, farm production under market power is meant to decrease with respect to the competitive case; however, farmers are protected by the MLP. Production of shelled peanuts decreases when repayment rate is equal to the price bid by shellers and increases when the repayment rate is determined by the government. (3) With respect to <u>stocks</u>, under market power a higher proportion of the peanut crop is carried as stocks in comparison to the competitive case. If the repayment rate is equal to the price bid by shellers then almost no stocks of shelled peanuts are carried, while if the government determines the repayment rate, the stock ratio is higher than in the competitive case. (4) With respect to the <u>government cost</u>, there is a trade-off for the government, assuming a repayment rate below the loan rate. The trade off is given by carry more stocks and pay less in marketing loan benefits but more in storage and financial costs vs. not carrying stocks and pay more in loan gains. However, the results are given by the assumptions. In addition, it is important to take into account that government carryover may depress future prices and make the MLP unsustainable.

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Crop and Soil Sciences,
University of Georgia and USDA – ARS

EVALUATION OF GEORGIA 01-R COMPARED TO OTHER PEANUT CULTIVARS

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INTRODUCTION

As new peanut cultivars are released, evaluations are necessary over a variety of soil types, locations and environments. Producers are anxious to view new cultivars under their management and environmental conditions. Georgia variety test information is important in preliminary evaluations of these new varieties compared to standards that have been grown for several years.

Funding was secured from the Georgia Peanut commission to fund ten Georgia county agents to conduct on-farm evaluations of the new Georgia peanut variety, Georgia 01-R. The studies varied from varietal comparisons, to disease control management and yield and grade. This new variety holds promise in several areas such as improved disease resistance, larger seed size, and improved yield and grade as seen in recent official Georgia Variety test data. Georgia 01-R is mid-oleic oil chemistry with good resistance to TSWV, white mold, CBR, and Rhizoctonia limb rot, and leafspot.

METHODS AND MATERIALS

Ten locations throughout Georgia were selected to evaluate Georgia 01-R to other late maturing cultivars. Some were planted in twin rows, others were on reduced fungicide spray programs. Each location reported reduced final plant stands when compare to the other cultivars planted. Individual site evaluations may be obtained from the principal investigator in these studies.

RESULTS AND DISCUSSION

Tables one-six lists the results of individual trials for the tested cultivars. Quality evaluations are currently being conducted to compare it to other recently released cultivars. It may result in the ability to plant less seed per acre, and reduce fungicide sprays while maintaining yield and grade of peanuts produced. This would result in improved economic return to Georgia producers growing this variety.

Table One: Yield and Grade of Several Peanut Cultivars Planted in Atkinson and Baker Counties during 2003.

	Atkinson		Baker	
Variety	Yield lb/A	%TSMK	Yield lb/A	%TSMK
Ga 01-R	4430	78.2	4810	72.3
DP-1	-	-	4980	70.5
C-99R	4553	76	4310	74.1

Table Two: Yield and Grade of Several Peanut Cultivars Planted in Burke and Irwin Counties during 2003.

	Burke		Irwin	
Variety	Yield lb/A	% TSMK	Yield lb/A	% TSMK
Ga 01-R	5707	71	4070	74
DP-1	4855	64	-	-
C99-R	-	-	4270	75

Table Three: Yield and Grade of Several Peanut Cultivars Planted in Burke and Miller Counties during 2003.

	Burke		Miller	
Variety	Yield lb/A	%TSMK	Yield lb/A	% TSMK
Ga 01-R	3620	76	4500	76
DP-1	-	-	4300	70
C99-R	3980	75	4130	73

Table Four: Yield, Grade, White Mold, and Rhizoctonia Limb Rot Incidence for Several Peanut Cultivars Planted in Early County during 2003.

Variety	White Mold %	Rhizoctonia %	Yield lb/A
DP-1	4.7	25.6	4790
Ga 01-R	15.2	23.5	5100
C99-R	6	19.4	4370

Table Five: Yield, White Mold, Rhizoctonia Limb Rot, and TSWV Incidence for Several Peanut Cultivars in Randolph County during 2003.

Variety	White Mold %	Rhizoctonia %	TSWV %	Yield lb/A
DP-1	10.9a	18.1a	7.5a	4250c
Hull	15.3a	26.2b	18.5b	4870b
Ga 01-R	11.6a	19.2a	7.0a	5480a

Table Six: Yield for Several Peanut Cultivars in Worth County during 2003.

Variety	Yield lb/A
Ga 01-R	4440
C99-R	3880
DP-1	3945

ACKNOWLEGEMENTS

The authors want to express appreciation to the Georgia Peanut Commission and Georgia Foundation Seed for their financial support of this project. Also, gratitude to the many Georgia Peanut Producers who allowed the University of Georgia to conduct these demonstrations on their farms.

2003 Multi-Cropping tillage Study to Evaluate the Effects of Tillage and Cover Crop on the Yield of Peanuts, Corn, and Cotton at the Southwest Georgia Research and Education Center in Plains, GA

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Stan Jones, Superintendent SW. Branch Station, UGA

INTRODUCTION

Numerous studies have been conducted to evaluate reduced tillage systems for individual crops, but few have been reported which incorporate continuous reduced tillage systems with or without a cover crop for a peanut, corn, cotton rotation. This will be the eighth year for this study looking at a peanut-corn-cotton rotation.

MATERIALS AND METHODS

Three blocks of two acres each have been utilized at the Southwest Research and Education Center at Plains for several years of crop rotation with peanut, corn, and cotton. The system during 2003 was Dekalb 697 corn planted either strip-till or no-till into fallow following peanut or Wrens 96 rye cover. The Cotton (Delta Pine 555BR) was planted by the same tillage methods into previous corn residue or following rye cover. The cover crop of rye was killed with Roundup at one quart/acre, approximately 20 days ahead of planting either the corn or the cotton.

Either Georgia 01R or DP-1 peanuts were planted in a single row pattern by strip tillage method into fallow-mowed cotton stubble or into fallow land which was harrowed, deep turned and tillovated. The other two treatments were the same two tillages but planted following a rye cover crop. The Wrens 96 rye was planted in December by drilling into harrowed land following cotton. The rye was planted at 1.5 bushels per acre. The peanuts were then strip-till or conventionally planted utilizing a Monosem vacuum planter and planted at six seed/ft of row. All plots can be irrigated with a linear system and standard management applied during the season.

RESULTS AND DISCUSSION

There was a significant yield response in favor of Georgia-01R. The yield results for corn and cotton are found in Table 1. Corn yields for all four treatments were reduced compared to other years due to severe corn rust infection.

The no-till cotton yields were reduced due to escaped weeds and competition even though we used a Roundup-ready cotton variety. Timeliness is essential to good weed control. As in previous years, our cotton yields for strip-tilled and no-tilled plots were very similar. Cover crop resulted in numerically higher yields for both the strip-till and no-till cotton. Further work on no-till cotton needs to be conducted and would be a tremendous cost savings to producers, particularly on a Greenville soil which requires several trips to plant cotton conventionally which increases fuel and labor costs.

For the first time since the study began eight years ago, there was a significant yield response to a cover crop being planted for both conventional and strip-DP-1 across tillages. Ga 01R had less CBR and rhizoctonia limb rot than DP-1. There was significant pod loss of DP-1 at harvest due to the rhizoctonia limb rot.

Peanut yields are found in Table 2. Digging losses have been a continual problem for us on the Greenville soil types with reduced tillage methods. The effects of CBR and Rhizoctonia limb rot can be found in Table 3. There was a high level of significance to CBR by tillage, cover crop and varieties. Rhizoctonia was affected by variety and cover crop by variety interaction.

Table 1. Yield of Dekalb 697 Corn and Delta Pine 555BR Cotton at Plains during 2003.

Tillage Treatment	Corn Yield bu./A	Cotton Yield lbs/A Lint
Strip-Till Fallow	73	1940
Strip-Till Cover	78	2100
No-Till Cover	71	1720
No-Till Fallow	77	1500

Table 2. Yield and Grade of Ga 01R and DP-1 Peanuts planted by four tillage Methods at Plains during 2003

Treatment	Ga 01R Yield lb/A	DP-1 Yield lb/A	Average Yield lb/A	Ga 01R TSMK %	DP-1 TSMK %
ST Fallow	4550	3650	4100a	75.2	68.3
ST Rye	4500	3705	4105a	74.7	67.6
Conv Rye	4495	4150	4320a	75.8	68.2
Conv Fallow	4490	2530	3600b	74.1	67.5
	4510*	3510	3960	75**	67

*p<.001
**p<.001

Table 3. Disease Incidence of CBR and Rhizoctonia Limb Rot on Two Peanut Cultivars Planted at Plains by Four Tillage Methods during 2003.

Treatment	Ga 01R CBR %	DP-1 CBR %	Avg. CBR %	Ga 01R Rhizoc %	DP-1 Rhizoc %	Avg. Rhizoc %
ST Fallow	5,5	4.6	5.1	21	37	29
ST Rye	1.1	3.1	2.1	16	38	27
			3.7			28
Conv Rye	4.6	13	9.0	20	36	27
Conv Fallow	21	34	27.5	19	32	25
			18			26

CBR = Tillage $p<.01$ cover crop $p<.001$ Tillage*cover crop $p<.01$ Variety $p<.05$ Tillage*Variety $p<.05$
Rhizoctonia= Variety $p< .0001$ cover crop*Variety $p<.10$

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COMPARISON OF A TRIPLE ROW PLANTING PATTERN TO TWIN AND SINGLE ROW PATTERNS

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INTRODUCTION

Research over the past 15-20 years has clearly differentiated the advantages of the twin-row pattern for planting peanut compared to the standard single-row pattern. On average, peanut planted in twin rows yield 400-500 lbs/A higher, grade out 1-2% higher in percent total sound mature kernels, and will have significantly less spotted wilt disease. Most of this research has compared twin-rows planted in a 7 to 9-inch twin row spacing to single rows spaced 36 inches apart. The objective of this research was to compare a triple-row pattern, with three rows spaced six inches apart on either side of a 72-inch seedbed. This pattern results in a 12-inch spacing between the two center rows.

EXPERIMENTAL DESIGN AND PROCEDURES

Tests were conducted at three sites in Georgia and one each in Alabama and Florida. The three test sites in Georgia were: Ponder Farm (Coastal Plain Experiment Station) near Ty Ty, Southwest Georgia Research and Education Center near Plains, and the Southeast Georgia Research and Education Center near Midville. The Alabama location was the Wiregrass Research and Extension Center at Headland. The Florida location was the North Florida Research and Education Center near Marianna.

At all locations, plots were two rows wide and length varied depending on field size. Treatments were replicated four times and the experimental design was a randomized complete block. Treatments were three row spacings (single, twin, and triple row patterns) by three cultivars (Georgia Green, Georgia-02C, and Carver). Planting dates were: Marianna – May 6; Tifton – May 12; Headland – May 15; Midville – May 27; and Plains – May 28. Seed population per acre was held constant by planting single rows at six seed per foot of row, twin rows at three seed per foot of row, and triple rows at two seed per foot of row. Planting depth was 2.25 inches and Thimet insecticide was applied in-furrow at the rate of five pounds per acre at planting. All other pest management and agronomic practices were based on university recommendations. Stand counts were made at each location within the first five weeks after planting to verify if a sufficient stand had emerged. All tests were irrigated as needed. Harvest date was determined by using the Hull-Scrape Maturity Profile method.

Data collected included spotted wilt disease ratings at locations where there were enough symptoms, yield, and grade factors. Yield data was calculated by converting individual plot weights to a pound per acre basis and adjusted to seven percent moisture after deducting percent foreign material. A five-pound sample was collected from each plot for grade factor determination by technicians with the Federal-State Inspection Service. Spotted wilt disease ratings were taken shortly before harvest by counting the number of one-foot sections severely affected by tomato spotted wilt virus (TSWV) in randomly selected 100 row-feet within each plot.

RESULTS AND DISCUSSION

Data analysis was done using Proc Mixed, SAS version 8.2 and mean separation was by Satterthwaite.

Tifton

Data analysis for yield indicated a significant cultivar by row pattern interaction ($p = 0.0112$). Yield data are presented in Table 1. Georgia Green and Carver had significantly ($p \leq 0.05$) higher yields in the twin and triple row pattern than the single row pattern. Georgia-02C had a significantly higher yield in twin rows than triple rows. There was no difference in yield between twin and single or between single and triple for Georgia-02C.

Table 1. Yield (lbs/A) of peanut cultivars planted in single, twin, and triple row patterns, Tifton, 2003.

	Row Patterns		
Cultivars	**Single**	**Twin**	**Triple**
Georgia Green	3632 b B*	4788 a A	4678 a A
Georgia-02C	4104 a AB	4530 a A	3976 b B
Carver	3983 ab B	4576 a A	4621 a A

*Lower case letters used for comparison of cultivars within each row pattern. Upper case letters used for comparison of row patterns within cultivars. Means in a column (lower case) or a row (upper case) that have the same letter do not differ significantly at the $P \leq 0.05$ level.

Data analysis for percent total sound mature kernels (%TSMK) indicated no interaction between cultivars and row patterns. There was a significant difference between row patterns and cultivars (Table 2). When averaged over cultivars, twin and triple row planted peanut had significantly higher percent TSMK than peanut planted in the single row pattern.

Table 2. Percent total sound mature kernels (TSMK) of peanut planted in single, twin, and triple row patterns, Tifton, 2003.

Cultivar (averaged over row patterns)	TSMK (%)		Row Pattern (averaged over cultivars)	TSMK (%)
Georgia Green	75.4 b*		Single	73.8 b
Georgia-02C	77.4 a		Twin	75.8 a
Carver	73.2 c		Triple	76.4 a
LSD (0.05)	**1.0**		**LSD (0.05)**	**1.0**

*Means within the same column followed by the same letter do not differ significantly at the p=0.05 level.

There was no data collected on spotted wilt severity at the Tifton location

Plains

The row spacing test at the Plains location was severely affected by Cylindrocladium black rot (CBR). Yield, grade, and CBR severity ratings were collected. Data analysis for yield indicated no difference ($p \leq 0.05$) among cultivars or row patterns and no interaction of the two variables. Yield data are presented in Table 3.

Table 3. Yield data of peanut planted in single, twin, and triple row patterns, Plains, 2003.

Cultivar (averaged over row patterns)	Yield (lbs/A)		Row Pattern (averaged over cultivars)	Yield (lbs/A)
Georgia Green	2446		Single	2599
Georgia-02C	2740		Twin	2647
Carver	3112		Triple	3052
LSD (0.05)	**NS**		**LSD (0.05)**	**NS**

Data analysis for percent TSMK indicated a significant difference among cultivars and row patterns, but no interaction. Those data are presented in Table 4.

Table 4. Percent total sound mature kernels (TSMK) of peanut planted in single, twin, and triple row patterns, Plains, 2003.

Cultivar (averaged over row patterns)	TSMK (%)		Row Pattern (averaged over cultivars)	TSMK (%)
Georgia Green	73.7 b*		Single	72.8 b
Georgia-02C	76.1 a		Twin	74.0 ab
Carver	72.2 c		Triple	75.1 a
LSD (0.05)	**1.3**		**LSD (0.05)**	**1.3**

*Means within the same column followed by the same letter do not differ significantly at the p=0.05 level.

Just as was the case at Tifton, Georgia-02C had a significantly higher percent TSMK than Carver and Georgia Green when averaged over row patterns. There was no difference between twin and triple row patterns for percent TSMK when averaged over cultivars. Peanut planted in the triple row pattern had a significantly higher percent TSMK than peanut planted in the single row pattern.

Ratings for percent CBR damage were taken just prior to harvest. Data analysis indicated no difference among cultivars or row patterns and no interaction for percent CBR damage. Previous research indicated that Carver and Georgia-02C have more resistance to CBR than Georgia Green. When averaged over row patterns, the percent CBR damage for each cultivar was: Georgia Green – 61%; Carver – 59%; and Georgia-02C – 46%. Because of the severity of CBR, no spotted wilt disease ratings were made at Plains.

Midville

Data analysis for yield at Midville indicated a significant difference among row patterns but no difference among cultivars and no interaction. Yield data are presented in Table 5.

Table 5. Yield data of peanut planted in single, twin, and triple row patterns, Midville, 2003.

Cultivar (averaged over row patterns)	**Yield (lbs/A)**		**Row Pattern (averaged over cultivars)**	**Yield (lbs/A)**
Georgia Green	4004		Single	4296 a*
Georgia-02C	3963		Twin	3608 b
Carver	3638		Triple	3701 b
LSD (0.05)	**NS**		**LSD (0.05)**	**507**

*Means within the same column followed by the same letter do not differ significantly at the p=0.05 level.

At the Midville location, the single row pattern had a significantly higher yield than the twin and triple row patterns. This trial received well above normal rainfall in June, July and August and was very dry prior to harvest. It is not known if the very wet conditions favored the single row pattern.

Data analysis for percent TSMK also indicated a significant difference among row patterns and no difference among cultivars and no interaction. Total sound mature kernels data are presented in Table 6.

Table 6. Percent total sound mature kernels (TSMK) of peanut planted in single, twin, and triple row patterns, Midville, 2003.

Cultivar (averaged over row patterns)	**TSMK (%)**		**Row Pattern (averaged over cultivars)**	**TSMK (%)**
Georgia Green	76.8		Single	78.3 a
Georgia-02C	77.2		Twin	77.4 a
Carver	76.5		Triple	74.8 b
LSD (0.05)	**NS**		**LSD (0.05)**	**1.1**

*Means within the same column followed by the same letter do not differ significantly at the p=0.05 level.

The single and twin row patterns had a significantly higher percent TSMK than the triple row pattern. No spotted wilt disease ratings were made at this location.

Headland, AL

Data analysis of yield data indicated significant differences among cultivars when averaged over row patterns and significant differences among row patterns when averaged over cultivars. There was no interaction between the two variables. Yield data are presented in Table 7. Carver had a significantly higher yield than Georgia Green and Georgia-02C when averaged over row patterns. The triple and twin row patterns had significantly higher yields than the single row pattern when averaged over cultivars.

Table 7. Yield data of peanut planted in single, twin, and triple row patterns, Headland, AL, 2003.

Cultivar (averaged over row patterns)	Yield (lbs/A)		Row Pattern (averaged over cultivars)	Yield (lbs/A)
Georgia Green	3204 b*		Single	2985 b
Georgia-02C	3258 b		Twin	3725 a
Carver	3936 a		Triple	3687 a
LSD (0.05)	**208**		**LSD (0.05)**	**208**

*Means within the same column followed by the same letter do not differ significantly at the p=0.05 level.

Data analysis for percent TSMK also indicated a significant difference among cultivars averaged over row patterns and row patterns averaged over cultivars. There was no interaction between the two variables. Percent TSMK data are presented in Table 8.

