

Influence of Planting Depth on Ground Sucker Occurrence and Yield of Burley Tobacco

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Abstract

Burley tobacco growers have reported increasing problems with lateral growth of shoots arising near the base of the plant, often referred to as "ground suckers". Ground suckers appear early in the season and in some cases can grow to be nearly as large as the mother plant. Ground suckers may reduce yields and add to labor costs when workers are harvesting or stripping the crop. Float plants are often blamed for the increase with many growers observing their problems increased when they began using float plants. We have observed that a large number of growers have difficulty planting float plant deeply due to poor soil preparation and/or lack of appropriate adjustments on their transplanters. The purpose of this study was to determine the influence of planting depth on the occurrence of ground suckers and the yield of burley tobacco. Float transplants (var. KT 204LC) were grown in a typical double layer greenhouse in the spring of each year. They were transplanted to the field in late May or Early June using a 2 row model 5000 Mechanical transplanter with adjustable skid. Planting depth was varied by raising or lowering the skids. At the "shallow" setting the goal was to barely cover the root ball of the float plant, with the top of the root ball 1/4 inch or less below the surface. At the deep setting the top of the root ball was at least 3/4 to 1 inch below the soil surface. In most years the deep set plant became established much quicker and had better early growth than the shallow set. By mid-season ground suckers were more prevalent on the shallow set. Deep set plants bloomed on average about one week earlier than the shallow set. At harvest time ground suckers that were large enough to be spared were harvested and kept separate from the rest of the plot. In two out of three years there were significantly more ground suckers on the shallow set plants. Total yield including leaf stripped from ground suckers was similar across planting depths, however a larger proportion of the yield on shallow set plants was from ground suckers. Yields without ground suckers included were significantly greater with deep planting in two of three years. This study has shown that ground sucker problems can be reduced or eliminated by deeper planting.

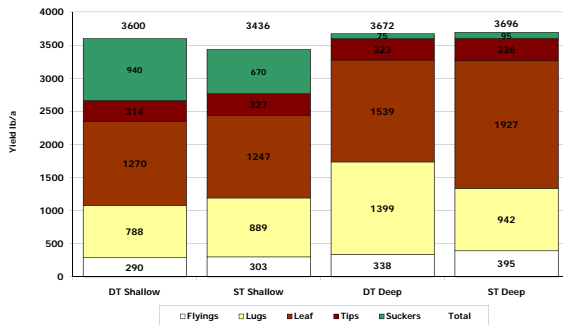
Figure 1. Tobacco transplants seven days after transplanting in 2007



2007 Weather Data

YEAR	MONTH	AVERAGE AIR TEMPERATURE			EXTREME AIR TEMPERATURE			PRECIPITATION DEPARTURE			
		MAX	MIN	AVG	MAX	MIN	TOTAL	NORMAL	TOTAL	DEPARTURE	
2007	May	79	56	68	90	40	1.45	-3.02	3.45	-3.02	
2007	Jun	84	63	74	94	54	1.77	-1.89	3.22	-4.9	
2007	Jul	83	64	74	89	56	6.90	-1.90	10.12	-3.02	
2007	Aug	90	69	80	99	58	2.56	-1.37	12.68	-4.38	
2007	Sep	84	60	72	95	46	1.15	-2.05	13.83	-6.43	
2007	Oct	73	53	63	90	33	5.28	+2.71	19.31	-3.72	

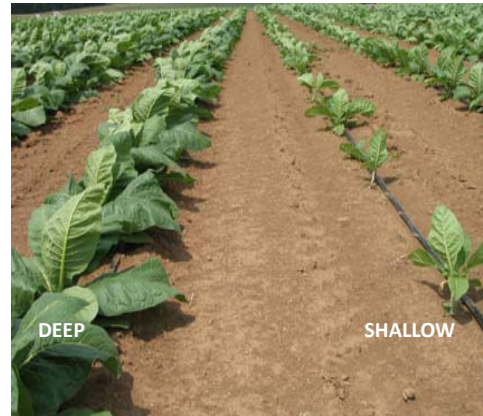
Planting Depth Study Spindletop Farm-- 2007



