AN INDUSTRY-WIDE CRISIS, BUT A SOLVABLE ONE

Citrus Greening
Huanglongbing:
The COVID of the citrus industry.

AN INDUSTRY-WIDE CRISIS,
BUT ONE WITH
IMMEDIATE SOLUTIONS
HLB: EFFECTS ON FLORIDA’S CITRUS INDUSTRY.
IMPACT ON OUR GROVES
(2004-2005 Vs. 2020-2021 Citrus Acres Lost,000)

641.4
Citrus Acres

infected groves:
0%

369.3
Citrus Acres
2020-2021

infected groves:
100%

Source: Florida Citrus Statistics 2020-2021 (March 2022) USDA, National Agricultural Statistics Service
Of the 74 million citrus trees in Florida,
Of the 74 million citrus trees in Florida, an estimated 90% are infected or otherwise lost.

Source: USDA APHIS.

https://www.mitogrow.com/citrus-greening-disease/
HLB: 2 YEAR EFFECTS ON FLORIDA’S CITRUS INDUSTRY.
IMPACT ON FLORIDA LABOR MARKET 2012/13-2015/16
(In Jobs)

from
66,445
Jobs in 2012/13

To
45,422
Jobs in 2015/16

Source: Source: IMPLAN software and supplemented by 2012 region data for Florida (IMPLAN Group LLC).

= 1,000 FL Citrus jobs
HLB: 2 YEAR EFFECTS ON FLORIDA’S CITRUS INDUSTRY.
IMPACT ON FLORIDA LABOR MARKET 2012/13-2015/16
(In Jobs by Growers)

Hardest Hit: GROWER

-13,885 generated jobs
lost from 2012-2016

Source: Source: IMPLAN software and supplemented by 2012 region data for Florida (IMPLAN Group LLC).
The industry output cumulative total impacts of HLB over a decade estimated at

- $4.643 billion

Note: Estimates don’t consider losses in fresh citrus or minor citrus varieties for processing.

Source: University Of Florida/IFAS: Economic Contributions of the Florida Citrus Industry in 2015-16 Final sponsored project report to the Florida Department of Citrus
HARVEST YIELD RESULTS
2021-2022. FLORIDA AVERAGE
(% change in boxes per acre)

On average

In just 1 year

Each acre of Floridian citrus trees yielded

22.7% less fruit

2021 to 2022

Source: USDA May 2022
REVERSE THE DEMISE
Florida’s Citrus Groves Naturally!

CitruSaver Fertilizer
POSITIVE Case Studies CitruSaver Fertilizer
Citrusaver Success Case Studies

VALENCIA
QUANTITATIVE STUDY 2022 RESULTS
DAVIS GROVE TREATED WITH CITRUSAVER

VALENCIA

CITRUSAVER TREATED GROVE
RESULTS:
HARVEST YIELD RESULTS
2021-2022. DAVIS GROVE TREATED WITH CITRUSAVER VS. FLORIDA AVERAGE
(% change in boxes per acre)

FLORIDA AVERAGE
UNTREATED (CONTROL)

-22.7% Yield

DAVIS GROVE
43 ACRES (CITRUSAVER TREATED)

+4% Yield

Source: USDA May 2022. & Proprietary.
HARVEST YIELD RESULTS
43 ACRES IN DAVIS GROVE TREATED WITH CITRUSAVER VS. FLORIDA AVERAGE. 2022
(% boxes per tree)

**FLORIDA AVERAGE**
UNTREATED (CONTROL)
1.75
Boxes/tree

**DAVIS GROVE**
43 ACRES (TREATED)
2.04
Boxes/tree

Source: USDA May 2022. & Proprietary.
QUALITATIVE STUDY 11/2021- 03/2022 RESULTS
THREE VALENCIA GROVES TREATED WITH CITRUS AVER 2021-2022

VALENCIA
QUALITATIVE STUDY
RESULTS:
# FRUIT DROP STUDY
THREE VALENCIA GROVES TREATED WITH CITRUSAVER VS. FLORIDA AVERAGE, 2021-2022

