DIVISION
of
PLANT INDUSTRY

BIENNIAL REPORT 2020-2022

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Report of the Division Director

Mandate of the Division of Plant Industry

The Division of Plant Industry (DPI, or the division) is one of 13 divisions within the Florida Department of Agriculture and Consumer Services (FDACS, or the department). DPI is the regulatory agency responsible for protecting Florida's native and commercially grown plants from harmful pests and diseases. The division is also responsible for protecting Florida's apiary industry. The statutory authority for the division is contained in Florida State Statutes Chapters 570, 581, 586 and 593.

Summary of Activities

IN MEMORIUM

Robert Woodruff – July 2021
Dr. Robert E. Woodruff (Taxonomic Entomologist 1958-1988 for Coleoptera and Orthoptera *sensu lato*) died in July 2021 (Skelley & Keller, 2022). "Bob" started his career with the State Plant Board as a Survey Entomologist, but soon moved into a Taxonomic Entomologist position where he stayed until retirement. He helped found the Center for Systematic Entomology and the scientific journal *Insecta Mundi* (https://centerforsystematicentomology.org). At the Florida State Collection of Arthropods (FSCA), Bob established the fossil collection (mostly amber) and was instrumental in developing the wet collections. While his regulatory work had him working on a variety of beetles, he is known for his work with scarab beetles. Likely his most influential publication was the *Scarabs of Florida, Part 1* (Woodruff, 1973), which inspired many students to work on scarabs across the US.

Skelley, P. E., & Keller, O. (2022). In Memoriam: Robert E. Woodruff, July 20, 1933–July 8, 2021. Insecta Mundi 0908: 1–32.

Woodruff, R. E. (1973). The Scarab Beetles of Florida (Coleoptera: Scarabaeidae) Part I. The Laparosticti (Subfamilies; Scarabaeinae, Aphodiinae, Hybosorinae, Ochodaeinae, Geotrupinae, Acanthocerinae). Arthropods of Florida and Neighboring Land Areas 8: 1-220. https://centerforsystematicentomology.org/insectamundi/0908_SkelleyandKeller_2022.pdf

Harold Denmark – November 2021
Mr. Harold Denmark (Entomologist, Chief of Entomology 1953-1992) died in November 2021. Harold was an entomologist for the years agriculture exploded in Florida. He never completed his Ph.D. because the commissioner at the time said his job was too important to go back to school. During his tenure, the FSCA was officially established and the number of Taxonomic Entomologists was increased to eight to handle the increasing work load. While active in many regulatory and infrastructure projects, he maintained his taxonomic responsibilities, primarily identifying mites and thrips. He was known world-wide for his taxonomic publications on predatory mites of the family Phytoseiidae. His last major publication was on the Phytoseiidae of the World (Denmark & Evans, 2019).

Denmark, H.A., & Evans, G. A. (2019). Additions to the World Fauna of the family Phytoseiidae (Acari: Mesostigmata) with an Illustrated Key to the Subfamilies, Tribes, Subtribes and Genera of the World. Indra Publishing House, 315 pp.

RULES

5B-57 – Introduction or Release of Plant Pests, Noxious Weeds, Arthropods, and Biological Control Agents – 5B-57.001, .004, .007 – Effective September 28, 2020; 5B-57.010, and .011 – Effective October 1, 2020
The purpose of this rulemaking was to clarify regulatory requirements and to make edits to the Noxious Weed List, which includes incorporating plants currently located on the Class I Prohibited Aquatic List cited in Rule 5B-64.011.

5B-52 – Boll Weevil Eradication – Effective November 2, 2020
The purpose of this rulemaking was to identify the pink bollworm as a pest of cotton, update and clarify the areas regulated for cotton pests, prohibit the planting of kenaf in specified areas, and amend procedures pertaining to the submission of reporting forms and invoicing assessments and penalties.

5B-65 – Firewood and Unprocessed Wood Products – Effective October 7, 2021
The purpose of this rulemaking was to update departmental forms and to amend the pest and disease pathogen lists to include pests and diseases recognized by the federal government.

5B-66 – Fruit Fly Eradication – Effective October 7, 2021
The purpose of this rulemaking was to clarify quarantine movement regulations and treatment measures for exposed areas during an emergency fruit fly eradication program.

AWARDS AND SPECIAL RECOGNITION

Career Achievement
Albert Wright – 2020
Rebecca Sanders – 2021

Employee of the Year
Daniel Greco – 2020
Dr. Nicole Casuso – 2021

F.M. O'Byrne Award
Dr. Serena Stornaiuolo – 2020
Harvey "Rusty" Noah – 2021

Edward Berger Award
No award in 2020 or 2021

Outstanding Service Award (December 2021)
Callie Jones
Michael Schlueter
Stephen Jenner

Sustained Excellence Award (December 2021)
Christine Zamora
Mercedes Jusino
Gloria Lotz
Randall Dean
Jason Johnson
Douglas Bair
Mary Sellers
Richard Blaney
Dr. Patti Anderson

Outstanding Service Award (Spring 2022)
Tracy Howard
Julio Rodriguez

Sustained Excellence Award (Spring 2022)
George Warden
Denise Hamm
Callie Walker
Arturo Montilla Nolasco
Deborah Greer
Ashley Pickett
Holly Hughes

First Finds (2022)
Abby Bartlett
Jimmy Hernandez
Krystal Ashman
Laura Ureta
Lisa Tyler
Alexander Tasi
Laura Ureta
Max Carfagno
Scott Krueger

Superior Teamwork
Kelsey Pitchford
Sam Hart
Chase Groninger
Danilo Garcia Pelegrin
David Brown
Gloria Gonzelez
Holly Jarboe
Lisa Blakey
Patricia McGill
Renan Espino Martinez

Potato Wart
Abby Bartlett
Alejandro Montoya
Bradley Danner
DeAnn Hansen
Diane McColl
Dr. Hector Urbina
Jason Stanley
Jimmy Hernandez
Krystal Ashman
Kyle Schnepp
Laura Ureta
Mark Laurint
Mayumi Needham
Mo Violett
Nora Marquez
Rachel Conklin
Ray Jarrett
Robert Leahy
Sam Hart
Sara Furgeson
Tavia Gordon
David Brown
Emily Safran
Mary Graham
Matt Brodie
Richard Blaney
Walter Golden

Exotic Fruit Fly Delimit Programs
Abby Bartlett
Alexis Nunez
Anthony Puppelo
Bill Churchill
Carlene Sargeant
Chantelle Viloria
Charles Gonzalez
Ciro Milian
Clarence Parkes
Cristina Urbina
Danilo Garcia Pelegrin
David Brown
Diane McColl
Eduardo Solis
Elena Kej
Eric Rojas

Frank Burgos
George Warden
Georgeanne Paris
Glorida Gonzalez
Hanoy Carmenate
Harry Morrison
Heathcliff Gracia Delfin
Holly Jarboe
James Lee
Jesse Krok
Joseph Hawk
John Quigley
John Serra
Juan Aleman Martinez
Juan Menendez Torres
Juan Yumar Pinares
Nora Marquez
Jimmy Hernandez
Kathy Gonzalez
Katy Steinkamp
Keith Zugar
Kelsey Pitchford
Lane Smith
Laura Ureta
Leicet Diaz Varona
Liliana Jerez
Mary Sellers
Matt Brodie
Miguel Hernandez
Nouredine Garami
Nubia Tapias
Paula Dwyer
Rachel Conklin
Ramon Prieto Reschop
Ray Jarrett
Renan Espino Martinez
Rich Tordi
Roger Blano
Sean Brown
Dr. Serena Stornaiuolo
Shannan Webb
Stephanie Paz
Suhayla Carrasquilla
Tim Stumpp

FSCA Holotype Project
Dr. Erin Powell
Dr. Oliver Keller

Citations of Special Recognition
Alexander Tasi
Becky Harn
Cyndi Moncrief
Daniel Ammann
Eddie Cayia
Elizabeth Averhoff
Emelia Nunez
Esteban Godinez
Grace Williams
Jeanie Frechette
Jeff Eby
Juan Aleman Martinez
Jude Gasparro-Brewer
Krystal Ashman
Maria Velez-Climent
Max Carfagno
Melanie Fryman
Melissa Costello
Michael Murphy
Nora Marquez
Phellicia Perez
Regina Fairbanks
Dr. Sam Bolton
Sam Hart
Sara Restrepo
Victoria Benjamin
William Mackey

USDA Certificate of Appreciation
Mark Laurint
Lisa Tyler
Josi Hansen
Daisy Li
Dr. Charles Changa
Rich Tordi
LeAnn West
Matt Miller
Rusty Noah
Clarence Parkes

Administration

OFFICE OF THE DIVISION DIRECTOR

During the biennium, the Division of Plant Industry (DPI) continued to battle invasive pests and diseases at an increasing introduction rate. Averaging nearly three new exotic arthropod and plant disease establishments a month, Florida is truly on North America's front lines for invasive species introductions. Having dozens of Ph.D.-level scientists, some of the most renowned taxonomic experts, and one of the world's largest insect collections, the Florida State Collection of Arthropods (FSCA) allows DPI to tackle the extraordinary number and diversity of invasives entering the state. In addition to the solid taxonomic support, the Division has over 300 inspectors in the field working in plant nurseries, row crops, citrus groves, interdiction stations, and many other high-risk areas. These assets, combined with strong research and development programs within DPI and constant engagement with our industry partners, make this Division the premier plant regulatory organization worldwide. To continue to support a growing agricultural and horticultural industry and an expanding workforce, the Division undertook several improvements and renovations to existing infrastructure. This included converting fumigation chambers, storage facilities, and other multi-use buildings into usable laboratory and office space. Adding high-capacity storage compactors to the insect collections and the library opened more space for technicians' general work areas.

Like the rest of the world, the Division was severely impacted by the COVID-19 pandemic. While most businesses, universities, and government agencies sent their workforces home to work "remotely," DPI did not follow this model. Division leadership determined that with the proper safeguarding measures in place, the workplace could be safe and sanitary. The level of service that our customers and stakeholders require and the expectations and high standards that we hold ourselves to demanded that we continue to come into the offices and laboratories to carry out our mission. After all, agriculture did not stop, and the public still needed to eat. This decision proved providential as DPI did not lose continuity of operations, did not have the immense turnover seen in other agencies when employees were told to come back into the office, and did not lose connection with our customers as seen in sister agencies. Let's hope that a situation like this never occurs again!

Perhaps the most noteworthy accomplishment of this period was eradicating the giant African land snail (GALS) for the second time in the history of the world. After an 11-year program with over 168,000 snails collected from 32 distinct population cores spread across Miami-Dade and Broward Counties, DPI has again eradicated this pest from Florida. Like the 1969 GALS program, this campaign enlisted the public's aid from day one. This program spent as much time on public outreach and engagement as eradication activities. For the first time, canines were used to find GALS in this program. Multiple foundational scientific publications, new protocols for survey and eradication, and fresh techniques for reaching different segments of the public are just a few of the deliverables that came from this program. The former Miami GALS eradication team transitioned into the Agricultural Snail and Slug Inspection Team (ASSIST) following the successful completion of operations in Miami-Dade and Broward Counties. This happened none too soon, as a GALS population was discovered in New Port Richey, not eight months after the eradication program in Miami was completed. Unlike the snails in Miami, which were brought in for religious ceremonies, this population clearly came from the pet trade. The population in New Port Richey is a rare phenotype with cream-colored flesh rather than the typical grayish brown seen in wild populations. This mutation is found almost exclusively in the pet trade. An eradication campaign was initiated immediately; total eradication is expected within four years.

Luckily, it was a relatively quiet period for fruit flies, with no eradication programs and only two delimiting programs. One was a single male peach fruit fly in Miami, and the other was a male Oriental fruit fly in Casselberry. The response to these was immediate, and the programs ran smoothly and efficiently.

The Division continued to successfully acquire a wide diversity of grants to help support the mission. As fee increases have not been supported for decades, DPI has to continually find other means of supporting the Division and, by extension, the industry. The average nursery/apiary inspection costs about $250, yet we charge $10 for an apiary inspection and $35 for a nursery inspection. Much of this federal funding comes through a competitive grants process within the Plant Protection Act (formerly Farm Bill) umbrella; however, USDA-NIFA and university funding sources are also utilized.

Several highly effective biological control programs continued through this period. The air potato biocontrol program is certainly a poster child for how successful these control measures can be. This popular program involves homeowners, extension agents, garden clubs, elementary schools, and many other stakeholder groups in distributing and releasing the leaf-feeding beetles. Being an attractive bright red beetle helps with public outreach and media participation. The decades-long effort to find a biological control agent for the pestiferous cactus moth is within a few years of completion. The final non-target testing of a parasitoid found

in Argentina, which takes place in DPI's insect quarantine, will conclude in the next biennium. All indications are that this insect will be approved for release, and this program will shift to mass production and release. A new program that began during this period was the Brazilian peppertree biological control program. Brazilian peppertree is one of the most devastating noxious weeds that Florida has ever seen. This weed has taken over and choked out native vegetation in over 700,000 acres in the state, often in ecologically sensitive areas such as mangrove forests and estuary environments. The new program involves mass-rearing a psyllid and thrips species that feed on different parts of the plant. This program is expected to grow dramatically over the next few years, eventually replacing the air potato biological program as our largest biocontrol effort.

During this period, the permitting unit was formally incorporated as a new Section in DPI with dedicated staff. Until now, it had been made up of DPI employees donating time to reviewing permit applications and proposals in addition to their regular duties and responsibilities. The creation of this unit became necessary after saw palmetto berry was added to DPI's regulated articles. This alone added thousands of new permit applications to the queue, and with the addition of hemp permitting to our portfolio, it became very apparent that a stand-alone unit was needed.

The devastated citrus industry continued to battle Huanglongbing (HLB) and its vector, the Asian citrus psyllid (ACP), along with citrus canker, citrus black spot, and the usual group of perennial pests such as citrus leaf miner, diaprepes beetles, and others. Down to around 422,000 planted acres and a harvested box count of only 45 million boxes represented Florida's worst harvest in 84 years. The contrast with the 2005 harvest of 175 million boxes before the spread of HLB is stark. Several factors are involved in this decline, but virtually all of this can be blamed on HLB. However, there are several emerging bright spots for citrus in Florida. First, the satsuma industry in North Florida continues to grow and flourish. At the time of this report, over 800 acres of citrus were planted in north Florida, with similar acreage planted in southern Georgia and southern Alabama. MOUs initiated, developed, and implemented by DPI allowed for the movement of fresh citrus fruit across state lines to various packing houses throughout the area. Several gene-edited citrus varieties have been developed for HLB and citrus canker tolerance. These varieties remain in quarantine laboratories; however, they will soon be eligible for release to the DPI citrus budwood program. The search for "escape" trees continued: mature citrus trees in a commercial grove environment showing signs of HLB tolerance. One such tree named the "Donaldson" was discovered in a USDA experimental grove in Groveland, Florida. This tree sparked the interest of growers, politicians, and scientists alike. Cuttings from this tree were sent to DPI's citrus germplasm introduction program and are in the process of clean-up before propagation for release to the industry. Hopefully, this early variety will give growers an option to replace the old line Hamlins, which are particularly susceptible to HLB.

Presentations

- **Smith, T. R.** 2022. Citrus Budwood Protection Program. Presented at the Florida Citrus Mutual Annual Meeting. June 15, 2022. Bonita Springs, Florida (30 Minute Presentation).
- **Smith, T. R.** 2022. Florida Citrus Update. Presented at the Annual Southern Plant Board Meeting. May 7, 2022. Oklahoma City, Oklahoma (15 Minute Presentation).
- **Smith, T. R.** 2022. Florida Pest and Disease Update. Presented at the Annual Southern Plant Board Meeting. May 7, 2022. Oklahoma City, Oklahoma (15 Minute Presentation).
- **Smith, T. R.** 2022. Invasive Species. Presented at the Plant Protection Summit (CBP, USDA, DPI). May 16, 2022. Gainesville, Florida (1 Hour Presentation).
- **Smith, T. R.** 2021. Giant African Land Snail; Eradication Program Overview. Presented at the Caribbean Plant Health Directors Forum. August 31, 2021. Virtual (1 Hour Presentation).

