245
570 +
734
2008 + 2009

NATIONAL PEANUT BOARD/SOUTHEAST PEANUT RESEARCH INITIATIVE
FINAL REPORT FOR WORK
DONE UNDER RESEARCH AGREEMENT

Final report
Summary
Dec 22, 2010

INSTITUTION: University of Georgia

PROJECT TITLE: Peanut cultivar responses to seed storage regime and planting date, year 2

RES. AGR. NO.: PROJECT LEADER: Dr. Timothy Grey
GACCP Control NO.: 036428-01 (806)

EXPIRATION DATE: Dec 31, 2010 NPB CONTACT: Maria Fenn or Dee Houston
NPB Control NO.: 195

2009 FINAL REPORT:

Field and laboratory studies were conducted in 2008 and 2009 to determine if peanut germination data could be correlated to field evaluations for yield and other parameters for multiple cultivar seed lots.

Statistical Analysis

Analyses were performed using the MIXED PROCEDURE function of SAS (SAS Inst., 2002) statistical software. The model compared storage methods, cultivar, planting date, and planting depth. Differences among treatment means were tested using Fisher's Protected Least Significant Difference Test (LSD) at $p \leq 0.05$.

Results and Discussion

Data are presented by planting date in order to observe the yield differences (Table 3). However, analysis indicated there was no difference between planting date or planting depth for any variable. There were significant differences between cultivars for yield, tomato spotted wilt incidence and early and final stand counts. Georgia-06G for both the April and June planting, had the highest yield among any cultivar, followed by AP-3. Initial germination testing indicated that AP-3 and Georgia-06G seed were as vigorous as Georgia Green, but Georgia Green yield was less. As the incidence of TSWV increased, the yield reductions were reflective as with Georgia Green and Georgia-01R. In contrast, the weakest cultivars for the germination study, York, Georgia-01R, and Georgia-02C (Figure 1), had the lowest yields in the study (Table 3). These data indicate that the potential for relating seed vigor to other parameters such as peanut stand establishment and yield, need further evaluation.

NATIONAL PEANUT BOARD/SOUTHEAST PEANUT RESEARCH INITIATIVE
FINAL REPORT FOR WORK
DONE UNDER RESEARCH AGREEMENT

Final report

Oct 16, 2009

INSTITUTION: University of Georgia

PROJECT TITLE: Peanut cultivar responses to seed storage regime and planting date

RES. AGR. NO.: PROJECT LEADER: Dr. Timothy Grey
GACCP Control NO.: 036428-01 (806)

EXPIRATION DATE: June 30, 2009 NPB CONTACT: Maria Fenn or Dee Houston
NPB Control NO.: 195

2008 FINAL REPORT:

Field and laboratory studies were conducted in 2008 to determine if peanut germination data could be correlated to field evaluations for yield and other parameters for multiple cultivar seed lots.

The experiment was conducted in 2008 at the University of Georgia Tifton campus. Peanuts seed lots from the 2007-growing season were used. The peanuts were stored in two locations using different storage methods. One method was stored at a traditional steel frame warehouse building and the other method was stored in a new dome structure made of concrete. The peanuts at both locations were put into burlap bags unshelled and placed into the storage facility after harvest in 2007. The test consisted of nine peanut cultivars with three replications. The different seed varieties were Georgia Green, Georgia 03L, Georgia 02C, Georgia 06G, Georgia 01R, AP3, C-99R, York, and AT 3085RO. Each replication compared storage method and cultivars across a temperature gradient. Enough seeds were removed from each bag at the two different locations in order to have 240 sound peanuts to test. After samples were removed from storage, they were separated into three different sizes and shelled with a box sheller. The equipment was cleaned after each cultivar to prevent any contamination. After the peanuts were shelled, they were screened to a more even kernel size using a size 18 and 21 screen.

Following processing, all seed were evaluated for germination parameters. Additionally, a controlled temperature germination table with thermocouples in every other cell was used to germinate the seed. The germination table was built by the UGA Engineering Department. The temperatures ranged from 14C to 36C on all three replications. The thermocouples were linked to a data box that recorded temperature readings every 10 minutes. A computer was hooked up to this box to collect the data so it could be translated into a spreadsheet. Each of the nine cultivars were evenly distributed across the 24 cells with numbering correlations. Each cell had a Petri dish that contained ten seeds for the first replication. The second and third replications had eight seeds in the Petri dish because of seed quantity available after sizing. Ten mL of water was added to each Petri dish after they were placed on the germination table. Data was recorded daily for each replication the number of germinated seeds for each cell by cultivar. The peanuts were considered germinated when they had a 0.5 cm radicle. The first replication was pulled out of storage on

3/6/2008, put on the germination table 3/19/2008, and the replication ended on 3/24/2008. The second replication was removed from storage 3/13/2008, put on the germination table 3/24/2008, and the replication ended 3/31/2008. The last replication was taken out of storage 3/24/2008, put on the germination table 3/31/2008, and the replication ended on 4/7/2008.