<table>
<thead>
<tr>
<th>FLORIDA AVERAGE UNTREATED (CONTROL)</th>
<th>CITRUSAVER TREATED GROVES CITRUSAVER (TREATED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STALLINGS GROVE:</td>
<td>DEVANE GROVE: 10 ACRES TREATED</td>
</tr>
<tr>
<td>10 SAMPLE TREES SELECTED</td>
<td>10 SAMPLE TREES SELECTED</td>
</tr>
<tr>
<td>01/2022-03/2022</td>
<td>11/2021-03/2022</td>
</tr>
<tr>
<td></td>
<td>37% LESS DROP</td>
</tr>
</tbody>
</table>

| DEVANE GROVE:                       | STALLINGS GROVE: 10 ACRES TREATED             |
| 10 SAMPLE TREES SELECTED            | 10 SAMPLE TREES SELECTED                       |
| 01/2022-03/2022                     | 01/2022-03/2022                                |
|                                     | 31% LESS DROP                                 |

| IMMOKALEE GROVE:                    | DEVANE GROVE: 103 ACRES TREATED               |
| 6 SAMPLE TREES SELECTED             | 10 SAMPLE TREES SELECTED                       |
| 11/2021-03/2022                     | 11/2021-03/2022                                |
|                                     | 43.4% LESS DROP                               |

Source: A: Proprietary.
VALENCIA

QUALITATIVE STUDY RESULTS:
YIELD AND QUALITY RESULTS
CITRUSAVER TREATED VALENCIA TREES: DE VANE, CANNON, LABELLE & IMMOKALEE GROVES VS. FLORIDA AVERAGE. 2021

FLORIDA AVERAGE
UNTREATED (CONTROL)

AVERAGE YIELD
BOXES YIELD/ACRE
366

AVERAGE FRUIT QUALITY
LB. SOLIDS PER 90 LB. BOX
5.48 lbs.

CITRUSAVER TREATED GROVES
AVERAGE RESULTS FROM FOUR CITRUSAVER TREATED GROVES (TREATED)

AVERAGE YIELD
BOXES YIELD/ACRE
449

AVERAGE FRUIT QUALITY
LB. SOLIDS PER 90 LB. BOX
6.43 lbs.

Sources: A: Proprietary University Of Florida Lake Alfred Pilot Plant analysis 02 25 2021. B USDA
FRUIT WEIGHT AND FRUIT QUALITY (BRIX/ACID RATIO) RESULTS
TREATED VS. UNTREATED VALENCE TREES IN DE VANE, LABELLE & IMMOKALEE GROVES 2021

UNTREATED FRUIT COLLECTED FROM
THE SAME GROVES AS THE CITRUSAVER
TREATED FRUIT
(CONTROL)

FRUIT WEIGHT
PER 75 ORANGES
30.5 lbs.

FRUIT QUALITY
BRIX/ACID RATIO
15.8

CITRUSAVER TREATED FRUIT
AVERAGE RESULTS FROM THREE
CITRUSAVER TREATED GROVES
(TREATED)

FRUIT WEIGHT
PER 75 ORANGES
34.3 lbs.

FRUIT QUALITY
BRIX/ACID RATIO
18.2

Source: A: Proprietary University Of Florida Lake Alfred Pilot Plant analysis 02 25 2021
This large scale irrigation trial is being conducted by one of the largest citrus growers in Florida. Positive results were observed by the grower within 30 days of application.
QUALITY DATA ANALYZED BY THE UNIVERSITY OF FLORIDA
CITRUSAVER TREATED VALENCIAS VS
THE USDA FLORIDA AVERAGE
VALENCIAS (USDA STATS FOR MARCH 1ST, 2021)*
Citrus Greening Treatment Project Average Weight of Root Samples on September 28, 2018 (CitruSaver treatments began in July 2017)

Analysis conducted by Robert Johnson of AG Consulting, Inc.