Table 8. Percent total sound mature kernels (TSMK) of peanut planted in single, twin, and triple row patterns, Headland, AL, 2003.

Cultivar (averaged over row patterns)	TSMK (%)		Row Pattern (averaged over cultivars)	TSMK (%)
Georgia Green	74.2 b*		Single	74.7 b
Georgia-02C	78.4 a		Twin	75.4 ab
Carver	73.6 b		Triple	76.1 a
LSD (0.05)	**1.1**		**LSD (0.05)**	**1.1**

*Means within the same column followed by the same letter do not differ significantly at the p=0.05 level.

Georgia-02C had a significantly higher percent TSMK than Georgia Green and Carver. Peanut planted in the triple row pattern had a significantly higher percent TSMK than peanut planted in the single row pattern. The percent TSMK of the twin row pattern was not significantly different than the single or twin row patterns.

Ratings for spotted wilt disease were made at the Headland location. Data analysis indicated a significant interaction between cultivars and row patterns. Those data are presented in Table 9.

Table 9. Percent spotted wilt disease of peanut cultivars planted in single, twin, and triple row patterns, Headland, AL, 2003.

	Row Patterns		
Cultivars	**Single**	**Twin**	**Triple**
Georgia Green	17.2 b C*	8.3 b B	6.3 b A
Georgia-02C	5.3 a B	3.5 a AB	2.2 a A
Carver	4.3 a B	2.2 a A	1.2 a A

*Lower case letters used for comparison of cultivars within each row pattern. Upper case letters used for comparison of row patterns within cultivars. Means in a column (lower case) or a row (upper case) that have the same letter do not differ significantly at the $P \leq 0.05$ level. LSD = 1.91.

Georgia-02C and Carver had significantly less spotted wilt disease than Georgia Green on all three row patterns. The triple row pattern had significantly less spotted wilt disease than the single row pattern on all three cultivars. The triple row pattern had significantly less spotted wilt disease than the twin row pattern on Georgia Green. There was no difference in spotted wilt disease between triple and twin row patterns on Georgia-02C and Carver. The twin row pattern had significantly less spotted wilt disease than the single row pattern on Georgia Green and Carver, but not on Georgia-02C.

Marianna, FL

At the Marianna, FL location all three cultivars were planted but yield data for Georgia Green and Carver were lost. Therefore, yield data analysis was for Georgia-02C only. There was a significant difference for yield among the row patterns (Table 10). There was no difference in yield between the twin and triple row patterns.

Table 10. Yield data of Georgia-02C peanut planted in single, twin, and triple row patterns, Marianna, FL, 2003.

Row Pattern (averaged over cultivars)	**Yield (lbs/A)**
Single	5192 b*
Twin	6021 a
Triple	5609 ab
LSD (0.05)	**601**

*Means within the same column followed by the same letter do not differ significantly at the p=0.05 level.

Data analysis for percent TSMK indicated a significant difference among the cultivars, but no difference among row patterns and no interaction between the two variables. The grade data are presented in Table 11.

Table 11. Percent total sound mature kernels (TSMK) of peanut planted in single, twin, and triple row patterns, Marianna, FL, 2003.

Cultivar (averaged over row patterns)	**TSMK (%)**		**Row Pattern (averaged over cultivars)**	**TSMK (%)**
Georgia Green	73.0 b		Single	72.8
Georgia-02C	76.8 a		Twin	73.3
Carver	70.2 c		Triple	73.8
LSD (0.05)	**1.3**		**LSD (0.05)**	**NS**

*Means within the same column followed by the same letter do not differ significantly at the p=0.05 level.

Georgia-02C had a significantly higher percent TSMK than Georgia Green and Carver. Georgia Green had a significantly higher percent TSMK than Carver.

Spotted wilt disease ratings were made at Marianna. Data analysis indicated a significant interaction among the two variables, as well as a significant difference among cultivars and among row patterns. Data for spotted wilt disease are presented in Table 12.

Table 12. Percent spotted wilt disease of peanut cultivars planted in single, twin, and triple row patterns, Marianna, FL, 2003.

	Row Patterns		
Cultivars	**Single**	**Twin**	**Triple**
Georgia Green	37.5 c B*	15.6 b A	13.4 b A
Georgia-02C	8.6 a A	8.0 a A	4.4 a A
Carver	22.6 b B	17.4 b A	12.4 b A

*Lower case letters used for comparison of cultivars within each row pattern. Upper case letters used for comparison of row patterns within cultivars. Means in a column (lower case) or a row (upper case) that have the same letter do not differ significantly at the $P \leq 0.05$ level. LSD = 5.1.

The twin and triple row patterns had significantly less spotted wilt disease on Georgia Green and Carver. There was no difference in spotted wilt disease among the three row patterns on Georgia-02C. Georgia-02C had significantly less spotted wilt disease than Georgia Green and Carver on all three row patterns. There was no difference in spotted wilt between Georgia Green and Carver on he twin and triple row patterns, but there was a difference between the two in spotted wilt incidence on the single row pattern.

Table 13 below provides the yield and grade of the three row patterns when averaged across cultivars and locations in 2003.

Table 13. Yield (lbs/A) and percent total sound mature kernels (TSMK) of peanut when averaged over cultivars and locations, 2003.

Row Pattern	Yield (lbs/A)	TSMK (%)
Single	3796	74.5
Twin	4126	75.2
Triple	4095	75.2

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The authors want to express appreciation to the National Peanut Board and the Southeastern Peanut Research Initiative (Georgia Peanut Commission, Alabama Peanut Producers Association, and Florida Peanut Producers Association) for financial support of this project. We also wish to thank David Tyson at the Ponder Farm and the staffs at the Southwest Georgia Research and Education Center near Plains, Southeast Georgia Research and Education Center near Midville, the Wiregrass Research and Extension Center at Headland, AL, and the North Florida Research and Extension Center near Marianna for their assistance in conducting this research.

TRIPLE ROW SEEDING RATE TEST

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INTRODUCTION

Concurrent research is evaluating the response of peanut planted in a triple row pattern compared to single and twin row patterns. In those research trials, seed population per acre is kept constant at six seed per foot on single rows, three seed per foot on twin rows, and two seed per foot on triple rows. In this research, various seeding rates on triple rows will be compared to six seed per foot on single rows and three seed per foot on twin rows. Previous research by Baldwin evaluated two, three, and four seed per foot on twin rows. Those rates are equivalent to four, six and eight seed per foot of row on single rows. Results from that research indicated highest yields were obtained when peanut was sowed at three seed per foot of row when planted in the twin row pattern. At four seed per foot of row on twin rows (eight per foot on singles), yields were significantly less than three seed per foot. Yield from plots planted at two seed per foot of row on twin rows was also significantly less than the three seed per foot of row rate. These data confirm the recommendation of three seed per foot of row on twin row pattern.

Initial observations of the triple row pattern tests indicated a need to evaluate different seeding rates on triple row spacing. When planters are calibrated to deliver only two seed per foot of row, there are more opportunities for intra-row skips. Therefore, this research was initiated to evaluate the response of peanut planted in the triple row pattern at three different intra-row seeding rates.

RESEARCH PROCEDURES

This test was conducted at the Coastal Plain Experiment Station's Ponder Farm near Ty Ty. 'Georgia-02C' was planted on 12 May 2003. Seeding rate treatments were: single row pattern at six seed per foot of row, twin row pattern at three seed per foot of row, and triple row pattern at two, two and one-half, and three seed per foot of row. The two, two and one-half, and three seed per foot of row on triple rows would equal six, seven and one-half, and nine seed per foot of row on single rows.

Plots were six feet wide by 50 feet long and there were four replications. The experimental design was a randomized complete block with four replications. All plots had Thimet insecticide in-furrow at the rate of five lbs/A. Pest management, agronomic, and irrigation decisions were all based on university recommendations. Data collected included plant stand counts, spotted wilt severity, yield, and grade factors. Spotted wilt severity was determined by counting one-foot hits severely affected by tomato spotted wilt virus (TSWV) in each plot and converted to a percentage basis. Yield was determined by converting plot weight to pounds per acre, adjusting to seven percent moisture, and subtracting out percent foreign material from grade sample report. A five-pound sample was collected from each plot and submitted to Federal-State Inspection Service for grade factor determination.

RESULTS AND DISCUSSION

The data are presented in the table below. Data analysis for yield indicated a significant difference ($p \leq 0.05$) among the treatments. There was no difference in yield among the twin row pattern at three seed per foot of row and all three of the triple row pattern seeding rates of two, two and one-half, and three seed per foot of row. All four of these treatments had a significantly higher yield than the single row pattern at six seed per foot of row. Data analysis for percent total sound mature kernels (TSMK) indicated a significant difference among treatments. These data agree with data from 2002, which indicates that two seed per foot of row on the triple row pattern is sufficient. This is encouraging since going to two and one-half or three seed per foot of row on triple rows would significantly increase pounds planted per acre and seed cost per acre. Spotted wilt disease severity ratings were made but the data were lost and can't be reported.

Row Pattern	**Seed/Ft. of Row**	**Single Row Equiv. (seed/ft)**	**Yield (lbs/A)**	**TSMK (%)**
Single	6	6	2574 b*	76.0 c
Twin	3	6	3383 a	76.5 bc
Triple	2	6	3476 a	77.0 abc
Triple	2.5	7.5	3516 a	77.5 ab
Triple	3	9	3230 a	78.0 a
LSD (0.05)			**511**	**1.4**

*Means in the same column followed by the same letter are not significantly different at the 0.05 level of probability.

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The authors want to express their deepest appreciation to the Georgia Peanut Commission for partial funding of this project. Appreciation and recognition is also given to John Hagin, Jeremy Taylor, Jess Bolton, and Ben Cox, student workers that provided much needed help.

VIRGINIA CULTIVAR, ROW PATTERN, AND SEEDING RATE TEST

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INTRODUCTION

Due to a dramatic reduction of acres in Virginia and North Carolina over the past two years, the peanut industry is looking to the southeast, especially South Carolina and east Georgia, to produce Virginia-type peanuts for the in-shell market. Many producers in the eastern part of Georgia's peanut belt were asked to consider growing Virginia-type peanuts in 2003. The previous University of Georgia recommendation for Virginia-type peanuts was to plant three to four seed per foot of row. This recommendation was based on growing conditions that did not include spotted wilt disease, caused by tomato spotted wilt tospovirus (TSWV), as a yield-limiting factor. Research on runner-type peanuts in the 1990's indicated that a final plant population of four plants per foot of row on single rows and two plants per foot of row on twin rows is needed to reduce risk of spotted wilt disease. There had been no evaluation or research on plant population of Virginia-type peanuts since spotted wilt disease had become such a major factor.

One of the primary reasons for the lower seeding rate recommendation of three to four seed per foot of row on Virginia-type peanuts had been due to the large seed size that would result in very high seeding rates in pounds of seed planted per acre. As an example, the Virginia cultivar 'Gregory' averages about 450 seed per pound. Planted at four seed per foot of row, the pounds of seed planted per acre would be 130. If planted at six seed per foot of row, the pounds of seed planted per acre would be 194. At 60 cents per pound for seed, planting the extra two seed per foot of row would cost a producer about $38 more per acre in seed. Our biggest concern was that if producers planted seed at the old recommended rate of four per foot of row, spotted wilt disease would have a major yield-limiting effect. Gregory is the most TSWV resistant Virginia-type cultivar available for producers in the southeast. The level of TSWV resistance in Gregory is equal to the resistance in 'Georgia Green'.

A test was designed to compare Gregory and 'NC-V 11' Virginia-type cultivars when planted on the single row pattern at six versus four seed per foot of row and on the twin row pattern at three versus two seed per foot of row.

RESEARCH PROCEDURES

This trial was planted at two locations in Georgia. The first location was the University of Georgia's Stripling Irrigation Research Park near Camilla and the second location was the RDC Pivot on the Coastal Plain Experiment Station at Tifton. The test was a factorial of two cultivars (Gregory and NC-V 11), two row patterns (single and twin), and two seeding rates (low = four seed per foot on single and two seed per foot on twin rows and high = six seed per foot on single and three seed per foot on twin rows). The Stripling location was planted on 14 May 2003. The experimental design was a split plot with row pattern as the main plot and cultivar X seeding rate as the sub-plot. There were six replications. Plot size at Stripling was six feet by 250 feet long. At the RDC Pivot, the experimental design was a randomized complete block and there were four replications. Plots were six feet by 40 feet long and the trial was planted on 30 May 2003. At both locations, Thimet insecticide was applied in-furrow at five pounds per acre. All production, irrigation, and pest management at both locations were based on University of Georgia recommendations. Data collected included plant stand, spotted wilt disease severity, yield, and grade factors. Data were analyzed using SAS Proc Mixed, version 8.2.

RESULTS AND DISSCUSSION

Stripling Irrigation Research Park

Data analysis for yield indicated a significant difference ($p = 0.05$) between cultivars and seed per foot of row. There were no significant interactions. Gregory had a significantly higher yield than NC-V 11, 4557 and 4195 pounds per acre, respectively (LSD = 204) when averaged over seeding rate and row pattern. When average over cultivars and row patterns, the higher seeding rate (six seed per foot of row on singles and three seed per foot of row on twins) had a significantly higher yield than the lower seeding rate, 4496 and 4256, respectively. Data analysis for percent total sound mature kernels (TSMK) indicated only a significant difference between row patterns. The twin row pattern, when averaged over cultivars and seed per foot of row, had a significantly higher percent TSMK than the single row pattern, 71.4 and 70.3, respectively (LSD = 0.7). This location was not rated for spotted wilt disease because the level was so low.

Tifton

Data analysis for yield at the Tifton location indicated a cultivar by seed per foot of row interaction. Analysis for percent total sound mature kernels indicated no significant difference between treatments and no interactions. Spotted wilt disease ratings were made and data analysis indicated no significant difference between treatments and no interactions. The table below provides the data for Tifton.

Cultivar	***Seeding Rate***	**Yield (lbs/A)**	***TSMK*** **(%)**	**Spotted Wilt Disease Severity (%)**
Gregory	High	4475 ab*	71.8	21.9
Gregory	Low	4675 a	72.9	15.9
NC-V 11	High	4499 ab	72.1	16.6
NC-V 11	Low	4298 b	71.8	26.6
LSD (0.05)		268	NS	NS

*Means in the same column followed by the same letter do not differ at the 0.05 level of probability

The excellent growing conditions at both locations negated any potential difference between the high (six seed per foot of row on singles and three seed per foot of row on twins) and the low (four and two seed per foot of row) seeding rates.

ACKNOWLEDGEMENTS

The authors want to express their deepest appreciation to the Georgia Peanut Commission for partial funding of this project. We also want to thank Rad Yager and Ivey Griner at the Stripling Irrigation Research Park for their help in this trial. Appreciation and recognition is also given to John Hagin, Jeremy Taylor, Jess Bolton, and Ben Cox, student workers that provided much needed help.

2003 GEORGIA PEANUT BREEDING LINE AND VARIETY TRIALS

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This report represents only one-year results. Multiple-year comparisons are recommended for more comprehensive variety evaluations. Georgia Peanut Variety Trials are annually conducted at three locations in the state (Coastal Plain Experiment Station at Tifton, Southwest Georgia Branch Station near Plains, and Southeast Georgia Branch Station near Midville). The irrigated test involves all recommended production practices, ie. fertilization, irrigation, and pesticide applications; and the nonirrigated test excludes just irrigation.

Coastal Plain Experiment Station - Sp/Val Irrigated Test

Georgia Browne has pod and seed size similar to other spanish-types. During 2003 as in past spanish tests, Georgia Browne again produced approximately 1000 lb/a more yield than the next best yielding spanish variety, Tamspan 90. An advanced Georgia breeding line (GA 982502) had the same highest yield and grade with 74% total sound mature kernels (TSMK) as Georgia Browne. Both Georgia Browne and GA 982502 had significantly higher yields than all other spanish varieties.

Georgia Red and Georgia Valencia had the highest yield among all valencia-type varieties tested in 2003. Three Georgia Valencia selections (GA Val-4,-10,and-12) were also similar to Georgia Red and Georgia Valencia in yield. Georgia Red had the highest TSMK grade percentage at 63%.

Coastal Plain Experiment Station-Ru/Va Irrigated Test

The 2003 growing season was a welcome change from the past several years of drought stress conditions. There was above average rainfall during June, July, and August. Some irrigation was used early in the growing season. Tomato spotted wilt virus (TSWV) and white mold or stem rot were moderate, but Rhizoctonia limb rot was quite severe among the more susceptible varieties at the end of the growing season. Disease ratings were taken at this location during mid-season and just prior to harvest.

Seven new varieties (six runner-types and one virginia-type) were included in the 2003 entry list. ‘Georgia-03L’ is a large-podded runner-type from the University of Georgia, previously tested as GA 962533. ‘AP-3’, ‘Andru II’, ‘DP-1’, and ‘Hull’ are runner market types from the University of Florida. ‘Tamrun OL02’ is also runner-type from Texas A & M University. ‘Wilson’ is a virginia market type from Virginia Polytechnic Institute and State University and USDA.

GA 011557, an advanced Georgia breeding line, and Georgia-02C topped all runner-type varieties for yield. However, Georgia-02C was not significantly different from Georgia-03L, Georgia Green, and another advanced Georgia breeding line, GA 011568 in yield. Two advanced Georgia breeding lines, GA 011567 and GA 011568, and the virginia variety, Georgia Hi-O/L, each had 80% or greater TSMK grades. Georgia Hi-O/L also had the highest yield of all the virginia-type varieties, and the highest percentages of extra large kernels (ELK) with 54%.

Coastal Plain Experiment Station - Ru/Va Nonirrigated Test

Drought stress was not a major yield or grade limiting factor this year. However, some TSWV, white mold or stem rot, and limb rot did occur, especially later in the growing season.

Two advanced Georgia breeding lines, GA 011557 and GA 011568, and two new Georgia varieties, Georgia-03L and Georgia-02C, topped the other runner-types in yield, and Georgia Hi-O/L had the highest yield of all the virginia-type varieties. GA 011567 and Georgia Hi-O/L had the highest TSMK grade at 80% and were followed closely by GA 011557 and Georgia-01R at 79%. Georgia Hi-O/L again had the highest percent ELK at 50%.

Southwest Georgia Branch Station-Ru/Va Irrigated Test

No irrigation was needed in 2003. Some TSWV and soilborne diseases, especially CBR were found sporadically throughout the test. Leafspot was also quite prevalent in spite of using recommended fungicides for control during the later part of the growing season. Yields were again down from 2001 and 2002.

Two advanced Georgia breeding lines, GA 011568 and GA 011567 topped the runner-types in yield, but were not significantly different from GA 011528, Georgia-03L, GA 011557, Georgia Green, AP-3, AgraTech 201, and Carver. GA 011568, GA 011528, Georgia-01R, and AgraTech 201 had the highest TSMK grade percentage at 76%, and were followed closely by GA 011567, GA 011557, and Georgia-02C at 75%. Perry, Georgia Hi-O/L, and NC-V 11 had the highest yields, and Georgia Hi-O/L had the highest grade of the virginia-type varieties. Wilson had the highest percentage of ELK at 38%.