DATA PROCESSING

The Data Processing section's primary responsibility is to ensure information technology (IT) infrastructure and services are established and maintained throughout the division. This section is also responsible for database and application development, Geographical Information Systems (GIS) mapping requests, IT procurement, installation, inventory, and support of computers and network infrastructure.

As of July 1, 2020, the division had 55 offices throughout the state with various network and communication connections. The Data Processing section was responsible for the procurement, installation, and support of approximately 500 computers and over 600 division users throughout the state.

The Covid-19 Pandemic forced many technological shifts in the way we do business. This increased the need for heightened information security, data automation, and online infrastructure for all program areas. This shift was the driving factor to move as many division databases and systems to cloud based interfaces to allow personnel to access and input data anywhere.

In June 2021, Debra Martinez, the Division of Plant Industry's first Division Information Officer retired after 22 years with the division. Her tireless efforts and attention to detail were a driving force supporting the division's goal of being the best trained, most highly motivated plant protection agency in the world. In August 2021, Carolyn Caudill Duever was appointed to the role of Division Information Officer. She had been with the division for 3 years as the Training Coordinator and brought over 30 years of systems and support experience with her.

In October 2021, the DPI-Laboratory Identification Sample Tracking (LIST) system was officially released to the division. This system replaced the Plant Pathology Sample Tracking (PPST) system which had been used to manage plant pest diagnoses from all around the state. The DPI-LIST system provides visibility to internal users and provides online results, reduced the need for hardcopy notification, and included all areas: botany, entomology, nematology and plant pathology.

The development of new software and technologies was further pushed forward by an upgrade to Oracle 2019. The push to move from Oracle expanded the use of GIS applications in conjunction

with the vendor ESRI. The Bureau of Pest Eradication and Control had moved to build Citrus Health Response Program (CHRP) applications with ESRI technologies. This technology was also implemented in managing the new giant African land snail programs.

Following the implementation of the Hemp Cultivation licensing in early 2020, the division contracted with vendor AgEagle to develop our first online paperless application and licensing process. A second phase was implemented to include the Native Endangered and Commercially Exploited Plants during 2022.

TRAINING

New Inspector Training

The Division of Plant Industry, New Inspector Training is one of the most comprehensive training events we conduct and is like no other training in the country. This is a 4-week training conducted with one week in South Florida, one week in Central Florida and two weeks in North Florida. This training has been held continuously over the past century. Despite the Covid-19 Pandemic, the Bureau of Plant and Apiary Inspection successfully held three cohorts of New Inspector Training. Minimal portions of Class #92 were held virtually, but overall training continued as usual. In total, the bureau trained 30 inspectors.

Employees Participating in New Inspector Training

CLASS #92
- Ethan Kelly, 101
- Mark Laurint, 104
- Elizabeth Zuniga, 207
- Katy Steinkamp, 215
- Victoria Benjamin, 221
- Clarence Parks, 304
- Rosie Dulzaides, 318
- Suhayla Carrasquilla, 330
- Nouredine Garami, 325
- Roger Blanco, 353

CLASS #93
- David Brown, DPS 108
- Diane Mccoll, DPS 114
- Nora Marquez, BN 150
- Kelsey Pitchford, DPS 217
- Victoria Benjamin, DPS 221
- Sarah Desmarais, DPS 250
- Rosie Dulzaides, DPS 318
- Alexis McNeer, DPS 323
- Nouredine Garami, DPS 325

CLASS #94
- Angi Hutcherson, HMP 1
- Austin Hawes, 115
- Shanelle Mulrooney, 243
- Chase Groninger, 220
- Colton Striker, 208
- Dante Gulla, 203
- Keith Zugar, 309
- Leicet Diaz Varona, 316
- Mary Graham, 326
- Emily Safran, 328

New Employee Orientation

Fifty-eight employees attended live or virtual New Employee Orientation (NEO) where they were given the opportunity to learn about the department. This training is traditionally held in person, taking place in Tallahassee. The standard procedure was for DPI employees to complete training in Tallahassee and extend their travel to Gainesville to learn about the Division of Plant Industry. Due to the Covid-19 Pandemic, NEO was held virtually for a period. The change from in-person to virtual and temporary changes to travel guidelines forced DPI to pause division specific orientation during this time.

LinkedIn Learning

The division continued using the online training platform LinkedIn Learning. In the timeframe of this publication, DPI employees viewed 2,883.46 hours of training material found on the site. LinkedIn Learning trainings are continuously updated to meet industry standards. Employees are encouraged to learn business skills related to their work at DPI and also have the benefit of being able to learn extracurricular material on their own time.

MAINTENANCE

The Maintenance section manages and directs the building maintenance programs for all Division of Plant Industry facilities statewide from their headquarters in Gainesville using personnel or contracted services. Maintenance directs routine and preventative maintenance along with special maintenance and construction projects. This section is also responsible for landscaping and custodial services in Gainesville.

Major projects conducted during this biennial period on the Doyle Conner Campus include the following:

The previously decommissioned Ag Commodity Irradiation Facility was remodeled to allow for the expansion of the Gainesville main campus infrastructure. After construction was complete, DPI Methods Development and Biological Control supervisors and staff including the 3D printing lab along with Florida Forest Service supervisors were able to move into the facility. The facility is 54,000 sq. ft. and has four supervisor offices, one lab and one storage room with a large footprint in the middle allowing for over 15 cubicles.

The former fumigation chamber building was remodeled to house the Florida State Collection of Arthropods wet collection primarily consisting of specimens preserved in alcohol. Fumigations had ceased decades prior to the renovation and the building was previously used for storage of state records. After the renovation and installation of compactors, the building was named Woodruff/Weems Special Collections Building and now holds over 2 million curated specimens and has two lab spaces.

The Doyle Conner Campus had three generators installed on the

campus to serve as backup power for our Biological Control Lab, Plant Pathology Quarantine Lab, and the Invertebrate Research and Containment Lab. The generators are tied into natural gas and can power each individual building.

The Doyle Conner Campus fence was replaced during this biennial period. All perimeter fencing was replaced with 6-foot chain link and metal decorative 6-foot fence was added along the front. In addition, automatic gates were installed at the main entrance and north gate to the campus allowing for secure parking for state vehicles outside of designated business hours.

PUBLIC INFORMATION AND OUTREACH

In the 2020-2022 reporting period, DPI's Public Information & Outreach section supported many events and programs for the division. The face-to-face outreach during this time was limited due to the Covid 19 pandemic and the cancellation of in person outreach events. That did not stop the division or this section from providing excellent customer service to the industry, our stakeholders and the public. Between June 2020 and June 2022, 47 external publications were created or edited. A full list of those publications can be found in Appendix C.

After the pandemic, it was determined that the main DPI telephone line would permanently remain forwarded to the helpline and the daily call volume continued to increase along with the daily volume of emails. In the reporting period this small group of information specialist fielded 37,766 phone calls along various email communications. These calls were sometimes resolved by the operators, but others require routing tickets to field personnel for follow-up. The CTS (Communication Tracking System) continues to be a great tool for our division to track calls.

During this reporting period, the PIO section managed all the reports of unsolicited seeds received in the mail reports. This program was promoted by a nationwide influx of unlabeled seeds being sent through to mail to residents in the United States from unknown sources. DPI worked to retrieve the seeds and turn them over to the USDA for follow-up. UF-IFAS Extension offices were set up as drop off locations also. The majority of these reports were in July and August of 2020. There were 2,397 total reports of Floridians receiving seeds they did not order. During this time, the DPI Helpline received 5,746 calls regarding the situation and entered 2,415 CTS tickets for follow-up. A web form was deployed to help manage the daily call volume and streamline the reporting process.

Don't Pack a Pest

Don't Pack a Pest is a cooperative agreement funded by USDA-APHIS-PPQ using AQI funding. In this funding period, the agreement was funding in the amount of $470,357.98. Since the advertising campaigns paid for these funds are targeted for the traveling public and most travel was halted due to the pandemic, the focus of the program changed during 2020. To execute the objectives of the program without compromising the mission, funds were used to refresh the campaign, update the website and prepare for initiatives once international travel resumed. Other enhancements to the communications toolkit for the program were made during this time including the partner country "how to guide" for choosing signage and campaign materials. The upgrades included draft press releases, launch event checklists and ways to engage local communities.

In 2021, travel resumed, and funds were again used to pay for large advertising campaigns in airports, on aircraft along with network TV and digital click ads on travel websites. The reach and data from those campaigns are listed below.

- American Airlines
  - March & April 2021
    - 4.93 million passengers on 23, 705 flights
  - December 2021 and January & February 2022
    - 6.66 million passengers on 37,896 flights
- Jet Blue
  - March & April 2021
    - 6.27 million passengers on 55, 412 flights
- Alaska Airlines
  - December 2021 and January & February 2022
    - 6.67 million passengers on 44,689 flights
- Network TV
  - March and April 2021
    - 425 airings on a variety of networks with the potential audience reach of 34-85 million viewers
  - October, November and December 2020
    - 600 airings on a variety of networks with the potential audience reach of 100 million viewers
- Digital Ads
  - December 2021 and January & February 2022
    - 890,448 impressions spread throughout multiple campaigns with 4,489 clicks

Offshore Partnerships

- Proposal was accepted and launch event was in the planning process for Grenada when the USDA and FDACS stopped travel in March of 2020. In late 2021, talks of a virtual launch was in progress with a timeframe of early 2022. In early 2022, it was decided that the launch would be in person and is scheduled for mid July 2022.
- Proposal for St. Kitts and Nevis was developed and submitted for the countries port directors review.
- Continued working with USDA/APHIS, prepare/implement enhancements to PR Toolkit, a "how to" guide on promoting the DPAP program. Kit includes press release templates, launch event checklists and ways to engage local communities.

FISCAL

DPI Expenditures FY 20-21 to FY 21-22		
	FY20-21	FY21-22
Directors Office (DO, Data Processing, Fiscal, Personnel)	4,720,051.39	5,307,486.20
Maintenance	763,284.39	472,315.02
PIO	372,206.12	337,543.45
Training	91,242.37	69,245.48
Total Administrative Services	5,946,784.27	6,186,590.15

Special Category Appropriations		
	FY20-21	FY21-22
Apiary Indemnities 100140 360001	36,000.00	36,000.00
Apiary Research 100777 360001	80,993.12	60,472.78
Boll Weevil 100134	142,556.31	176,190.43
Endangered Plant Species 100207	269,988.35	146,462.90
IFAS Invasive Exotics 103810	540,000.00	540,000.00

Division Funds		
	FY20-21	FY21-22
General Revenue	14,952,241.17	16,493,175.26
Citrus Inspection Trust Fund	320,695.21	375,688.31
Federal Grants Trust Fund	16,162,280.58	13,835,894.59
Agricultural Emergency Eradication Trust Fund	8,202,270.01	8,874,148.92
Plant Industry Trust Fund	5,540,359.13	5,383,179.52

Plant Industry Programs		
	FY20-21	FY21-22
Apiary	989,576.00	925,883.97
Bagrada Bug	27,853.28	42,868.60
Bio Rearing Facility	592,934.24	606,079.28
Biocontrol of Air Potato	160,000.00	160,000.00
Botany	149,535.27	146,651.71
Brazilian Pepper	65,000.00	153,996.00
Brown Marmorated Stink Bug	63,424.25	-
Cactus Moth	144,454.00	65,693.00
CAPS Infrastructure	150,000.00	150,000.00
CAPS Combined Survey	235,720.90	239,291.00
CHRP Federal	6,895,472.49	6,896,566.37
CHRP State	2,000,000.00	2,000,000.00
CRAFT	3,049,275.59	1,026,637.17
Citrus Budwood	265,428.68	199,083.01
High Risk and Detector Dog	1,301,440.73	1,536,885.00
Don't Pack a Pest	270,671.25	405,038.75
Diagnostics	143,209.84	107,066.19
Entomology	1,947,730.42	1,543,649.84
Florida Citrus Germplasm	308,926.00	372,188.00
Fruit Fly Detection	1,000,000.00	1,000,000.00
Fruit Fly ID	66,582.00	45,106.00
Fruit Fly Methods	125,000.00	75,000.00
Giant African Land Snail Federal	1,380,947.17	753,743.02
Giant African Land Snail State Side	276,920.48	237,372.27
Grapefruit Rootstock	669,905.00	423,134.10
State Industrial Hemp	631,344.47	698,513.43
Honey Bee Survey	20,700.00	20,700.00
Horntail Snail	-	500,000.00
Lychee Mite	600,000.00	179,801.00
Imported Fire Ant Regulatory	122,329.78	111,843.94
Melon Fly	4,360.22	-
Methods	595,180.83	591,923.22
Nematology	562,737.44	602,367.50
Old World Bollworm Tomato Commodity	145,000.00	145,000.00
Oriental Fruit Fly	-	333,775.54
Plant Inspection	7,836,951.44	8,585,487.13
Plant Pathology	463,531.44	439,000.24
Pest Eradication and Control	329,594.73	311,743.85
Potato Wart	-	87,580.00
Total	**33,591,737.94**	**31,719,669.13**

Bureau of Plant and Apiary Inspection

The Bureau of Plant and Apiary Inspection is responsible for protecting Florida's agricultural industry and the public from the introduction and spread of serious plant pests. The bureau enforces Florida statutes and departmental rules pertaining to the movement of apiaries, plants and plant products, and conducts routine surveys for the early detection of pests.

NURSERIES

July 1, 2020 – June 30, 2021
Environmental Specialists conducted 24,112 inspections of 9,554 nursery locations during the 2020-21 season. One hundred twenty-one Hold Order and Quarantine notices were issued to prevent the sale of infected or prohibited plants. These plants were either treated, destroyed or released once official verification of mitigation was received.

During this period, 995 new nurseries were registered equalling 1,175 locations.

July 1, 2021 – June 30, 2022
Environmental Specialists conducted 18,795 inspections of 9,943 nursery locations during the 2021-22 season. Sixty-one Hold Order and Quarantine notices were issued to prevent the sale of infected or prohibited plants. These plants were either treated, destroyed or released once official verification was received.

During this period, 1,075 new nurseries were registered equalling 1,226 locations.

A Certificate of Registration issued by the Division of Plant Industry is required by any person selling nursery stock in Florida. Nursery stock is defined as "all plants, trees, shrubs, vines, buds, vegetable and field crop plants, flowering annual plants, aquatic plants, corms, tubers, bulbs, liners, cuttings, grafts, and scions thereof, grown or kept for propagation, sale or distribution." Seeds, lawn, or pasture grasses, cut flowers, cut ferns and cut foliage (greens) are specifically exempt from nursery stock classification.

STOCK DEALERS

July 1, 2020 – June 30, 2021
Environmental Specialists made 4,381 inspections of 9,110 stock dealer locations during the 2020-21 season. Fifty Hold Order and Quarantine notices were issued to prevent the sale of infected or prohibited plants. These plants were either treated, destroyed or released after being tested in a lab.

During this period, 297 new Stock dealers were registered equalling 414 locations.

July 1, 2021 – June 30, 2022
Environmental Specialists made 7,765 inspections on 9,095 stock dealer locations during the 2021-22 season. Twenty-two Hold Order and Quarantine notices were issued to prevent the sale of infected or prohibited plants. These plants were either treated, destroyed or released after being tested in a lab.

During this period, 246 new stock dealers were registered equalling 374 locations.