<table>
<thead>
<tr>
<th></th>
<th>WE3&amp;4 Treatment</th>
<th>Untreated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Root Weight in Grams</td>
<td>3.64</td>
<td>2.54</td>
</tr>
<tr>
<td>Dry Root Weight in Grams</td>
<td>1.76</td>
<td>1.12</td>
</tr>
</tbody>
</table>

Average % improvement compared to Untreated

(Wet) no improvement 43.31%

(Dry) no improvement 57.14%
CitruSaver 24-month Success Case Study

HAMLIN
# FRUIT WEIGHT INCREASE AND FRUIT QUALITY RESULTS

**HAMLIN TREES: DE VANE, CANNON, LABELLE & IMMOKALEE GROVES VS. FLORIDA AVERAGE. 2021**

<table>
<thead>
<tr>
<th>FLORIDA AVERAGE (UNTREATED)</th>
<th>CITRUSAVER TREATED GROVES (TREATED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVERAGE FRUIT WEIGHT</td>
<td>AVERAGE RESULTS FROM FOUR GROVES</td>
</tr>
<tr>
<td>FLORIDA STATE INDEX</td>
<td>AVERAGE INDEX VS FLORIDA STATE INDEX</td>
</tr>
<tr>
<td>100</td>
<td>113.3%</td>
</tr>
<tr>
<td>AVERAGE FRUIT WEIGHT INCREASE</td>
<td>113.3%</td>
</tr>
<tr>
<td>LB. SOLIDS PER 90 LB. BOX</td>
<td>4.9 lbs.</td>
</tr>
<tr>
<td>4.9 lbs.</td>
<td>5.4 lbs.</td>
</tr>
</tbody>
</table>

Sources: A: Proprietary University Of Florida Lake Alfred Pilot Plant analysis 12 06 2021. B USDA
FRUIT WEIGHT AND FRUIT QUALITY (BRIX/ACID RATIO) RESULTS
TREATED VS. UNTREATED HAMLIN TREES IN DE VANE, LABELLE & IMMOKALEE GROVES 2021

UNTREATED FRUIT COLLECTED FROM THE SAME GROVES AS THE CITRUSAVER TREATED FRUIT (CONTROL)

<table>
<thead>
<tr>
<th>FRUIT WEIGHT PER 75 ORANGES</th>
<th>21.5 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRUIT QUALITY BRIX/ACID RATIO</td>
<td>19.9</td>
</tr>
</tbody>
</table>

CITRUSAVER TREATED FRUIT AVERAGE RESULTS FROM THREE CITRUSAVER TREATED GROVES (TREATED)

<table>
<thead>
<tr>
<th>FRUIT WEIGHT PER 75 ORANGES</th>
<th>23.9 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRUIT QUALITY BRIX/ACID RATIO</td>
<td>18.9</td>
</tr>
</tbody>
</table>

Source: A: Proprietary University Of Florida Lake Alfred Pilot Plant analysis 12 06 2021
FLORIDA HAMLIN GROVE NOVEMBER 2021
CITRUSAVER TREATED VS UNTREATED WITH CITRUSAVER
2021 CitruSaver treated Hamlins analyzed by The Univ. of Florida Pilot Plant - Lake Alfred, Florida (Results compared to the USDA's Florida Average statistics-Dec. 1, 2021)

Source of data (date samples collected)
CTV – CitruSaver Field trial Catania-Sicily