Southwest Georgia Branch Station-Ru/Va Nonirrigated Test

Drought stress was not a problem at this location during the growing season. Similar to the irrigated test, some TSWV and soilborne diseases were sporadically found in the test. Leafspot was also quite prevalent.

Four advanced Georgia breeding lines (GA 011528, GA 011557, GA 011567, and GA 011568), Georgia-03L, Georgia Green, and Georgia-01R topped the runner-type varieties in yield, and GA 011557 had the highest TSMK grade at 78%.

Georgia Hi-O/L topped the virginia-types in yield, and Perry had the highest TSMK grade at 73%. NC-V 11 had the highest ELK percentage at 41%.

Southeast Georgia Branch Station-Ru/Va Irrigated Test and Nonirrigated Test

Both peanut variety tests were planted at this location on May 29, 2003. However, extensive damage resulted from soil compaction and water-logged conditions from over 27 inches of rain during May, June, and July causing very low yields and considerable variation in performances among plots within both tests. After careful analysis and review of this data, it was decided that the results obtain were not accurately reflecting the genetic potential of the entries. Thus, the data was omitted.

2003 GEORGIA PEANUT BREEDING LINE AND VARIETY TRIAL
Coastal Plain Experiment Station
-Sp/Val Irrigated Test-

Breeding Line and Variety	Digging Date	Yield (lb/a) W-DMRT[1]	TSM (%)	OK (%)	DK (%)	ELK (%)	Seed (no./lb)
Spanish Types							
Georgia Browne	09/02	4196 a	74.0	3.7	0.1	4.2	1065
GA 982502[2]	09/02	4054 a	73.8	4.9	0.4	5.7	1134
Tamspan 90	08/11	2902 b	65.4	7.5	1.0	2.0	1160
Spanco	08/04	2195 de	60.1	8.6	4.1	1.8	1106
Olin	08/11	2151 de	63.4	7.9	1.6	5.4	1160
Pronto	08/04	1943 ef	63.8	8.0	2.9	1.1	1123
Valencia Types							
Georgia Valencia	08/11	2727 bc	59.2	4.2	2.9	11.5	774
GA Val-12[2]	08/11	2597 bc	55.9	5.9	3.7	6.0	849
GA Val-10[2]	08/11	2505 cd	55.9	5.0	5.3	8.0	804
Georgia Red	08/11	2497 cd	63.0	5.2	3.7	7.2	922
GA Val-4[2]	08/11	2442 cd	60.1	4.8	2.6	6.8	867
H & W Valencia 102	07/28	1714 fg	50.7	13.8	3.9	0.1	1224
Valencia McRan	07/28	1679 fg	49.7	14.3	3.4	0.1	1253
H & W Valencia 101	07/28	1658 fg	52.2	13.0	2.9	0.1	1202
N.M. Valencia C	07/28	1631 fg	54.8	12.1	2.4	0.1	1219
N.M. Valencia A	07/28	1475 g	53.6	13.4	1.6	0.1	1264

[1] Waller-Duncan Multiple Range Test: Yields within the same column followed by the same letter do not differ significantly at the 0.05 level of probability.
[2] Advanced Georgia breeding line.
Planted: April 17, 2003.
Fertilization: Applied 3.5 lb/a Solubor and 1000 lb/a gypsum.
Soil Type/Test: Tifton loamy sand; pH=6.4, P_2O_5=17, K_2O=203, Ca=799, Mg=125 lb/a.
Previous Crop: Cotton.
Management: Treated with Sonalan+Dual, Temik, Headline (2 sprays), Folicur (3 sprays).

Digging Date:	July 28	Aug. 4	Aug. 11	Sept. 2
Rainfall (in.):	17.26	18.80	25.20	31.18
Irrigation (in.):	2.15	2.15	2.15	2.15
Total (in.):	19.41	20.95	27.35	33.33

NOTE: Tomato spotted wilt virus (TSWV) and white mold or stem rot disease pressure was quite high.

2003 GEORGIA PEANUT BREEDING LINE AND VARIETY TRIAL
Coastal Plain Experiment Station
-Ru/Va Irrigated Test-

Breeding Line and Variety	Digging Date	Yield (lb/a) W-DMRT[1]	TSMK (%)	OK (%)	DK (%)	ELK (%)	Seed (no./lb)
Runner Types							
GA 011557[2]	09/30	5558 a	79.2	2.6	0.6	--	603
Georgia-02C	10/07	5277 ab	77.8	2.8	0.4	--	722
GA 011568[2]	09/30	5074 bcd	80.2	2.1	0.7	--	687
Georgia-03L	09/30	5049 bcd	74.0	2.7	0.5	--	669
Georgia Green	09/30	5017 bcd	76.8	4.1	0.8	--	796
GA 011528[2]	09/30	4782 cde	78.0	3.5	0.8	--	689
AP-3	09/30	4765 cde	73.5	2.9	0.3	--	740
GA 011567[2]	09/30	4723 de	81.7	1.4	0.1	--	644
GA 982502[2]	09/30	4542 ef	72.8	8.2	0.1	--	1075
Georgia-01R	10/21	4234 fg	79.0	1.9	0.7	--	644
Carver	09/30	4128 fgh	71.7	5.4	2.22	--	696
AgraTech 201	09/30	4049 ghi	74.2	3.1	4.2	--	699
Andru II	09/23	4021 ghi	68.9	6.0	1.7	--	837
DP-1	10/21	3725 hij	74.5	3.1	1.6	--	762
C34-24[3]	10/21	3625 ijk	76.4	3.6	1.0	--	728
Tamrun OL02	09/30	3320 jkl	73.8	3.5	1.4	--	734
C-99R	10/21	3269 jkl	72.9	3.1	2.4	--	649
ANorden	09/30	3166 kl	73.5	4.8	1.3	--	766
Hull	10/21	3053 l	71.3	3.9	4.8	--	667
Virginia Types							
Georgia Hi-O/L	09/23	5198 abc	80.5	0.9	1.9	54.0	515
Perry	09/23	4040 ghi	72.3	2.0	3.3	35.8	523
NC-V 11	09/23	3851 ghi	69.7	1.7	3.8	48.6	440
Gregory	09/23	3245 kl	68.7	2.4	4.7	28.2	546
Wilson	09/23	3234 kl	68.5	2.5	2.0	26.4	541

[1] Waller-Duncan Multiple Range Test: Yields within the same column followed by the same letter do not differ significantly at the 0.05 level of probability.
[2] Advanced Georgia breeding line.
[3] Advanced USDA breeding line.
Planted: May 12, 2003.
Fertilization: Applied 3.5 lb/a Solubor and 1000 lb/a gypsum.
Soil Type/Test: Tifton loamy sand; pH=6.4, P_2O_5=80, K_2O=130, Ca=606, Mg=52 lb/a.
Previous Crop: Corn.
Management: Treated with Sonalan+Dual, Temik, Headline (2 sprays), Folicur (4 sprays), Basagran, Select, and Lannate (2 sprays).

Digging Date:	Sept. 23	Sept. 30	Oct. 7	Oct. 21
Rainfall (in.):	31.59	32.03	32.03	32.95
Irrigation (in.):	1.70	1.70	1.70	1.70
Total (in.):	33.29	33.73	33.73	34.65

NOTE: Tomato spotted wilt virus (TSWV) and white mold or stem rot disease pressure was moderate, but Rhizoctonia limb rot was quite high at the end of the growing season, especially among the later maturing entries.

2003 GEORGIA PEANUT BREEDING LINE AND VARIETY TRIAL
Coastal Plain Experiment Station
-Ru/Va Nonirrigated Test-

Breeding Line and Variety	Digging Date	Yield (lb/a) W-DMRT[1]	TSMK (%)	OK (%)	DK (%)	ELK (%)	Seed (no./lb)
Runner Types							
GA 011557[2]	09/30	5765 a	79.2	2.3	0.8	--	610
GA 011568[2]	09/30	5519 ab	76.9	3.4	1.3	--	718
Georgia-03L	09/30	5410 abcd	73.5	2.4	0.7	--	641
Georgia-02C	10/07	5142 abcde	77.2	3.8	0.4	--	734
GA 011528[2]	09/30	5018 bcdef	76.6	3.4	2.7	--	698
GA 011567[2]	09/30	4867 cdefg	80.0	2.4	0.3	--	673
Georgia Green	09/30	4843 cdefg	76.8	4.0	0.7	--	816
AP-3	09/30	4818 defgh	71.8	3.6	0.3	--	771
GA 982502[2]	09/30	4817 defgh	73.8	6.0	0.4	--	1083
Carver	09/30	4479 fghij	75.0	4.2	0.5	--	734
Tamrun OL02	09/30	4462 fghij	74.3	3.3	1.8	--	746
Andru II	09/23	4196 hijk	70.3	4.5	2.0	--	862
AgraTech 201	09/30	4074 ijk	76.2	4.0	1.2	--	702
Georgia-01R	10/21	3909 jk	78.9	1.8	0.5	--	670
ANorden	09/30	3715 kl	73.8	5.2	0.6	--	768
DP-1	10/21	3615 klm	74.5	3.0	0.3	--	758
C34-24[3]	10/21	3120 lmn	75.0	2.6	1.0	--	761
Hull	10/21	2991 mn	75.6	3.6	0.6	--	695
C-99R	10/21	2813 n	74.6	3.9	0.3	--	680
Virginia Types							
Georgia Hi-O/L	09/23	5460 abc	80.3	0.9	0.9	50.4	506
Perry	09/23	4650 efghi	73.7	1.3	0.8	34.0	519
NC-V 11	09/23	4644 efghi	73.9	0.7	0.6	49.3	449
Wilson	09/23	4251 ghijk	71.6	1.6	0.5	31.4	525
Gregory	09/23	4131 ijk	70.2	2.0	2.0	26.4	583

[1] Waller-Duncan Multiple Range Test: Yields within the same column followed by the same letter do not differ significantly at the 0.05 level of probability.
[2] Advanced Georgia breeding line.
[3] Advanced USDA breeding line.
Planted: May 12, 2003.
Fertilization: Applied 3.5 lb/a Solubor and 1000 lb/a gypsum.
Soil Type/Test: Tifton loamy sand; pH=6.4, P_2O_5=80, K_2O=130, Ca=606, Mg=52 lb/a.
Previous Crop: Corn.
Management: Treated with Sonalan+Dual, Temik, Headline (2 sprays), Folicur (4 sprays), Basagran, Select, and Lannate (2 sprays).

Digging Date:	Sept. 23	Sept. 30	Oct. 7	Oct. 21
Rainfall (in.):	31.59	32.03	32.03	32.95

NOTE: Tomato spotted wilt virus (TSWV) and white mold or stem rot disease pressure was moderate, but Rhizoctonia limb rot was quite high at the end of the growing season, especially among the later maturing entries. Drought stress was not a problem in this test.

2003 GEORGIA PEANUT BREEDING LINE AND VARIETY TRIAL
Southwest Georgia Branch Station
-Ru/Va Irrigated Test-

Breeding Line and Variety	Digging Date	Yield (lb/a) W-DMRT[1]	TSMK (%)	OK (%)	DK (%)	ELK (%)	Seed (no./lb)
Runner Types							
GA 011568[2]	10/01	4300 a	76.0	3.5	0.0	--	776
GA 011567[2]	10/01	4276 a	75.5	3.0	0.0	--	764
GA 011528[2]	10/01	4039 ab	76.5	3.5	0.0	--	793
Georgia-03L	10/01	3898 abc	71.5	2.5	0.0	--	711
GA 011557[2]	10/01	3798 abc	75.0	3.5	1.0	--	735
Georgia Green	10/01	3703 abcd	73.5	6.0	0.0	--	812
AP-3	10/01	3610 abcd	68.5	4.5	0.0	--	824
AgraTech 201	10/01	3551 abcd	76.0	3.0	1.0	--	793
Carver	10/01	3545 abcd	73.5	4.0	0.0	--	763
Georgia-02C	10/01	3425 bcde	75.0	4.5	0.0	--	803
Andru II	09/18	3348 bcdef	67.0	7.5	0.0	--	932
Georgia-01R	10/14	3320 bcdef	76.0	3.0	0.0	--	718
ANorden	10/01	3142 cdef	72.5	4.5	0.0	--	808
GA 982502[2]	10/01	3125 cdef	74.0	3.5	0.0	--	1142
Hull	10/14	2951 def	72.0	4.0	0.5	--	765
Tamrun OL02	10/01	2895 def	72.5	4.0	0.0	--	831
C34-24[3]	10/16	2637 ef	73.5	3.5	0.5	--	816
DP-1	10/16	2629 ef	70.0	6.0	0.0	--	848
C-99R	10/14	2550 f	74.0	4.0	0.0	--	735
Virginia Types							
Perry	09/18	3427 bcde	71.5	2.0	0.0	33.5	574
Georgia Hi-O/L	09/18	3400 bcde	74.5	2.0	1.5	32.5	612
NC-V 11	09/18	3259 bcdef	70.5	2.5	0.0	34.5	547
Gregory	09/18	2953 def	68.0	3.0	0.5	36.5	650
Wilson	09/18	2672 ef	65.0	4.5	0.5	38.5	683

1. Waller-Duncan Multiple Range Tests: Yields within the same column followed by the same letter do not differ significantly at the 0.05 level of probability.
2. Advanced Georgia breeding line.
3. Advanced USDA breeding line.

Planted: May 21, 2003.
Seeding Rate: 6 seed/foot in 36" rows.
Fertilization: 12 lb N, 66 lb P_2O_5, 18 lb K_2O, and 1 ton lime/acre.
Soil Type/Test: Greenville sandy loam; P = Low, K = High, and pH = 5.9.
Management: Moldboard plowed and rototilled; Sonolan, Dual, and Valor used for weed control; Bravo (3 sprays) and Folicur (4 sprays).

	May	June	July	Aug.	Sept.
Rainfall (in.):	6.77	4.64	5.91	6.34	2.33
Irrigation (in.):	0	0	0	0	0
Total (in.):	6.77	4.64	5.91	6.34	2.33

Note: Some soilborne diseases were observed.

2003 GEORGIA PEANUT BREEDING LINE AND VARIETY TRIAL
Southwest Georgia Branch Station
-Ru/Va Nonirrigated Test-

Breeding Line and Variety	Digging Date	Yield (lb/a) W-DMRT[1]	TSMK (%)	OK (%)	DK (%)	ELK (%)	Seed (no./lb)
Runner Types							
GA 011557[2]	10/01	4940 a	77.5	2.5	0.0	--	695
Georgia-03L	10/01	4581 ab	71.5	2.0	1.0	--	709
GA 011568[2]	10/01	4558 ab	75.0	4.0	0.0	--	760
GA 011567[2]	10/01	4535 abc	75.5	3.5	1.0	--	732
GA 011528[2]	10/01	4512 abc	76.0	3.5	0.0	--	767
Georgia Green	10/01	4438 abcd	74.0	5.5	0.0	--	889
Georgia-01R	10/16	4382 abcd	73.0	4.0	0.5	--	780
Carver	10/01	4353 bcd	73.0	4.5	1.0	--	803
Georgia-02C	10/01	4335 bcde	76.0	3.0	0.0	--	803
C-99R	10/16	4301 bcde	70.5	6.0	0.5	--	772
Hull	10/16	4218 bcdef	73.5	3.5	0.5	--	750
GA 982502[2]	10/01	4184 bcdef	73.5	5.0	0.0	--	1199
DP-1	10/16	4103 bcdefg	72.0	5.0	0.0	--	830
AP-3	10/01	4020 bcdefgh	70.0	6.0	1.0	--	890
Andru II	09/18	3890 defgh	66.5	8.0	1.0	--	930
AgraTech 201	10/01	3766 efghi	74.5	5.0	0.0	--	739
C34-24[3]	10/16	3591 ghi	72.5	4.5	0.0	--	791
Tamrun OL02	10/01	3579 ghi	71.5	5.0	0.0	--	865
ANorden	10/01	3518 hi	72.5	4.5	1.0	--	800
Virginia Types							
Georgia Hi-O/L	09/18	4317 bcde	72.5	1.0	1.0	25.5	684
Perry	09/18	3965 cdefgh	73.0	1.5	0.0	30.5	638
NC-V 11	09/18	3716 fghi	67.5	2.0	0.5	41.0	565
Gregory	09/18	3513 hi	68.5	2.5	1.0	26.0	664
Wilson	09/18	3294 i	65.5	3.0	0.0	22.0	601

1. Waller-Duncan Multiple Range Tests: Yields within the same column followed by the same letter do not differ significantly at the 0.05 level of probability.
2. Advanced Georgia breeding line.
3. Advanced USDA breeding line.

Planted: May 21, 2003.
Seeding Rate: 6 seed/foot in 36" rows.
Fertilization: 12 lb N, 66 lb P_2O_5, 18 lb K_2O, and 1 ton lime/acre.
Soil Type/Test: Greenville sandy loam; P = Low, K = High, and pH = 5.9.
Management: Moldboard plowed and rototilled; Sonolan, Dual, and Valor used for weed control; Bravo (3 sprays) and Folicur (4 sprays).

	May	June	July	Aug.	Sept.
Rainfall (in.):	6.77	4.64	5.91	6.34	2.33

Note: Some soilborne diseases were observed.

