Report to the Georgia Agricultural Commodity Commission for Peanuts-2008

Effect of Seeding Rate on Tomato Spotted Wilt in New Resistant Cultivars and Breeding Lines

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Stand establishment is critical for managing Tomato spotted wilt (TSW), caused by *Tomato spotted wilt virus*, in peanut, especially in cultivars such as Georgia Green with moderate levels of spotted wilt resistance. Fields with plant stands of less than 3 plants/ft of row typically are at much greater risk than with populations of greater than 4 plants/ft of row (**Figure 1**). Many growers plant 6 (or more) seed/ft of row to obtain final stands of 4 (or more) plants/ft of row.

Figure 1. Relationship between final plant population and risk of damage by spotted wilt in peanut according to 2009 TSWV Risk Index

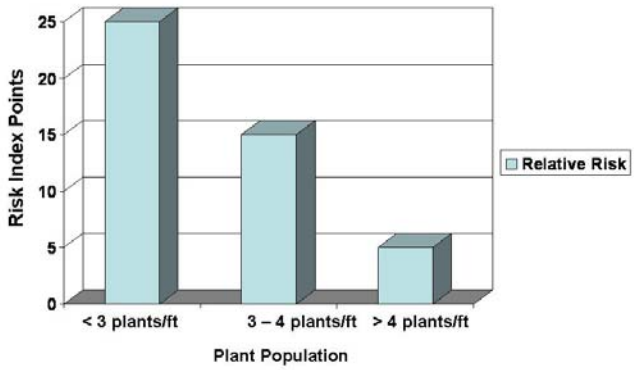
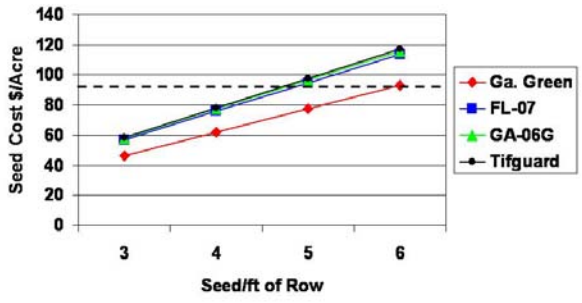


Figure 2. Effect of cultivar and seeding rate on seed cost ($/Acre) in 2008. Dashed line represents cost of Georgia Green at 6 seed/ft of row.



From Amanda Smith and Nathan Smith, April, 2008

New cultivars are available with better field resistance to Tomato spotted wilt than that of Georgia Green. However, several of these promising cultivars have larger seed size than that of Georgia Green. Therefore, even if the cost per pound is the same, larger seed translates into increased seed cost to plant at the same rate/ft of row. 2008 estimates of relative seed costs for Georgia Green, Florida-07, Georgia-06G, and Tifguard are given in **Figure 2**. All three new cultivars have significantly higher costs/A than Georgia Green at the same seeding rate. The objective of this study was to determine if seeding rates could be reduced in these new cultivars without increasing the risk of losses to TSW. Planting 4.5 seed/ft of row would result in seed costs similar to that of Georgia Green at 6 seed/ft of row (**Figure 2**). A field experiment was conducted in 2008 at Tifton. Georgia Green, Florida-07, Georgia-06G, and Tifguard were planted at 3,4,5, and 6 seed/ft of row in conventionally tilled single rows, with no insecticide for thrips control. Planting date was April 23. Stands that resulted from the different seeding rates were similar for the four cultivars, and plant populations averaged across cultivars are given in **Figure 3**.

Final incidence of TSW in Florida-07, Georgia-06G, and Tifguard was lower than in Georgia Green, regardless of seeding rate (**Figures 4 and 5**), and there was little difference in TSW among seeding rates in any of those three cultivars.

Figure 3. Effect of peanut cultivar and seeding rate on plant population, Lang Farm 2008 (Averaged across 4 cultivars). Numbers on bars represent the "Risk Index values" associated with the respective populations.

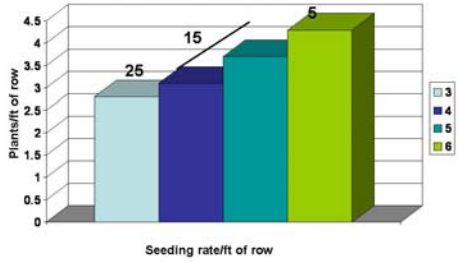
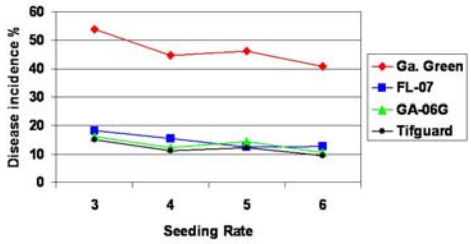
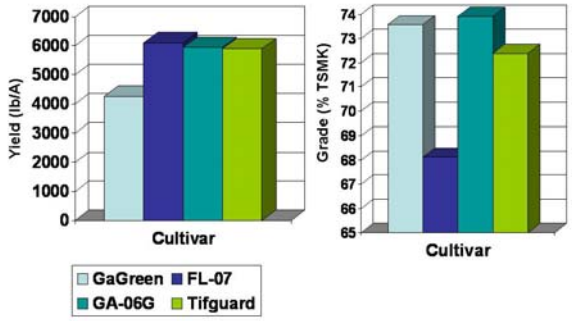


Figure 4. Effect of peanut cultivar and seeding rate on final incidence of spotted wilt, Lang Farm 2008.



Similarly, across all seeding rates, yields were much higher for all three than for Georgia Green. Grades of Georgia-06G and Tifguard were similar to that of Georgia Green (**Figure 5**).

Figure 6. Effect of peanut cultivar on yield and grade, Lang Farm 2008.



These results indicate that better resistance in Florida-07, Georgia-06G, and Tifguard may allow reducing seeding rates without increasing the risk of losses to Tomato spotted wilt if seed quality and soil conditions are favorable for stand establishment.

In a second study, Georgia Green, Georgia-01R, Georgia-02C, and 4 breeding lines were compared at 3 and 6 seed/ft of row in a test at the UGA-Lang Farm. Seeding rate had little effect on final spotted wilt ratings or yield in some of the breeding lines (Table 1). These data indicate that greater reductions in seeding rates may be possible with some breeding lines for spotted wilt management. It is notable, however, hat there was an obvious difference in mainstem prominence with higher plant populations with some lines.

Table 1. Effect of peanut genotype and seeding rate on spotted wilt and yield, 2008.

	Final spotted wilt %		Yield (lb/A)	
Genotype	3 seed/ft	6 seed/ft	3 seed/ft	6 seed/ft
Georgia Green	48.7	40.1	3909	4922
GA 052524	9.1	6.7	5847	6344
GA 052527	10.3	4.1	6172	6181
GA 052529	6.0	2.4	6197	6175
Georgia-01R	21.8	15.5	5797	6134
Georgia-02C	12.5	6.7	5272	5509
C724-19-25	18.9	19.6	5800	6216
LSD	3.8	3.8	389	389