• Variety: Tarocco - Blood Orange- sour root stock - a variety that is native to Sicily
• Age: 4 years old citrus trees in a Conventional (non-organic) commercial grove
• CTV- "Severe Isolate" originated in California- SY 568, a highly virulent strain from University of California- Riverside by indexing (graft transmission) in a citrus host range,
• Root application Method- Applied using a Microjet irrigation system
• Number of Trees - 30 trees treated with CitruSaver - 10 trees untreated control
• Fruit will be harvested in November 2020 - fruit weight and quality data will also be analyzed
• First application May 4th 2020
• First field trial foliar vigor photo documentation June 8th 2020
• Dr. Davino's evaluation on June 8th, 2020
  1) CitruSaver treated trees had more new flush compared to the untreated trees
  2) CitruSaver treated trees had more foliar vigor compared to the untreated trees
  3) CitruSaver Treated CTV Infected trees showed no symptoms of dry branches and dwarfism – Untreated CTV infected trees all exhibit typical CTV symptoms of dry/dying branches and dwarfism
  4) all treated trees had new fruit buds (none of the untreated trees had produced any fruit by this date)
• Dr. Davino's second evaluation took place on July 22, 2020
  1) CitruSaver α (alpha) formulation exhibited the most foliar vigor, new flush, and more fruit sets compared to the control trees as well as the other two CitruSaver formulations currently being tested.
  2) CitruSaver α treated trees have over twice the amount of fruit than the untreated trees
  3) CitruSaver α has exhibited better results against this severe strain of CTV than any other product he has tested so far
Tarocco “Blood” Orange – 4 year old trees infected by Citrus Tristeza Vir
Conventional Commercial Grove
SICILY, ITALY

First CitruSaver Treatment applied on May 4, 2020

UnTreated CTV infected trees with symptoms of dry branches and dwarfism (June 8)

CitruSaver Treated CTV infected trees with no symptoms of dry branches and dwarfism (June 8)
According to Professor Salvatore Davino, within 3 months of treatment, CTV infected citrus trees treated with CitruSaver exhibited more new flush, more foliar vigor, and no branch Dieback symptoms as compared to the untreated citrus trees. Furthermore, new Fruit buds were only observed on CitruSaver treated citrus trees.
Xylella fastidiosa is one of the most dangerous plant-pathogenic bacteria worldwide. Over 560 plants are susceptible to this pathogen worldwide. The first detection of Xylella in olives trees occurred in Southern California. Xylella has been detected in several US states infecting several plants and crops including grape vines, almond trees, peach trees, oak trees, etc.
San Cataldo Olive Grove

11 Preliminary conclusions

The six months applications of the Agnesina and Olivesaver fertilizer on “Xylella Fastidiosa” infected olive groves and the sustainable management practices shows preliminary results on both low and medium field trial compared to control. Most of the plants for all the treated trials responded to treatments and shows more foliages, a greener vegetation, new shoots and a better healthy status compared to untreated plants. For some plants very few olive production is expected. Branches desiccation process due to “Xylella fastidiosa” disease is ongoing.
FIGURE # 4

NET INCREASE IN FOLIAR GROWTH FROM 30 SAMPLE TAGGED BRANCHES (IN CM)
FROM MAY 20, 2021 TO DECEMBER 1, 2021
Medium infected Xylella Fastidiosa Olive Trees in San Cataldo, Puglia-Italy

FIGURE # 5

OLIVE FRUIT PRODUCTION AVERAGE OF 10 TREES PER TREATMENT OR CONTROL (IN GRAMS)
HARVESTED ON OCTOBER 20, 2021
To whom it may concern,

My name is Jonathan O. Brown. I recently retired from Bethel Farms as Sr. VP of production. I have over 40 years’ experience growing Citrus and Turf in Florida.

In my forty years I’ve dealt with many of the same production issues other growers face, CLM, Citrus Tristeza, Canker and Now HLB. The fact is our industry is in serious jeopardy. Our production dropped from 240 million boxes to forty-one million boxes of fruit.

As growers we are looking to public and private sources for information and products to help cope with production and quality issues brought on by HLB. In the past I have worked with FDACS to develop labels for Nanotechnology based nutrient products. Those products are still used today in the fight against HLB along with allowing growers to stay within the BMP guidelines where nutrient applications are concerned.

In order for today's citrus producer to stay in business we are tasked with trying new products to add to our toolbox for the fight against HLB. In the beginning of the 2020/2021 fruit season I was approached to participate in performance trials utilizing CitruSaver. I’ll leave the science of how it works for Vasilios Fotopoulos to explain. I will simply give a summary of applications and results.