2003 GEORGIA PEANUT BREEDING LINE AND VARIETY TRIALS
Coastal Plain Experiment Station
-Disease Ratings-

Breeding Line and Variety	Ru/Va Irrigated Test TSWV[1] (%)	Ru/Va Irrigated Test TD[2] (%)	Ru/Va Nonirrigated Test TSWV[1] (%)	Ru/Va Nonirrigated Test TD[2] (%)
Wilson	19.2 ab	71.2 a	19.2 bc	59.2 a
Tamrun OL02	20.8 a	56.7 b	23.3 a	62.9 a
Gregory	15.0 bc	52.5 bc	20.0 ab	59.6 a
AgraTech 201	10.0 def	46.2 cd	13.3 de	46.7 b
Perry	13.3 cd	42.1 de	15.8 cd	39.2 c
NC-V 11	12.5 cd	41.2 def	10.0 efg	32.5 cde
Carver	12.9 cd	38.8 efg	12.1 def	32.5 cde
ANorden	7.9 e-h	34.6 fgh	13.3 de	34.2 cd
Andru II	10.0 def	32.9 ghi	10.0 efg	29.6 d-g
C-99 R	14.6 c	30.8 hij	15.0 d	30.0 def
Hull	15.0 bc	29.6 hij	15.0 d	31.7 de
Georgia Green	7.9 e-h	27.9 h-k	8.3 fgh	27.1 d-h
C34-24[4]	7.9 e-h	27.9 h-k	7.9 ghi	25.8 e-h
GA 982502[3]	5.4 ghi	27.1 i-l	4.6 h-k	22.5 ghi
DP-1	11.7 cde	24.2 j-m	13.3 de	30.0 def
AP-3	5.8 f-i	21.2 k-n	4.2 ijk	22.1 hij
Georgia-03L	4.2 hi	20.8 k-n	6.7 g-j	21.7 hij
GA 011557[3]	3.8 hi	20.4 lmn	3.3 jk	17.1 ijk
Georgia-02C	5.0 ghi	19.2 mno	5.4 h-k	17.9 ijk
GA 011528[3]	6.7 f-i	19.2 mno	3.8 jk	15.0 jk
Georgia-01R	9.2 d-g	17.5 mno	6.7 g-j	22.9 f-i
Georgia Hi-O/L	7.6 hi	17.1 mno	5.4 h-k	16.7 ijk
GA 011568[3]	3.3 i	15.4 no	3.3 jk	12.9 k
GA 011567[3]	2.9 i	12.5 o	2.5 k	12.1 k
Mean	9.6	31.1	10.1	30.1

[1] Percentage of tomato spotted wilt virus (TSWV) incidence at about mid-season.
[2] Percentage of total disease (TD) incidence prior to digging, primarily TSWV and some soilborne diseases.
[3] Advanced Georgia Breeding Line.
[4] Advanced USDA Breeding Line.

BROILER LITTER FOR PEANUT UNDER VARYING TILLAGE SYSTEMS

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With the expansion of the broiler industry in the Southern coastal plain, broiler litter (manure + bedding) is being applied on row crops including peanut. Research has shown its value for several crops, but the results from application to lands to be planted to peanut have been variable. The differences in the results may relate to tillage following its application. The objective of this research was to determine if tillage affects the manner in which peanuts respond to applications of poultry litter.

Materials and Methods

Experiments were planted at Attapulgus and Tifton in 2002 and 2003. The experiments were strip-plots with three tillages as main plots (strips) and three broiler litter rates as subplots. There were four replications. The three tillages were deep turn or moldboard plow (DT), rip bed (RB), and strip till (ST). The broiler litter rates were 0, 2, and 4 ton/acre. Broiler litter was broadcast on the subplots prior to tillage. Distribution of the litter following the three tillages was essentially buried 10 inches deep for DT, mixed in the surface soil for RB, and mainly on the surface for ST. Soil test K was "medium" for the experiment at Attapulgus in 2002 and we broadcast 100 lb of muriate of potash/acre prior to tillage. No other fertilizers were applied on the plots according to recommendations from soil tests made prior to litter applications. Both experiments in 2002 were planted to Georgia Green. In 2003, the experiment at Attapulgus was planted to Georgia Green and the experiment at Tifton was planted to DP_1. Due to the high incidence of disease at Attapulgus in 2002, the plots were rated for white mold and CBR, one month prior to digging. Pod yield and grade data were obtained. Data for the individual experiment are presented in Tables 1 to 5 and a summary of the four experiments is presented in Table 6.

Results and Discussion

At Attapulgus in 2002, white mold was prevalent only in the deep turn tillage (DT) tillage (Table 1). The whole experiment had a very high incidence of CBR. The incidence was least with DT, greater with RB and greatest with ST. The incidence also increased significantly with an increased broiler litter rate. There were no significant interactions between tillage and broiler litter rate for disease incidences.

The high rate of CBR resulted in low pod yield and low TSMK (Table 2). Yield was greatest for DT, intermediate for RB and least for ST. Yield was not affected by broiler litter rate. TSMK was least in strip tillage, intermediate for RB and greatest for DT. Broiler litter rate did not affect TSMK. There were no significant interactions between tillage and broiler litter rate for either yield or TSMK. Differences noted for tillage and broiler litter rate appeared to be relatable to the severity of CBR. High rates of broiler litter and reduced tillage appear detrimental where CBR potential is great.

Table 1. Effects of tillage and broiler litter rate on white mold and CBR., Attapulgus, 2002.

Tillage	Broiler litter, T/a			
	0	2	4	$\bar{x}$
	White mold hits			
				$LSD_{0.1}$ = 0.37†
DT	0.75	0.75	0.50	0.67
RB	0	0	0	0
ST	0	0	0	0
$\bar{x}$	0.25	0.25	0.17	NS‡
	CBR			
				$LSD_{0.1}$ = 5.6
DT	8.8	12.5	13.0	11.4
RB	15.0	18.3	22.5	18.6
ST	23.8	20.3	25.0	23.0
$\bar{x}$	15.8	17.0	20.2	Pr>0.0228

† Least significant difference between tillage treatments at the 10% significant level.
‡ Probability of significance, NS = nonsignificant at 10% or greater level.
§ Deep turn (DT), Rip bed (RB) and Strip till (ST).

Table 2. Effects tillage and broiler litter rates on yield and TSMK, Attapulgus, 2002. Initial pH = 5.8, soil test P, K, Ca, and Mg = 77, 46, 652, and 63 lb/acre, respectively.

Tillage	Poultry litter, T/a			
	0	2	4	$\bar{x}$
	------*Yield, lb/a*------			
				$LSD_{0.1}$ = 740†
DT§	3940	3790	4070	3930
RB	2910	2590	2510	2670
ST	1710	1770	1440	1638
$\bar{x}$	2860	2710	2670	NS‡
	------*TSMK, %*------			
				$LSD_{0.1}$ = 1.5
DT	71.8	72.8	72.3	72.3
RB	71.8	74.8	68.3	71.6
ST	66.5	67.8	68.5	67.6
$\bar{x}$	70.0	71.8	69.7	NS

† Least significant difference between tillage treatments at the 10% significant level.
‡ Probability of significance, NS = nonsignificant at 10% or greater level.
§ Deep turn (DT), Rip bed (RB) and Strip till (ST).

The experiment at Attapulgus was conducted on a different plot area in 2003. The incidence of disease was low and yields were much greater than in 2002 (Table 3). Neither yield nor TSMK was affected by tillage or broiler litter rate. There also were no significant interactions between tillage and broiler litter rate.

Table 3. Effects tillage and broiler litter rates on yield and TSMK, Attapulgus, 2003.
Initial pH = 6.2, soil test P, K, Ca, and Mg = 90, 117, 644, and 104 lb/acre, respectively.

Tillage	Broiler litter, T/a			
	0	2	4	$\bar{x}$
	Yield, lb/a			
DT[§]	3822	3727	4384	3978
RB	4638	4360	4068	4355
ST	4035	3967	4644	4216
$\bar{x}$	4165	4018	4366	NS[‡]
	TSMK, %			
DT	71.5	71.0	71.2	71.2
RB	71.5	72.5	72.8	72.2
ST	72.0	72.5	72.8	72.4
$\bar{x}$	71.7	72.0	72.2	NS

‡ Probability of significance, NS = nonsignificant at 10% or greater level.
§ Deep turn (DT), Rip bed (RB) and Strip till (ST).

At Tifton in 2002 (Ponder farm), TSWV was very severe even though we planted in the window of planting times suggested by the TSWV index. Both yield and grade were low (Table 4). Neither was affected by either tillage or poultry litter rate. There were no interactions between tillage and poultry litter rate.

Table 4. Effects of tillage and broiler litter rates on yield and TSMK, Tifton, 2002.
Initial pH = 5.9, soil test P, K, Ca, and Mg = 30, 154, 591, and 44 lb/acre, respectively.

Tillage	Broiler litter, T/a			
	0	2	4	$\bar{x}$
	Yield, lb/a			
DT[§]	1930	1470	2030	1810
RB	1980	1610	1740	1780
ST	1800	1880	1650	1780
$\bar{x}$	1900	1650	1810	NS[‡]
	TSMK, %			
DT	66.0	63.2	64.2	64.5
RB	67.5	64.2	65.2	65.7
ST	65.8	65.2	65.8	65.6
$\bar{x}$	66.4	64.2	65.1	NS

‡ Probability of significance, NS = nonsignificant at 10% or greater level.
§ Deep turn (DT), Rip bed (RB) and Strip till (ST).

Yield was greater for DT than for RB in an experiment conducted in Tifton in 2003 (Table 5). Yield for ST was statistically the same as for DT and for RB. Application of broiler litter did not affect yield. Neither tillage nor broiler litter rate affected TSMK. There were no significant interactions between tillage and broiler litter rate for either yield or TSMK.

Table 5. Effects of tillage and broiler litter rates on yield and TSMK, Tifton 2003.
Initial pH = 5.7, soil test P, K, Ca, and Mg = 46, 91, 688, and 42 lb/acre, respectively.

Tillage	Broiler, T/a			
	0	2	4	$\bar{x}$
	Yield, lb/a			
				$LSD_{0.1}$ = 507[†]
DT[§]	4840	4909	4532	4760
RB	3981	4056	4118	4052
ST	4251	4310	4356	4306
$\bar{x}$	4357	4425	4335	NS[‡]
	TSMK, %			
DT	71.0	71.2	70.5	70.9
RB	69.2	68.0	69.2	68.8
ST	70.8	70.2	70.0	70.3
$\bar{x}$	70	70	70	NS

† Least significant difference between tillage treatments at the 10% significant level.
‡ Probability of significance, NS = nonsignificant at 10% or greater level.
§ Deep turn (DT), Rip bed (RB) and Strip till (ST).

A summary of the four experiments (location-years) is provided in Table 6. Mean yields and TSMKs in 2002 were greatly affected by the high incidences of disease (CBR at Attapulgus and TSWV at Tifton). In 2003, we moved to another field at Attapulgus and had a nearly disease free environment. The general incidence of TSWV was much less in 2003 than in 2002, throughout the peanut belt. At Tifton, we also changed fields, as well as, variety (from Georgia Green to DP-1) and had little incidence of TSWV. For the four experiments combined tillage did not significantly affect either yield or TSMK, however, it is difficult to ignore that the average yield was 600 lb/acre greater for DT than for ST and that the average TSMK was also greatest for DT. Likewise, effects of broiler litter rate were not significant. Numerically, both yield and TSMK were greatest where no litter was applied.

Table 6. Summary of the effects of location-year, tillage, and broiler litter rate on pod yield and TSMK for four experiments.

Location-Year	Pod yield (lb/a)	TSMK (%)
Attapulgus 2002	2747 b†	70.5 a
Attapulgus 2003	4183 a	72.0 a
Tifton 2002	1786 c	65.2 b
Tifton 2003	4350 a	70.0 a
Tillage		
DT§	3587 a	69.7 a
RB	3213 a	69.6 a
ST	2984 a	69.0 a
Broiler litter rate		
ton/acre		
0	3320 a	69.6 a
2	3160 a	69.4 a
4	3295 a	69.2 a

†Means within a group followed by a common letter are equal by LSD (P=0.1).
§ Deep turn (DT), Rip bed (RB) and Strip till (ST).

Summary

Broiler litter applied at 2 or 4 ton/acre prior to planting did not significantly (P=0.1) affect either yield or TSMK. Overall four experiments broiler litter application tended to decrease both yield and TSMK. There were no interactions between tillages and broiler litter rates, indicating that broiler litter application was ineffective or detrimental in all tillages. The plots used in the experiments all had adequate fertility for peanut (similar to the vast majority of peanut fields in Georgia). More positive results for broiler litter application may have been obtained if fertility was extremely low, but that is the case for few peanut fields in Georgia. Considering the great benefit of broiler litter for other crops in the sandy soils of the Southern Coastal Plain, peanut appears to be a poor target crop for broiler litter application.

Deep turn tillage (moldboard plow, DT) resulted in the highest yields in two of four experiments. In one experiment that was no doubt due to lower incidence of CBR by burial of the inoculum. Over all four experiments, DT provided numerically, but not statistically the greatest yield and TSMK. However, the data are not conclusive for tillage due to the strong influence of disease in the 2002 experiments.

Sponsors and Acknowledgment

Data in this report are the Georgia portion of the data generated in a Southeastern Initiative, Three State (AL, FL, and GA) project funded by the National Peanut Board.

The help of Dr. Timothy Brenneman in rating plots for disease is appreciated.

CALIBRATION OF SOIL TEST CALCIUM WITH MODERN VARIETY YIELD AND GRADE AND WITH CALCIUM CONCENTRATION AND GERMINATION OF THE SEED PRODUCED

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Few calcium studies had taken place since Florunner was the predominant runner-type variety. Based on those earlier studies with Florunner, bloom gypsum application is recommended when Mehlich-1 soil Ca is less than 250 mg/kg (500 lb/acre). Bloom gypsum is always recommended for the larger seeded virginia-type peanut and for all peanuts grown for seed. The objective of this research was to determine if modern runner-type varieties, having varying seed size, have calcium requirements different from those of Florunner and if they differ from each other.

Materials and Methods

Field experiments were conducted at Attapulgus and Tifton in 2002 and 2003. Four varieties were planted in replicated plots at each location each year. Due to ever-changing variety recommendations, selection of varieties for the experiments was not consistent in each year. The varietal plots were split at first bloom so that ½ received gypsum at the rate recommended by the Georgia Extension Service and the other ½ did not. We determined pod yield and grade, as well as, calcium concentration and germination of the seed produced. Plant and soil samples were analyzed in the Soil and Plant Analysis laboratory at the Coastal Plain Experiment Station and germination of the seed produced was determined by the Georgia Department of Agriculture Seed Laboratory at Tifton. Experiments were statistically analyzed as split-plots and the main effect means were separated by the LSD test at P=0.05. There were no statistically significant interactions between variety and gypsum application (P=0.05) in the individual experiments, indicating that all varieties reacted to gypsum application in a similar manner. Therefore only the main effect means for variety and gypsum application are presented. Results of individual trials are presented followed by a summary of the four experiments.

Results and Discussion

The experiment at Attapulgus, Ga in 2002 was devastated by CBR, resulting in low yields and low grades (Table 1). Soil Ca was below 250 mg/kg (the critical level established in Georgia). Due partially to disease, variability was great in the plots and no differences were recorded for pod yield or seed Ca due to variety. DP_1 yielded less and had lower grade than the other three varieties. Over all four varieties, bloom gypsum increased grade as well as seed Ca and germination.

At the Attapulgus site in 2003 the beginning soil Ca was adequate to high at 360 mg/kg (Table 2). No responses in yield or grade would be anticipated due to additions of gypsum for Florunner. GA_02C had high yield, grade, seed Ca and germination. Yield for DP_1 was equal to that of GA_02C, but seed Ca was lower. Over the four varieties, only seed Ca was increased by gypsum additions.

Table 1. Attapulgus, GA 2002
Soil tests in the pegging zone prior to application of gypsum treatments:
Soil pH = 6.0, K, Ca, and Mg = 48, 162, and 22 mg/kg, respectively.

Variety	**Pod Yield lb/acre**	**TSMK %**	**Seed Ca mg/kg**	**Germination %**
AT_201	1184 a	65 a	653 a	70 a
DP_1	1060 a	56 b	594 a	63 b
GA Green	1321 a	64 a	709 a	75 a
Norden	1183 a	60 a	661 a	76 a

Gypsum	**Pod Yield lb/acre**	**TSMK %**	**Seed Ca mg/kg**	**Germination %**
bloom gypsum	1191 a	62 a	703 a	76 a
no gypsum	1184 a	60 a	606 b	67 b

Values in a data set and column followed by a common letter are not different by LSD (0.05).
There were no significant interactions of variety and gypsum by F test (P=0.05).

Table 2. Attapulgus, GA 2003
Soil tests in the pegging zone prior to application of gypsum treatments:
Soil pH = 6.2, K, Ca, and Mg = 55, 360, and 51 mg/kg, respectively.

Variety	**Pod Yield lb/acre**	**TSMK %**	**Seed Ca mg/kg**	**Germination %**
Ga_O2C	4872 a	73 a	843 a	93 ab
DP_1	4587 ab	68 b	575 b	90 ab
Carver	4209 bc	70 b	836 a	94 a
Norden	3749 c	69 b	881 a	90 b

Gypsum	**Pod Yield lb/acre**	**TSMK %**	**Seed Ca mg/kg**	**Germination %**
bloom gypsum	4267 a	70 a	939 a	93 a
no gypsum	4441 a	69 a	628 b	91 a

Values in a data set and column followed by a common letter are not different by LSD (0.05)
There were no significant interactions of variety and gypsum by F test (P=0.05)

Soil Ca at the Tifton site in 2002 was near the Ga threshold level established with Florunner (Table 3). Yields were low and there was great variability in the plots due to a high incidence of Tomato Spotted Wilt Virus infection. Planting DP_1 resulted in greatest yield and numerically the lowest grade among the four varieties. Yield of Norden was greater than yield of GA Green. There were no other significant responses for yield, grade or seed Ca due to variety or gypsum in the experiment, but gypsum significantly increased germination of the seed produced.

In an experiment at Tifton in 2003 where the initial soil Ca was 332 mg/kg, GA_02C produced the highest yield and grade of four varieties and seed Ca and germinations of seed produced equal to Carver and Norden (Table 4). Bloom gypsum did not affect yield or grade, but significantly increased the concentration of Ca in the seed and percent germination, regardless of variety.

Table 3. Tifton, GA 2002

Soil tests in the pegging zone prior to application of gypsum treatments:
Soil pH = 5.7, K, Ca, and Mg = 78, 261, and 25 mg/kg, respectively.

Variety	**Pod Yield** lb/acre	**TSMK** %	**Seed Ca** mg/kg	**Germination** %
AT_201	2268 bc	65 a	743 a	77 a
DP_1	3014 a	64 a	760 a	76 a
GA Green	1970 c	73 a	870 a	80 a
Norden	2576 b	70 a	739 a	82 a

Gypsum	**Pod Yield** lb/acre	**TSMK** %	**Seed Ca** mg/kg	**Germination** %
bloom gypsum	2522 a	71 a	760 a	83 a
no gypsum	2393 a	65 a	796 a	73 b

Values in a data set and column followed by a common letter are not different by LSD (0.05)
There were no significant interactions of variety and gypsum by F test (P=0.05).

A summary of the four experiments (location-years) is provided in Table 5. Only the Attapulgus 2002 experiment had a soil Ca test of less than the threshold concentration where gypsum is recommended by the Georgia Extension Service for commercial peanut fields. Over both gypsum treatments, yield, grade and germination were low for that experiment, but the high infection with CBR contributed to the poor crop at that location. Even though the total data set indicates a wide range in values due to location and year, the above threshold Ca concentrations indicate the difficulty in finding cultivated soils with Mehlich-1 soil Ca less than 250 mg/kg, where response of yield and grade to bloom gypsum may be anticipated.

When the four experiments were combined, it is clear that grade, seed Ca and germination of the seed was increased by bloom gypsum application (Table 6). Significant responses due to gypsum application was determined for at least one of these measurements in all four experiments (Table 7).

