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FE995

Planting and Annual Cultural Maintenance Costs for Reset-Replacement Trees in a Florida Citrus Grove in 2016 [1]

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Replacement of diseased, unproductive or dead trees is an important part of the cultural program for citrus groves. Typically, having an empty or unproductive tree space in a grove can be costly because some of the expenses related to grove operation will still be incurred and equipment for fertilization and spraying must continue to pass by each tree location. Also, under normal circumstances, a successful resetting or tree replacement program gives perpetual life to a citrus grove and does not involve the same level of capital investment and lost income as full grove replanting.

Historically, the average annual tree loss in Florida citrus groves has been 3% but can vary greatly across individual groves. Diseases such as blight, tristeza, and root rot have been typical causes for tree loss, but lightning strikes, mechanical damage, freezes can also cause occasional tree losses. However, since the introduction of Huanglongbing (HLB, commonly known as citrus greening) in 2005, the average annual tree loss rate increased to 5%.

We collected prices and productivity rates for this report through a telephone survey during May 2016 that included Florida citrus tree planters, tree removers, caretakers, growers, as well as fertilizer and chemical vendors. It is worth noting that the chemical vendor's quotes reflect retail prices but growers can typically get discounts on high volume purchases. Also, the estimated costs required to manage resets from the time of planting through year three were based on programs recommended by UF/IFAS researchers combined with information provided by growers.

Growers have different preferred management and reset practices. Tree removal, for example, can be done by different methods such as "pushing" or "clipping". As described by Futch et al. (2008), pushing consists of lifting most of the root system out of the soil, whereas clipping does not disturb the soil since it consists of shearing the tree off above ground and leaving the tree stump and root system in place. It was reported that neither method differs in regard to the effect on subsequent pest and pathogen status or reset performance (Futch et al. 2008). Therefore, operational and economic aspects should decide which method is used for tree removal. Based on our survey, clipping may be cheaper than pushing on a per acre basis since more trees per hour

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can be clipped and removed, when compared to pushing trees. Also, if trees are pushed, one may need to consider the cost of preparing the site for planting resets or rebuilding the soil bed, if applicable.

Another practice that varies greatly across growers is the fertilization program for resets. They may choose to fertilize resets using dry soluble fertilizer, liquid fertilizer through fertigation, or slow release fertilizer. This report lists the cost of two annual applications of a slow release fertilizer for young citrus tree care (for non-bearing plants) with an average of six months of controlled release. Our calculations are based on nitrogen rates of approximately 0.23, 0.45, and 0.68 pounds of nitrogen per tree per year, for years one, two, and three respectively, as recommended by Obreza and Morgan (2011).

To help protect young trees from becoming HLB-infected, the recommended program to control the insect vector, the Asian citrus psyllid, includes multiple applications of systemic neonicotinoids through soil drenches (Rogers 2014). Rates for each insecticide application vary according to tree size (new reset, 1 to 2 years old, 3 to 5 years, and older trees). Neonicotinoid drenches are also effective against leafminers, but, still, there are other pests that growers need to protect their plants from, such as mites, flies, thrips and others. Those soil drench applications supplement other insecticide applications for young tree care that are part of the whole grove pest management program.

Finally, some growers may opt to make spot herbicide applications around resets. This report accounts for two applications in years one and two. Arguably, there is no need for spot herbicide application on year three, since the citrus reset trees will have grown substantially.

Table 1 shows the costs for tree removal, planting, and cultural maintenance for years one through three and represents all types of citrus. The costs are presented in ranges on a per tree basis for different numbers of trees being reset per acre. The per tree costs decrease as the number of reset trees per acre increases. As an example, based on prices reported on our survey, the cost of a three-year tree replacement program on a mature citrus grove with replacement of six trees per acre, totals $315.72. As a comparison with the previous report on reset program costs (Muraro 2012), there has been an average increase of 57% in the total supplemental maintenance costs, mostly due to higher costs of fertilizer and labor (handling chemicals, product applications, and supervision).

For over a decade, the Florida citrus industry has been dealing with the challenge of producing fruit in the face of HLB. It is estimated that, on average, 80% of the trees in a Florida citrus operation are HLB-infected (Singerman and Useche 2016). Therefore, growers are coping with lower yields, quality, and size of fruit, as well as higher mortality rates and increasing cost of production. All these factors have contributed to the decrease in citrus acreage reported every season since the introduction of HLB in 2005 (USDA 2016).