Tests were then conducted on all seed in the field at the Gibbs Farm in Tifton under controlled growing conditions. Field experiments included two planting timings (April and June) at different depths (2 to 3 inches), and the effects on stand establishment, disease incidence and yield. Peanut were planted April 29, 2008 for the early planting date and June 4, 2008 for the late planting date. Early stand counts were taken after planting and late stand counts were taken at harvest (September and October) for each trial. Additionally, tomato spotted wilt evaluations were taken prior to harvest.

Laboratory study

Statistical Analysis

Analyses were performed using the MIXED PROCEDURE function of SAS (SAS Inst., 2002) statistical software. The model compared storage methods, timing, cultivar, and temperature. Differences among treatment means were tested using Fisher's Protected Least Significant Difference Test (LSD) at $p \leq 0.05$.

Results and Discussion

Only one of the nine cultivars resulted in a significant difference between storage methods. The difference in storage at P=0.05 for AP3 peanut resulted in lower germination in the dome with 52.8% germination compared to the Warehouse with 58.6% (Table 1). The different temperatures in each cultivar showed the same change among replications. The percent cumulative germination ranged from 65%-80%. There were statistical differences in germination over time. Each cultivar peaked in germination about the 96 hour mark, with no differences in percent cumulative germination among the 96, 120, and 144 hour readings (Table 2). There were differences in cumulative germination at the other sample times (Table 2), and all nine cultivars had the same trend (Figure 1). Georiga 02C and York were the weakest overall germinating seed lots while Georgia Green had the greatest response.

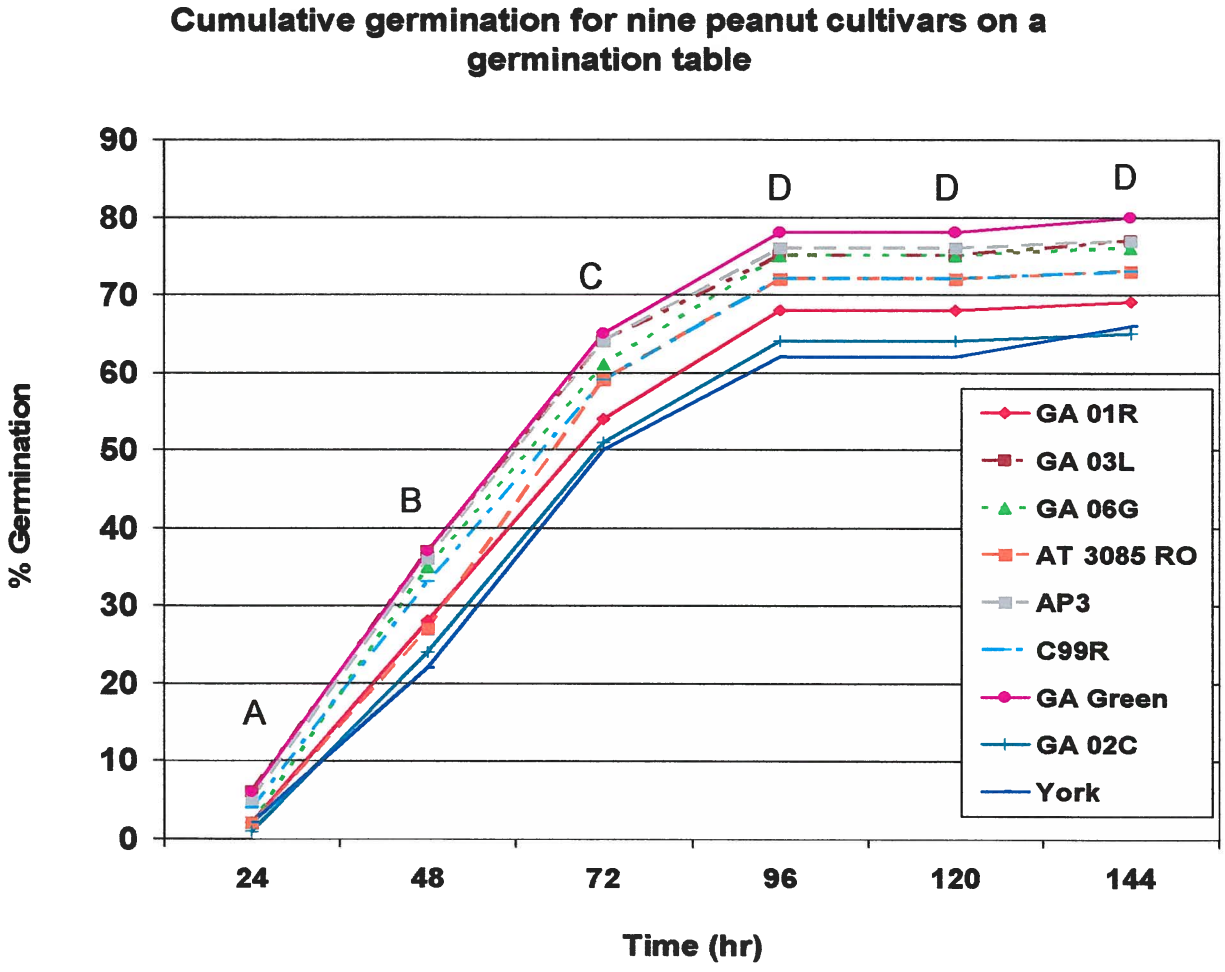
Table 1. Difference in storage at P= 0.05

Type	AP3
Storage	% Cumulative germination
Dome	52.8 A
Ware.	58.6 B

Table 2. Peanut emergence over time for nine peanut cultivars averaged over temperature.