Table 4. Tifton, GA 2003
Soil tests in the pegging zone prior to application of gypsum treatments:
Soil pH = 5.8, K, Ca, and Mg = 56, 332, and 24 mg/kg, respectively.

Variety	Pod Yield lb/acre	TSMK %	Seed Ca mg/kg	Germination %
Ga_O2C	4825 a	74 a	872 a	93 a
DP_1	4386 b	71 b	636 b	84 b
Carver	4214 b	70 b	865 a	95 a
Norden	4304 b	70 b	918 a	92 a

Gypsum	Pod Yield lb/acre	TSMK %	Seed Ca mg/kg	Germination %
bloom gypsum	4452 a	71 a	973 a	93 a
no gypsum	4412 a	71 a	672 b	89 b

Values in a data set and column followed by a common letter are not different by LSD (0.05)
There were no significant interactions of variety and gypsum by F test (P=0.05)

Summary

Although we tried to obtain experiments where soil Ca was less than 250 mg/kg (500 lb/acre), where some response in yield and grade could often be obtained with Florunner, 75% of our experiments with modern varieties were conducted in fields with higher soil Ca. Most commercial peanut fields have soil Ca tests where Florunner yield and grade are not significantly increased by additions of gypsum at bloom. The results in this study with several modern varieties, indicate the same results for those varieties. There was a lack of interaction between variety and bloom gypsum application in this study, indicating that there is no evidence for recommending separate gypsum applications among these varieties. Data collected for seed Ca concentration and germination of the seeds produced in these experiments indicate that bloom gypsum should continue to be recommended for all peanuts grown for seed production, regardless of variety.

Table 5. Summary for 4 location-years.

Location Year	Soil Ca mg/kg	pod yield lb/acre	TSMK %	Seed Ca mg/kg	germination %
Attapulgus 02	162 d	1187 e	71.2 e	872 b	71 c
Attapulgus 03	360 ab	4354 a	69.8 bcd	784 b	92 a
Tifton 02	261 c	2457 d	68.2 d	1179 a	79 b
Tifton 03	332 b	4432 a	71.3 b	823 b	91 a

Values for pod yield, TSMK, seed Ca and germination are an average of gypsum and no gypsum.
Values in a data set and column followed by a common letter are not different by LSD (0.05).

Table 6. Effect of bloom gypsum application for all experiments combined.

Gypsum	pod yield lb/acre	TSMK %	seed Ca mg/kg	germination %
bloom gypsum	3108 a	69 a	989 a	87 a
no gypsum	3107 a	66 b	840 b	80 b

Values in a data set and column followed by a common letter are not different by LSD (0.05)

Table 7. Significant interactions of location-year with gypsum applications (by F test at P= 0.05)

Location-year	Soil Ca[1] mg/kg	Gypsum	TSMK %	Seed Ca mg/kg	Germination %
Attapulgus02	162	bloom	62.0	926*	75.5*
		no gypsum	60.4	817	66.8
Attapulgus03	360	bloom	70.5	939*	92.8
		no gypsum	69.2	628	90.8
Tifton02	261	bloom	71.0	1111	83.2*
		no gypsum	65.3	1242	73.4
Tifton03	332	bloom	71.4	973*	92.8*
		no gypsum	71.3	672	89.4

[1]Soil Ca after planting where no gypsum had been applied.
*Value for bloom gypsum application for a given location-year is significantly greater than where no bloom gypsum was applied by the F test (P=0.05).

Sponsor

The data in this report are the Georgia portion of the data generated in a Southeastern Initiative, Three State (AL, Fl, and GA) Project funded by the National Peanut Board.

BRISTLY STARBUR CONTROL IN PEANUT WITH STRONGARM APPLIED POSTEMERGENCE

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INTRODUCTION

Bristly starbur (*Acanthospermum hispidum*), also known as Texas sandspur or goat-head, is considered to be the 6th most troublesome weed of peanut in Georgia. Strongarm (diclosulam) is a soil-applied herbicide that provides excellent residual control of bristly starbur and many other broadleaf weeds in peanut. Since the effectiveness of soil-applied herbicides is often very dependant upon moisture conditions after application, many growers would prefer to apply postemergence herbicides. Research on the potential benefits of postemergence applications of Strongarm in Georgia is limited.

MATERIALS AND METHODS

Small plot field trials were conducted in 2003 in Decatur County at the Attapulgus Research and Education Center and at an on-farm location in Randolph County. Strongarm 84WDG at 0.113, 0.225, and 0.45 ozs/A was applied postemergence to 1-15" tall bristly starbur. A non-ionic surfactant (80/20) was included with all treatments at 0.25% v/v. Treatments were applied with a CO_2 -powered, backpack sprayer calibrated to deliver 15 GPA using flat fan nozzles tips (11002DG).

The treatments were arranged in a randomized complete block design with 3 to 4 replications. Data were subjected to analysis of variance and means separated using Duncan's Multiple Range Test ($P = 0.05$).

RESULTS AND DISCUSSION

No significant peanut injury was observed with any postemergence application of Strongarm (data not reported). Visual bristly starbur control ratings can be found in Table 1. All rates of Strongarm provided excellent (> 98%) control of bristly starbur at both locations.

CONCLUSIONS

Bristly starbur is extremely sensitive to postemergence applications of Strongarm applied at low rates. At the current time, Strongarm is **not** labeled for postemergence use in peanut. These results will be used to help develop a postemergence label if DowAgroSciences can be convinced of the benefits.

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Table 1. Bristly starbur control with Strongarm applied postemergence, 2003.

Strongarm 84WDG Rate/A[b]	Bristly Starbur Control - %[a]	
	Randolph County[c]	Decatur County[d]
Untreated	0 b[e]	0 b
0.45 ozs	100 a	99 a
0.225 ozs	100 a	99 a
0.113 ozs	100 a	99 a

[a]Visual estimates of weed control obtained 26-32 days after treatment.
[b]Included 80/20 @ 0.25% v/v.
[c]Bristly starbur was 1-12" tall at the time of application.
[d]Bristly starbur was 1-15" tall at the time of application
[e]Means in the same column with the same letter are not significantly different according to Duncan's Multiple Range Test (P = 0.05).

Five Years of Subsurface Drip Irrigation on Peanut

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Introduction

Peanut yield is greatly affected by the preceding crop and its management. Current best management practices (BMP) recommend peanut to be planted 1 out of 3 years, grass-type crops be grown prior to peanut, and the rotated grass-crop be well fertilized (Henning et al., 1982; Sholar et al., 1995). These BMP's have been established for irrigated areas typically using overhead irrigation (sprinkler) systems. Following these recommendations do not necessarily assure optimum crop yields, but minimize yield reductions due to biological factors such as disease, nematodes, weeds, and other plant pests.

There are over 1.2 million hectares irrigated in Georgia, Florida, and Alabama. Of that area over 56% is irrigated using overhead irrigation type systems. Peanut is raised on about 12% of the irrigated land in the tri-state region (Anonymous, 1999). In Georgia, peanut is grown on 23% of the irrigated land. Subsurface drip irrigation (SDI) systems are used on less than 6100 ha in the tri-state area, with most SDI systems used for vegetable production (Anonymous, 1999). It is unknown how many of these SDI systems are used to grow peanut.

SDI has the potential to provide consistently high yields with non-uniform precipitation while conserving soil, water, and energy. These SDI systems have the capability of frequently supplying water to the root zone while reducing the risk of cyclic water stress typical of other irrigation systems. Also, SDI systems are adaptable to variations of field shape making them an important consideration in the southeast.

The water situation in the tri-state region (Alabama, Georgia, and Florida) suggests that water conservation techniques be investigated. This implies the use of subsurface drip irrigation systems that have high irrigation efficiencies and low evaporation from the soil surface. The objectives of this research were to determine the long term pod yield response of peanut to five crop rotations, two drip tube lateral spacings, and three irrigation regimens using subsurface drip.

Materials and Methods

The research site was located in Terrell County near Sasser, GA on a Tifton sandy loam soil (Fine-loamy, kaolinitic, thermic Plinthic Kandiudults) with 2-5% slope. The area was non-irrigated farmland converted to subsurface drip irrigation in 1998. Cotton had been planted the previous two seasons. Three tiers were used for the SDI irrigation treatments and one tier was assigned as a sprinkler treatment. An SDI tier consisted of three blocks (replications), five crop rotations, and two thin-wall drip lateral spacings for a total of 30 plots per tier. The irrigation levels were 100%, 75% and 50% of estimated crop water use.

The five crop rotations included continuous peanut, cotton and/or corn rotated with peanut at two, three, and four year intervals. All crops were planted on a 0.91 m row spacing planted in a single row orientation. The two drip tube lateral spacings had drip tubes installed underneath each crop row (narrow, 0.91 m) and in alternate crop row middles (wide, 1.83 m). Sorensen et al. (2001) described in detail the irrigation system design criteria and irrigation control. The thin-wall drip tube (Super Typhoon, Netafim Irrigation, Inc., Fresno, CA 93727; www.netafim-usa.com) had a wall thickness of 0.254 mm (10 mil) and emitters spaced every 46 cm with a flow rate of 1.5 L h^{-1}. All thin-wall drip tubing was buried 31 to 36 cm deep using a modified ripper shank.

Irrigation water was applied daily based on replacement of estimated crop water use for peanut. Air temperature (maximum, minimum and average), total solar radiation, and precipitation were recorded daily. Daily potential evapotranspiration (ET_o) was estimated using the modified Jensen-Haise equation adjusted for local conditions. Daily ET_o was then multiplied by the weekly K_c to estimate the daily water replacement for peanut (ET) which is identified as the 100% irrigation level. The other two irrigation levels were determined by multiplying the 100% irrigation level by 75% and 50%. Precipitation totals were subtracted from the estimated daily ET. Irrigation events were scheduled daily except when precipitation exceeded estimated ET.

Peanut variety, "Georgia Green", was planted between 10 to 16 May (depending on weather conditions) with a vacuum type planter (Monosem vacuum planter, ATI., Inc., Lenexa, KS 66219; www.monosemplt.com) at about 20 seeds m^{-1} on a 0.91 m row spacing. Treatments in each respective year received the same weed, insect, and disease control management applications following standard recommendations outlined by the University of Georgia Agricultural Extension Service.

Harvest dates were based on the optimum crop maturity determined by the hull scrape method (Williams and Drexler, 1981). Sample weights were recorded and a 4 to 7-kg sub-sample was split from the collected plot sample and shelled to determine farmer stock grade and kernel size distributions. Pod yield was based on total sample weight adjusted to 7% moisture. Farmer stock grade (FS) and kernel size distribution was determined using procedures specified by the USDA (USDA, 1993).

Results and Discussion

Table 1 shows total water applied, yearly precipitation received, and average irrigation applied by water level for the five year period during the growing season (01 May to 30 Sept). Long term average precipitation typically received during this time is approximately 568 mm. These values show that during the years 1999 to 2002 much less precipitation was received than during the 1998 growing season. This time period, 1999 to 2002, was the extended drought that occurred across the southeast region. Only the 1998 growing season received greater than normal precipitation.

Figure 1 shows the average yearly pod yield for peanuts in rotation without respect to lateral spacing. Continuous peanut pod yields and individual crop rotations will be discussed later. The average pod yield for the five years was 4736 kg ha^{-1} for peanut in rotation. These data show that the initial year, 1998, had the greatest yield. These initial year yields can be attributed to the higher than normal precipitation and good crop rotation. Pod yield decreased during the next two years with the onset of drought. During 1999 and 2000, there was very little precipitation received between land preparations and planting. We observed that water movement to the soil surface from the drip system essentially stopped at the tillage interface. In 1999 and 2000 seed germination was the major cause of lower pod yields. In 2001, we did a slightly different approach in that we tilled the land earlier in the year spring (mid March) in order to have a longer time period for precipitation to wet the soil. At planting, the top 5 to 8 cm was knocked off the top of the bed and seed was planted into moist soil. This worked well in both 2001 and 2002 as seed emergence was excellent (visual observations no data collected) and final yields were much higher than in previous years (1999 and 2000).

Irrigation totals in Table 1 show that that different irrigation levels were applied during the growing season. Figure 2 shows the average pod yield response to these various irrigation levels by drip tube lateral spacing (continuous peanut excluded). These data show no difference in pod yield between the narrow lateral spacing at any irrigation level. Pod yield trends show that the narrow lateral spacing, though not significant, is always slightly higher than the wide lateral spacing. Yield of peanut, in rotation and with narrow spaced drip tube laterals, averaged 4883 kg ha^{-1} and wide spaced laterals averaged 4592 kg ha^{-1}. Yield between drip tube lateral spacing and rotation was not significant, however, simulated net returns for a specific grower could be compared to determine which drip tube spacing would be most economical for the grower. Peanut in rotation and irrigated at 75% had essentially the same pod yield (4819 kg ha^{-1}) as the 100% irrigated and rotated treatment (4890 kg ha^{-1}) implying a 25% water savings for the same yield. Peanut in rotation and irrigated at the 75 or 100% irrigation level had 7.8% higher pod yields compared with the 50% irrigated irrigation level.

Table 2 shows the yield response of crop rotation by irrigation level. Peanut planted in short-term rotations (alternate year) averaged 4164 kg ha^{-1} across all irrigation levels for both cotton and corn. Pod yield was 4241 kg ha^{-1} at the 75% irrigation level in the same short term rotations. The two year rotation had higher peanut yield (5579 kg ha^{-1}) than the alternate year rotations (4164 kg ha^{-1}). There was no yield difference between two and three year rotations and averaged 5309 kg ha^{-1} across all irrigation levels.

Figure 3 shows the pod yield response of crop rotation compared with narrow and wide lateral spacings. These data show the yield of the narrow lateral spacing is always higher than the wide lateral spacing especially with alternate year rotations. While, these yield trends are not always significant, they do imply that a grower may need to consider installing drip tube laterals underneath every row instead of alternate row middles. Longer rotations of two to three years between peanut averaged 5172 kg ha^{-1} for the narrow drip tube lateral spacing. Pod yield increased over 900 kg ha^{-1} with a peanut/cotton (4236 kg ha^{-1}) rotation compared with continuous (3322 kg ha^{-1}) peanut (narrow tube lateral spacing). The corn/peanut (4949 kg ha^{-1}) rotation had about 1627 kg ha^{-1} increase compared with continuous peanut (narrow drip tube lateral spacing). These pod yield data indicate that just one year between peanut crops can increase pod yield an average 1270 kg ha^{-1} over continuous peanut. From a peanut yield standpoint, the recommendation would be to plant corn in an alternate year which resulted in a 713 kg ha^{-1} pod yield increase compared with an alternate cotton rotation. Longer crop rotations (greater than one year between peanut crops) had just over a 580 kg ha^{-1} higher pod yield compared with the alternate year rotations. Overall, with best management practices of good crop rotation (at least two years between peanut crops), drip tube under every row, and irrigating at 75%, peanut yield averaged 5172 kg ha^{-1}. Lowest peanut yields were irrigated at 50%, and drip tube laterals at wide spacing showed peanut yield of 2891 kg ha^{-1} or a 56% yield decrease compared with the best case scenario.

Average farmer stock (FS) grade for each crop rotation and lateral spacing is shown in Table 3. The percentage of total sound mature kernels (TSMK) tended to increase and the percentage of other kernels (OK) tended to decrease as time between peanut crops increased. Overall, the best FS grade was for the longer rotations which had over an 11 percentage point increase in TSMK (77%) compared with continuous peanut (68%). The OK grade parameter showed an average 2.2 percentage point decrease with the rotated treatment (4.4%) compared with the continuous peanut treatment (6.5%).

The TSMK and OK grade parameters were averaged over all years and all crop rotations with respect to drip tube lateral spacing. These data show that the TSMK grade parameter was higher for the narrow (72.0%) drip tube lateral spacing compared with the wide (71.1%) lateral spacing. There was no difference for OK between drip tube lateral spacing.

Summary

The results from this research support current best management practices for long crop rotation for higher yield. These results also show that subsurface drip irrigation can be an alternative irrigation practice. Longer crop rotations between peanut crops resulted in higher pod yields than with alternate year rotations. Peanut planted following corn in an alternate year rotation had higher pod yields than when following cotton. Continuous peanut had the lowest pod yield when compared to all other peanut rotations. There was no difference in pod yield with drip tube lateral spacing. Pod yield was higher with the 75% and 100% irrigation levels compared with the 50% irrigation level, especially at the wide lateral spacing. The peanut farmer stock grade (FS) was highest with longer peanut rotations and tended to decrease as time decreased between peanut crops. The best pod yield and graded occurred at the 75% irrigation level with a narrow drip tube lateral spacing following a corn crop, either alternate or multiple years between peanut crops. Conversely the worst pod yield occurred at the 50% irrigation level, wide drip tube lateral spacing with continuous peanut.

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Literature Cited

Anonymous. 1999. 1998 annual irrigation survey. Irrigation Jour. 49:28-38.

Henning, R. J., A. H. Allison, and L. D. Tripp. 1982. Cultural practices p. 123-138. *In* H. E. Pattee and T. H. Stalker (eds.) Advances in Peanut Science. Am. Peanut Res. and Educ. Soc., Yoakum, TX.

Sholar, R. E., R. W. Mozingo, and J.P. Beasley, Jr. 1995. Peanut cultural practices. pp. 354-382. *In* H. E. Pattee and T. H. Stalker (eds.) Advances in Peanut Science. Am. Peanut Res. and Educ. Soc., Stillwater, OK. 614 pp.

Sorensen, R. B., F. S. Wright, and C. L. Butts. 2001. Subsurface drip irrigation system design for research in row crop rotations. Appl. Eng. In Agric. 17(2):171-176.

United States Department of Agriculture. 1993. Milled Peanuts: Inspection instructions. U. S. Department of Agriculture, Agricultural Marketing Service, Fruit and Vegetable Division, Washington, D. C.

Williams, E. J., and J. S. Drexler. 1981. A non-destructive method for determining peanut pod maturity. Peanut Sci. 8:134-141.

Table 1. Total precipitation received and irrigation applied during the growing season and average 5-year values (25 mm = 1.0 inch).

Water source	Year					
	98	99	00	01	02	avg
	------------------------- mm ------------------------					
precipitation	718	492	398	433	441	496
irrigation						
50%	117	171	161	210	73	146
75%	182	250	232	272	101	207
100%	242	328	304	360	144	276

Table 2. Average pod yield for five crop rotations for the three irrigation levels (1.0 kg ha^{-1} = 0.89 lbs ac^{-1}). P = peanut; C= cotton; and M = corn; means followed by a different letter(s) are significantly different (P < 0.05).