To remain profitable and in business in the long run, Florida citrus growers need to evaluate their investment in new trees. Particularly, given increasing costs and uncertain output, growers have a need for incentives to plant new trees. Some public and private programs have been put in place in recent years to provide growers with such incentives. Therefore, the objective of this report is not only to provide a benchmark for the costs of planting and maintaining reset citrus trees in Florida in the era of HLB, but also to inform industry stakeholders and policymakers of the costs growers incur in when planting new trees.

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Table 1. Estimated cost per tree per year, planting/maintaining reset citrus tree three years, HLB-infected grove.

	Reset/Replacement Trees per Acre			
Tree Removal	**1–5**	**6–10**	**11–25**	**26+**
(includes clip, remove, and burn tree; herbicide spray to tree stump)	**$ Per Tree**			
Total tree removal[1]	8.93	8.01	7.37	6.76
Planting Cost	**$ per Tree**			
Tree cost	8.56	8.56	8.56	8.56
Plant tree and first watering	2.83	2.58	2.06	1.98
Total Planting Cost	**11.39**	**11.14**	**10.62**	**10.54**
Young Citrus Tree Supplemental Maintenance	**$ per Tree per Year**			
Year #1				
Slow release fertilization (2 applications)[2]	3.45	3.25	3.06	2.89
Neonicotinoids psyllid management (8 drench applications)[3]	3.79	3.57	3.37	3.17
Spot herbicide (2 applications)[4]	0.83	0.78	0.73	0.69
Sprout and herbicide guard (tree wrap and installation labor)	0.54	0.51	0.48	0.45
Sprouting and pruning	0.85	0.80	0.76	0.71
Chemical handling/supervision	1.35	1.27	1.19	1.12
Grove care supervision	0.44	0.42	0.39	0.37
Total Tree Care Cost Year #1	**11.25**	**10.60**	**9.99**	**9.41**
Year #2				
Slow release fertilization (2 applications)[2]	5.49	4.81	4.21	3.68
Neonicotinoids psyllid management (8 drench applications)[3]	4.02	3.51	3.07	2.69
Spot herbicide (2 applications)[4]	0.83	0.72	0.63	0.55
Sprouting and pruning	0.85	0.75	0.65	0.57
Chemical handling/supervision	1.59	1.39	1.22	1.07
Grove care supervision	0.44	0.39	0.34	0.30
Total Tree Care Cost Year #2	**13.22**	**11.57**	**10.12**	**8.86**
Young Citrus Tree Supplemental Maintenance	**$ Per Tree Per Year**			
Year #3				
Slow release fertilization (2 applications)[2]	7.53	6.47	5.56	4.77
Neonicotinoids psyllid management (8 drench applications)[3]	2.85	2.45	2.11	1.81
Sprouting and pruning	0.85	0.73	0.63	0.54
Chemical handling/supervision	1.48	1.27	1.09	0.94
Grove care supervision	0.44	0.38	0.33	0.28
Total Tree Care Cost Year #3	**13.16**	**11.30**	**9.71**	**8.34**
Total supplemental maintenance costs (Trees 1–3 years old)	**37.63**	**33.47**	**29.82**	**26.60**
	Reset/Replacement Trees per Acre			
Summary of Tree Replacement Costs	**1–5**	**6–10**	**11–25**	**26+**
	$ per Tree			
Tree removal costs	8.93	8.01	7.37	6.76
Planting costs	11.39	11.14	10.62	10.54
Supplemental Maintenance Costs (Years 1–3	37.63	33.47	29.82	26.60
Total Three-Year Cumulative Costs	**57.95**	**52.62**	**47.81**	**43.90**

[1] Tree removal rates vary greatly. Average hourly rates of $71.67 for clipping trees and $73.75 for pushing trees were reported by tree removal companies and caretakers through a phone survey in May 2016. Tree removal by pushing trees may result in the need of rebuilding beds in Florida flatwoods (cost not included in this table).
[2] Obreza and Morgan (2011).
[3] Rogers (2014).
[4] Rogers and Dewdney (2016).