Counts	Georgia O1R	Georgia O3L	Georgia O6G	AT 3085RO	AP3	C99R	Georgia Green	Georgia O2C	York
Hours	----------% Cumulative germination----------								
24	2 A	6 A	2 A	2 A	5 A	4 A	6 A	1 A	2 A
48	28 B	37 B	35 B	27 B	36 B	33 B	37 B	24 B	22 B
72	54 C	64 C	61 C	59 C	64 C	59 C	65 C	51 C	50 C
96	68 D	75 D	75 D	72 D	76 D	72 D	78 D	64 D	62 D
120	68 D	75 D	75 D	72 D	76 D	72 D	78 D	64 D	62 D
144	69 D	77 D	76 D	73 D	77 D	73 D	80 D	65 D	66 D

[a]Temperatures across a thermo-gradient table ranged from 14 to 36 C.



Field study

Statistical Analysis

Analyses were performed using the MIXED PROCEDURE function of SAS (SAS Inst., 2002) statistical software. The model compared storage methods, cultivar, planting date, and planting depth. Differences among treatment means were tested using Fisher's Protected Least Significant Difference Test (LSD) at $p \leq 0.05$.

Results and Discussion

Data are presented by planting date in order to observe the yield differences (Table 3). However, analysis indicated there was no difference between planting date or planting depth for any variable. There were significant differences between cultivars for yield, tomato spotted wilt incidence and early and final stand counts. GA 06G for both the April and June planting yield the highest among any cultivar, followed by AP3. Initial germination testing indicated that AP3 and GA 06G seed were as vigorous as Georgia Green, but Georgia Green yield was less As the incidence of TSWV increased, the yield reductions were reflective as with Georgia Green and GA 01R. In contrast, the weakest cultivars for the germination study, York, GA 01R, and GA 02C (Figure 1), had the lowest yields of the study (Table 3). These data indicate that the potential for relating seed vigor to other parameters such as peanut stand establishment and yield, need further evaluation.

Conclusions

The next step is to continue this research into 2009, then combine the data for analysis for two years. Further data analysis will be used to compare the laboratory germination studies to the field research at that time.

The authors wish to thank Casey Horton, Charlie Hilton, and Aaron Wise for technical assistance with this research. The authors thank the Georgia Peanut Commission for partial funding and assistance with this research.

Table 3. Yield, tomato spotted wilt counts, and stand for time of planting and cultivar study of various peanut seed lots from Georgia in 2008.[a]

	Yield				Tomato Spotted Wilt				Stand counts: Early season				Stand counts: At harvest			
	Planting Date				Planting Date				Planting Date				Planting Date			
Cultivar	April 29		June 4		April 29		June 4		April 29		June 4		April 29		June 4	
	lbs/acre				#/plot				#foot/row				#foot/row			
AP-3	5050	ab[b]	4940	b	4.8	bc	4.3	d	3.8	c	3.6	e	4.3	cd	4.1	c
AT3085 RO	4990	abc	5070	b	3.7	c	5.6	cd	4.3	b	4.2	b	4.8	b	4.9	a
C99-R	4760	c	4500	c	6.8	b	7.4	c	4.1	b	4.1	bc	4.0	de	4.4	b
GA 03L	4780	bc	4990	b	3.0	c	5.6	cd	4.9	a	4.8	a	4.7	b	4.8	a
GA 06G	5120	a	5550	a	3.6	c	4.7	d	4.2	b	4.0	cd	4.3	c	4.4	b
GA 01R	4980	abc	4600	c	6.6	b	12.7	b	3.8	c	3.9	cd	3.8	e	4.8	a
GA 02C	4460	d	4210	d	3.8	c	5.3	cd	3.6	cd	4.0	bcd	4.0	de	4.4	b
GA Green	4990	abc	4620	c	9.2	a	17.8	a	4.8	a	4.8	a	5.2	a	5.0	a
York	4840	bc	4490	c	5.0	cb	5.5	cd	3.4	c	3.7	de	3.8	e	4.3	bc

[a]MIXED model analysis; the 2-way interactions of planting depth and cultivar was not significant, therefore data was combined for presentation across variables.

[b]Within a column, values followed by the same letter are not significantly different at the 5% probability level.