	Irrigation Level		
Crop rotation	50%	75%	100%
	--------------- kg ha^{-1} ------------		
PPPPP	2996g‡	3274fg	3051g
PCPCP	3845ef	3938def	3899ef
MPMPM	4187cde	4543bcde	4575bcde
CMPCM	5120abc	5759a	5857a
PCMMP	4851abcd	5040abc	5229ab

Table 3. Average total sound mature kernels (TSMK) and other kernels (OK) for all crop rotations by narrow (0.91 m) and wide (1.83 m) drip tube lateral spacing (1.0 m = 3.28 ft). P = peanut, C = cotton, M = corn and means within each grade parameter followed by a different letter are significantly different (P < 0.05).

Crop rotation	Lateral spacing			
	Narrow		Wide	
	TSMK	OK	TSMK	OK
	------------------------ % ------------------------			
PPPPP	68.6 e‡	6.6 c	68.2 e	6.7 c
PCPCP	70.5 bcd	5.5 ab	69.1 de	6.4 ab
MPMPM	72.2 b	5.0 a	69.4 cde	6.5 bc
CMPCM	71.6 bc	5.5 abc	71.4 bcd	5.6 abc
PCMMP	77.2 a	4.4 a	77.4 a	4.3 a

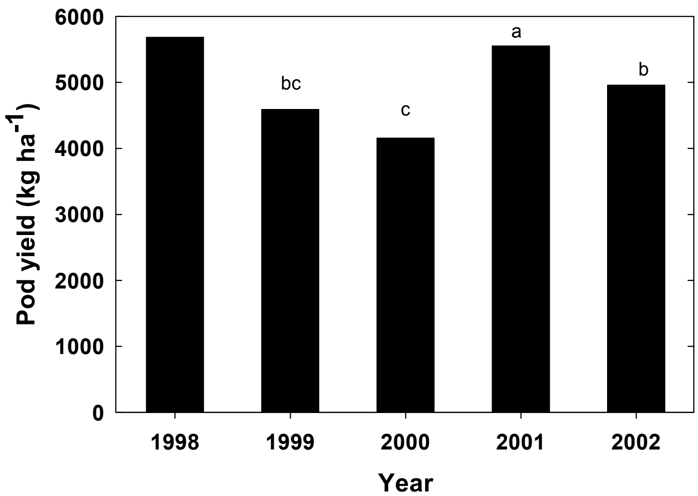

Figure 1. Average yearly pod yield for peanuts for all crop rotations (excluding continuous peanut treatment), irrigation levels, and drip tube lateral spacings. Crop rotations started in 1998. Different letters denote significant yield differences at the $P \leq 0.05$ (1.0 kg ha^{-1} = 0.89 lbs ac^{-1}).

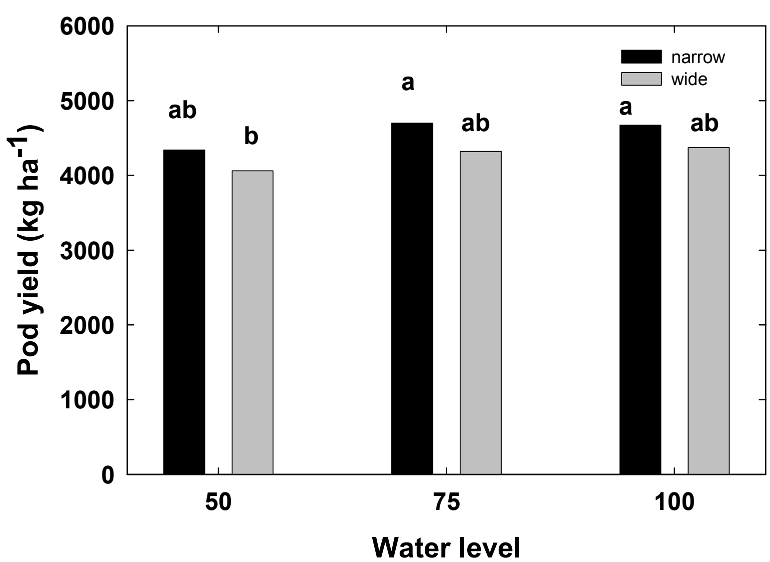

Figure 2. Average pod yield response to various irrigation levels (50%, 75%, and 100%) by drip tube lateral spacing (narrow = 0.91 m; wide = 1.83 m) excluding continuous peanut. Different letters denote significant yield differences at the $P \leq 0.05$ (1.0 m = 3.28 ft; 1.0 kg ha^{-1} = 0.89 lbs ac^{-1}).

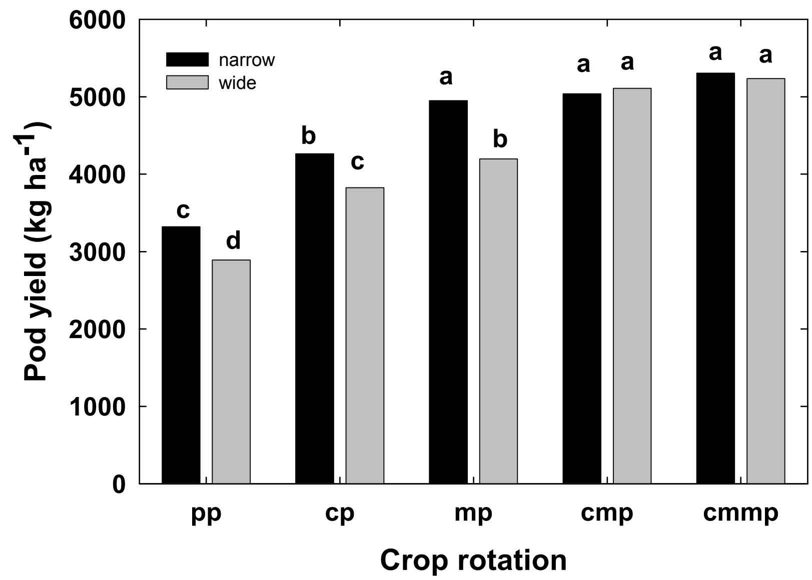

Figure 3. Peanut pod yield response to narrow (0.91 m) and wide (1.83 m) lateral spacings with respect to various crop rotation treatments. Crop treatments are continuous peanut, alternate year with cotton, alternate year with corn, two year rotation with cotton and corn, and a four year rotation with cotton and corn where p=peanut, c=cotton, and m= corn (maize). Different letters denote significant yield differences at the $P \leq 0.05$ (1.0 m = 3.28 ft; 1.0 kg ha^{-1} = 0.89 lbs ac

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CULTIVAR AND FUNGICIDE SPRAY SCHEDULE INTERACTION

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INTRODUCTION

Several of the recently released peanut cultivars have higher levels of resistance to foliar and soil-borne diseases than previously released cultivars. These new cultivars offer producers the opportunity to reduce the number of fungicides applied in a crop season by two to four applications without suffering yield loss. Many of these new disease-resistant cultivars are late maturing, requiring 150 days or longer to reach optimal maturity. This factor alone can result in an additional fungicide application in some years. A research trial was initiated to evaluate the performance of several of these recently released cultivars when receiving eight versus four fungicide applications.

RESEARCH PROCEDURES

This test was conducted at the Coastal Plain Experiment Station's Ponder Farm near Ty Ty. 'C-99R', 'DP-1', 'Georgia-01R' and C34-24 (an advanced USDA breeding line) were planted on 9 May 2003 in a twin row pattern. Seeding rate was three seed per foot of row in each twin row. Thimet insecticide was applied in-furrow at five pounds per acre. Fungicide treatments were eight and four applications. The fungicide treatment schedule is listed in Table 1.

Table 1. Fungicide spray schedule

	Days After Planting							
# Fung. Applic.	31	45	59	73	87	101	115	129
8	**Headline**	**Headline**	**Folicur**	**Folicur**	**Folicur**	**Folicur**	**Bravo**	**Bravo**
4		**Headline**		**Folicur**		**Folicur**		**Bravo**
Date of Applic.	6/9/03	6/23/03	7/7/03	7/21/03	8/4/03	8/18/03	9/1/03	9/15/03

Plots were six feet wide and length varied according to the contour of the field with the longest rows about 400 feet long and the shortest rows about 250 feet long. The experimental design was a randomized complete block with four replications. Pest management (other than disease control), agronomic, and irrigation decisions were all based on university recommendations. Data collected included plant stand counts, spotted wilt severity, yield, and grade factors. Spotted wilt severity was determined by counting one-foot hits severely affected by tomato spotted wilt virus (TSWV) in each plot and converted to a percentage basis. Yield was determined by converting plot weight to pounds per acre, adjusting to seven percent moisture, and subtracting out percent foreign material from the grade sample report. A five-pound sample was collected from each plot and submitted to Federal-State Inspection Service for grade factor determination.

RESULTS AND DISCUSSION

Data analysis for yield indicated no significant difference ($p \leq 0.05$) among the treatments and no interaction between cultivar and fungicide schedule. Due to the fact it was a very wet year, disease pressure was high and the eight-application schedule had a higher yield than the four spray schedule, 5061 and 4729 pounds per acre, respectively when averaged over cultivars. The data for yield are presented in Table 2.

Table 2. Yield (lbs/A) of four runner cultivars receiving eight or four fungicide applications, Tifton, 2003.

Cultivar	# Fungicide Applications	Yield (lbs/A)	TSMK (%)	Spotted Wilt (%)
C-99R	8	5265	75.8	5.3 a
C-99R	4	4720	75.0	12.9 b
DP-1	8	5115	72.5	4.4 a
DP-1	4	4749	73.0	10.0 b
Georgia-01R	8	4929	77.5	5.1 a
Georgia-01R	4	5083	77.5	11.8 b
C34-24	8	4936	73.5	4.8 a
C34-24	4	4363	73.0	14.1 b
LSD (0.05)		***NS***	**NS**	**1.4**

*Means in the same column followed by the same letter are not significantly different at the 0.05 level of probability.

Data analysis for percent total sound mature kernels (TSMK) indicated a significant difference among cultivars when averaged over number of fungicide applications, but no difference between fungicide schedules and no interaction (Table 3). The percent TSMK for number of fungicide applications when averaged over cultivars was 74.8 for the eight applications and 74.6 for the four applications.

Table 3. Percent total sound mature kernels (TSMK) of peanut cultivars when averaged over number of fungicide applications, Tifton, 2003.

Cultivar	TSMK (%)
C-99R	75.4 b
DP-1	72.8 c
Georgia-01R	77.5 a
C34-24	73.3 c
LSD (0.05)	**1.7**

*Means in the same column followed by the same letter are not significantly different at the 0.05 level of probability.

Data analysis for spotted wilt disease severity ratings indicated a significant interaction between cultivars and number of fungicide applications (Table 4). All four cultivars had significantly less spotted wilt disease when receiving eight fungicide applications compared to receiving only four fungicide applications.

Table 4. Spotted wilt disease severity (%) of four runner cultivars receiving eight or four fungicide applications, Tifton, 2003.

	# Fungicide Applications	
Cultivar	8	4
C-99R	5.3 a	12.9 b
DP-1	4.4 a	10.0 b
Georgia-01R	5.1 a	11.8 b
C34-24	4.8 a	14.1 b
LSD (0.05)	**1.4**	

*Means in the same column followed by the same letter are not significantly different at the 0.05 level of probability.

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USE OF FUMIGATION AND RESISTANT CULTIVARS TO MANAGE CYLINDROCLADIUM BLACK ROT (CBR)

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INTRODUCTION

Cylindrocladium black rot (CBR), caused by *Cylindrocladium parasiticum*, is an emerging disease in Georgia that is found in new fields each year. It is distributed across the peanut growing region in Georgia, but some areas with a history of growing Virginia-type peanuts and/or soybeans have more severe problems. Overall losses are not as high as for some diseases since it is not found in many fields, but where it occurs it is often the biggest factor limiting production. It is a bigger problem in the Virginia-North Carolina region, and they frequently fumigate with metam sodium to limit losses. They also grow Virginia-type peanuts and have had CBR-resistant cultivars available for a number of years. The use of metam sodium has been more limited in Georgia, and runner peanuts with significant resistance to CBR were not available. After years of research, new peanut cultivars with significant CBR resistance are available. The fungicides Folicur and Abound have also shown some suppression of CBR. The objective of this research was to evaluate the level of resistance and yield potential of these new cultivars under field conditions, and to determine the additional benefit of fumigation and/or fungicides under heavy disease pressure.

MATERIALS AND METHODS

Tests were conducted at several locations in south Georgia, each with a different soil type as follows: Gibbs Farm, CPES, Tifton (Tifton loamy sand), Southwest Georgia Branch Station, Plains (Greenville sandy clay), Southeast Georgia Branch Station, Midville (Dothan loamy sand), and the Attapulgus Research and Education Center, Attapulgus (Norfolk loamy sand). The plot areas each had peanuts the year before, and with the exception of Attapulgus where tillage was a treatment, were moldboard plowed and marked in 6 ft beds prior to planting. Treated (Vitavax PC, 4 oz/100 lb) seed of Georgia Green, Carver, Georgia-02C, and AT-201 were planted with a two-row Monosem vacuum planter at 7 seed/ft. Phorate 20G (4 lb/A in furrow) was applied at planting for insect control, and fields with a history of nematodes also received Temik at planting. Metam sodium treatments (Vapam 42%, 10 GPA) were injected 8-10 inches deep under the row with a single shank (KMC strip-till applicator) at least 2 weeks prior to planting. All fields were irrigated as needed and sprayed with chlorothalonil regularly to control foliar diseases. Standard cultural practices for peanut as recommended by the University of Georgia Extension Service were followed for weed and insect control. A split plot or split-split design with five to six replicates was used in all locations. Each experimental unit was a single two-row bed (25 ft x 6 ft, 36-in. rows). Sprays were applied with a CO_2 belt-pack sprayer delivering 20 GPA with a broadcast boom using three TX-SS6 hollow cone nozzles per row.

The peanuts were dug at maturity and the incidence of CBR and white mold (ie. stem rot caused by *Sclerotium rolfsii*) evaluated after inverting. Plots were harvested by combine and the pods were dried to approximately 10% moisture. All data were subjected to analysis of variance and Fisher's LSD values were calculated for comparison of treatments.

RESULTS AND DISCUSSION

The new cultivars Carver and Georgia-02C both showed tremendous promise for reducing losses to CBR when compared to the current standard cultivar Georgia Green. The incidence of CBR was consistently lower and pod yields were generally 700-1200 lb/A higher with the resistant cultivars than Georgia Green, resulting in much higher financial returns per acre. The one exception to this was the 2003 test in Attapulgus (Table 2) where Georgia-02C had a very poor stand and did not yield well. Incidence of TSWV was not severe in these trials and was not a major factor in yield differences. White mold (Stem rot) was present in several tests and Georgia-02C sometimes had lower levels of this disease as well.

There were very few interactions of cultivar X fumigant, indicating that the cultivars responded similarly to the use of Vapam. The one very notable exception to this was the 2002 test in Tifton (Table 5). In this trial the Vapam application increased yield of Georgia Green by about 1000 lb/A (from 2627 up to 3607 lb/A), while Georgia-02C yielded about 3800 lb/A with or without Vapam. Overall the response to Vapam was much lower in these trials than in previous studies conducted in Georgia. In a couple of tests the soil conditions were not favorable during the application, but in the other trials reason for the lack of efficacy are still not known.

In trials where Folicur/Abound programs were used, yields were consistently higher than where just Bravo was used for leaf spot control. Some of this may well have been from control of soilborne diseases other than CBR, and in fact in 2002 (Table 5) there was no yield difference between the Folicur/Abound and the Moncut program, although the latter has activity only on soilborne diseases other than CBR.

The one trial comparing tillage showed no differences in levels of CBR, but the strip till did produce higher yields and greater dollar value per acre than did the conventional tillage. This trial is being repeated in 2004.

Overall this work demonstrates the value of some excellent new cultivars for managing CBR. These cultivars have a high level of resistance to TSWV and high yield potential as well, and both have mid-season maturity. Carver is very susceptible to leaf spot and must be sprayed accordingly, but its resistance to CBR far outweighs that weakness.

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TABLE 1. VAPAM X FUNGICIDE X CULTIVAR TEST, PLAINS, GA (2003)

CULTIVAR	RATE/A	APP'S	White Mold 9/02 [1]	CBR 9/02 [2]	CBR 9/29 [2]	Yield (lb/A)	SMKSS	$/ton	$/A
Georgia Green			13.0	33.3	44.8	2937	67.4	335	497
Carver			12.2	25.2	35.1	4068	65.8	328	666
GA-02C			8.2	15.0	15.7	3927	70.2	348	685
LSD (P<0.05)			3.2	7.0	6.3	428	2.2	11	75
FUNGICIDE PROGRAM									
Folicur alt. w/	7.2 fl oz	2 & 4	9.0	23.4	28.5	4067	67.8	337	687
Abound	12 fl oz	3 & 5							
Nontreated (Bravo only)			14.0	25.4	35.2	3252	67.8	337	550
LSD (P<0.05)			3.0	6.0	5.2	349	n.s.	n.s.	61
FUMIGANT PROGRAM									
Vapam	10 GPA	preplant	12.0	25.0	32.6	3631	67.5	335	610
No Vapam			11.0	24.0	31.0	3677	68.1	339	625
LSD (P<0.05)			3.0	6.0	n.s.	n.s.	n.s.	n.s.	n.s.

[1 & 2] Percent of row feet infected, based on number of disease loci (up to 12 inches of linear row) per plot.

TABLE 2. TILLAGE X VAPAM X CULTIVAR TEST, ATTAPULGUS, GA (2003)

TILLAGE PROGRAM	White Mold 8/28 [1]	CBR 8/28 [2]	White Mold 9/16 [1]	CBR 9/16 [2]	Yield (lb/A)	SMKSS	$/ton	$/A
Conventional	2.0	6.2	6.8	13.8	3915	65.4	330	650
Strip	2.1	5.0	9.9	12.1	4259	67.7	341	726
LSD (P<0.05)	n.s.	n.s.	n.s.	n.s.	282	2.3	n.s.	57
FUMIGANT PROGRAM								
Vapam (10 GPA)	2.0	4.3	9.2	10.6	4202	66.5	335	706
No Vapam	2.0	7.0	7.6	15.3	3971	66.6	336	670
LSD (P<0.05)	n. s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
CULTIVAR								
Georgia Green	2.1	7.3	10.7	16.4	4060	67.6	339	690
Georgia 02-C	1.2	1.0	4.5	3.9	3486	66.5	336	591
Carver	2.3	8.2	10.0	18.6	4715	65.6	331	783
LSD (P<0.05)	n.s.	5.0	3.9	8.3	346	n.s.	n.s.	69

[1 & 2] Percent of row feet infected, based on number of disease loci (up to 12 inches of linear row) per plot.