PLANTS AND NURSERIES UNDER INSPECTION BY COUNTY
July 1, 2020 – June 30, 2021

COUNTY	TOTAL NURSERY LOCATIONS	TOTAL ACRES	TOTAL PLANTS
ALACHUA	224	937.81	4,113,640
BAKER	28	98.72	62,305
BAY	14	1,203.31	9,620
BRADFORD	19	13.02	29,816
BREVARD	260	1,185.84	655,045
BROWARD	501	720.70	2,603,849
CALHOUN	7	811.71	2,648,957
CHARLOTTE	75	569.57	403,662
CITRUS	89	801.13	292,626
CLAY	39	55	407,373
COLLIER	204	724.51	112,907,301
COLUMBIA	51	297.47	1,850,969
DE SOTO	44	728.64	2,411,366
DIXIE	21	163.36	5,462
DUVAL	110	530.59	203,637
ESCAMBIA	48	29.68	3,742,352
FLAGLER	28	865.32	1,384,004
FRANKLIN	2	0.35	2,260
GADSDEN	22	398.18	11,453,774
GILCHRIST	35	123.82	587,736
GLADES	41	2,879	800,428
GULF	8	1.76	5,137
HAMILTON	12	113.62	51,022
HARDEE	46	1,204.25	5,755,053
HENDRY	59	645.35	1,804,760
HERNANDO	95	769.12	453,755
HIGHLANDS	128	1,782.34	5,626,056
HILLSBOROUGH	493	1,835.96	17,311,895
HOLMES	12	1.96	6,079
INDIAN RIVER	97	1,020.14	298,707
JACKSON	23	14.91	45,948
JEFFERSON	34	194.18	2,326,051
LAFAYETTE	9	178.11	6,525,551
LAKE	311	3,549.85	41,903,135
LEE	392	2,458.68	3,493,897
LEON	63	46.94	115,178
LEVY	78	1,130.36	9,958,853

COUNTY	TOTAL NURSERY LOCATIONS	TOTAL ACRES	TOTAL PLANTS
LIBERTY	3	0.36	4,412
MADISON	16	215.17	25,603,958
MANATEE	166	631.28	305,165,016
MARION	189	871.1	1,199,379
MARTIN	177	2,065.09	10,760,904
MIAMI-DADE	2,342	22,927.2	143,229,876
MONROE	37	21.6	48,310
NASSAU	20	127.89	15,785
OKALOOSA	19	6.33	9,673
OKEECHOBEE	46	2,864.65	214,797
ORANGE	427	2,636.23	45,820,243
OSCEOLA	77	345.02	1,662,855
PALM BEACH	563	2,357.93	19,870,752
PASCO	166	124.06	920,575
PINELLAS	219	62.18	204,948
POLK	302	710.36	8,195,571
PUTNAM	53	339.72	266,711
SANTA ROSA	50	455.47	4,931,383
SARASOTA	120	136.25	4,181,867
SEMINOLE	187	1,212.78	1,424,426
ST. JOHNS	62	245.13	134,265
ST. LUCIE	80	1,405.52	767,506
SUMTER	80	1,000.47	4,9749,222
SUWANNEE	67	777.351	11,927,786
TAYLOR	13	24.63	167,667
UNION	5	70.12	4,231
VOLUSIA	293	2,647.37	3,321,501
WAKULLA	12	12.11	5,518,950
WALTON	23	55.87	11,813
WASHINGTON	12	42.97	104,392
Totals	**9,548**	**72,477.47**	**887,696,033**

July 1, 2021 – June 30, 2022

COUNTY	TOTAL NURSERY LOCATIONS	TOTAL ACRES	TOTAL PLANTS
ALACHUA	224	1,455.5	4,247,879
BAKER	26	112.0	93,249
BAY	15	1,205.4	14,311
BRADFORD	18	37.8	59,727
BREVARD	288	3,330.6	672,341
BROWARD	518	1,308.2	4,187,168
CALHOUN	11	842.4	8,182,969
CHARLOTTE	75	1,703.3	557,964
CITRUS	91	462.9	339,200
CLAY	37	285.3	749,157
COLLIER	203	1,001.7	110,847,535
COLUMBIA	51	699.3	4,278,393
DE SOTO	42	2,141.7	2,694,931
DIXIE	22	1,913.1	44,110
DUVAL	122	1,102.5	1,633,072
ESCAMBIA	59	101.5	7,446,944
FLAGLER	29	1,276.7	1,700,851
FRANKLIN	2	0.3	5,975
GADSDEN	24	402.8	12,278,635
GILCHRIST	37	338.7	2,252,255
GLADES	35	3,472.4	4,336,734
GULF	9	17.5	11,531
HAMILTON	10	364.1	99,176
HARDEE	48	3,527.3	44,249,767
HENDRY	61	2,794.7	3,650,988
HERNANDO	97	1,028.0	635,651
HIGHLANDS	132	3,665.1	6,520,471
HILLSBOROUGH	492	40,002,014.5	19,377,829
HOLMES	14	39.6	35,913
INDIAN RIVER	97	1,540.3	672,497
JACKSON	32	59.9	66,700
JEFFERSON	37	193.4	2,313,018
LAFAYETTE	10	189.1	6,528,332
LAKE	328	4,905.0	52,291,080
LEE	405	2,677.0	5,686,479
LEON	66	58.6	117,573
LEVY	78	1,944.7	10,181,907
LIBERTY	2	30.0	30,068

COUNTY	TOTAL NURSERY LOCATIONS	TOTAL ACRES	TOTAL PLANTS
MADISON	19	130.2	28,111,989
MANATEE	172	3,373.7	306,886,263
MARION	200	1,383.7	1,353,466
MARTIN	175	4,583.6	12,566,409
MIAMI-DADE	2,405	25,854.2	164,019,361
MONROE	39	53.7	166,099
NASSAU	22	128.1	13,838
OKALOOSA	36	164.5	15,473
OKEECHOBEE	48	5,288.2	826,463
ORANGE	454	3,334.1	57,124,079
OSCEOLA	85	292.0	1,838,606
PALM BEACH	576	5,476.7	64,809,751
PASCO	189	239.7	965,661
PINELLAS	234	257.5	701,435
POLK	313	2,048.2	12,815,069
PUTNAM	56	286.1	315,450
SANTA ROSA	60	451.7	7,741,015
SARASOTA	125	235.5	4,976,628
SEMINOLE	202	1,742.1	6,871,272
ST. JOHNS	68	265.2	145,879
ST. LUCIE	85	2,637.6	5,674,900
SUMTER	84	40,001,249.7	10,950,400
SUWANNEE	69	2,778.1	14,112,711
TAYLOR	12	48.3	272,462
UNION	7	36.3	33,673
VOLUSIA	311	2,862.3	3,909,322
WAKULLA	13	11.1	5,520,250
WALTON	21	87.2	63,689
WASHINGTON	16	43.4	108,567
Totals	**9,943**	**80,113,857.5**	**1,037,911,794**

IMPORTED FIRE ANT

Since the introduction of the imported fire ant (IFA) in Florida between 1933 and 1945 it has spread to all counties. There are two species of IFA found in Florida. The most common is *Solenopsis invicta* Buren, the red imported fire ant (RIFA) and the less common *Solenopsis* geminata (Fabricius); a native fire ant.

July 1, 2020 – June 30, 2021

As of June 30, 2021, there were 1,339 nursery and stock dealer locations under a compliance agreement for Imported Fire Ant certification purposes. During this period, plant inspection personnel spent 5,262 hours associated with IFA activities.

July 1, 2021 – June 30, 2022

As of June 30, 2022, there were 1,339 nursery and stock dealer locations under a compliance agreement for IFA.

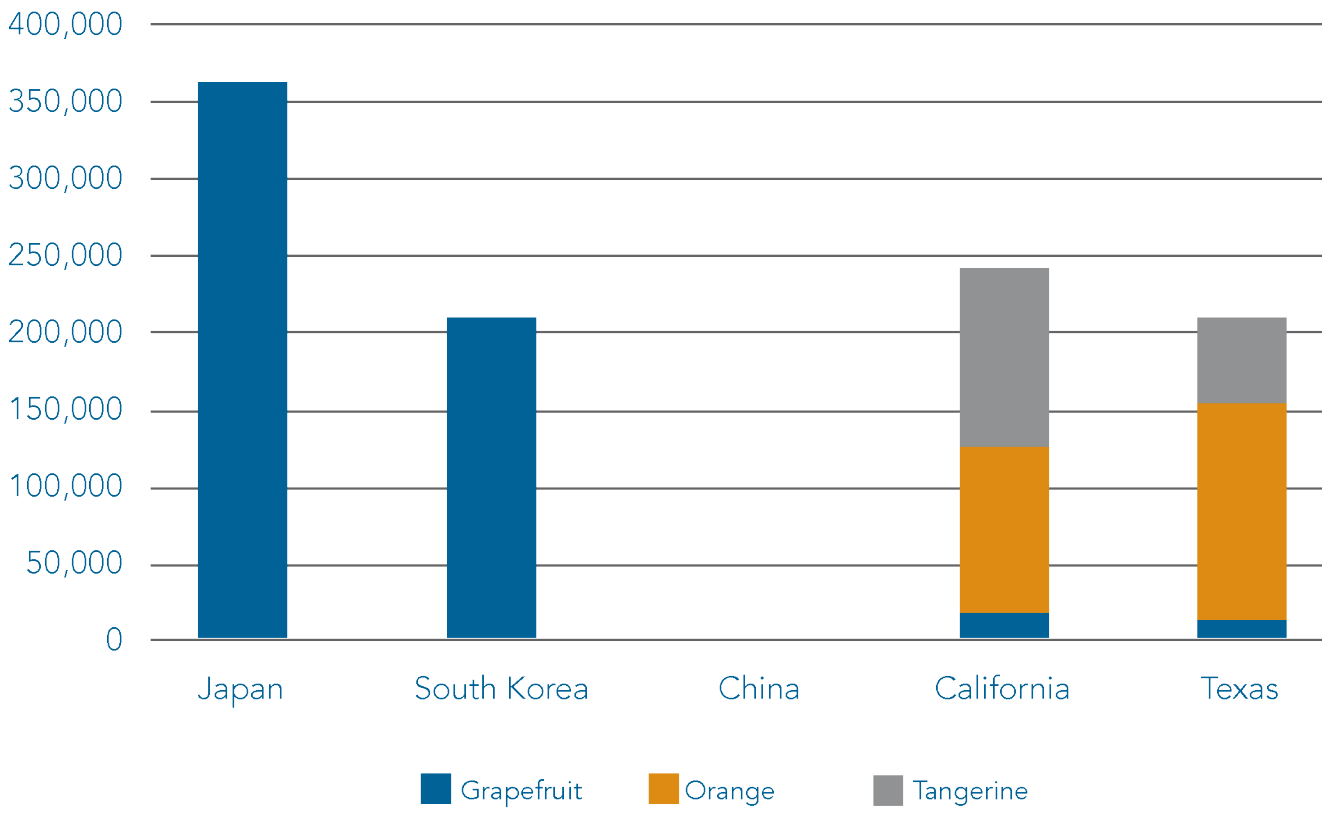
CARIBBEAN FRUIT FLY PROTOCOL PROGRAM

CITRUS

July 1, 2020 – June 30, 2021

During the 2020-21 season, 16,920 acres were certified under the Caribbean Fruit Fly Protocol Program (CFFPP) which produced 1,018,442 certified cartons shipped under the program. A total of 571,928 cartons were exported to Japan and South Korea while 446,514 cartons were shipped domestically to California and Texas.

TOTAL PROTOCOL CITRUS SHIPPED 2020-2021					
	Japan	South Korea	China	California	Texas
Grapefruit	362,097	209,597	0	15,734	10,866
Orange	0	234	0	108,240	142,308
Tangerine	0	0	0	113,275	56,091
Totals	**362,097**	**209,831**	**0**	**237,249**	**209,265**



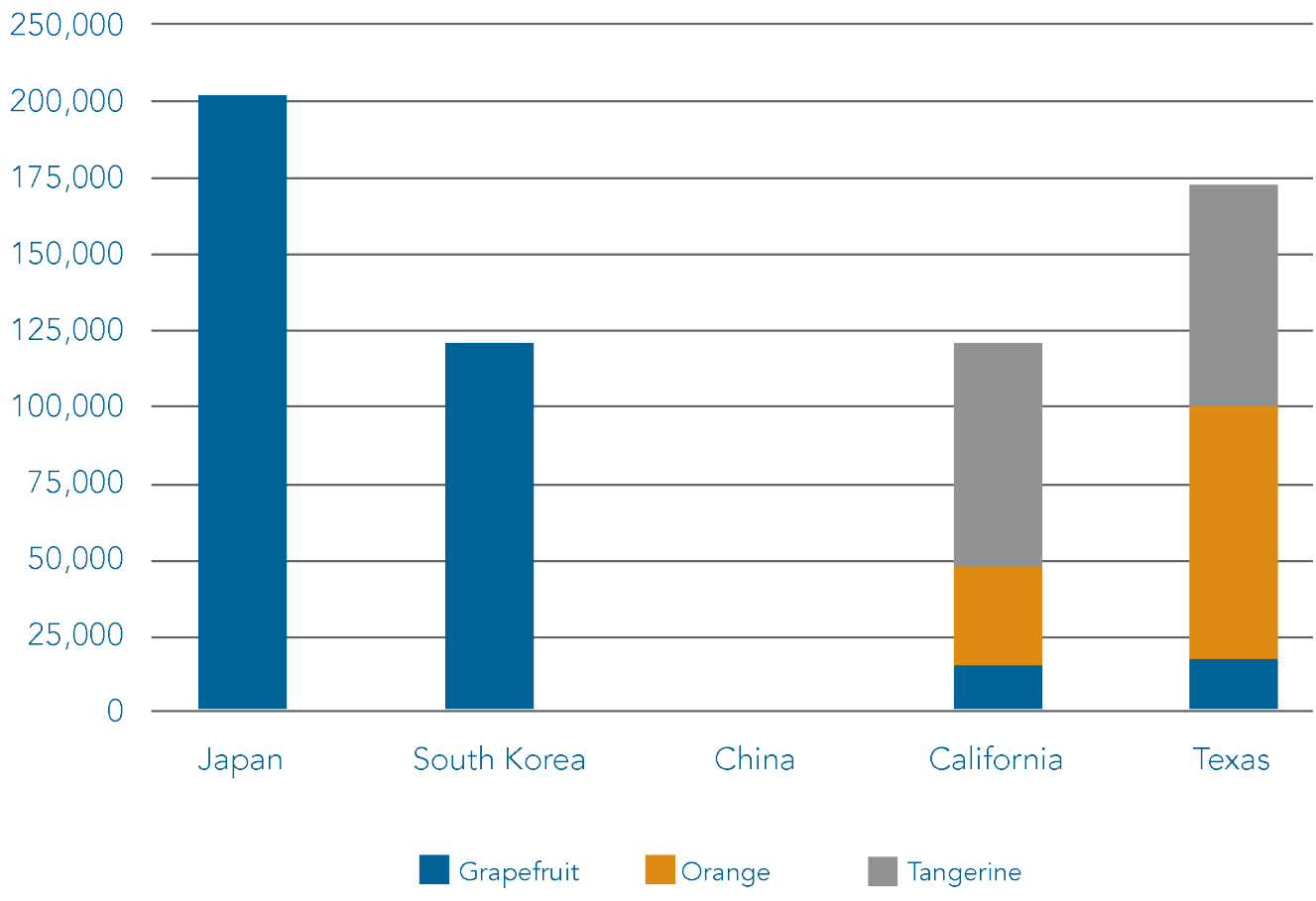
Personnel dedicated 39,479 hours to CFFPP during the 2020-21 season.

