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2012 Southeastern Peanut Research Initiative
Final Report

Title: Evaluation of replant decisions as affected by plant stand

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There are a number of reasons that a grower can have a poor plant stand in a year, varying from traveling too fast with the planter, having vacuum pressure set too low on a planter, poor quality seed with low germination, and many others. Thus, peanut scientists are faced every year with questions on whether a grower should replant his field when faced with a poor plant stand. This becomes a highly significant economic decision for a grower, especially when large seeded cultivars are used and/or seed prices are high. If a grower does not re-plant a poorly established field, it can lead to additional pest pressures from *Tomato spotted wilt tospovirus* (TSWV), weed pressure in skipped drill row, and ultimately lead to low yields, grades, and profit. However, spraying a burndown herbicide and starting over will essentially double seed costs and require an extra trip through the field for herbicide application.

It is essential to understand how to proceed if unacceptable stand establishment occurs. Partial replanting is less costly, but creates a situation where peanuts of two different ages are present in the field. Full replanting can provide a consistent crop, but the later planting date and cost of reestablishment is often undesirable. Therefore, the objectives of this research were to test several reestablishment methods and determine the effects on final yield and grade.

Materials and Methods
Experiments were conducted at the Plant Science Research and Education Center in Citra, FL. Aldicarb was applied in furrow at planting. The experiment was irrigated as needed and fungicides were applied regularly to suppress both foliar and soil-borne diseases.

Seeding treatments were as follows:

	Treatment	Abbreviation
1	Strip-till, no replant, 4 plants/ft	4.0 PPF - Strip
2	Strip-till, no replant, 1.8 plants/ft	1.8 PPF - Strip
3	Conv-till, no replant, 4 plants/ft	4.0 PPF - Conventional
4	Conv-till, no replant, 1.8 plants /ft	1.8 PPF - Conventional
5	Re-strip original row, replant 6 plants /ft	Re-Strip - Full Replant
6	Supplement trt 2 with 3.5 plants/ft	Side-Strip - Supplement
7	Burndown, replant 6 plants /ft	Burndown full replant
8	Supplement original strip 3.5 plants/ft	Original strip supplement

Original planting date was April 27 in a single-row arrangement, replanting date May 23. In all treatments, higher than necessary seeding rates were used, then the plots were thinned by hand to the desired number of plants per foot of row. In treatment 5 (restrip, full replant), additional strip-tillage occurred within the original row. The tillage removed the previously existing plants. In treatment 6 (side-strip supplement), strip-tillage occurred immediately adjacent to the original rows with an additional 3.5 plants per foot added. The result was a quasi twin-row arrangement. In treatment 7, glufosinate was applied to kill emerged peanuts, the area was then replanted on top of original row. Treatment 8, the planter was centered on original row, but no additional strip-tillage occurred.

Harvest for treatments 1-4 occurred on September 25, while replanted treatments (5-8) were harvested on October 16. Peanuts were dried to 9.5% moisture and weighed. A subsample was sent for grade determination.

The experiment was conducted with 4 replications of each treatment. Data were analyzed using ANOVA and treatment means were separated using Fisher's Protected LSD (P=0.05).

Results

Three treatments (1, 3, 8) yielded >5300 lb/A and no statistical differences were observed (Figure 1). It was expected that treatments 1 and 3 would have the highest yields since they both started with 4 plants/ft with an early planting date. Four plants/ft of row is considered optimum and were used as a positive control. Conversely, the >5000 lb/A was not expected for treatment 8 where peanuts were replanted on top of the existing row. It was believed that excessive damage of the originally planted peanuts would result during the supplemental planting and the low stand population would continue. However, the original planting survived well and the supplemental planting established properly, leading to respectable yields.

The next highest yielding treatments (>4440 lb/A) were 5 and 7, re-strip on original row and glufosinate burndown followed by full replanting, respectively. It was not surprising that both of these treatments resulted in similar yields since they were so similar in nature. Both treatments effectively removed all existing plants, either mechanically or chemically, followed by replanting. Though a full stand was established by both of these procedures, the later planting date resulted in less than optimum yields. Also in this grouping was treatment 4 (1.8 plants per foot, conventional tillage) at 4912 lb/A. This treatment was not statistically different from two of the three treatments yielding >5300 lb. Though 1.8 plants per foot is significantly less than optimum, the indeterminate growth habit of peanut allows for considerable yield compensation if extra space and resources in the row are available. Additionally, diseases that follow poor stand establishment, primarily TSWV, were very low at this location.

Treatments 2 and 6 yielded the lowest with less than 4200 lb/A. It is not known why treatment 2 (1.8 plants/ft, strip-till) yielded significantly lower than treatment 4 (1.8 seeds/ft conventional tillage). Additionally, it is not known why treatment 6 (side strip supplement) yielded almost 1300 lb/A less than treatment 8 (original strip supplement).

All treatments listed above were sub-sampled and set away for grade analysis. This is critical information considering that several of these replant methods would result in

peanuts of two different ages growing together. This would likely result in significant differences in grade and final profitability of these treatments. Unfortunately, the contractor that graded these samples mixed and confused the samples from this project with other samples that were sent. As a result, we were unable to definitively match which samples were from which experiment. Therefore, no reliable grade data are available for this project.

It is difficult, with one year of data, to draw definitive conclusions. However, a few treatments stand out and seem reliable. One in particular is treatment 4 (1.8 plants per foot, conventional tillage). Though many would consider this stand to be too thin, under irrigation and low TSWV pressure, these few plants can compensate and reach respectable yields. But if replanting does occur, either mechanically or chemically removing existing plants can be a favorable option.

Figure 1. Peanut yield resulting from peanut planting/replanting options.