

1. Title: Effects of Calcium on Yield, Grade, and Hull Degradation with Virginia-Type Peanut

2. Project Investigators:

Dr. Todd A. Baughman, Associate Professor and Agronomist, Vernon, TX
Dr. Thomas A. Lee, Professor & Plant Pathologist, Stephenville, TX
Mr. W. James Grichar, Research Scientist, Yoakum, TX
Dr. Mark McFarland, Associate Professor and Soil Fertility Specialist, College Station, TX

3. Problem and Need:

Although Texas produces all four market-type of peanut, the Virginia-type seems to be one with a significant competitive advantage for some producers. This competitive advantage could possibly increase with the new farm bill. This market-type is produced on numerous farms across West Texas. However, this area could expand with the new farm bill. Calcium is a critical element for producing all market-types of peanut, and is especially critical with the Virginia-type peanut. This is due to its larger kernel size and the fact that it is most often sold as an in-shell peanut. Normally, in many areas of Texas calcium is not a limiting factor in peanut production. The soils (especially in West Texas) often are naturally calcareous in nature. Therefore, current fertility recommendations would indicate that calcium is not a limiting factor in most Virginia-type fields in Texas. However, there have been issues with peanut grade/quality and hull characteristics (including brightness and degradation) in recent years. This has lead to the recommendation of adding calcium in-season to increase quality for the in-shell market. While this has been a normal practice in the Virginia-Carolina region (most often in the form of gypsum), the soils in that region are more acidic (less calcareous). The objectives of this proposal are to evaluate the use of calcium on peanut yield, quality, and hull degradation, and possibly determine what factors are leading to hull degradation problems.

4. Plan of Action:

Field studies were established in Texas during the 2003 and 2004 growing seasons to evaluate the use of calcium on peanut yield and grade. Five studies were conducted on producers' field in Terry and Wilbarger County. Treatments included untreated (no calcium), one application of gypsum at 1500 lbs/A (750 lbs/A on 20" band), two applications of N-Cal at 12 gallons per acre each applied in a broadcast spray, and one or two applications N-Cal applied through the center pivot. The application of gypsum and first N-Cal spray were applied on June 26, 2003 and June 30, 2004 while the second N-Cal spray was applied on July 23, 2003 and July 22, 2004 at the Terry County locations. The first applications were applied on July 12, 2004 and the second application was made on July 26, 2004. Peanut were harvested to determine yield and grade.

Two studies were conducted at the Western Peanut Growers Farm near Denver City and the Yoakum Experiment Station near Yoakum. Treatments included untreated (no calcium), one application of gypsum at 1500 lbs/A (750 lbs/A on 20" band), and two applications of N-Cal at 12 gallons per acre each applied in a broadcast spray. The studies also include three Virginia varieties: Jupiter, NC7, and VC2. The application of gypsum and first N-Cal spray were applied on June 25, 2003 and June 30, 2004 (Western Peanut Growers) and August 12, 2003 and August 26, 2004 (Yoakum) while the second N-Cal spray was applied on July 23, 2003 and July 22, 2004 (Western Peanut Growers) and August 26, 2003 and September 9, 2004 (Yoakum).

5. Results:

Neither yields nor grades were affected by any of the calcium applications in the first study. Yield was not affected in 3 or 4 trials in the second study and grade was not affected in any of the trials. Yield was reduced by the N-Cal spray treatment in Trial 4 of the second study. This was most likely due to excessive leaf burn from the sprayed application of N-Cal. There were no differences in yield or grade between Virginia varieties in two trials. NC7 yielded high than VC2 or Jupiter in two of the trials. VC2 had a higher grade than NC7 and Jupiter in one trial and NC7 in another.

Table 1. The effects of calcium applications on Virginia peanut yield and grade in 2003 and 2004.

Variety	Yield					Grade				
	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
	----- (lb/A) -----					----- (%) -----				
Untreated	5200	5480	6410	4950	4940	72	73	69	74	71
Gypsum	5060	5150	6500	5150	4330	72	73	71	73	71
N-Cal -Spray	4980	5710	5830	5490	4890	70	72	72	74	71
N-Cal – Center Pivot	4600	5520	5650	4470	4290	72	72	71	74	73
LSD (10%)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Standard Deviation			980	700	590			1	1	1
CV (%)	7	8	16	11	13	2	3	2	2	2

Trials conducted in Terry County on the Delwin Marrow Farm (Trial 1), the Monty Henson Farm (Trial 2), J.W. Hawkins Farm (Trial 3), Tommy Mason Farm (Trial 4), and Wilbarger County on the Clint White Farm (Trial 5).

Table 2. The effects of calcium applications on Virginia peanut yield and grade in 2003 and 2004.

Variety	Yield				Grade			
	Trial 1	Trial 2	Trial 3	Trial 4	Trial 1	Trial 2	Trial 3	Trial 4
Untreated	2980	2150	3240	4430	72	68	74	72
Gypsum	3180	2120	3300	4380	72	70	74	71
N-Cal -Spray	2070	2100	3440	4070	73	70	74	71
LSD (10%)	NS	NS	NS	222	NS	NS	NS	NS
NC7	3310	2060	3760	4210	72	69	74	70
VC2	2950	2360	3380	4360	73	71	75	72
Jupiter	2970	1940	2850	4310	73	69	73	72
LSD (10%)	250	NS	320	NS	NS	NS	1	1
Standard Deviation	350	522	460	330	2	2	1	2
CV (%)	11	25	14	8	2	3	2	2

Trials conducted on the Western Peanut Grower Farm (Trial 1 and 3) and the Yoakum Experiment Station (Trial 2 and 4).

LSD = least significant difference, CV = coefficient of variation, NS = not significant
Means within a column which differ by more than the LSD are statistically different (P=0.10).