During the 2020-21 fiscal year, CFFPP personnel conducted the following inspections:

- Fruit fly trap services: 11,088
- Harvesting inspections: 3,360
- Packing house inspections: 559
- Acreage surveyed for preferred hosts: 197,783

July 1, 2021 – June 30, 2022
During the 2021-22 season, 15,645 acres were certified under CFFPP. A total of 611,212 certified cartons were shipped under the program. A total of 320,683 cartons were exported to Japan and South Korea, while 290,529 were shipped domestically to California and Texas.

TOTAL PROTOCOL CITRUS SHIPPED 2021-2022					
	Japan	**South Korea**	**China**	**California**	**Texas**
Grapefruit	201,991	118,692	0	16,657	16,696
Orange	0	0	0	31,268	84,280
Tangerine	0	0	0	70,262	71,466
Totals	**201,991**	**118,692**	**0**	**118,187**	**172,342**



During the 2021-22 fiscal year, CFFPP personnel conducted the following inspections:

- Fruit fly trap services: 8,634
- Harvesting inspections: 4,722
- Packing house inspections: 650
- Acreage surveyed for preferred hosts: 151,742

CARAMBOLA

July 1, 2020 – June 30, 2021
During the 2020-21 season, 160 acres were certified for export to Texas and California. There were 1,274 cartons shipped to Texas and 46,993 shipped to California for a total of 48,267 cartons.

During the 2020-21 fiscal year, CFFPP personnel conducted the following inspections:

- Fruit fly trap services: 524
- Packing house inspections: 29
- Harvesting inspections: 119
- Acreage surveyed for preferred hosts: 2,090

July 1, 2021 – June 30, 2022
During the 2021-22 season, 160 acres were certified for export to Texas and California. There were 299 cartons shipped to Texas and 85,594 shipped to California for a total of 85,893 cartons.

During the 2021-22 fiscal year, CFFPP personnel conducted the following inspections:

- Fruit fly trap services: 567
- Packing house inspections: 33
- Harvesting inspections: 113
- Acreage surveyed for preferred hosts: 640

PEACH

July 1, 2020 – June 30, 2021
Although there was some acreage trapped, there were problems establishing a packinghouse due to the pandemic. As a result, the peach harvest was instead sent directly to a South Carolina packinghouse and distributed to states not requiring protocol guidelines.

July 1, 2021 – June 30, 2022
No growers requested peach certification during this fiscal year.

IMPORT INSPECTIONS
Distribution centers, nurseries importing foreign plant material and post-entry quarantine locations are potential high-risk sites for bringing in exotic insect pests and plant pathogens due to the large volume of plant and plant products imported to these sites. Import inspection activities were conducted at high-risk locations throughout the state. These import inspections are instrumental in preventing the introduction of exotic insect pests and plant pathogens into the US through Florida.

July 1, 2020 – June 30, 2021
During the 2020-21 fiscal year, the following inspections were completed:

- 27 post entry quarantines
- 44 firewood inspections
- 90 cut flower import inspections
- 134 distribution center inspections
- 324 domestic plant material inspections
- 286 domestic and foreign plant material inspections
- 186 produce inspections
- 95 craft store inspections

July 1, 2021 – June 30, 2022
During the 2021-22 fiscal year, the following inspections were completed:

- 3,655 total import inspections
- 38 post-entry quarantines
- 71 firewood inspections
- 126 cut foliage, ferns, and flower inspections
- 126 distribution center inspections
- 964 domestic and foreign plant material inspections
- 710 produce inspections
- 180 craft store inspection

NON-PROHIBITED AQUATIC PLANT HARVESTING PERMITS
The Division of Plant Industry regulates the importation, transportation, cultivation, collection, sale or possession of any aquatic plant. Non-prohibited aquatic plant harvesters are required to be registered as a nursery and sign a compliance agreement/ permit to harvest non-prohibited aquatics.

July 1, 2020 – June 30, 2021
For the 2020-21 fiscal year, the division issued one aquatic harvesting permit. The Division had 30 active nurseries under compliance.

July 1, 2021 – June 30, 2022
For the 2021-22 fiscal year, the Division issued one aquatic harvesting permit. The Division had 45 active nurseries under compliance.

ENDANGERED PLANT HARVESTING PERMITS
Harvesting endangered and commercially exploited plants requires individuals to have a permit issued by the Division of Plant Industry.

July 1, 2020 – June 30, 2021
During the 2020-21 fiscal year, 1,532 permits were issued for the harvest of saw palmetto berries, while 73 permits were issued for other plant sales.

July 1, 2021 – June 30, 2022
After the 2021-22 fiscal year, issuance of this permit moved to the Permitting Unit under the Bureau of Entomology, Nematology and Plant Pathology.

TEMPORARY CERTIFICATES
Temporary certificates are issued to persons or businesses needing to demonstrate their plant material meets plant pest freedom requirements. The persons or businesses often do not meet the conditions needed to be fully registered under our division rules. These include sod grass inspection, homeowners moving out of Florida, or one-time plant sales.

July 1, 2020 – June 30, 2021
During the 2020-21 fiscal year, 672 temporary certificates were issued.

July 1, 2021 – June 30, 2022
During the 2021-22 fiscal year, 923 temporary certificates were issued.

PEST DETECTION RECORDS
July 1, 2020 – June 30, 2021

PEST RECORDS	ARTHROPODS/MOLLUSCA	DISEASES/NEMATODES
NEW HOST RECORD	42	23
NEW COUNTY RECORDS	175	27
NEW STATE RECORDS	8	8
NEW U.S. CONTINENTAL RECORDS	8	1

PEST DETECTION RECORDS
July 1, 2021 – June 30, 2022

PEST RECORDS	ARTHROPODS/MOLLUSCA	DISEASES/NEMATODES
NEW HOST RECORD	14	62
NEW COUNTY RECORDS	5	157
NEW STATE RECORDS	9	5
NEW U.S. CONTINENTAL RECORDS	7	3
NEW BOTANY COUNTY RECORDS: 157		

HEMP PROGRAM
In 2020, the department completed rules and regulations to allow for the commercial cultivation of hemp. Hemp cultivation and licensing is regulated under rule 5B-57.014, State Hemp Program. The division is responsible for regulations involving licensing and growing hemp in the state.

July 1, 2020 – June 30, 2021
No information reported during this fiscal year.

July 1, 2021 – June 30, 2022
During the 2021-22 fiscal year, there were 653 hemp licenses were issued with 788 locations covering over 19,000 acres. A total of 346 hemp inspections were conducted during this reporting period.

VEGETABLE, CUT FERN AND CUT FLOWER CERTIFICATIONS
Vegetable, cut fern, and cut flower businesses generally need to meet specific regulatory requirements for export. These include specialized inspections of the plant material where a certificate attesting to the inspection is issued.

July 1, 2020 – June 30, 2021
No information reported during this fiscal year.

July 1, 2021 – June 30, 2022
During the 2021-22 fiscal year, 240 vegetable, cut fern, and cut flower certificates were issued.

NEMATODE CERTIFICATION
Florida nursery stock is regulated for certain nematodes when shipped to California, Arizona, Texas, Louisiana, European Union (EU) and other countries. The Division of Plant Industry has plant inspectors across the state responsible for conducting nematode sampling to meet certification requirements.

July 1, 2020 – June 30, 2021
During the 2020-21 fiscal year, nematode certification personnel evaluated 3,259 ornamental nursery locations consisting of 17,652 acres. A total of 2,647 samples were collected and processed from citrus nurseries and ornamental nurseries for nematode certification. During this reporting period, plant inspection personnel spent 10,358 hours related to nematode certification activities.

July 1, 2021 – June 30, 2022
During the 2021-22 fiscal year, nematode certification personnel evaluated 1,270 ornamental nursery locations consisting of 16,436 acres. A total of 2,881 samples were collected in the field and processed from nurseries for nematode certification.

EXPORT CERTIFICATION
Export certification allows for nurseries and nursery stock dealers to export plants and plant products out of the state and/or country.

Canadian Greenhouse Certification allows for nurseries to export greenhouse grown plants to Canada based on quarterly inspections using authorized stickers in place of a phytosanitary certificate.

Canadian Blueberry Certification allows for blueberry fruit shipments to enter Canada based on negative trapping surveys for the blueberry maggot using authorized stickers in place of a phytosanitary certificate.

The Corn Borer Certification is a trapping and pre-harvest treatment agreement designed to mitigate the European corn borer. When employed, this certification authorizes firms to ship untreated corn, beans and bell peppers into California, Texas, Idaho, Oregon and Washington. The only Florida counties considered infested are Calhoun, Escambia, Gadsden, Hamilton, Holmes, Jackson, Jefferson, Madison, Okaloosa and Santa Rosa.

July 1, 2020 – June 30, 2021
Plant Inspection personnel issued 9,943 state phytosanitary certificates and 12,788 federal phytosanitary certificates for plants and plant products destined to other states and countries.

There are 129 nursery locations under compliance for the Canadian Greenhouse Certification and inspectors spent over 419 hours conducting audits and ensuring compliance with the program.

During the 2020-21 fiscal year, 49 locations consisting of 2,535 acres in Florida were certified for Canadian Blueberry Certification. Inspectors spent over 420 hours certifying Florida blueberry farms for fresh fruit shipment to Canada.

The Corn Borer Certification program was not in place during this fiscal year.

July 1, 2021 – June 30, 2022
Plant Inspection personnel issued 9,296 state phytosanitary certificates and 12,072 federal phytosanitary certificates for plants and plant products destined to other states and countries.

Twenty unique compliance agreements totaling 2,848 nurseries were issued to meet individual state import requirements.

The 2021-22 fiscal year saw the completed transition from the Canadian Greenhouse Certification to the new U.S. Canada Greenhouse Plant Certification Program (GCP). The premise is the same as the original program, allowing for nursery stock to be shipped via an export label in lieu of a phytosanitary certificate. This fiscal year, 41 nurseries were under compliance.

This fiscal year, California was added to the Blueberry Certification Program. Forty-nine locations consisting of 3,121 acres in Florida were certified for fresh fruit shipment to Canada and California.

The Corn Borer Certification program was established during this fiscal year. Forty-six hours were dedicated to monitoring 40 European corn borer traps.

AGRICULTURAL SNAIL AND SLUG INSPECTION SURVEY TEAM (ASSIST)
In the wake of the eradication of giant African land snail, it was determined the division would transition the remaining eradication staff to focus on phytophagous snail survey along with keeping the existing canine trained to maintain the resources necessary to facilitate a snail eradication program, if necessary. The program began in February 2022 and the team was rebranded to ASSIST (Agricultural Snail and Slug Inspection Survey Team). The role of ASSIST is to focus on site specific surveys, targeting invasive mollusks which allows for populations to be discovered before they become too widespread to eradicate or control. By doing so, the department can act quickly, mitigate, eradicate, and prevent the establishment of these pests. ASSIST targets areas of high-risk including places with a history of domestic and international trade movement. These locations are risk assessed and inspected at regular intervals based on the risk assessment.

February 1, 2022 – June 30, 2022
There were 616 establishments targeted for inspection.

From February to the end of the fiscal year, 1,535 inspections were completed, 216 canine inspections were completed and 98 samples were collected by program personnel and canines.

DETECTOR DOG PROGRAM
A primary objective of this program is to continue safeguarding our nation's food and environmental security through early detection of exotic pests and pathogens that threaten agricultural production and ecological systems. This program provides the opportunity for early identification and mitigation of plant pests by using detector dog technology directed at high-risk pathways.

Trained canines have been deployed at mail/parcel hubs and distribution centers targeting high-risk host material.

Four canine teams inspect parcel facilities. They are tasked with the inspection of packages for high-risk plants and plant products. Two teams are in Central Florida (Orlando & Tampa) and two teams are stationed in Miami. These teams also travel throughout Florida conducting searches in areas where there are no permanent canines stationed. This allows for teams to train together and provide a wider range of coverage for the state. Information collected during this type of travel will aid in the placement of future detector dog teams. Two canine teams are assigned to exotic snail programs. The exotic snail teams respond to potential snail finds, helpline calls and eradication programs.

Teams conduct daily inspections at private mail sort facilities targeting plant pests and diseases that may negatively impact Florida agriculture and our food supply. Routine inspections using detector dog technology include detections of fruit, vegetables, plants and plant products mailed from within and into the state of Florida. High-risk target fruit identified through canine alerts include citrus, guava, mango, papaya and stone fruits including peaches, nectarines, cherries, plums and apricots. The program strives to identify unmarked shipments of agriculture material and educate those who are not complying with Florida's import requirements.

In addition to the six canine/handler teams, the division has a program manager headquartered in Tampa to supervise the handlers and oversee the detector dog program. The program manager is responsible for conducting annual canine certification, program development, and problem solving in all canine inspection areas.

July 1, 2020 – June 30, 2021
Two canine teams are assigned to the GALS eradication program in Miami. The focus is to assist with early detections of live GALS on high-risk properties. For properties previously positive, the canine teams serve as an additional negative inspection and confirmation that a positive property is free of the snails. For helpline calls or new detections, the canines can supplement a thorough survey and help quickly delimit infestations.

Parcel facility overview:
- 16,937 total alerts
- 878 targets placed
- 92% detection accuracy

Giant African Land Snail activities:
- 1,253 properties inspected
- 1,089 targets placed
- 98.6% detection accuracy

July 1, 2021 – June 30, 2022
Two canine teams work on invasive environmental mollusks in Miami. One team is dual trained in mollusks and agriculture. This team is focused on parcel facilities, however, it has also been deployed to the field during emergency GALS programs. The focus is to assist with early detection of live invasive mollusks on high-risk properties and shipping pathways. For properties previously positive for GALS, the canine teams serve as an additional negative inspection and confirmation that a positive property is free of snails. For helpline calls or new detections, the canines can supplement a thorough survey and help quickly delimit infestations. This has been demonstrated during the ongoing emergency GALS program initiated in June 2022 in Pasco County, Florida where two detector dog teams have been deployed. The environmental canines have been instrumental in transitioning from the old GALS program to the new phytophagous snail program. They have conducted surveys in marinas, tile warehouses and other high-risk entities for invasive mollusks. Under this program they continue to search previously positive GALS properties and respond to discoveries of new GALS properties throughout Florida.

Parcel facility overview:
- 10,363 accurate parcel alerts
- 10,457 total parcel alerts
- 99.1% detection accuracy
- 215 unmarked parcel finds

Environmental overview:
- 531 properties inspected
- 21 GALS surveys on Pasco County program
- 1,074 targets found
- 1,138 targets placed
- 94.4% detection accuracy

INTERDICTION STATIONS
The Bureau of Plant and Apiary Inspection has a supervisor and five inspectors who survey and inspect in and around high-risk Agriculture Interdiction Stations on interstates and other roads in North Florida. These stations have the highest potential for exotic pest introduction. The four main interdiction stations entering Florida are located on I-95 in Yulee, I-75 in White Springs, I-10 in Pensacola, and I-10 in Live Oak. The inspectors also travel to the other 19 side stations for survey and inspection activities.

Their main focus is to inspect plant material and agricultural products brought into Florida via tractor trailers and leased U-Haul-type trucks for foreign plant pests and pathogens or those with a very limited distribution in the United States and Florida. During the inspections they examine, collect and submit soil, plants and plant materials from all parts of the trailer and/or container. Inspectors also verify compliance with federal and state regulations for these products.

Carriers are subject to targeted and random detailed inspections, which are conducted in pull-over areas. Visual surveys of the immediate environs at these locations are also conducted.

July 1, 2020 – June 30, 2021
Overview:

- 4,672 vehicles inspected
- 508 samples collected
- 15 live exotic species were intercepted 166 times
- 7 dead exotic species were intercepted 66 times
- 42 trucks were refused entry
- 33 confiscations

July 1, 2021 – June 30, 2022
Overview:

- 4,457 vehicles inspected
- 676 samples collected
- 32 live exotic species were intercepted 91 times
- 12 dead exotic species were intercepted 13 times
- 69 trucks were refused
- 26 confiscations

PEACH FRUIT FLY, *BACTROCERA ZONATA*

On December 13, 2021, one male *Bactrocera zonta*, peach fruit fly was detected in a Jackson trap baited with the male attractant Methyl Eugenol (ME) placed in an akee tree in North Miami triggering a need for delimit trapping. 341ME and 65 McPhail traps were placed and serviced in the delimitation area. No additional suspect flies were found. The delimitation concluded on March 23, 2022.