TABLE 3. VAPAM X FUNGICIDE X CULTIVAR TEST, PLAINS, GA (2002)

CULTIVAR	RATE/A	APP'S	White Mold [1]	CBR 8/12 [2]	CBR 9/3 [2]	Yield (lb/A)
Georgia Green			--	62.2	67.9	2661
Carver			--	41.4	39.2	3777
GA-02C			--	48.6	39.3	3390
LSD (P<0.05)			--	5.8	5.9	387
FUNGICIDE PROGRAM						
Folicur alt. w/	7.2 fl oz	2 & 4	--	51.5	46.1	3437
Abound	12 fl oz	3 & 5				
Nontreated (Bravo only)			--	50.3	51.5	3115
LSD (P<0.05)			--	n.s.	4.8	316
FUMIGANT PROGRAM						
Vapam	10 GPA	preplant	--	46.9	47.6	3554
No Vapam			--	54.5	50.0	2999
LSD (P<0.05)			--	4.8	n.s.	317

[1 & 2] Percent of row feet infected, based on number of disease loci (up to 12 inches of linear row) per plot. White mold was not evaluated since it was present at very low levels.

TABLE 4. VAPAM X CULTIVAR TEST, MIDVILLE, GA (2002)

CULTIVAR	RATE/ A	APP'S	CBR 10/25 [2]	Yield (lb/A)	SMKSS	$/A
Georgia Green			50.9	2642	74.6	491
AT-201			45.1	2956	75.3	551
Carver			28.5	3675	72.5	660
GA-02C			30.8	3359	76.6	636
LSD (P<0.05)			9.7	571	1.1	111
FUMIGANT PROGRAM						
Vapam	10 GPA	preplant	38.5	3119	74.8	577
No Vapam			41.2	3196	74.7	591
LSD (P<0.05)			n.s.	n.s.	n.s.	n.s.

[1 & 2] Percent of row feet infected, based on number of disease loci (up to 12 inches of linear row) per plot.

TABLE 5. FUNGICIDE X CULTIVAR TEST, TIFTON, GA (2002)

	NO VAPAM							
CULTIVAR	**White Mold 8/28 [1]**	**CBR 8/28 [2]**	**White Mold 9/16 [1]**	**CBR 9/16 [2]**	**Yield (lb/A)**	**SMKSS**	**$/ton**	**$/A**
Georgia Green	5.1	30.9	10.3	49.9	2627	71.4	355	460
Georgia-02C	4.9	4.9	7.6	20.3	3835	75.1	372	713
AT-201	8.4	19.7	11.6	44.5	2972	72.7	358	533
LSD (P<0.05)	3.4	9.2	n.s.	10.4	440	n.s.	n.s.	83
FUNGICIDE PROGRAM								
Moncut 70DF	2.5	18.7	2.3	37.7	3402	74.6	370	632
Folicur/Abound	2.5	21.3	5.3	37.8	3175	70.5	349	549
Nontreated	13.3	15.6	21.9	39.1	2852	74.1	366	525
LSD (P<0.05)	3.4	9.2	4.5	10.4	440	n.s.	n.s.	83

	VAPAM (10 GPA)							
CULTIVAR								
Georgia Green	10.8	15.3	10.1	31.6	3607	73.7	367	662
Georgia-02C	5.3	6.9	6.7	17.3	3809	75.7	374	714
AT-201	10.4	10.7	14.0	31.2	3472	72.6	359	624
LSD (P<0.05)	4.0	5.4	5.2	8.5	n.s.	n.s.	n.s.	n.s.
FUNGICIDE PROGRAM								
Moncut 70DF	0.9	13.9	1.9	28.0	3660	73.5	363	665
Folicur/Abound	3.9	9.6	5.6	25.2	3837	74.5	370	711
Nontreated	21.7	9.5	23.3	26.9	3391	74.1	366	623
LSD (P<0.05)	3.4	5.4	5.2	14.5	n.s.	n.s.	n.s.	n.s.

[1 & 2] Percent of row feet infected, based on number of disease loci (up to 12 inches of linear row) per plot.

A RISK INDEX FOR LEAF SPOT AND SOILBORNE DISEASES OF PEANUT IN GEORGIA 2003

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Peanuts and 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 in the southeast during the summer, including high temperatures, relative humidity and the potential for daily rainfall and thunder storms, create the near-perfect environmental conditions for outbreaks of fungal diseases. Common fungal diseases are 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 of common, but of sporadic importance. If peanut growers do not take appropriate measures to manage fungal diseases, crop losses in a field may exceed 50%.

Managing diseases with fungicides

Strategies for managing fungal diseases of peanut are typically dependent on the use of multiple fungicide applications throughout 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 appearance of leaf spot diseases. The timing of subsequent applications is determined by the length of the effective protective interval of the previous fungicide application, which is dependent on the properties of the fungicide and on weather conditions. 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.

Disease severity is affected by many factors

One early leaf spot looks pretty much like any other leaf spot and one limb lesion from *Rhizoctonia* looks similar to other lesions caused by the same fungal pathogen. However, as every grower knows, what truly matters in the end is not so much the presence of a leaf spot, or white mold, or limb rot, but *how much* of each disease is present. This "how much" factor, often referred to as "severity", is largely dependent on many variables in addition to the use of a fungicide program.

Weather affects the potential for disease. Most fungal diseases will be more severe during periods of increased rainfall and of less concern during drier periods. The AU-pnut leaf spot advisory that has been used to effectively manage diseases in peanut is based on this relationship between disease and weather. Even those growers who do not use AU-pnut recognize the need to shorten the time between fungicide applications in wet weather.
New peanut varieties can have a major impact on disease. The variety 'Georgia Green' is currently planted on approximately 75% of the peanut acreage in the southeast; however some

new varieties from breeding programs at the University of Georgia and the University of Florida not only have improved resistance to spotted wilt, caused by the tomato spotted wilt virus, but to fungal diseases as well. For example, the varieties 'DP-1' and 'GA-01R' have some of the best leaf spot resistance ever available in a commercial peanut variety. Varieties 'GA-02C' and 'Carver' have a level of resistance to Cylindrocladium black rot (CBR) that is superior to that of Georgia Green. Just as none of the current varieties is immune to spotted wilt, none are completely immune to fungal diseases either. However, improved resistance will likely lead to reductions in disease severity.

Crop rotation is one of the most important tactics to reduce disease severity in peanut production. 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 southern stem rot 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, southern stem rot, and perhaps CBR, than fields with shorter rotations, or no rotation at all. In Georgia, the Cooperative Extension Service recommends at least two years between peanut crops to help manage diseases.

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.

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 conducted by Dr. Albert Culbreath and graduate students Scott Monfort and Emily Cantonwine at the Coastal Plain Experiment Station in Tifton, it has been shown 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. Additional studies by Dr. Tim Brenneman and Dr. Carroll Johnson, both at the Coastal Plain Experiment Station, found that soilborne diseases were not increased in strip tillage above conventional tillage when peanut was grown in rotation with cotton. Obviously, implications for disease management is only one of many factors that a grower must consider when choosing to practice either conventional or conservation tillage and disease management. However, if a grower decides to practice conservation tillage with peanut production, he can expect lower levels of leaf spot in many instances.

Planting date can also affect the severity of disease in a field. Earlier planted peanuts (April-early May) tend to have more severe outbreaks of southern stem rot than do later planted peanuts. The severity of spotted wilt is also more severe on peanuts that are planted in this window. 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 in the environment (number of spores) 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.

Row spacing, 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 by Dr. Tim Brenneman and graduate student Layla Sconyers has lead to the realization that leaf spot tends to be more severe in twin row plantings and stem rot more severe in single rows when six seed per foot (single row) and three seed per foot (in each twin row) are planted. Planting peanuts in a twin row pattern leads to more rapid canopy closure, a condition that increases the relative humidity within the canopy and produced conditions favorable for leaf spot disease. Conversely, 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 stem rot from plant to plant.

Irrigation is often a critical component of a production system that 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 tem rot. Fungi 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. The use of irrigation can increase the period of time that conditions are favorable for disease spread above the period of favorable weather in a non-irrigated field. In two otherwise similar fields, the potential for disease is greater in the irrigated field.

All Fields Aren't Created Equal When It Comes To Disease

Each of the seven variables discussed above has some impact on the potential for disease in a peanut field, and the effects are additive. That is, the grower who is able to work all seven factors in his favor is likely to have the **potential** for less disease in a field than a grower who is able to incorporate only a couple of factors in his management program. At this point, it is important to clarify three points. First, we say that the first grower has the "potential" for less disease and not that he will always have "less" disease at the end of the season. By decreasing the potential for disease in the field, for example by using a more resistant variety and by reducing the inoculum with a long crop rotation, the grower can expect that the treat of severe losses will be reduced. However, if the grower does not use an adequate fungicide program or if excessive rain and poor weather conditions lead to conditions favorable for disease, he can still expect to incur disease severe enough to minimize the benefits of an otherwise superb disease management program. Second, not all of the seven factors carry an equal weight in their effect on disease. For example, the benefits of planting a variety with greater disease resistance and by utilizing a long crop rotation are of greater benefit than by planting single rows in strip tillage. Both sets of conditions will reduce the pressure from leaf spot; however the first set of variables will have much greater impact. Finally, the real benefit from reducing the potential for disease in a field, and the disease pressure that may follow, is that the grower can expect greater success from a fungicide program than if he did not carefully manage the disease factors. At the very least, the grower can expect greater success from his current fungicide program. In the future, with results from careful research studies, it is likely that new fungicide programs will be available to growers who minimize the risk of disease in a field that will allow the growers to reduce their inputs in a fungicide program while maintaining optimum yields.

Putting It All Together: A Risk Index for Fungal Diseases of Peanut in Georgia

The index presented here, much like the University of Georgia's Tomato Spotted Wilt Index, 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 to foliar and soilborne diseases in the coming season. More importantly, it should serve as an educational tool that allows the grower to predict the benefits of different management practices he makes in hopes of producing a better crop.

The risks associated with leaf spot and soilborne (primarily southern stem rot and Rhizoctonia limb rot) diseases are to be determined independently. The magnitude of points associated with each variable are not linked between soilborne and foliar diseases. However, the points allotted to each variable in the Peanut Disease Risk Index 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 only 5 points is allotted to the variable "row pattern". The magnitude of points assigned within each category and to each variable has been checked to insure 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 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".

Using the Risk Index

To assess the potential for disease in a field, the grower should calculate the point totals for leaf spot disease and for soilborne diseases. 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. After totaling the points for each variable, the grower can determine the risk category for each type of disease.

Crop rotation with a non-legume crop.

Years Between Peanut Crops	Leaf Spot Disease Points	Soilborne Disease Points
0	25	25
1	15	20
2	10	10
3	5	5
*4 or more	5	0

*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.

Tillage

Tillage	Leaf Spot Disease Points	Soilborne Disease Points
conventional	5	0
reduced*	0	0

* This is does not apply for reduced tillage situations where peanut is following directly behind peanut in a rotation sequence.

Field History

Previous disease problems in the field?*	Leaf Spot Disease Points	Soilborne Disease Points
NO	0	0
YES	10	15

* "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.

Cultivar (Variety) Selection

Variety	Leaf Spot Disease Points	Soilborne Disease Points
Georgia Green	20	20
Andru II	30	20
AT 201	30	20
C99-R	10	10
Carver	20	15
Norden	20	20
Hull	15	10
GA-02C	20	15
GA-01R	5	10
DP-1	5	10

*Varieties C99-R and DP-1 have an increased susceptibility to Rhizoctonia limb rot, in part due to the abundant vine growth, and to Cylindrocladium black rot.

**Varieties Carver, GA-02C, and possibly GA-01R have increased resistance to CBR than do other varieties commonly planted in Georgia.

Irrigation

Does the field receive irrigation?	Leaf Spot Disease Points	Soilborne Disease Points
NO	0	0
YES	10	5*

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

Planting Date

Peanuts are planted:	Leaf Spot Disease Points	Soilborne Disease Points
Early (April- May 10) *	0	5**
Mid-May (May 11-30 May)	5	0
Late (June 1 and later) *	10	0

*Planting during these periods will increase the risk of spotted wilt caused by TSWV.
**Earlier planted peanuts will have a small increased risk for white mold.

Row Pattern

Peanuts are planted in:	Leaf Spot Disease Points	Soilborne Disease Points
Single rows	0	5
Twin rows	5	0

Risk Totals

	Leaf Spot Disease Points	Soilborne Disease Points
Risk Total		
Risk		

Interpreting Your Risk Total

The maximum number of points that could be assigned to any field for risk of leaf spot diseases is 95; the minimum number of points in fields with the least risk is 10. For soilborne diseases, the maximum number of points is 75 (highest risk) and the lowest number of points is 10. An interpretation of your point total is included in the following table.

Risk

	Leaf Spot Points	Soilborne Points
High Risk	**65-95**	**55-75**
High Risk: Growers should always follow full fungicide input program in a high risk situation.		
Medium Risk	**35-60**	**30-50**
Medium Risk: 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	**10-30**	**10-25**
Low Risk: 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 fungicide programs that will be available in the future.		

Example 1.
A grower plants **Georgia Green** (20 leaf spot points, 20 soilborne points) on **May 5** (0 leaf spot points, 5 soilborne points), with **two years between peanut crops** (10 leaf spot points, 10 soilborne points) on **conventional tillage** (5 leaf spot points, 0 soilborne points), **single row spacing** (0 leaf spot points, 5 soilborne points), in an irrigated field (10 leaf spot points, 5 soilborne points) with **a history of leaf spot disease**, but **not soilborne disease** (10 leaf spot points, 0 soilborne points).

Points: leaf spot risk: **55** (Medium risk). **Points:** soilborne disease: **45** (Medium Risk).

Example 2.
A grower plants **DP-1** (5 leaf spot points, 10 soilborne points) on **May 15** (5 leaf spot points, 0 soilborne points), with **three years between peanut crops** (5 leaf spot points, 5 soilborne points) on **strip tillage** (0 leaf spot points, 0 soilborne points), **twin row spacing** (5 leaf spot points, 0 soilborne points), in an irrigated field (10 leaf spot points, 5 soilborne points) with **no history of leaf spot disease** or **soilborne disease** (0 leaf spot points, 0 soilborne points).

Points: leaf spot risk: **30** (Low risk). **Points:** soilborne disease: **20** (Low risk).

Example 3.
A grower plants **Georgia Green** (20 leaf spot points, 20 soilborne points) on **May 15** (5 leaf spot points, 0 soilborne points), with **one year between peanut crops** (15 leaf spot points, 20 soilborne points) on **conventional tillage** (5 leaf spot points, 0 soilborne points), **twin row spacing** (5 leaf spot points, 0 soilborne points), in an irrigated field (10 leaf spot points, 5 soilborne points) with **a history of leaf spot disease** and **soilborne disease** (10 leaf spot points, 15 soilborne points).

Points: leaf spot risk: **70** (High risk). **Points:** soilborne disease: **60** (High risk).

Final Thoughts
Growers should remember when assessing the meaning of their point totals that the breakdown for high, medium, and low risk fields are somewhat arbitrary. Therefore, although both 35 points and 60 points are within the category of "medium risk" for leaf spot disease, a field with 35 points is likely to have a lower disease pressure than a field with 60 points. Another point is that it is unlikely that many growers will able to achieve the minimum risk total in every category. However, an important use of this index will be to minimize overall risk in situations where point values for a variable may be high. For example, if a grower is forced to plant peanut in the same field on an annual basis, he may be able to use a variety with more resistance.

At the very least, growers who use this risk index will have a better understanding on how fungal diseases may affect them in the coming season. The index may also help them to adopt management practices that will allow them to improve their disease control in the field. With this information, it may be possible in the future to reduce fungicide inputs in fields where the risk of disease is found to be low.

AN EVALUATION OF EXTENDED INTERVAL FUNGICIDE PROGRAMS FOR PEANUTS GROWN UNDER REDUCED RISK TO DISEASE

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INTRODUCTION

The first version of the University of Georgia's Fungal Disease Risk Index for Peanuts was released in 2003. This index provides peanut growers with the first comprehensive system with which to assess the impact of multiple factors, including crop rotation, the history of disease in a particular field, cultivar selection, planting date, irrigation, tillage (conventional or strip), and row pattern (single rows or twin rows) on the potential for disease in the field. The complete Fungal Disease Risk Index is presented elsewhere in this Research and Extension report. In addition to providing an educational tool to the grower to optimize management decisions with regards to disease control, the risk index may also provide the opportunity to modify fungicide programs based upon the apparent risk of fungal diseases in a field. For example, where the risk to the fungal diseases leaf spot, white mold and Rhizoctonia limb rot is considered to be high, then a grower is advised to use a strong fungicide program with both a soilborne and a foliar disease component. Typically, a high-risk field will be treated seven times during the season and perhaps more frequently if weather is conducive for disease or disease appears in a field. However, where the risk of disease in a field is found to be reduced, i.e. either low or moderate, then it may be possible to extend the interval between fungicide applications from 14 days to 21 days or perhaps even longer.

There were two major objectives in this study. The first objective was to use the Fungal Disease Risk Index to calculate the potential for diseases at four locations, two commercial fields and two research plots. The second objective was to evaluate the effectiveness of full season and reduced input programs at each of these sites to determine if growers could successfully use the index to develop more cost effective fungicide programs. Clearly, all fields will not need the same level of disease control. By identifying fields with lower risk, it is hoped that the grower can save money on fungicides, fuel, and labor. It should be noted that the extended interval programs that will be discussed in this paper might not conform to the fungicide label developed by the manufacturer. Whenever a grower uses less fungicide than is specified on the label, the manufacturer may no longer be held responsible for the effectiveness of the program on disease control.

MATERIALS AND METHODS

In 2003 field trials were conducted at the Shaw Farm in Lanier County, the Henderson Farm in Dougherty County, the Black Shank Farm in Tift County, and the Attapulgus Research and Education Center in Decatur County. The 2003 Fungal Disease Risk Index was used to assess the potential for disease at each location and full-season versus extended interval fungicide programs were compared for final disease ratings and for yield. Data in each trial were analyzed with analysis of variance and Fisher's protected least significant difference at $p \leq 0.05$.

Lanier County

A field trial was established in 2003 at the Shaw farm in Lanier Co., GA. This was the first time that peanut was known to have been planted on this site. The field was planted to cotton in 2002. The experimental design was a randomized complete block with four replications. Plots were eight rows wide by the length of the field (~1000 ft). Peanut, 'Georgia Green', was planted on 14 May and dug on 23 Sep. Plots were rated for disease on 4 Aug, 29 Aug, and 19 Sep. The grower planted on twin rows and practiced conservation tillage. Treatments included 1) full-season Bravo Ultrex program, 2) full-season Headline/Folicur program, 3) full-season Abound program, 4) full-season Moncut program, 5) reduced-season Bravo Ultrex program, 6) reduced-season Headline/Folicur program, and 7) reduced-season Abound/Folicur program (Table 1). The grower applied treatments with a tractor-mounted boom sprayer. Fungicides were applied on the following dates: **1:** 12 Jun, **1.5:** 23 Jun, **2:** 27 Jun, **3:** 11 Jul, **4:** 18 Jul, **4.5:** 1 Aug, **5:** 9-11 Aug, 6: 22 Aug, **7:** 4 Sep. The field was irrigated; fertility, weed, and insect control followed recommendations for the University of Georgia's Cooperative Extension Service. Leaf spot, white mold and tomato spotted wilt were measured during the season. Data were analyzed with SAS (Proc GLM) and mean separation ($p<=0.05$) with Fisher's protected LSD.