Year one of trials (2020/21 season):

Scope; 32 acres of Early-Mid Sweet Orange. Bulk of the trees were 20 years old.

Applications; 4 total. 3 Applications through Micro-sprinkler irrigation, 1 foliar application using citrus speed/air delivery sprayer.

Timing; 1st app- 1st week of April (irrigation)

2nd app- 3rd week of April (irrigation)

3rd app- 1st week of May (foliar)

4th app- 3rd week of May (irrigation)

Results; The third application (foliar) was combined with a scheduled canker spray. We notice a healthy sheen on the trees, like an oil spray, however without the side effects of oil (leaf drop). We also noticed less incidence of canker...
lesions on the leaves and fruit compared to previous years. Production (boxes per acre) was up around 25% average compared to the two years prior. Pounds Solid and Brix were acceptable and statistically 2-3% higher compared to the two years prior. It should be noted, the juice was in the top 10% in the juice processor’s taste test.

Our average box per acre was 300 boxes. The state average of non-Valencia was down 23% and most comparable blocks averaged 180-200 boxes per acre.

Year two of Trials (2021/22 season):

Scope; 32 acres of Early-Mid Sweet Orange. Bulk of trees were 20 years old.

Applications; 4 total. 3 Applications through Micro-sprinkler irrigation, 1 foliar application using citrus speed/air delivery sprayer.

Timing; 1st app-1st week of April (irrigation)
2nd app- 3rd week of April (irrigation)
3rd app- 1st week of May (foliar)
4th app- 3rd week of May (irrigation)

Results: The third application (foliar) was combined with a scheduled canker spray. As with the year prior we were happy with the overall color and health of the trees. Again we noted fewer canker lesions on fruit and leaves, while neighboring groves were experiencing higher incidence due to extended wet periods with wind. Production was down 22%. Brix and pounds solids were up 8% compared with the year prior. It should be noted, the pound solids were on average .5-1lb higher per box compared to surrounding blocks going to the juice processor for processing. It should also be noted 590 sub standard trees were removed and replaced in the spring of 2021. The juice processor rated the juice at the top of the list in the taste test. Even with this year’s drop in production, we were still averaging 225 boxes per acre, while neighboring blocks of same age trees were averaging 110-180 boxes per acre. I was unable to find statewide production numbers for non-Valencia for the 2021/22 season.
Year three; (2022/23 season) The same applications as year one and two were applied. The results will not be available until after harvest in December of 2022 or January of 2023. It should be noted that an additional 46 acres of Valencia sweet orange were added to the program.

In conclusion, I see better tree health, less incidence of canker lesion, higher brix and higher pounds solids utilizing CitruSaver in a citrus production program. HLB exaggerates the swing, or alternating crop effect, however I have experienced higher than average production compared to non-treated control blocks even on an off year. It will be interesting to see the results for year three. Given the opportunity, growers will find a best fit scenario on where and when to include it in their production programs.

Thank you,
Jonathan O. Brown
ProGro Solutions
jbrown@progrosolutions.com
(863)444-1751
Πιστεύουμε ότι η μνήμη της αγίας Μικράς Αγίας Τιάρας και της Μεγάλης Αγίας Τιάρας, θα πρέπει να είναι θεμελιωτική θέση για την ονομασία της Βυζαντινής και της Ευρωπικής αρχιτεκτονικής και θα πρέπει να κρατηθεί ανοικτοποιημένη για την παράδοση και την ακολουθία.

Παρατηρούμε ότι το αποτέλεσμα της Αγίας τιάρας και της Αγίας τιάρας, θα πρέπει να είναι θεμελιωτική θέση για την ονομασία της Βυζαντινής και της Ευρωπικής αρχιτεκτονικής και θα πρέπει να κρατηθεί ανοικτοποιημένη για την παράδοση και την ακολουθία.

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