APIARY INSPECTION

A Certificate of Beekeeping Registration issued by the Division of Plant Industry is required by any person having honey bee colonies within Florida. Beekeepers are separated into three categories based on the number of colonies they manage: Backyard (1-40 colonies), Sideline (41-100 colonies) and Commercial (101 or more colonies).

The apiary inspection team services 105 bait hives at the ports of entry around the state to capture any unwanted bees or bee pests that may be imported into the state. These are conducted by apiary inspectors with assigned ports every 21-30 days. Additionally, the division collaborates with the USDA-APHIS National Honey Bee Survey to assess honey bee colony health across the nation. Twenty-four sampling kits are issued to Florida and they are all completed by the apiary inspection team.

Although there are numerous challenges within this sector of agriculture, from pest and disease issues to forage loss to pesticide exposures, the Florida beekeeping industry continues to grow.

July 1, 2020 – June 30, 2021

There were 892 new beekeeper registrations processed during the 2020-21 season. This brought Florida's industry to 5,176 registered beekeepers. Apiary Inspection was operating at full staff during most of this season. Even still, due to the beekeeper to inspector ratios, we are unable to visit each beekeeper for an annual inspection. Approximately 45% of the registered beekeepers underwent a routine inspection during this season.

Apiary inspectors conducted 2,327 routine apiary inspections during the 2020-21 season. There were 1,211 permits issued to ship loads of honeybees out of the state, consisting of 480,839 colonies total. There were 300 inspections completed to certify hives destined for California for almond pollination as "ant-free".

In addition to providing these services to the beekeeping industry, the apiary inspection team performed follow-up visits for more than 100 calls from the general public regarding nuisance honey bees during the 2020-21 season.

July 1, 2021 – June 30, 2022

There were 845 new beekeeper registrations processed during the 2021-22 season. This brought Florida's industry to 5,442 registered beekeepers. The Apiary Inspection section was operating at full staff during most of this season. Even still, due to the beekeeper to inspector ratios, we are unable to visit each beekeeper for an annual inspection. Approximately 45% of the registered beekeepers underwent a routine inspection during this season.

Apiary inspectors conducted 2,384 routine apiary inspections during the 2021-22 season. There were 1,076 permits issued to ship loads of honey bees out of the state, consisting of 464,250 colonies total. There were 347 inspections completed to certify hives destined for California for almond pollination as "ant-free".

In addition to providing these services to the beekeeping industry, the apiary inspection team performed follow-up visits for 42 calls from the public regarding nuisance honey bees during the 2021-22 season.

COUNTY	TOTAL APIARIES	TOTAL COLONIES
ALACHUA	149	22,167
BAKER	25	3,729
BAY	81	1,287
BRADFORD	22	2,595
BREVARD	169	60,720
BROWARD	210	6,405
CALHOUN	18	13,040
CHARLOTTE	60	38,424
CITRUS	58	5,073
CLAY	96	670
COLLIER	64	5,688
COLUMBIA	46	4,130
DE SOTO	15	6,688
DIXIE	11	4,322
DUVAL	220	3,470
ESCAMBIA	125	1,818
FLAGLER	29	649
FRANKLIN	10	173
GADSDEN	25	606
GILCHRIST	30	884
GLADES	8	2,600
GULF	24	6,087
HAMILTON	11	251
HARDEE	21	17,839
HENDRY	31	19,141
HERNANDO	60	4,797
HIGHLANDS	59	16,748
HILLSBOROUGH	254	9,482
HOLMES	27	5,610
INDIAN RIVER	65	17,095
JACKSON	49	2,029
JEFFERSON	30	464
LAFAYETTE	8	221
LAKE	134	41,221
LEE	179	23,797

COUNTY	TOTAL APIARIES	TOTAL COLONIES
LEON	117	2,590
LEVY	34	2,049
LIBERTY	30	17,153
MADISON	21	152
MANATEE	90	31,907
MARION	100	4,703
MARTIN	57	11,952
MIAMI-DADE	248	22,109
MONROE	29	479
NASSAU	60	1,481
OKALOOSA	102	3,702
OKEECHOBEE	21	5,196
ORANGE	152	5,882
OSCEOLA	45	1,610
PALM BEACH	247	39,432
PASCO	126	14,131
PINELLAS	307	2,455
POLK	153	39,393
PUTNAM	52	1,962
SANTA ROSA	88	498
SARASOTA	96	5,998
SEMINOLE	88	876
ST. JOHNS	116	1,346
ST. LUCIE	63	18,749
SUMTER	18	4,289
SUWANNEE	41	8,229
TAYLOR	16	3,444
UNION	10	356
VOLUSIA	123	24,715
WAKULLA	58	9,003
WALTON	48	1,907
WASHINGTON	25	1,918
OUT OF STATE SHIPMENTS	218	203,680
Totals	**5,422**	**843,266**

Bureau of Entomology, Nematology and Plant Pathology

The Bureau of Entomology, Nematology, and Plant Pathology provides plant pest and disease diagnostic services for the division, cooperators (universities, USDA, other states and programs), public, and other stakeholders. Charged with the mission of providing accurate identification, all stakeholders are enabled to take sound regulatory action and make informed decisions, potentially protecting Florida agriculture from millions of dollars in loss due to pests and diseases.

The bureau includes the following sections: Entomology, Nematology, Plant Pathology and Botany. Additional resources that enable the bureau to carry out its primary diagnostic functions include a Fruit Fly Identification Lab, Molecular Diagnostics Lab, Honey bee Diagnostics Lab, the Florida State Collection of Arthropods (FSCA), and a library. In support of the division mission, the bureau also includes the Cooperative Agricultural Pest Survey (CAPS) Program, Permitting, and Quarantine sections.

ENTOMOLOGY

The Entomology section identifies arthropod and mollusk samples submitted from division inspectors, USDA inspectors, pest detection surveys, emergency eradication programs, businesses, universities, other governmental entities, and the public. This section also curates the Florida State Collection of Arthropods (FSCA), which contains over 12 million specimens. The museum's mission is to build the best possible worldwide collection of terrestrial and aquatic arthropods in support of research, education and the regulatory functions of FDACS. The staff maintains resources and relationships with other experts related to insect taxonomy and publishes research results in multiple media.

	2020-2021 Fiscal Year				2021-2022 Fiscal Year				Biennial Total
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
# Samples Received	1,329	1,115	1,317	1,943	1,492	1,366	1,343	1,768	**11,673**
# Lots Identified	3,246	1,473	1,793	2,784	2,089	1,994	1,922	2,531	**17,832**

Grant Awards

- 2022 Plant Protection Act, Biological Control of Bagrada Bug, *Bagrada hilaris* (Pentatomidae), $43,600
- Collaborative Research: Digitization TCN: Extending *Anthophila* research through image and trait digitization (Big-Bee), 2021, $154,730
- PPA 2021, Biological Control of Bagrada Bug, *Bagrada hilaris* (Pentatomidae), $46,000

Project and Program Narratives

***Bactrocera dorsalis* (Hendel), Oriental fruit fly, a regulatory incident.** (Dr. Gary Steck.) A single male specimen was trapped in a Jackson trap baited with methyl eugenol and hung in an avocado tree (*Persea americana*) in Casselberry, Florida. Increased trap densities in an 81-square-mile area around the detection site were maintained and traps monitored closely for an estimated two life cycles. No additional flies were found, and the delimitation program was terminated on 20 October 2021.

***Bactrocera zonata* (Saunders), peach fruit fly, a regulatory incident.** (Dr. Gary Steck.) A single male specimen was captured in a Jackson trap baited with methyl eugenol in North Miami. Increased trap densities in a 66-square-mile area around the detection site were maintained and traps monitored closely for an estimated two life cycles. No additional flies were found. The delimitation program ended 30 March 2022. (Miami-Dade County; 12142021-7907; Stephanie Paz, DPI; 13 December 2021.)

Giant African Land Snail Eradication Program. On June 21, 2022, photographs of snails from a population in New Port Richey were submitted to FDACS, and live specimens subsequently were collected (Pasco County; E3152-01-06232022-05782; Gary Webb and Daniel Merced; 23 June 2022). Entomology staff, including Dr. Elijah Talamas and Dr. Paul Skelley, made GALS identifications and coordinated efforts in the initial stages of the eradication program.

Citrus Leprosis Mite Survey. The Entomology section contributed to the collection and diagnosis of the species of mite (*Brevipalpus yothersi*) that serves as the main vector for Leprosis. This work was principally carried out by Dr. Sam Bolton (Entomology), who was deployed as a scientific officer for two weeks in 2021 (May 31 to June 11). Dr. Bolton received samples from the survey team, who extracted samples from citrus groves within the Immokalee area, where the leprosis like virus was reportedly found. The numbers of *B. yothersi* were found to be extremely low in abundance, especially in managed groves, where insecticide applications largely eradicate the vector. Numbers of this species were significantly higher in abandoned groves, but it should be noted that their overall abundance was still relatively low, especially compared to a published report from Mexico. The other known vector of Leprosis (*Brevipalpus phoenicis*) was almost undetectable and was only recovered from plant species that were not citrus. The principal finding of this entomological survey was that the vectors of Leprosis are extremely low in abundance, which probably explains why the virus was only detected in one place, perhaps where the mites had an opportunity to accumulate to a sufficient density to allow the virus to propagate locally. The virus may have moved over to citrus from an unknown reservoir. Most of the time this virus is undetectable because the vector does poorly on citrus at this latitude and under the relatively effective treatment and insecticidal application regimes used in Florida. Indeed, the numbers of the main vector, *B. yothersi*, were so low on citrus that Dr. Bolton had to develop a much more intensive and efficient sampling procedure to detect the mite.

Horntail Snail Emergency Program. In August 2020, *Macvochlanys indica* Benson was found in the environment in Miami-Dade County and reported to FDACS-DPI; subsequent surveys of area nurseries led to the establishment of an emergency detection and mitigation program. Dr. Elijah Talamas (Gainesville) and Dr. Mary Yong Cong (based out of the USDA Subtropical Research Station, Kendall) acted as the primary Science Officers throughout the program. Dr. Talamas coined the common name used above and oversaw the production of identification tools for horntail snail. Drs. James Hayden, Elijah Talamas and Paul Skelley along with other entomology and ENPP staff members participated in this program in fall 2020, working one and two-week rotations in the Miami area, as the local science officer and to help the regulatory branch perform surveys and obtain compliance agreements. The rotating science officers provided identifications of snails at new properties throughout the program, seeing hundreds of samples of horntail snails from five counties (Collier, Pasco, Palm Beach, Miami-Dade, Indian River). Dozens of nurseries and residential properties were surveyed per week from August 2020 to June 2021, totaling nearly 2,900 locations. Ultimately, snail control measures in nurseries were effective to keep nurseries clean, though the snails are still found in the local environment outside of treated nurseries.

Digitization of Primary Type Specimens at The Oxford University Museum of Natural History, The Natural History Museum of London, and Naturhistorisches Museum Wien of Vienna. In 2022, Dr. Elijah Talamas travelled to these three museums to collaborate on the digitization of their primary type specimens that represent species in their initial descriptions. Additionally, he conducted analysis of the historical collection of Platygastroidea at Naturhistorisches Museum Wien. The digitized type specimens are deposited in the Museum of Biological Diversity (MBD) database.

Delphacid survey project. In 2019, DPI received funding from the United States Farm Bill to survey for delphacid planthoppers and the plant pathogens they transmit in rice and sugarcane. The survey took place in the Everglades Agricultural Area, where most of Florida's sugarcane and rice are grown. Dr. Susan Halbert, Jade Allen and Catherine Nance worked in collaboration with Drs. Kishore Dey and Julian Bezeulin on the project. There were two motivating factors for this survey. First, Asian rice delphacids are among the most serious agricultural pests in the world and they are not known to occur in the Western Hemisphere. Although Florida is not a major producer of rice, it is a potential landing site for exotic pests and disease that could spread to major rice production areas. The second reason for the survey was the need to look for delphacid transmitted sugarcane and rice viruses. Fiji disease of sugarcane is not present in the Western Hemisphere, but we have its delphacid vector in Florida. Sugarcane is propagated with cuttings, so vascular pathogens, like Fiji disease, can easily travel via crop propagation. A rice virus that causes hoja blanca disease was reported in the southeastern USA several decades ago and has not been found since then. Its delphacid vector is here, which would allow the virus to spread if it were introduced. Entomology staff identified hemiptera samples from rice and sugarcane for three years and did not find any exotic rice or sugarcane delphacids or viruses. However, a leafhopper new to Florida (and the USA) was identified from several rice paddies. *Balclutha jafara* Webb was described from the Seychelle Islands in 1980.

Development of the Yellow 3D Printed Psyllid Trap and Survey. (Dr. Susan Halbert and Catherine Nance in collaboration with James Snyder and the 3D Print Laboratory.) Florida psyllid traps, designed and manufactured in the FDACS-DPI 3D Print Laboratory, were used to monitor for potato psyllids in over 80 high risk locations. Entomology staff made identifications of all hemiptera and counted all by-catch. Fortunately, no potato psyllids were

found, but the traps yielded at least 19 county records, one state record, and one Western Hemisphere record for various Hemiptera. Five of the county records during this reporting period were for psyllids.

Suction Trap Survey. (Dr. Susan Halbert, Jade Allen, Andrew Boring and Catherine Nance.) Suction traps are large machines that sample air continuously for flying insects. They are made of 15-inch diameter PVC pipe, mounted vertically on 4X4 posts about 18 inches above ground. There is a motor in the bottom that sucks insects flying above the trap into a screen cone, and from there into a jar of preservative. Some of the traps (tall) have a 20-foot tower mounted on the top of the six foot section that contains the motor. The traps run continuously on commercial power, and samples are collected approximately once a week. During this reporting period, there were total of seven traps located throughout the state with one in Miami, one in Belle Glade, three in Immokalee, and two in Winter Haven. In this timeframe 11 county records were reported from the collection of these traps.

Revision of Publication of "Psyllids of Florida." (Dr. Susan Halbert.) In collaboration with Dr. Daniel Burckhard, of the Natural History Museum in Basel, Switzerland, a monograph on Florida psyllids, including keys to the 70 known species, was published in September 2020.The keys include significant exotic pests that could become established in Florida. Five new species of endemic Florida psyllids were described, and several other species with unknown taxonomic status were solved and redescribed.

Deluca Preserve Lepidoptera Survey. In April-May 2022, Dr. James Hayden participated in a survey of lepidoptera by UF McGuire Center of the newly donated IFAS DeLuca Preserve at Yeehaw Junction. This was an opportunity to sample specimens from a part of the state that is under-sampled and is in the center of Florida's ranchland, but which has many well-preserved natural habitats. The survey is ongoing, visiting every few months. DPI personnel (Dr. Hayden and his technicians) add the numerical majority of species and specimens by collecting moths at light traps.

Survey of soil Arthropod fauna of Florida. (Dr. Felipe Soto-Adames, Ann Dunn, and the thrips team.) This survey includes insects and non-insects, with a specific focus on locating unreported introduced species. It is a multi-faceted, long-term project that involves collecting leaf litter samples and soil samples around the state.

