

AN INDUSTRY-WIDE CRISIS, BUT A SOLVABLE ONE

Citrus Greening

2005-2022.



Huanglongbing: **The COVID of the citrus industry.**

2005-2022.

AN INDUSTRY-WIDE CRISIS, BUT ONE WITH IMMEDIATE SOLUTIONS



IMPACT ON OUR GROVES (2004-2005 Vs. 2020-2021 Citrus Acres Lost ,000)



¥

1,000 citrus acres lost

IMPACT ON OUR GROVES

(Infection Instances 2022)



Source: USDA APHIS.

IMPACT ON OUR GROVES (Infection Instances 2022)

Of the 74 million citrus trees In Florida,

an estimated 90% Are infected or otherwise lost.

: https://www.mitogrow.com/citrus-greening-disease/.

IMPACT ON FLORIDA LABOR MARKET 2012/13-2015/16

(In Jobs)

from 66,445 Jobs in 2012/13





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

IMPACT ON FLORIDA LABOR MARKET 2012/13-2015/16

(In Jobs by Growers)

Hardest Hit: GROWER GENERATED JOBS



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

ECONOMIC IMPACT (2006-2016 study. Values in 2016 Dollars)



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













VALENCIA CITRUSAVER TREATED GROVE RESULTS:



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



Source: USDA May 2022. & Proprietary.

HARVEST YIELD RESULTS 43 ACRES IN DAVIS GROVE TREATED WITH CITRUSAVER VS. FLORIDA AVERAGE. 2022 (% boxes per tree)



Source: Source: USDA May 2022. & Proprietary.







VALENCIA QUALITATIVE STUDY RESULTS:



FRUIT DROP STUDY

THREE VALENCIA GROVES TREATED WITH CITRUSAVER VS. FLORIDA AVERAGE. 2021-2022

FLORIDA AVERAGE UNTREATED (CONTROL)

DEVANE GROVE: 10 SAMPLE TREES SELECTED 11/2021-03/2022



DEVANE GROVE: 10 ACRES TREATED 10 SAMPLE TREES SELECTED 11/2021-03/2022

31% LESS DROP

STALLINGS GROVE: 10 SAMPLE TREES SELECTED 01/2022-03/2022

STALLINGS GROVE: 10 ACRES TREATED 10 SAMPLE TREES SELECTED 01/2022-03/2022

37% LESS DROP

IMMOKALEE GROVE: 6 SAMPLE TREES SELECTED 11/2021-03/2022 IMMOKALEE GROVE: 103 ACRES TREATED 10 SAMPLE TREES SELECTED 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



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 VALENCIA TREES IN DE VANE, LABELLE & IMMOKALEE GROVES 2021



Source: A: Proprietary University Of Florida Lake Alfred Pilot Plant analysis 02 25 202

IMMOKALEE 103 ACRES – VALENCIA TREATMENT BEGAN IN APRIL 2020)





May 13, 2020

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





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.

| ` WE | 3&4 Treatment | Untreated | | | | | |
|---|---------------|-----------|--|--|--|--|--|
| Wet Root Weight in Grams | 3.64 | 2.54 | | | | | |
| Dry Root Weight in Grams | 1.76 | 1.12 | | | | | |
| Average % improvement compared to Untreated | | | | | | | |
| (Wet) no improvement | 43.31% | | | | | | |
| Average % improvement compated to Untreated | | | | | | | |
| (Dry) no improvement | 57.14% | | | | | | |





FRUIT WEIGHT INCREASE AND FRUIT QUALITY RESULTS HAMLIN TREES: DE VANE, CANNON, LABELLE & IMMOKALEE GROVES VS. FLORIDA AVERAGE. 2021



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



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



The Univ. of Florida Pilot Plant - Lake Alfred, Florida (Results compared to the USDA's Florida Average statistics-Dec. 1, 2021) lbs of Solids/90 lb box Brix/Acid Ratio Juice wt of 75 fruit (lbs) Gross wt of 75 fruit (lbs) 5 0 10 15 20 25 30 Corkscrew Grove (Dec. 3, 2021) Seminole Grove (Dec. 3, 2021) DeVane Grove (Dec. 22, 2021) Source of data (date samples collected) DeVane Grove (Dec. 3, 2021) ■ USDA Florida Average (Dec. 1, 2021)

2021 CitruSaver treated Hamlins analyzed by

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 sever 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 CltruSaver 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 OLIVE TREE FIELD TRIAL (PUGLIA - ITALY) WITH CITRUSAVER FERTILIZER **CONDUCTED BY THE UNIVERSITY OF BASILICATA** OCT. 2021

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.



