

March 9th, 2016

Research on Fruit Drop in HLB Infected Late Season Sweet Orange Trees Treated with RGA

Introduction:

Florida Citrus Growers have been experiencing premature fruit drop in Huanglongbing (HLB) infected citrus especially during the past few seasons. Many of the fruit may drop prematurely in HLB infected trees and this can cause a major reduction of the total citrus crop after several years of a grove being infected with the HLB bacteria ⁽¹⁾. Younger bearing trees ages 8 to 12 years old seem to have less defense or reserve compartmentalization ability and are dropping large amounts of fruit compared to some of the older trees also infected (Figure1). Based on root sampling of these trees, loss of fibrous root mass appears to be another important factor involved in the ability of trees to hold fruit without premature fruit abscission. Previous research has indicated as much as a 38% loss of fibrous root mass in 4 year old symptomatic Valencia trees infected with the HLB ⁽²⁾.

Data collected from a previous study in a Central Florida Field Trial has demonstrated that applications of a multiple strain microbial inoculant –Rapid Growth Activator (RGA) at 2 week intervals had a positive effect on fibrous root growth in moderately to severely HLB infected Late Season Sweet Orange. The RGA treated trees had statistically more new flush and root cores samples showed the development of more new fibrous roots (Figure 2). The Brix/Acid ratios of the RGA treated trees also had a higher ratio (26.68) compared to the untreated control trees with a ratio of (22.85).

The Goals of this study was to determine if RGA could provide a reduction in fruit drop in a grove setting with 7 year old late season sweet orange trees treated under the same conditions. During this study HLB infected trees in the field received applications of RGA at 4 week intervals during the growing period. The effects of RGA treatments on fruit drop were counted and removed under trees monthly and documented up until fruit harvest.

Methodology:

After establishing citrus trees were infected with HLB by visual and molecular PCR testing, the trees in the Grove were flagged and randomly separated into treatment and control groups. Thirty Four infected trees were available in the Treatment block (17 Control Trees and 17 RGA Treated Trees). The field trees that were selected are an early season Valencia variety which is harvested earlier than common Valencia varieties. Since the fruit develops later than early season oranges fruit drop counts were initiated at the beginning of November when fruit drop began in this variety and up until the February harvest. The RGA

biological inoculant was applied to root zone areas at the rate of 2lbs/acre at 4 wk intervals as a spray drench through harvest.

Treated and untreated trees in the block were watered frequently as to assist biological treatments to properly reach and distribute into the root zone areas of infected plants.

During RGA treatments the amount of fruit drop was followed and documentation of fruit drop began when drop started to initiate. Fruit drop for each tree was recorded monthly and combined for November through December and January through February harvest. Once the fruit under each tree was counted it was raked to the middle of the row.

Results and Discussion:

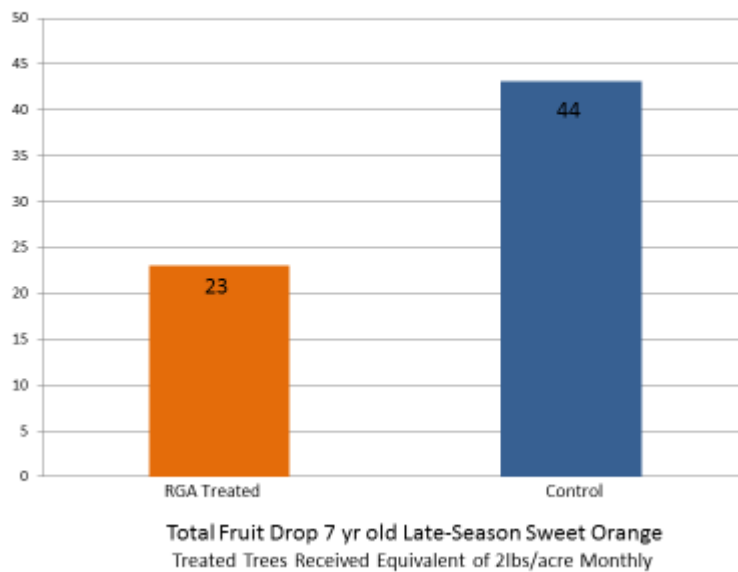
The data collected showed that RGA treatments had a significant reduction in fruit drop during the Months of November through December and for the Total fruit drop for the season. A 48% reduction of fruit drop was seen in RGA treated trees compared to control untreated checks at season end (Graph 1 Significant at 95% CI = .006).

The majority of fruit began to drop in late November through December during the unseasonably warm fall weather. A 52% reduction in fruit drop was seen in RGA treated compared to untreated controls (Significant at 95% CI = .002) during this time period. Much less drop occurred during the month of January through February in both the RGA treated and control trees which showed no significant difference during this time.

It appears that stimulating fibrous root growth in HLB infected trees can have a positive effect not only on improving tree vigor but also on reducing the amount of fruit drop. Possibly the production of new fibrous roots assists in water and nutrient uptake and slows down premature abscission which has been commonly occurring in many younger groves. More studies are currently being conducted in commercial groves of several ages and varieties to determine the impact of RGA on fruit drop.

Graph 1:

Fruit Drop Data Central Florida Field Trial 2016



1. Bassanezi RB, Montesino LH, Gasparoto MCG, Bergamin Filho A, , Amorim L 2011. Yield loss caused by huanglongbing in different sweet orange cultivars in São Paulo, Brazil. *Eur J Plant Pathol* 130:577–586.
2. Graham, J. H., Johnson, E.G., Gottwald, T. R., and Irey, M. S. 2013. Presymptomatic fibrous root decline in citrus trees caused by huanglongbing and potential interaction with *Phytophthora* spp. *Plant Dis.* 97:1195-1199

Figure 1.



November 27th, 2015

Figure 2.

Untreated Tree



RGA Treated



Root Core Sample



Root Core Sample