Major Curation Projects at the Florida State Collection of Arthropods. The entirety of the museum's alcohol collections was moved into a newly renovated building, giving this part of the collection more space to expand and reducing safety hazards. An updated count of specimens held by the museum was established and will be essential to secure funding for future museum projects. Dr. James Hayden and Kevin Burnette curated most of the T.S. Dickel 2020 Accession, about 400 drawers of moths, mostly from Florida and Colorado. This is a very important collection for Florida, with valuable specimens from south Florida, often the first ones collected on the continent. Dr. Elijah Talamas and the hymenoptera team began the digitization of bees in the FSCA. Ann Dunn began updating the list of myriapod and arachnid holotypes in the FSCA collection and is in the process of publishing this list and reporting on condition of specimens. Dr. Oliver Keller catalogued the pinned type specimens held by the collection.

Collaborative research on fossil insects. In 2022, Dr. Elijah Talamas travelled to the Staatliches Museum für Naturkunde in Stuttgart, Germany. There he provided instruction on how to smooth and polish amber and take images of the specimens inside amber. He also mentored a graduate student and taught about Platygastroidea with a focus on taxa found in amber. Additionally, he made progress in addressing various taxonomic issues.

Phantasma Scale Survey. (Drs. Zee Ahmed and Erin Powell). St. Lucie and Martin counties were surveyed December 6-8, 2021, for *Fiorinia phantasma*, a polyphagous invasive armored scale pest with a preference for attacking palms. The division teamed up with the USDA and UF/IFAS to lead this survey, and the pest was detected in both counties for the first time.

Various Research Projects

- From 2018-present, Dr. Elijah Talamas conducted research on the biological control of Bagrada Bug in collaboration with the California Department of Food and Agriculture and the United States Department of Agriculture.
- In 2022, Dr. Elijah Talamas collaborated with CSIRO Brisbane, Australian National Insect Collection, Canberra on research about the parasitoids of stink bug eggs.
- In 2022, Ann Dunn wrote and published a key to the Caliothrips (Thysanoptera: Thripidae) of Florida and selected potential pests of economic importance.
- In 2022, Ann Dunn began producing an updated list of species of freshwater fairy shrimp (Branchiopoda: Anostraca) and clam shrimp (Branchiopoda: Laevicaudata and Branchiopoda: Spinicaudata) known from Florida and investigating freshwater plankton species composition in urban stormwater and farm runoff.

Outreach & Presentations

- Collaboration on the Anastasia Mosquito Control District educational center. In January 2022, the Entomology section along with DPI Public Information and Outreach began consulting and collaborating with the Anastasia Mosquito Control District in the development of educational exhibits about insects in their new mosquito educational center. These exhibits aim to educate visitors of all ages on the fundamentals of entomology. These efforts were organized by Dr. Eileen Buss.
- Guest Lecturing: UF Insect Diagnostics class (ENY6942). In October 2021, staff were invited to instruct graduate students of the UF Entomology and Nematology Department in a series of guest lectures on identification of mites (Dr. Samuel Bolton), fruit flies (Dr. Gary Steck), scale insects (Dr. Erin Powell), thrips (Dr. Felipe Soto-Adames) and aphids (Dr. Susan Halbert and Catherine Nance). Two technicians (Minjin Hao and Lily Deeter) gave hands-on, workshop-style lessons on slide-mounting, a technical skill

required for accurate identification of certain taxa.

- Workshops. In June 2022, Erin Powell led a half-day workshop on scale, mealybug and whitefly identification for the University of Florida faculty, extension agents, graduate students and other professionals, teaching identification skills such as slide-mounting and the basic biology of these important plant pests.

Presentations

- *Tuta absoluta* taxonomic training, presentation by Dr. James Hayden. October 7, 2020. "*Tuta absoluta* and similar moths." Organized by Dr. Amanda Hodges/UF, this was an international training for Caribbean Region identifiers. Tomato Leaf Miner Diagnostic and Surveillance Training course, Greater Caribbean Safeguarding Initiative.
- Center for Systematic Entomology meeting. Fifteen-minute presentation by Dr. James Hayden. April 3, 2021.. "Big, weird pyralids." A morphology-based cladistic analysis of Pyralidae, suggesting there are two new subfamilies.
- The Lepidopterists' Society / Southern Lepidopterists' Society / Association for Tropical Lepidopera / Societas Europaea Lepidopterologica joint annual meeting (held remotely). August 20, 2021. 12-minute talk by Dr. James Hayden: "The relationships of some more aberrant pyralids."
- As part of the St. Lucie/Martin phantasma Scale Survey, Dr. Erin Powell was invited to talk on introduction to scale insect biology on December 6, 2021.
- As part of the Phantasma Scale Webinar for UF/IFAS on February 9, 2022, Dr. Erin Powell was invited to speak again on introduction to scale insect biology.
- Florida First Detector's Palm Pest Webinar for UF/IFAS invited Dr. Erin Powell to talk on phantasma scale on March 4, 2022.
- Florida Entomological Society annual meeting June 19–22, 2022. Poster by Dr. James Hayden: "A new *Mimorista* species in Florida and cladistics of Nomophilini (Lepidoptera: Crambidae)."
- USDA-ARS Overseas Biological Control Laboratories (OBCLs) stakeholder workshop presented by Dr. Elijah Talamas, 2022.
- German Barcode of Life (GBOL) III: Dark Taxa, annual consortium meeting presentation by Dr. Elijah Talamas, 2021.

Awards

Dr. James Hayden. 2022 Annual Achievement Award for Regulatory Entomology. Awarded by the Florida Entomological Society.

NEMATOLOGY

Nematology analyzes soil and plant samples for nematodes, conducts pest detection surveys and provides diagnoses of plant problems, as well as completing identification of plant parasitic nematodes involved in regulatory and certification programs. State of Florida statutes and rules mandate the predominant regulatory activities of the section. Analyses of plant and soil samples include those from in-state programs, plant shipments originating in Florida destined for other states and countries, as well as samples intercepted in Florida from outside the United States.

The Nematologists and support staff processed and analyzed:

FY 2020-2021:	10,535 soil and root samples
FY 2021-2022:	11,530 soil and root samples
TOTAL	**22,065**

Analyses for certification and regulatory programs relative to citrus, ornamental plants and other Florida crops represented 93.7 percent of the identification work provided by the section. The remaining 6.3 percent included analyses for surveys of nematodes in cultivated and natural lands and for identification of nematode species involved in plant problems. No less than 78,500 specimens were examined, and 27,113 morphological identifications were provided. The number of molecular analyses conducted by the Section was 1,467. These molecular analyses, which involved mainly root-knot nematode species, were in addition to the morphological analyses listed above.

Research

Characterization of Florida sting, stubby root and other nematodes

Renato Inserra, Biological Scientist IV

A cooperative study with nematologists of the University of Florida was conducted to characterize morphologically and molecularly sting nematode (*Belonolaimus longicaudatus*) populations infesting turf grasses in Florida and southeastern USA. The results of the phylogenetic analyses using D2-D3 LSU and ITS1-5.8S-ITS2 rDNA gene sequences showed that the populations from south Florida grouped in a separate clade in the phylogenetic trees from that of populations from north Florida and other localities. Furthermore, the populations from south Florida were morphologically closely related to the original populations of this species for having stylet shorter than tail and differed from those from other localities, which have stylet longer than tail. Both populations are very damaging to turfgrasses. Studies are in progress to define many biological, ecological and genetic aspects of these population.

Another project was carried out to characterize molecularly stubby root nematodes from the United States and other countries. This study involved the cooperation of nematologists from California, Mexico and Belgium. The analysis of sequences of the D2-D3 expansion fragments of 28S rRNA gene of populations of stubby root nematodes collected in Florida revealed the following species:

Nanidorus minor, *N. renifer*, *Paratrichodorus allius* and *Trichodorus obtusus*. The molecular characterization of these Florida species was given for the first time. The confirmation of occurrence of *N. renifer* and *P. allius* in Florida should be of concern for the blueberry and potato industries of the state.

In another cooperative study with nematologists from California and Spain, a Florida nematode species closely related to dagger nematodes was characterized molecularly for the first time. This species, which is commonly associated with oak trees, was reported and described by Chitwood as *Xiphinemella esseri,* in 1957. The results of the phylogenetic analyses showed that *X. esseri* is closely related to the group of nematodes that includes dagger and needle nematodes. Although Chitwood considered this species as a root feeder, its parasitism has not been demonstrated.

Survey of plant-parasitic nematodes in Florida strawberry fields

Janete A. Brito, Research Scientist

Janete Brito collaborated with a nematologist and a Ph.D student from the University of Florida in a plant-parasitic nematode survey in Florida strawberry fields. Results obtained using molecular, biochemical and morphological analysis showed that *Meloidogyne hapla* is the major root-knot nematode species present in our Florida strawberry fields. However, another species of root-knot nematode, *Meloidogyne javanica* was found infecting strawberry plants in an organic farm. To our knowledge, this finding is the first report of *M. javanica* infecting strawberry under field conditions in the USA. A manuscript and a Reseach Note are in preparation and will be submitted to the Journal of Nematology, a peer reviewed journal.

Additional biological, physiological, molecular and micribiome characterization of *Meloidogyne spartinae*

Janete A. Brito, Research Scientist
Silvia Vau, Biological Scientist II
Jason Stanley, Biological Administrator III
Ruimin Xue, Laboratory Technitian IV
Lucas Dombeck, Laboratory Technician

Meloidogyne spartinae is a very unique species of root-knot nematode that infects cordgrass in marine environments. This species has a very interesting biology and adaptability to salt water. A study has been conducted in collaboration with the University of Florida and California Department of Food and Agriculture (CDFA) focusing on additional biological, physiological, molecular and micribiome characterization of *Meloidogyne spartinae*. Data is being collected and a manuscript preparation is in progress.

Survey of plant-parasitic nematodes in Florida turf fields

Jason Stanley, Biological Administrator III
Renato Inserra, Research Scientist I
Janete Brito, Research Scientist 1
Silvia Vau, Biological Scientist II

A survey was conducted with personnel from the Bureau of Plant and Apiary Inspection targeting plant parasitic nematodes in various sod farms throughout Florida. Varieties included St. Augustine, Bahia and Zoysia grass farms. Multiple genera were collected from these surveys including *Dolochodorus*, *Meloidogyne*, *Hoplolaimus* and *Paratylenchus*. Morphological identifications were made, and further molecular studies are currently being conducted with collaboration by the CDFA and the FDACS-DPI Molecular Diagnostic Lab. Early identifications indicate that there are possibly new species present and previously described species may be more closely related to other species than originally thought. Future plans are in place to collect type material from various locations in Florida for comparison.

Improving diagnostic of the peach root-knot nematode

Janete A. Brito, Research Scientist

A cooperative study with a nematologist and a post-doctoral scientist of the California Department of Food and Agriculture (CDFA) was carried out aiming to develop a multiplex Real-time PCR to identify and distinguish the peach root-knot nematode, *Meloidogyne floridensis* from the tropical root-knot nematode species. This nematode species is an emerging pathogen of peach and other crops such as tomato, squash and cucumber that is only known to occur in the USA (California, Florida, Georgia and South Carolina). Morphological and morphometrical differentiation of this nematode species from other related *Meloidogyne* species is time consuming and requires taxonomic expertise. This newly developed RT-PCR method proved to be fast, reliable, repeatable, sensitive, and capable of detecting one single juvenile of *M. floridensis* alone and in a complex DNA background (mixture of DNA extracted).

Foliar nematodes associated with strawberry in Florida

Renato N. Inserra, Biological Scientist IV
Silvia Vau, Biological Scientist II

A longstanding project on the characterization of foliar nematode populations associated with Florida strawberry was continued in 2020-2021. This cooperative project with nematologists from California, Florida, Louisiana and Spain was broadened and included the study of foliar nematode populations from strawberry, rice and ornamental plants. Populations from these plants previously identified as *Aphelenchodes besseyi* were analyzed morphologically, morphometrically and molecularly. The results of these analyses indicated that *A. besseyi* is a species complex containing several cryptic species: *A.besseyi sensu stricto*, *A. oryzae*, a new species *A. pseudobesseyi* sp. n. and other undescribed species. A population from Florida strawberry fitted morphologically the original description of *A. besseyi* and is considered the only representative of this species. A rice population from Louisiana fitted the original description of *A. oryzae* in having post-uterine branch (PUS) length consistently less than one third of the distance between vulva and anus (VA). *Aphelenchoides oryzae* parastizing rice and other monocots, which were previously synonymized with *A. besseyi*, were re-established based on morphological and molecular datasets. Three populations from Florida ornamental plants (*Dryopteris erythrosora*, *Echinacea* sp and *Farfugium japonicum*) differed from the other two above mentioned species and are described as *A. pseudobesseyi* sp.

n. This new species has females with a large and conspicuous PUS longer than one-third of VA.

PLANT PATHOLOGY

The Plant Pathology section diagnoses plant problems exhibiting symptoms of pathogenic infection or environmentally borne (abiotic) syndromes on plant material samples primarily collected and submitted by DPI plant inspectors. Diagnostic services are also offered to homeowners. The section also supports export certification through testing of asymptomatic plant material for pathogens to satisfy phytosanitary requirements of importing states and countries.

In addition to these duties, section staff participate in New Inspector training, permit application, reviews scientific research for publication in peer reviewed literature and serve on multiple internal, external and multi-agency committees, panels and societies, all with fulfilling the focus of DPI's mission.

SAMPLE TOTALS July 1, 2020 – June 30, 2022	
SAMPLE	**TOTAL**
Citrus black spot	407
Citrus canker	968
HLB (including citrus nursery certification)	18,477
Interdiction station	282
Laurel Wilt	17
Pathology general	4,781
Soil	316
Sudden Oak Death	4
Sweet orange scab like disease	4
Palm Phytoplasma	69
Miscellaneous	3
Total samples	**25,328**

Major Projects

Citrus leprosis emergency response

K.Dey, M. Velez-Climent, P. Soria

On May 21, 2021, FDACS-DPI inspectors and diagnosticians detected the presence of cytoplasmic-type citrus leprosis virus from four sweet orange (*Citrus sinensis*) trees in commercial citrus groves (Alico Felda Grove, Felda City, Collier County) in southwest Florida. The citrus leprosis disease is associated with at least five different viruses that produce similar symptoms in citrus, but there are two distinct types, referred to as cytoplasmic and nuclear citrus leprosis virus (CiLV-C and CiLV-N) respectively. Citrus leprosis is transmitted by tenuipalpid false spider mites (*Brevipalpus* spp). Plants belonging to the genus *Citrus* are the most common hosts of CiLV. Within citrus, sweet orange (*Citrus sinensis*) and mandarins are the most susceptible to the virus. Prior to this find, the cytoplasmic type was not reported to occur in the United States. This find is considered a regulatory incident. The symptoms in fruits, leaves and stems resembled what has been reported elsewhere, where the disease is known to occur. Molecular tests based on PCR assays and Sanger sequencing confirmed the findings. Considering the significance of the detection, a statewide emergency response unit was formed to survey the extent of the disease and provide necessary control measures. Over the course of four weeks, 120 suspect samples were tested for the virus across multiple groves. The vector for this virus, *Brevipalpus* spp. was also surveyed. Surprisingly, no other plants tested positive for the virus. Further analysis of the four positive plants in a whole transcriptome analysis using Oxford Nanopore Technology, however, showed no traces of the viral sequences. Due to this viruses unusual nature of local infection only, the destructive processing of infected host tissue left us with no remaining infected material for further testing. It appeared that the detection was localized to only a few trees, and there were no mites detected from the groves surveyed. The possible economic impact of this virus justified the prompt response. After this incident, a Citrus leprosis-Brevipalpus science panel was formed, which included scientists from OPI, UF and the USDA with the goal to actively monitor the incident area. The team met twice in a time span of 90 days, physically surveyed the groves and reviewed the incident. As no further symptoms were observed, the panel was dissolved in May 2022.