Table 1. Fungicide programs at the Shaw Farm in Lanier County.

TRT		1*	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7
1	Bravo Ultrex (1.37 lb)	X		X		X		X		X		X		X
2	Headline (9 fl oz)		X											
2	Folicur					X		X		X		X		
2	Bravo Ultrex (1.37 lb)													X
3	Tilt (2.0 fl oz)	X		X										
3	Bravo WeatherStik (1.0 pt)	X		X										
3	Abound (18.5 fl oz)					X				X				
3	Bravo Ultrex (1.37 lb)							X				X		X
4	Headline (9 fl oz)		X											
4	Moncut (0.71 lb)					X								
4	Moncut (1.07 lb)									X				
4	Bravo Ultrex (1.37 lb)					X		X		X		X		X
5	Bravo Ultrex (1.37 lb)		X			X			X			X		
6	Headline (9 fl oz)		X						X					
6	Folicur (7.2 fl oz)					X						X		
7	Tilt (2.0 fl oz)		X											
7	Bravo WeatherStik (1.0 pt)		X											
7	Abound (12 fl oz)											X		
7	Folicur (7.2 fl oz)					X			X					

*Note: There is one week between sprays "1" and "1.5" and two weeks between sprays "1" and "2" and between "2.5" and "3.5".

Dougherty County
A field trial was conducted at the Henderson Farm in Dougherty County near Albany Georgia. The fungicide treatments were similar, but not identical, to those described above for Lanier County and are presented in Table 2. The field site was rated using the Leaf Spot Risk Assessment Index as a low-leaf spot risk field. Factors considered in the rating were variety (Georgia Green), tillage (conventional), irrigation, past history (2 yr. rotation w/ cotton), and row pattern (twin). Full season programs of Bravo, Headline/Folicur, and Abound were compared with reduced spray programs for each of these three fungicide regimes and a Full-season Moncut program. Peanuts were planted on May 5, 2003. Four replications of seven treatments were arranged in a randomized complete block design. Each plot was 18 rows wide. Average plot length was 2215 ft. Peanuts were rated for leaf spot and white mold at mid-season and again immediately prior to harvest.

Table 2. Fungicide application schedule and formulated rate per acre for Dougherty County trial.

TRT		1*	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7
1	Bravo Ultrex (1.37 lb)	X		X		X		X		X		X		X
2	Headline (9 fl oz)		X											
2	Folicur					X		X		X		X		
2	Bravo Ultrex (1.37 lb)													X
3	Tilt (2.0 fl oz)	X		X										
3	Bravo WeatherStik (1.0 pt)	X		X										
3	Abound (18.5 fl oz)					X				X				
3	Bravo Ultrex (1.37 lb)							X				X		X
4	Headline (9 fl oz)		X											
4	Moncut (0.71 lb)					X								
4	Moncut (1.07 lb)									X				
4	Bravo Ultrex (1.37 lb)					X		X		X		X		X
5	Tilt (2.0 fl oz)		X			X			X			X		
5	Bravo WeatherStik (1.0 pt)		X			X			X			X		
6	Headline (6 fl oz)		X											
6	Folicur (7.2 fl oz)					X		X		X				
6	Bravo Ultrex (1.37 lb)												X	
7	Tilt (2.0 fl oz)		X											
7	Bravo WeatherStik (1.0 pt)		X											
7	Abound (12 fl oz)					X				X				
7	Folicur (7.2 fl oz)							X						
7	Bravo Ultrex (1.37 lb)												X	

**Note: There is one week between sprays "1" and "1.5" and two weeks between sprays "1" and "2" and between "2.5" and "3.5".

Decatur County
A field trial was conducted at the Attapulgus Research and Education Center in Decatur County. The field in which this trial was conducted had been cleared of forest in 2001 and this was the first crop of any kind to our knowledge. Two varieties were used in the study, 'Georgia Green' and 'C99-R'. The seed were planted in single rows with conventional tillage.

Table 3. Fungicide application schedule and formulated rate per acre for Attapulgus trial.

TRT		1*	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7
1	Untreated													
2	**AU-pnut**	Exact timing of these applications for AU-pnut varied depending on rainfall.												
2	Tilt (2.0 fl oz)	X		X										X
2	Bravo WeatherStik (1.0 pt)	X		X										X
2	Abound (12 fl oz)							X				X		
2	Folicur (7.2 fl oz)					X				X				
3	Tilt (2.0 fl oz)	X		X		X		X		X		X		X
3	Bravo WeatherStik (1.0 pt)	X		X		X		X		X		X		X
4	Tilt (2.0 fl oz)	X			X			X			X			X
4	Bravo Ultrex (1.37 lb)	X			X			X			X			X
5	Tilt (2.0 fl oz)			X				X				X		
5	Bravo Ultrex (1.37 lb)			X				X				X		
6	Tilt (2.0 fl oz)	X		X										X
6	Bravo WeatherStik (1.0 pt)	X		X				X				X		X
6	Abound (12 fl oz)					X				X				
6	Folicur (7.2 fl oz)													
7	Tilt (2.0 fl oz)			X										
7	Bravo WeatherStik (1.0 pt)			X										
7	Abound (12 fl oz)											X		
7	Folicur (7.2 fl oz)							X						

*Note: There is one week between sprays “1” and “1.5” and two weeks between sprays “1” and “2” and between “2.5” and “3.5”.

The trial was planted on 19 May 2003 using a split plot design where whole-plots were fungicide treatments and sub-plots were variety. There were four replications in the study. Each whole plot was eight rows (36 in. centers) wide by 40 ft in length. Each subplot was 4 rows wide. Staff at the research station applied the treatments using a tractor mounted boom sprayer. Fungicide sprays for the AU-pnut program and the calendar programs were initiated on 23 Jun. The trial was rated near harvest for leaf spot and white mold. Each plot was taken to yield at harvest; plots were dug on 30 Sep.

Treatment 1 (untreated)
Treatment 2 (AU-pnut) plots

AU-PNUT notes:

1. Spray first AU-pnut (Tilt/Bravo) at time of WEEK 1 calendar spray.
2. All AU-pnut prior to 50 days after planting, use Tilt/Bravo
3. For AU-pnut Sprays from 51-120 DAP, alternate Folicur (7.2 oz/A) with Abound (12.0 oz/A)
4. After 120 DAP, switch back to Tilt/Bravo

Treatment 3 (Tilt/Bravo 7X) plots
Treatment 4 (Tilt/Bravo 5X. 1-2.5-4-5.5-7)
Treatment 5 (Tilt/Bravo 3X, 2-4-6) plots
Treatment 6 (Tilt/Bravo, Tilt/Bravo, Folicur, Abound$_{12oz}$, Folicur, Abound$_{12oz}$, Tilt/Bravo, 6-7)
Treatment 7 (Tilt/Bravo, Folicur, Abound$_{12oz}$, 2-4-6) plots

Tift County

A field trial was conducted at the Black Shank Farm on the Coastal Plain Experiment Station in a field that had been planted to peanut since 2000. A split-plot experimental design with six replications was used. Plots were planted on 20 May 2003. The whole plot treatments were variety, either ‘Georgia Green’ or ‘Georgia 01-R’. Each whole plot was 4 rows wide by 25 ft in length. Each subplot was 2 rows wide. Plots were treated with a CO_2 backpack sprayer at a pressure of 30 psi and a spray volume of 20 gal/A. Fungicides were applied to the calendar schedule on 18 Jun, 4 Jul, 18 Jul, 1 Aug, 15 Aug, 20 Aug (5.5), 29 Aug, and 12 Sep Plots were rated for leaf spot and white mold on 8 and 29 Sep. Plots were dug on 29 Sep and taken to yield.

Table 4. Fungicide application schedule and formulated rate per acre for Black Shank Farm trial.

TRT		1*	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7
1	Untreated													
2	**AU-pnut**													
2	Tilt (2.0 fl oz)													
2	Bravo WeatherStik (1.0 pt)	6/18		6/30										8/28
2	Abound (12 fl oz)							7/24				8/15		
2	Folicur (7.2 fl oz)					7/11				8/5				
3	Tilt (2.0 fl oz)	X		X		X		X		X		X		X
3	Bravo WeatherStik (1.0 pt)	X		X		X		X		X		X		X
4	Tilt (2.0 fl oz)	X				X		X			X			X
4	Bravo Ultrex (1.37 lb)	X				X		X			X			X
5	Tilt (2.0 fl oz)			X				X				X		
5	Bravo Ultrex (1.37 lb)			X				X				X		
6	Tilt (2.0 fl oz)	X		X										X
6	Bravo WeatherStik (1.0 pt)	X		X				X				X		X
6	Abound (12 fl oz)					X				X				
6	Folicur (7.2 fl oz)													
7	Tilt (2.0 fl oz)	X												X
7	Bravo WeatherStik (1.0 pt)	X												X
7	Abound (12 fl oz)							X			X			
7	Folicur (7.2 fl oz)					X								
8	Tilt (2.0 fl oz)			X										
8	Bravo WeatherStik (1.0 pt)			X										
8	Abound (12 fl oz)											X		
	Folicur (7.2 fl oz)							X						
9	Headline (9 fl oz)		X						X					
9	Folicur (7.2 fl oz)					X						X		
9														

**Note: There is one week between sprays “1” and “1.5” and two weeks between sprays “1” and “2” and between “2.5” and “3.5”.

Treatment 1 (untreated)

Treatment 2 (AU-pnut) (Tilt/Bravo, Tilt/Bravo, Folicur, Abound, Folicur, Abound, Folicur, Bravo) plots

Treatment 3 (Tilt/Bravo 7X) plots

Treatment 4 (Tilt/Bravo 5X, 1-2.5-4-5.5-7) plots

Treatment 5 (Tilt/Bravo 3X, 2-4-6) plots

Treatment 6 (Tilt/Bravo, Tilt/Bravo, Folicur, $Abound_{12oz}$, Folicur, $Abound_{12oz}$, Tilt/Bravo, 1-7)
Treatment 7 (Tilt/Bravo, Folicur, $Abound_{12oz}$, $Abound_{12oz}$, Tilt/Bravo, 1-2.5-4-5.5-7) plots
Treatment 8 (Tilt/Bravo, Folicur, $Abound_{12oz}$, 2-4-6) plots
Treatment 9 (Headline, Folicur, Headline, Folicur) plots

RESULTS

The 2003 growing season was extremely wet and rainfall was abundant throughout much of the season. Conditions were very favorable for fungal diseases. Tomato spotted wilt was typically not severe in most fields. Results from individual trials are presented below.

Results from Shaw Farm, Lanier County

2003 UGA Fungal Disease Risk Index Values
Plots Planted to Georgia Green
Leaf Spot: **45 points**, Moderate Risk
Soilborne: **25 points**, Low Risk

Leaf spot control was outstanding for all treatments, either full season or reduced input. Though peanuts had not been in this field in the past, white mold was found in the field at a low incidence. Still, there were no significant differences in disease control between treatments. Yields were lowest where only chlorothalonil (Bravo Ultrex) was used in a program.

Table 5. Results from field trial in Lanier County.

Treatment	Leaf spot Fla. Scale		White mold hits/100 ft		Yield lb/A		Value $355/T minus Program Cost
1. FS* Bravo	1.88	A**	5.00	A	5768	C	$977.31
2. FS Headline/Folicur	2.00	A	2.00	A	6366	AB	$1055.18
3. FS Abound	2.00	A	7.75	A	6028	ABC	$985.59
4. FS Moncut	1.88	A	4.00	A	5847	BC	$955.46
5. Reduced Bravo	2.62	A	5.75	A	5771	C	$997.79
6. Reduced Headline/Folicur	2.12	A	4.25	A	6446	A	$1090.58
7. Reduced Abound	2.00	A	5.00	A	6196	ABC	$1049.70

*FS indicates a full season, seven-spray fungicide program.
**Values followed by the same letter re not statistically different at $p<0.05$.

Results from Henderson Farm, Dougherty County

Control of early leaf spot and white mold was similar among all fungicide programs. However, yields were numerically, if not significantly, greater where soilborne fungicides were included in the fungicide program.

2003 UGA Fungal Disease Risk Index Values
Plots Planted to Georgia Green
Leaf Spot: **50** points, Moderate Risk
Soilborne: **40** points, Moderate Risk

Table 6. Results from field trial in Dougherty County.

Treatment	Leaf Spot Fla. Scale		White Mold hits/100ft		Yield lbs/A	
Trt 1 FS* Bravo	2.7	A**	16.5	A	3300	A
Trt 2 FS Headline/Folicur	2.9	A	8.9	A	3507	A
Trt 3 FS Abound	2.6	A	10.6	A	3660	A
Trt 4 FS Moncut	2.8	A	5.9	A	3676	A
Trt 5 Reduced Bravo	2.7	A	11.8	A	3253	A
Trt 6 Reduced Headline/Folicur	2.95	A	10.2	A	3326	A
Trt 7 Reduced Abound	2.7	A	8.4	A	3744	A

*FS indicates a full season, seven-spray fungicide program.
**Values followed by the same letter re not statistically different at $p<0.05$.

Results from Attapulgus field trial, Decatur County

Soilborne disease was nearly absent in this trial, except along one edge of the field where sclerotia of *Sclerotium rolfsii* may have washed from other production fields. Foliar diseases, especially early leaf spot, led to nearly complete defoliation of the untreated plots. Plots that were sprayed fewer times had more severe leaf spot at the end of the season; however yields were not significantly different. In fact, there was no significant difference in yield between the best treatment (AU-pnut schedule) and the untreated check, despite substantial differences in defoliation. Variability within the field may have skewed some yield results.

2003 UGA Fungal Disease Risk Index Values

Plots Planted to C99-R:
Leaf Spot: 25 points, Low Risk
Soilborne: 15 points, Low risk

Plots Planted to Georgia Green:
Leaf Spot: 35 points, Moderate
Soilborne: 25 points, Low Risk

Table 7. Results from the Attapulgus dryland study.

		Across Fungicides					
Treatment		Leaf spot rating		White mold		Yield	
	Variety	Fla Scale		Hits/80 ft		(lbs/A)	
	C99-R	2.8	a*	0.11	a	3530	a
	Georgia Green	3.9	b	0.36	b	3319	a
	Program	***Results across varieties***					
1	Untreated	6.8	A	0.00	A	3221	A
2	AU-pnut	2.0	CD	0.75	A	4538	A
3	7X Tilt/Bravo	2.2	CD	0.75	A	3528	A
4	5X Tilt/Bravo	2.4	C	0.75	A	3335	A
5	3X Tilt/Bravo	4.6	B	0.00	A	3221	A
6	FS Folicur/Abound	1.3	D	0.00	A	2620	A
7	3 spray Folicur/Abound	3.9	B	0.00	A	3505	A

* Values followed by the same letter re not statistically different at $p<0.05$.

Results from the Black Shank Farm in Tift County

Disease in this field, as anticipated, was greater than at the other sites evaluated in this study. Because of the short rotation in the field, the risk for soilborne disease was severe. Data analysis showed no significant interaction between fungicide treatment and variety. Therefore, the results are presented across fungicide treatments and then across varieties. Georgia-01R was more susceptible to white mold, but less susceptible to leaf spot than was Georgia Green. Leaf spot control suffered as the number of fungicide applications dropped from 7 to 5 to 3. Control of white mold was possible with reduced soilborne fungicide inputs. However, failure to treat with a soilborne fungicide led to significant yield reductions. The greatest numeric yield and best white mold control was found where the AU-pnut program was used, though this required an additional fungicide application.

2003 UGA Fungal Disease Risk Index Values

Plots Planted to Georgia-01R
Leaf Spot: **50** points, Moderate Risk
Soilborne: **45** points, Moderate Risk

Plots Planted to Georgia Green
Leaf Spot: **65** points, High Risk
Soilborne: **55** points, High Risk

Table 8. Results from field trial at the Black Shank Farm.

		Across Fungicides					
Treatment		Leaf spot rating		White mold		Yield	
	Variety	Fla Scale		Hits/50 ft		(lbs/A)	
	Georgia-01R	3.04	b*	15.0	a	3789	a
	Georgia Green	4.73	a	9.2	b	3686	a
	Program	***Results across varieties***					
1	Untreated	6.9	A	14.2	AB	2754	C
2	AU-pnut	2.6	DE	4.2	E	4284	A
3	7X Tilt/Bravo	2.5	DE	14.8	AB	3450	B
4	5X Tilt/Bravo	4.1	C	17.8	A	3473	B
5	3X Tilt/Bravo	5.1	B	16.1	A	3408	B
6	FS Folicur/Abound	2.2	E	8.1	D	4180	A
7	Red Folicur/Abound	3.7	C	9.6	CD	4068	A
8	3 spray Folicur/Abound	4.9	B	11.5	BCD	3921	A
9	4 Spray Headline/Folicur	3.0	D	12.3	BC	4103	A

* Values followed by the same letter re not statistically different at p<0.05.

DISCUSSION

The primary objective of this study was to assess the 2003 Fungal Disease Risk Index under field conditions through a comparison of full season and reduced input fungicide programs. The risk index was generally successful in predicting the level of disease that would occur in a field. In every trial at least some reduced input fungicide programs, if they included some level of soilborne fungicide, maintained yields that were not significantly different from full season programs. The key factor appeared to be the use of a soilborne fungicide. Even where the risk of soilborne disease was considered to be low, for example at the Shaw Farm in Lanier County, addition of a soilborne fungicide into the disease program was beneficial. Also, at the Black Shank Farm, fewer fungicide applications resulted in more severe leaf spot disease. However, this increase did not result in significant yield reductions if soilborne diseases were controlled.

This study has demonstrated that growers can effectively manage diseases in a peanut field with fewer fungicide applications, even when weather conditions during the season are very favorable for fungal disease. In fact, if reduced input programs were successful in 2003, they should be effective in most seasons. Factors to consider before implementing a reduced input program include assessment of risk factors and use of some soilborne fungicides in the program. Also, growers should be aware that use of a reduced input program might result in less fungicides being applied than directed by the pesticide label. From this research, there is clear indication that growers can apply fewer fungicides while maintaining similar yields to full season programs where risk to disease is reduced. Some growers put great value on the historic success of a full-season seven-spray fungicide program and will not wish to adopt a lower input program. However, lower inputs in reduced risk fields are likely to be of interest to many growers, especially when the grower can save on fuel and labor costs with fewer trips across a field.

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