ches (all the trails compared to controls) - low degree infection trials

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| Trial | Branches growth average (%) | Desiccated Branches (%) |
|-------------------|-----------------------------------|-------------------------------|
| Agru-S-F (ex CSa) | 37,66% | 13,33% |
| OS-SW-F (ex CSB) | 47,67% | 60,00% |
| OS-SW (ex CSy) | 42,53% | 13,33% |
| AGRU-S-F | 45,97% | 30,00% |
| AGRU-S | 45,24% | 36,67% |
| os | 168,59% | 16,67% |
| C Pruned | 99,82% | 43,33% |
| C Unpruned | 74,87% | 3,33% |



| Trial | Branches growth average (%) | Desiccated Branches (%) |
|-------------------|-----------------------------------|-------------------------------|
| Agru-S-F (ex CSa) | 30,07% | 3,33% |
| OS-SW-F (ex CSB) | 27,51% | 53,33% |
| OS-SW (ex CSy) | 109,00% | 6,67% |
| AGRU-S-F | 28,38% | 30,00% |
| AGRU-S | 105,45% | 16,67% |
| 05 | 128,08% | 6,67% |
| C Pruned | 55,52% | 60,00% |
| C Unpruned | 46,41% | 40,00% |



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| Spin Off Accademico - Università degli Studi della Basilicata | | | Spin Off Accademico - Università de | egli Studi della Basilicata | | |
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Pg8

San Cataldo Olive Grove

Agreenment

11 Preliminary conclusions

The six months applications of the Agruresina and Olivesaver fertilizer on "Xylella Fastidiusa" 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 foliage, a greener vegetation, new shoots and a better healthy status compared to untreated plants. For some plantss very few olive production is expected. Branches desiccation process due to "Xylella fastidiona" disease is ongoing.





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Via Annebale Maria di Prancia TS100 Matora (MT) - Italy PIVA: 01258430774

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with wave agrees



Squinzano Olive Grove







FIGURE # 5

OLIVE FRUIT PRODUCTION AVERAGE OF 10 TREES PER TREATMENT OR CONTROL (IN GRAMS)



HARVESTED ON OCTOBER 20, 2021

SAN CATALDO XYLELLA FASTIDIOSA OLIVE FIELD TRIAL 2022



OS-SW-F OS-SW (ex AGRU-S-F AGRU-S

CSγ)

OS

MED 2022 MED 2022 MED 2022 MED 2022

Control

LOW 2021 MED 2021 Agru-S-F

(ex CSα)

(ex CSβ)

MED 2022 MED 2022 MED 2022

ANALYSIS CONDUCTED UNDER THE AUTHORITY OF THE UNIVERSITY OF BASILICATA RESEARCHERS



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 todays 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.

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Year one of trials(2020/21season):
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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.

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Year two of Trials(2021/22season):
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Scope; 32 acres of Early-Mid Sweet Orange. Bulk of trees were 20 years old.

Applications; 4 total. 3Applications 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 <u>jbrown@progrosolutions.com</u> (863)444-1751



Τ.Κ. 20500 FAX: 2746024174 εν Νεμέα τη 25 - 10 - 2021

Αγαπητοί κύριοι

Είμοτα η αδελφότητα της υρώς Μονής Αγίων Τοζιαρχών, Αρχαίας Νεμέας, Κορινθίας, Από τον Αύγουστο έως τον Οκτιάβριο του 2020, εφαρμόσομε τρος εφαρμογές του προίθντος Οίινεσκνετας λίπσαμα στα περίπου 150 ελαιδέστη που βρίσκονται στιν ιδιοκτηρία της Μονής μαις τα οποία μας προμιθέσεια ο φίας και συνεργάτης μας κ. Βασίλαιος Φισκόπουλος, Δύο θεραπείες στη ρίζα και μία θεραπεία στά φύλλα.

Επιτρέψτε μως, παρακαλούμε, να σας εκθέσουμε εν συντομία τις εντυπώσεις μας και τις παρατηρήσεις μας από την εφαρμογή του προϊόντος στα δικά μας δέντρα.