Materials and Methods

- Conventional tillage and fertilization
- Drip irrigation provided in 2007
- **Two transplanting depths**
 - Shallow: root ball < 1/4 inch below surface
 - Deep: root ball > 3/4 inch below surface
- Post transplant "hilling" (2008/2009)
 - Soil moved to base of plant at cultivation
- "Ground Sucker" retained at harvest
- Cured conventionally
- Stripped into 5 grades
 - 4 stalk position grades
 - total of leaf from ground suckers

Figure 2. Tobacco four weeks after transplanting in 2007



Results

- Deep set transplants established quicker and had better early season growth (figure 1 and 2).
- Deep set plants flowered 5 to 7 days earlier than shallow (figure 3).
- At harvest deep set plants typically exhibited a single stalk while shallow set plants often had competing stalks (figure 4).
- In 2007 and 2008 (both dry years) total yields, including ground suckers were similar across all treatments. Main stalk yields were greater for deep set.
- In 2009 (wet year) total yields, including ground suckers were greater for shallow set. Main stalk yields were not different, but ground suckers were reduced by deep setting.

Figure 3. Tobacco nine weeks after transplanting in 2007



Figure 4. Tobacco stubs after harvest in 2007



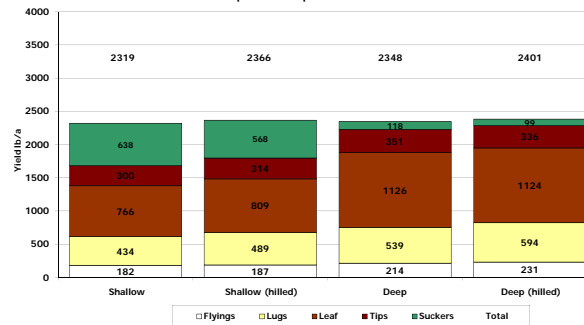
Conclusions

- Deep set transplants established quicker, grew more rapidly, and flowered earlier than shallow set plants.
- Deep set transplants had fewer ground suckers than the shallow set.
- Hilling of plants later in the season did not reduce ground suckers
- Total yield per plant was similar across planting depths whether it was from a single stalk or multiple stalks.
- Deep transplanting reduced ground sucker problems and can save growers money on additional labor.

2008 Weather Data

YEAR	MONTH	AVERAGE AIR TEMPERATURE			EXTREME AIR TEMPERATURE			PRECIPITATION DEPARTURE			
		MAX	MIN	AVG	MAX	MIN	TOTAL	NORMAL	TOTAL	DEPARTURE	
2008	May	71	52	62	83	39	4.88	+0.41	4.88	+0.41	
2008	Jun	84	64	74	92	53	3.30	-0.36	8.18	+0.05	
2008	Jul	87	65	76	93	53	2.54	-2.46	10.72	-2.41	
2008	Aug	87	63	75	93	51	1.08	-2.85	11.80	-5.26	
2008	Sep	84	60	72	96	51	1.21	-1.99	13.01	-7.25	
2008	Oct	70	45	57	86	26	1.35	-1.22	14.36	-8.47	

Planting Depth Study Spindletop Farm-- 2008



2009 Weather Data

YEAR	MONTH	AVERAGE AIR TEMPERATURE			EXTREME AIR TEMPERATURE			PRECIPITATION DEPARTURE			
		MAX	MIN	AVG	MAX	MIN	TOTAL	NORMAL	TOTAL	DEPARTURE	
2009	May	74	55	64	86	39	5.05	+0.58	5.05	+0.58	
2009	Jun	83	64	74	93	48	5.41	+1.75	10.46	+2.33	
2009	Jul	80	63	71	86	54	5.89	+0.89	16.35	+3.22	
2009	Aug	83	64	73	90	51	5.38	+1.45	21.73	+4.67	
2009	Sep	77	59	68	83	46	5.37	+2.17	27.10	+6.84	
2009	Oct	62	45	54	79	29	4.83	+2.26	31.93	+9.10	

Planting Depth Study Spindletop Farm-- 2009