Survey for exotic delphacids and associated pathogens

K.Dey, M. Velez-Climent, P. Soria, M. Fryman

This project addresses Goal 1S, in the Implementation Plan for 2017 Farm Bill Section 10007. This project was a collaboration between the University of Florida Everglades Research and Education Center and FDACS-DPI. Dr. Susan Halbert and Dr. Kishore Dey from DPI were involved in the surveys of exotic delphacid pests and the viruses they vector. This was a multiyear project started in 2019 and concluded in 2021. For FY2020, four field surveys were conducted in October 2020, June-July 2021, August 2021, and September 2021 in the sugarcane and rice production region in southern Florida (Palm Beach and Glades counties), including Native American sugarcane fields. For each survey, eleven sugarcane fields and nine rice fields were selected. For the four surveys, a 15-inch sweep net was used to collect delphacids. Four 25-sweep samples were collected in each field. Hemipteran insects in the samples were identified by FDACS-DPI. Hemiptera expert Susan Halbert visually inspected for target virus symptoms. In addition, the topmost leaf with a visible collar (sugarcane, young rice), or the flag leaf (rice with panicles), of one plant was collected at each location, resulting in a sample of ten leaves per field. Leaf samples were stored at -18°C until further processing for high throughput sequencing on a MinION sequencer (Oxford Nanopore Technologies) by FDACS-DPI plant virus expert Kishore Dey. Leaf samples for each field were pooled by crop for each of the three surveys resulting in six composite samples (three sugarcane, three rice). Each composite sample was individually processed to extract the total RNA using a modified CTAB protocol, followed by RNAeasy clean up. Random cDNA was synthesized using

ProtoScirpt II Reverse Transcriptase (NEB, USA) and 8N random primers. Second strand synthesis was done using a NEBNext dA-tailing module (NEB). All cDNA was barcoded by native barcoding kit of Oxford Nanopore, followed by adapter ligation.
All purification steps were performed using a Mag-Bind TotalPure NGS kit. The libraries were mixed and loaded to a MinION flow cell and sequenced for 16 hours using a MinION sequencer connected to a computer with MinION software. Base calling and barcode-splitting was done after the run using the software Guppy toolkit. *De nova* assembly of reads was separately performed. The unassembled reads and assembled contigs were BLastn searched against a local GenBank database created in Geneious Prime software for 18 economically important viruses in rice and sugarcane, including the five target viruses.

Viruses that were screened for in sugarcane samples:

- Fiji disease virus (survey target)
- Maize chlorotic mottle virus
- Maize yellow mosaic virus
- Sugarcane mosaic virus
- Sugarcane streak Egypt virus
- Sugarcane striate virus
- Sugarcane white streak virus
- Sugarcane yellow leaf virus
- Sorghum mosaic virus

Viruses that were screened for in rice samples:

- Rice hoja blanca tenuivirus (survey target)
- Rice grassy stunt virus (survey target)
- Rice stripe virus (survey target)
- Southern rice black-streaked dwarf virus (survey target)
- Rice black streaked dwarf virus
- Rice gall dwarf virus
- Rice ragged stunt virus
- Rice tungro spherical virus
- Rice tungro bacilliform virus

The results of this survey are consistent with results of previous suction trap sampling and field sampling conducted during 2019-2020. All specimens collected during the reporting period already have been collected in Florida. However, the survey has continued to demonstrate the capability to detect newly established delphacids that might be harmful to the sugarcane and rice industries in Florida and nationally.

No virus sequences were detected from composite sugarcane samples and only endogenous Rice tungro bacilliform virus eRTBV was detected from composite rice samples. The full genome was assembled by mapping to eRTBV (Genbank Accession no BR000030.1) using mapping to reference tool on Geneious Prime software. The sequences had 99.99% nt identity to the reference isolate.

The finding of eRTBV like sequences is believed to be "genomic fossil." Viral sequences can accidently get integrated into host genome and are known as endogenous viral elements (EVEs) (Liu et al. 2012. The Plant Journal 72: 817-828). In the rice genome, endogenous RTBV like (eRTBVL) sequences were identified (Liu et al. 2012, Kunii et al. 2004. BMC genomics 5: 1-14). Based on the homology with RTBV at amino acid level, the reassembled eRTBVL lacks open reading frame (ORF)II. As no active rice tungro bacilliform virus sequence was detected in the high throughput data, this finding indicates that the rice plants were free of rice tungro bacilliform virus and should not be of any concern.

Citrus Black Spot

H. Urbina, T. Smith, C. Jones

Following its initial detection in Southwest Florida in 2010, the DPI has continued to monitor the presence and movement of Citrus Black Spot (CBS), caused by the ascomycete fungus *Phyllosticta* (=Guignardia) *citricarpa* in commercial citrus groves. To this end, in collaboration with the Bureau of Pest Eradication and Control, the mycology unit (H. Urbina, T. Smith, C. Jones) has confirmed presence of CBS in field samples, using quantitative PCR assays.

CBS samples tested July 1, 2020 – June 30, 2022

Season	2020-2021	2021-2022
Fruit	60	80
Asymptomatic tissue	192	289
Total samples	252	369
Total Production Blocks/Residences tested	58	49

Additionally, the unit has tested for presence, and mating type, of conidial spores on asymptomatic tissues from citrus trees adjacent to symptomatic ones, using assays designed and validated at DPI.

Potato Wart

In November 2020, DPI was alerted by the USDA about seed potato distributed to Florida potato growers that was potentially contaminated with *Synchytrium endobioticum*, the causal agent of potato wart and a USDA PPQ select agent. These seed potatoes came from Prince Edward Island, Canada from a field that tested positive for potato wart after shipment. In conjunction with CAPS, and assistance from Plant Inspection, ENPP scanned soil samples from potentially contaminated fields in Georgia and Florida following a USDA protocol, sending any suspected positive samples to USDA for diagnosis. No *S. endobioticum* was detected in any sample from Georgia (79) or Florida (118).

Service

Internal/Interagency

Citrus Black Spot Science Panel
H. Urbina, J. McVay
Citrus Leprosis Science Panel
K. Dey, J. McVay
Lettuce Mosaic Advisory Committee
K. Dey, J. Hansen
Permit Review Committee
J. Hansen, T. Smith

External

Florida Phytopathological Society
H. Urbina, Vice President
Institutional Biosafety Committee, University of Florida
J. McVay, Community Voting Member

BOTANY

This section identifies plants for the Division of Plant Industry, as well as for other governmental agencies and private individuals. The Botany section maintains a reference herbarium (international acronym PIHG) with over 17,000 dried plant specimens and 1,400 vials of seeds. Responsibilities include training Plant Inspection staff and reviewing permit applications for regulated plant species.

Identifications of botanical samples	1,451
Identification of plants for other ENPP sections	9,668
Total samples identified	11,119
Herbarium specimens added to PIHG	1,875

Projects

Inventory of Morningside Nature Center

Our collaboration with the city of Gainesville gave the city an updated and taxonomically corrected inventory of its largest park and allowed us to collect specimens for our herbarium over the course of two years. This extended collection time provided the opportunity to observe species with short life spans that could easily be missed in a shorter project and to record flowering events for species that had been missed in earlier, shorter surveys previously carried out by students. This project led to additional opportunities to collect and to collaborate with the city on future inventories of smaller parks. It also added to good will between the Division and the City. We continue to hear complements from city staff about this project.

The herbarium now includes 659 specimens collected from Morningside during this inventory, all of which are available online through our digitizing project. The inventory reported 615 total taxa for the park with 179 taxa new to their previous list.

Herbarium activity 7/2020-6/2022
Number of specimens accessioned = 1,875
Number of digitized herbarium specimens on-line = 16,969
Number of specimens received from UF as exchange = 145
Collections made by Alex de la Paz = 2,469

Continuing digitization of herbarium specimens; currently 16,969 specimen records online.

Public Engagement

Video Lunch and Learn: "Identifying Florida Native Palms."

Video presentation to DOT and NGOs explaining the permit process for rescuing endangered plants.

Video Lunch and Learn: "Wicked Plants: Injurious plants in Florida."

Video presentation "Making of a Florida Botanist."

"Endangered Plants Part 1" for Florida Native Plant Society.

"Endangered Plants Part 2" for Florida Native Plant Society.

"Tour of DPI Herbarium & History of Botanical Science" for Florida Native Plant Society.

Outreach

- Represented DPI at Quarterly UF/IFAS Cultivar Release Committee Meetings.
- Two Master Naturalist Classes for 27 students, Florida Museum of Natural History.

COOPERATIVE AGRICULTURAL PEST SURVEY (CAPS)

The Cooperative Agricultural Pest Survey (CAPS) is a combined effort by federal and state agricultural organizations to conduct surveillance, detection and monitoring of agricultural and natural resource pests. The program serves both the public and private sectors by improving the quality and availability of pest information. It promotes export of agricultural commodities by conducting pest surveillance and generating and reporting data on the absence of pests. Through outreach and educational events, CAPS provides the most up-to-date pest information and training to commercial and small growers, homeowners, community gardens, and master gardener programs.

CAPS Core Surveys: As part of the cooperative agreement, the CAPS team conducted six core surveys; Corn Commodity, Cotton Commodity, Exotic Wood Borer and Bark Beetle Survey, Mollusk Survey, Nursery Survey and Small Grains Survey. These surveys included 49 insect, molllusk and plant disease pests of state and federal concern. Target pests include, but are not limited to, Giant African Land Snail, Cotton Seed Bug, Old World Bollworm, Spotted Lanternfly, and Asian Long Horned Beetle. The CAPS program deployed 1006 traps and had 319 visual survey sites during the reporting period.

The CAPS program continues to collaborate andparticipate in outreach events associated with the University of Florida's "Florida First Detector" program, a series of workshops focused on disseminating plant pest information to master gardener and other stakeholder groups.

Tomato Commodity Survey: The CAPS program managed a Plant Protection Act 7721 (PPA 7721) funded program focusing on pests of tomato and other solanaceous crops. Trapping and visual surveys include tomato fruit borer, Old World bollworm, potato psyllid, tomato brown rugose fruit virus and others. Personnel in this program deployed 494 traps and had 59 visual survey sites during the reporting period.

Potato wart survey: The CAPS team surveyed approximately 225 acres at 5 potato farms after the state was notified by USDA-APHIS-PPQ of two new detections of potato wart fungus ((*Synchytrium endobioticum*) at a farm located in the province of Prince Edward Island (PEI), Canada. The detections occurred in October 2020. Six potato growers in Florida received seed material from the farm in PEI in 2012. Due to the disease's ability to persist in the soil, the CAPS team conducted a soil sampling survey at five of the six farms. The team was unable to make contact with the final location. The disease was not found at any of the locations surveyed.

Black bean bug survey: Scientists from the University of Florida discovered a post on iNaturalist that they suspected might be a new plataspid bug in Florida. CAPS personnel followed up and discovered the black bean bug (*Brachplatys subaeneus* (Westwood)), a new US Continental record, on seagrape (*Coccoloba uvifera* (L.)L.) near the North Miami Beach boardwalk. The CAPS team has continued to assist with surveillance of this pest.

Phantasma scale survey: The CAPS team assisted with surveys for phantasma scale (*Fiornia phantasma*).

Box tree moth survey: After detections of box tree moth (*Cydalima perspectalis*) in several states in the US, tracing activities directed survey activities in Florida. The CAPS team surveyed several sites where material was known to have originated from infested areas. The team conducted surveys, collected surrendered box wood plants, and conducted outreach to the homeowners. The collected material was destroyed. No box tree moths were found.

Brown marmorated stink bug survey: The CAPS team assisted University of Florida researchers with surveys for brown marmorated stink bug (*Halyomorpha halys*) in Lake County.

Pink bollworm survey: CAPS conducted trapping surveys for pink bollworm (*Pectinophora gossypiella*) at a historical cotton field in Indian River County.

MOLECULAR DIAGNOSTICS LABORATORY (MDL)

The Molecular Diagnostics Laboratory (MDL) provides nucleic acid-based identifications for the Division of Plant Industry (DPI). These identifications are conducted using rapid assays, such as probe-based quantitative polymerase chain reactions (qPCRs) and DNA sequence analysis. MDL serves the needs of multiple DPI Bureaus, including ENPP, Plant and Apiary Inspection, Methods Development and Biological Control, and Citrus Budwood Registration. MDL is in a prime position to study many questions related to plant pest and disease diagnosis in Florida, their pathways into the state and their mitigation (e.g., accurate identification of biological control agents being deployed). MDL wields excellent human and material resources, allowing for this work to commence quickly and effectively.

Table X. Samples processed by Molecular Diagnostics Laboratory for the biennial period July 2020 through June 2022.

Biennial Quarter	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	Biennial Total
Regulatory Samples	538	376	706	524	395	376	616	496	4027
Additional Samples (Methods Development, Validation, Calibration)	250	508	84	50	247	508	234	207	2088
TOTALS	**788**	**884**	**790**	**574**	**642**	**884**	**850**	**703**	**6115**

Grant Awards
MDL contributed to several grant funded projects during this biennial period.

Grant	Dates	Award Amount
Fruit Fly Farm Bill 2020	September 1, 2020 - July 31, 2022	$66,582.00
Fruit Fly Farm Bill 2021	September 1, 2021 - July 31, 2022	$45,106.00
Fiscal Year 2022 Oriental Fruit Fly Ports of Entry	May 18, 2022 – July 18, 2022	$372,380.00

Project and Program Narratives

A new *Pleotrichophorus* species (Hemiptera: Aphididae) in Florida
Apterous and alate viviparous and oviparous females of *Pleotrichophorus blackmani* sp. n. were described and illustrated using light and scanning electron microscopy (SEM). SEM images of apterous viviparous female of *Pleotrichophorus glandulosus* (Kaltenbach, 1846), type species of the genus *Pleotrichophorus*, were given for the first time. Taxonomic notes were given, and an updated key to the apterae of the *Euthamia*-feeding aphids is provided. A multigene phylogenetic analyses of two New World *Pleotrichophorus* species places the genus in the tribe Macrosiphini *sensu stricto*. *Pleotrichophorus glandulosus*, the type species of the genus, was described from Germany. European specimens of *P. glandulosus* from France had similar molecular sequences to both Florida species, strongly suggesting that the new species belongs in *Pleotrichophorus*. COI and gnd sequence data indicate that *P. blackmani* sp. n. can be identified reliably by DNA barcodes.

***Thelaxes suberi*, an Oak aphid (Hemiptera: Aphididae: Thelaxinae) new to the Western Hemisphere**
Thelaxes suberi (Del Guercio) was found for the first time in North America. The first collection was on a single potted oak tree in rural Marion County, Florida. Morphological and molecular techniques were used to determine the identity of this adventive species. The find was reported first only as a quarantinable pest because the prior whereabouts of the potted plant were not known. However, suction trap collections in Polk County in 2020 indicated that the species is established in Florida. It is not known if this species will become numerous on oaks in North America.

Synonymy of an economic mite in the genus *Tetranychus*
Spider mites from Florida identified as *Tetranychus gloveri* Banks yielded COI and ITS1/ITS2 sequences that were either highly similar or identical to GenBank sequences of *Tetranychus okinawanus* Ehara from Japan. In the description of *T. okinawanus*, only a single morphological character, the length of the solenidion on tarsus III, was used to separate *T. okinawanus* from *T. gloveri*. Using types of both species, this character was reassessed and is shown to provide no basis for the treatment of *T. okinawanus* as a distinct species. Therefore, we assert that *Tetranychus okinawanus* Ehara is a junior synonym of *Tetranychus gloveri* Banks. We also provide a diagnosis and supplementary description of *T. gloveri* based on specimens from available geographic regions (USA: Louisiana, Florida, Japan) and designated a female lectotype.