Μετά την συστημιατική κραρμογή του λιπάσματος στα ελακόδεντρα της Μονής μος, υπήρξε θεαματική πρόοδος και βέλτισση της υγείας των δέντρων. Τα δέντρα αντώσογονήθηκαν, Βάλτισθηκε η υγεία του φυλλισματός τους, δεν έχουν πέλου κλαδία που να έχουν στοιχοία έροφι συλλισματος, κάτη ματα του φυλλισματός τους, δεν έχουν πέλου κλαδία που να έχουν στοιχοία έροφι συλλισματος, κάτησα τα άνθη αυτά δεν τραστική του ανάρχου τα πελευταία το πάραι κόπου χημικό λιπασμα, του πολάγοταν τα κειλουταία 15 χρόνια. Εκίση δενά έχουν διαστική την υναμενόμενη ποσότημα καρποίν τα τελευταία 10 περίπου χρόνια. Κάτος φολύνα. Εκίση δεν έχουν διαστική την υναμενόμενη ποσότημα καρποίν τα τελευταία 10 περίπου χρόνια. Κάτος φολύνα Εκίσης δενά έχουν διαστική του αναμικόμενη ποράτημα καρποίν τα τελευταία 10 περίπου χρόνια. Κάτος φολύνα Εκίσης δενά έχουν διαστική του πολύ δέντρα (τα περιοσότερα τα φυτέψαμε εμιάς πρίν απολ θύρόναι περίσσιο), με το συγκεκριμένο προίο Οίνενεκταν ποριδετικά ξαντάριντάτανμαν και πολύδα πολύδα πολλά διαδούτερο. Το διαστική το του και το τεγινόζι από εντραφιστητικημαι τα φαιριβοσουμε το λιτάσια μαίο στους εποδιότερο. Το δίντρα κατιρούτου προίο Οίνενεκταν ποριδετικά ξαντάριντάτανμαν και το ποδιδιασμια μόλο στοι τους αποδιδους και το τεγινόζι αι δεν τεριοριστηκαι το τεριοχρίσσουμε το λιτάσσιμα μόνο στα ευλαισδίετρο. Το του επιβεβαιώντει και πού το τους του καριστικότει το τοι μεγάλη βελισμικατη ματη διάσδο στου γισία και ποριού τους εποις μαλα δόλτρα του κτηματος της Μονής μας, όπως εσπεριδοιδη λεμοντές, πορτοκαλιές, λιστούς κ. Αι κι εκίνει παρούσια τους του ποι μεγαλη βελισικά της παριδιο στου γισία τους εποι δρύσμαι την αποίους ποι το τους τους διασιμάσματα τη μπο εφοριδοσουμε την λίπουση τα διούς της πληρικός και την ποινότημε του προίοτισος, διαμιώσεις τοι μηνεισομματική μαι το μαιδιάση τοι τους τους τους και ποζητης ανά το διαδια τους τους διαμιόσμους τοι μην εφοριβασουμε την λίπουση τα διοι είναις και πη τη τοι τοι τους του ανά δια διατικα τους διαλη τα τατιστισματη τη τοι τοι του του του του τοι ανο

όδυντας καρπό. Όσας αυτιλαμβάνοτε είμαστε απόλέτας ευχοριστημένοι ή καλύτερα ποθοποιοριένου με το προϊόν και μπορούμε όχι μόναν υσταββαθαιουσμα τις παρηγετιές του ιδιότητα αλλά και να το συστήσουμε αναποφύλακτα και σε άλλους. Είμαστε πλέον βέβαιοι ότι σόζει τα δέντρα και την παραγιαγή. Μετ' ευχών και ειλογτών

Θερμός ευχαριστούντες Ο Καθηγούμενος +Ο Μητροπολίτης Γ.Ο.Χ. Κορίνθου και Νεμέας ΠΑΓΚΡΑΤΙΟΣ και οι συν εμοί αδελοοί



HOLY MONASTERY OF THE HOLY ARCHANGELS ANCIENT NEMEA, CORINTHIA. T.K. 20500 FAX: 2746024174

in Nemea on 25 - 10 - 2021

Dear Gentlemen.

We are the brotherhood of the holy Monastery of HOLY ARCHANGELS, Ancient Nemea, Corinth, Between August to October of 2020, we applied three applications of the Olivesaver product as a fertilizer on the approximate 150 olive trees located on the property of our Monastery, which was supplied to us by our friend and collaborator Mr. Vasilios Fotopoulos. Two treatments to the root and one treatment to the foliage.

Please allow us to briefly share our impressions and comments from the application of the product on our own trees. After the systematic application of the fertilizer to the olive trees of our Monastery, there has been spectacular progress and improvement of the health of the trees. The trees have been revitalized, the health of their foliage has improved, they no longer have branches that have symptoms of foliar/branch desiccation, they have kept their flowers, which produced fruit. We estimate the fruit production to have increased by over 70%. It is worth noting that these trees have not received any chemical fertilizer for at least the last 15 years. They have also not produced the expected amount of fruit in the last 10 years or so. Every year less fruit, to almost none, a fact that has been strongly observed in the last 6 years. While they seemed to grow old without being very old trees (most of which we (the brotherhood) planted about 30 years ago). This particular Olivesaver product has literally revived the trees and increased their yielded. The efficacy of this product is further confirmed by the fact that we did not limit ourselves to applying the fertilizer only to the olive trees, but we also applied root treatments and sprayed the foliage of other trees of our Monastery estate, such as citrus, lemon, orange, persimmon, etc. They all showed the same great improvement and progress in their health and increase in their fruitfulness. We should also mention as a confirmation the fact that, in order to see the value and to validate this product, we did not apply Olivesaver on two olive trees which, of course, did not show any improvement, but instead remained with the same symptoms of an unknown disease, aging, and not bearing fruit. As you understand we are completely pleased or rather extremely excited about this product. We can not only testify to its beneficial properties but also recommend it unreservedly to others. We are now confident that it saves trees and their productivity.

With wishes and blessings

Warmly thankful The Abbott

† The Metropolitan G.O.H. Corinth and Nemea

 $\Pi A \Gamma K PATIO\Sigma$ and my fellow brother