Review of American *Fiorinia*
This work provides general descriptions, illustrations, molecular diagnostic data, taxonomic keys, slide mounting recommendations and Florida distribution records for *Fiorinia* Targioni Tozzetti species occurring in the USA. Species treated are *F. externa* Ferris, *F. fioriniae* (Targioni Tozzetti), *F. japonica* Kuwana, *F. pinicola* Maskell, *F. phantasma* Cockerell & Robinson, *F. proboscidaria* Green and *F. theae* Green. New descriptions of second-instar males and females of all seven species in addition to first-instar nymphs and adult females of *F. phantasma* and *F. proboscidaria* are presented. Taxonomic keys to second-instar males and females are developed for the first time and previously available taxonomic keys to first-instar nymphs and adult females are improved. DNA sequences were used to further evaluate the monophyly of *Fiorinia* and provide additional diagnostic tools for *Fiorinia* species. Multigene phylogenetic analyses, COI barcoding methods, and examination of type material indicate that *F. yongxingensis* Liu, Cai & Feng, 2020, syn. nov. is a junior synonym of *F. phantasma*. A morphological survey of the genus demonstrates, for the first time, the utility of second-instar males for diagnostics. This study will help inform regulatory and pest management decisions by facilitating morphological and molecular identification of adventive *Fiorinia* species occurring in the USA.

Tephritid fruit fly diagnostics
DPI scientists described the egg, three instars, and pupa of *Dacus bivittatus* Bigot using optical and scanning electron microscopy and compared them with those of other *Dacus* Fabricius species for which these stages have been described as well as those of two important pest species of *Zeugodacus* Hendel that infest cucurbits. A new anatomical term, lateral lips, was introduced to describe a feature of the facial mask. A feature of the egg that has not been reported previously for Tephritidae was described: a peculiar arrangement of aeropyles in an irregular line partially encircling the egg near the posterior end. A table of morphological characters visible with light microscopes provided diagnostic information to separate larvae of *Dacus bivittatus* from those of most other *Dacus* species and two *Zeugodacus* species for which larvae have been described. MDL also contributed to new descriptions of *Anastepha* larvae and descriptions of new *Anastrepha* species from South America.

Improving Platygastroidea biological control agent diagnostics
Parasitoid wasps were reared from sentinel egg masses and wild egg masses that were collected in Florida in yellow cylinder traps operated by CAPS. As a result of this study, new associations were found between stink bug and egg parasitoids, including species that appear to be undescribed and an Old-World parasitoid wasp that was found to be newly established in Florida. Projects on Platygastrinae combined morphology and COI barcode data to develop robust species concepts of parasitoid wasps reared from plant galls formed by flies (Cecidomyiidae). The molecular data, now linked to holotype or paratype specimens, can then be used

to diagnose the species. This method has been used to identify parasitoid wasps from remnants of a parasitized host. Data are publicly available and publishing of scientific papers resulting from the research is ongoing. MDL contributed data to a study that describes a classical biological control agent (*Gryon aetherium*) of the invasive Bagrada Bug.

Giant African Land Snail and OFF emergency programs
MDL contributed identifications to the recent OFF and GALS emergency programs. Using COI barcodes, the identification of OFF collected in the Tampa area were confirmed. ITS, COI, and 16S sequences from new and legacy GALS samples were used to evaluate the origin of the New Port Richey (NPR) GALS samples. NPR GALS were demonstrated to be unique from the Miami outbreaks. MDL also detected several other species of large, and still unidentified, snails in other legacy interception and raid samples.

Cotton seed bug, *Oxycarenus hyalinipennis*
MDL has tested several samples of this species from Florida, California, the Caribbean, Africa and South Asia. Comparison of these samples to those in world databases seems to indicate that the species *O. laetus*, present in South Asia, may be a synonym of *O. hyalinipennis*. Additionally, samples from an old Florida incursion do not match those *O. hyalinipennis* that have invaded southern California.

Presentations (MDL employees in bold)

- A maximalist approach to describing a biological control agent reveals it to be adventive in North America and advances the systematics of Scelionidae (Hymenoptera, Platygastroidea). **Moore, M.R., Roberts, C.G., Combee, L.A., coauthors.** April 3, 2021, 12:15 PM – 12:30 PM ET (Gainesville, FL)
- A tale of two synonymies. **Moore, M.R.,coauthor.** April 3, 2021, 12:45 PM – 1:00 PM ET (Gainesville, FL)
- Exceptional larval morphology of nine *Anastrepha* species confirm proposed relationships within the mucronota group (Diptera: Tephritidae). **Moore, M.R., – coauthor.** November 2, 2021, 3:05 PM – 3:20 PM MT (Denver, CO)
  COI barcode library for Anastrepha Schiner (Diptera: Tephritidae). **Moore, M.R., lead author and presenter**. November 2, 2021,3:35 PM – 3:50 PM MT (Denver, CO)
- A new phylogeny for Anastrepha (Diptera: Tephritidae) from AHE and the information content in nuclear loci for species identification. Moore, M.R., coauthor. November 2, 2021, 3:50 PM – 4:05 PM MT (Denver, CO)

HONEY BEE DIAGNOSTICS LABORATORY (HBDL)
Driven by industry need, a Research Scientist position to oversee diagnostics for honey bee health concerns was conceived and filled January 31, 2022. The filling of this position was an early milestone in the development of a diagnostic lab with the responsibility of diagnosing honey bee pests and diseases. Over the following months, a conceptual framework and mission was developed, which includes diagnosing regulatory pathogens andpests such as *Paenibacillus larvae* (American foulbrood), *Apis mellifera scutellata* (Africanized honey bee) and *Tropilaelaps* spp., as well as diagnosing unidentified biotic factors contributing to disease in honey bee colonies, researching and developing novel diagnostic methods and applications and communicating to the public issues affecting honey bee health. To achieve these aims, the HBDL employs traditional and molecular diagnostic tools to identify bacterial, viral and fungal pathogens as well as arthropod pests. While the HBDL did not become independently functional until February 2023, progress was made towards adopting proven technologies and developing new assays.

Africanized honey bee detection in Florida and Jamaica
DPI developed several rapid genetic tests for identifying mitochondrial lineages of the Africanized Honey Bee. UF IFAS scientists had significant background on the problem, including a great deal of additional data and control samples to support validation of our new assay. A second set of rapid tests aimed at narrowing down geographic origin in Africa has been developed along with the same UF IFAS group. MDL/HBDL assisted with the investigations related to the grant PPA Project# 3.0382, but this was not planned from the beginning of the funded study.

In 2021, the Jamaican Ministry of Agriculture and Fisheries asked for assistance in identifying Africanized bees in Jamaica. MDL provided mitochondrial data to the MOA. These bees were subsequently tested by researchers at Purdue University using whole genome sequencing.

PERMITTING AND CONTAINMENT
The ENPP Permit section is comprised of biological scientists and administrative staff who collaborate with other Division personnel from the remaining bureaus to form a larger permit review team. The permit review team members engage in routine meetings to discuss current issues surrounding the introduction or movement of regulated articles (organisms and soil) into and within Florida. The Permit section relies on the taxonomic expertise and regulatory experience of these division personnel to accurately review both state and federal permit applications.

The Permit section operates under statutory authority to achieve the mission of the division: "to detect, intercept and control plant and honeybee pests that threaten Florida's native and commercially grown plants and agricultural resources." This authority is broadly referenced in Florida Statute 581.083 and Florida Administrative Code 5B-57.004. Permits issued by DPI can prevent the spread of plant pests and disease, limit the introduction of invasive arthropods, protect critical natural resources, safeguard consumers from unjust business practices, maintain the integrity of research and industry standards and

more. At times other state or federal agency permits or approval may be required to perform a particular activity or move and/or possess a regulated article. Applicants are encouraged to remain up to date with all pertinent regulations that may impact their interests or needs.

The Permit section spearheads containment facility inspections throughout the state to verify permit holder compliance and assess risk at locations where FDACS permits are maintained. The Permit section also works with federal counterparts in the USDA-APHIS-PPQ to not only weigh in on federal permit applications, but also perform joint inspections at federally permitted containment facilities. DPI maintains oversight for three USDA-approved containment facilities in the state. Permit section containment officers ensure researchers comply with state and federal guidelines at each of these locations:

- Invertebrate Research and Containment Laboratory (IRCL) – Gainesville
- Plant Pathology Containment Laboratory (PPCL) – Gainesville
- Norman C. Hayslip Biological Control Research and Containment Laboratory (BCRCL) – Fort Pierce

The Permit section is also periodically tasked with providing comment on Qualitative Pathway-Initiated Pest Risk Assessments (PRAs) for the importation of agricultural commodities into the United States. The Permit section chairperson(s) will consult with the permit review team and other division staff to analyze the implications of proposed pathways and produce a timely response to USDA-APHIS and other relevant plant health stakeholders.

Permit Review Team Members (as of June 2022) and Function

Leroy Whilby D.P.M, ENPP Bureau Chief
Paul Skelley Ph.D., Entomology Section Administrator
James Hayden Ph.D., Arthropod Permit Liaison
Jason Stanley, Nematology Section Administrator, Soil Permit Analyst1
Patti Anderson Ph.D., Botany Permit Lead Analyst
Alexander de la Paz, Botany Permit Analyst
Nicole Casuso D.P.M., Permit Database and Review Workflow Facilitator
Marti Martin, Permit Records Management1
Victor Cline, Voucher Records Management1
Edward Cayia, Arthropod / Native Plant Harvesting Permit Analyst
James Durrell, Native Plant Harvesting Permit Analyst 1
Nicholas Dorman, Commercial Hemp / Native Plant Harvesting Permit Analyst1
Hannah Wagner, Commercial Hemp / Native Plant Harvesting Permit Analyst 2
Mileydis Vargas, Commercial Hemp / Native Plant Harvesting Permit Analyst 2
John McVay Ph.D., Plant Pathology Section Administrator
Jodi Hansen, Plant Pathology Permit Analyst
Taylor Smith, Plant Pathology Permit Analyst
Cheryl Jones, Plant and Apiary Inspection Assistant Bureau Chief,
Post-Entry Quarantine and Import Specialist
Eric Rohrig Ph.D., Methods Development and Biological Control Bureau Chief, Industrial Hemp / Non-native Species Planting Permit Analyst

[1]These personnel assumed their role in 2021.
[2]These personnel assumed their role in 2022.

Table 1. Permit applications processed by the Permit Section for the biennial period July 2020 through June 2022.

Type of Permit	2020 July 1 – Dec 31	2021 Jan 1 – June 30	2021 July 1 – Dec 31	2022 Jan 1 – June 30	TOTAL
FDACS-08208	35	30	29	69	163
FDACS-08025	1,285	281	1,342	474	3,382
FDACS-08112	339	575	338	470	1,722
FDACS-08450*	0	0	0	7	7
FDACS-08274	4	2	1	2	9
FDACS-08084	6	4	4	4	18
PPQ 526	47	135	121	145	448
PPQ 588	9	12	7	12	40
PPQ 525	3	10	3	3	19
PPQ 546	2	3	3	1	9
TOTAL	**1,730**	**1,052**	**1,848**	**1,187**	**5,817**

Note: Not all applications result in an active issued permit; some applications may be denied or withdrawn during processing.
*The Permit Section did not start processing FDACS-08450 applications until 2022.

Table 2. Facility inspections performed by Permit Section scientists for the biennial period July 2020 through June 2022.

	2020 July 1 – Dec 31	2021 Jan 1 – June 30	2021 July 1 – Dec 31	2022 Jan 1 – June 30	TOTAL
Facility Inspections	7	11	10	40	**68**

Table 3. Total number of PRAs reviewed for the biennial period July 2020 through June 2022.

	2020 July 1 – Dec 31	2021 Jan 1 – June 30	2021 July 1 – Dec 31	2022 Jan 1 – June 30	TOTAL
PRAs	7	21	25	16	**69**

FDACS Permits Issued

FDACS-08208 – Application and Permit to Move Organisms Regulated by the State of Florida

Florida Statute 581.083 requires a special permit and security for any organisms deemed as a potential threat to plant life in this state. DPI is the sole issuing agency for this type of permit. Per Rule Section (1) of Chapter 5B-57.004 F.A.C., "It is unlawful to introduce, multiply, possess, move, or release any arthropod, plant pest, biological control agent, noxious weed, or invasive plant regulated by the Department or the USDA except under permit issued by the Department unless a federal permit, PPQ 526, has been issued by the USDA with concurrence by the Department." In certain instances, the division may request an FDACS-08208 in addition to the PPQ 526 permit. This may be for species that are of particular concern to Florida and no longer regulated with the USDA or may be requested of entities with intended uses that pose a higher risk to local agriculture, natural areas, or consumers. Only individuals may apply for a permit to possess, research, release, commercially produce/resale, or display certain regulated organisms for educational purposes. An individual may obtain a permit on behalf of an agency, institution, or other larger entity. However, the individual listed as the signatory on the first page of the application is the primary responsible party. Any changes to the permit holder or other listed personnel must be filed with the division's Permit section promptly. The FDACS-08208 review process is summarized below:

1. Permit section intakes and reviews applications for completion and relevance.
2. Taxonomic specialists from the other ENPP sections are consulted and asked to write a memo supporting approval or denial of the request. Additional permit conditions can be required such as employing specific security measures, devitalization methods, production/cultivation techniques, etc.[1]
3. Memos are reviewed by the director's office and the permit is approved/denied. The director's office will indicate the expiration date of the permit. Typically, permits are valid for one to three years depending on numerous risk factors.
4. Final action is taken by the Permit section to notify the applicant of the decision.
5. Once a permit is issued, Permit section biological scientists will schedule and perform at least an annual inspection (frequency dependent on risk level) for each FDACS-08208 recipient occurring within their designated area of the state.

[1]At times, taxonomists may indicate if voucher specimens should be requested to confirm the identity of the regulated organism. If vouchers are required by the entomologists, Permit section administrative staff will send a **Permit Voucher Specimen Request and Identification Invoice** (FDACS-08526) with the final approved permit, any conditions and official letter to the applicant. Fees may be assessed and collected for applicable services rendered, such as diagnostic fees and special inspections, per Rule 5B-2.010. Curated voucher specimens are stored within the Florida State Collection of Arthropods.

FDACS-08025 – Request for Permit to Harvest Endangered or Commercially Exploited Plant(s) or Plant Part(s)

This permit is referenced in Rule Chapter 5B-40 F.A.C. Preservation of Native Flora of Florida. Any individual seeking to collect plants/plant parts listed as endangered or commercially exploited in the Regulated Plant Index (5B-40.0055 F.A.C.) must obtain written permission from the property owner or legal representative and an annual harvesting permit through DPI. The name and relevant contact information, such as a phone or email address, must be provided to confirm permission has been granted for the proposed harvest activities. Individuals seeking to harvest plants/parts from property that they own or manage themselves must still obtain a permit. Permits are issued for the following purposes: commercial sale, propagation, rescue, or research. Those applying to harvest plants for propagation must be an active registered nursery in good standing with the division. The nursery's firm number and status would be confirmed during the application review process. Those applying to perform a rescue or research operation must also include a written plan summarizing how plants will be handled to ensure their survival. Botanical gardens and parks typically apply for these types of harvesting permits. These written plans would be reviewed by the Botany section.

In 2018 DPI was tasked with reviewing applications for the harvest of Saw Palmetto (*Serenoa repens*) berries. This species was added to the Regulated Plant Index as commercially exploited when concerns from the public were received and its status voted upon by the Florida Endangered Plant Advisory Committee. The seasonal nature of the crop and the volume of applications that resulted for the subsequent years prompted the need for reform and development of a more efficient intake, review, and permit issuance process. In 2022, an online application process was launched through AgEagle Aerial Systems Inc. to expedite the review process and provide support during the seasonal surge of applications for permits to harvest Native Endangered or Commercially Exploited (NECE) plants. This was an expansion of the existing online system created to manage commercial hemp cultivation licenses (*see next section on FDACS-08112*). The shift to an online system significantly improved the multi-level review process for not only saw palmetto berry applications, but also allowed for the transition of the remaining permits for harvesting other NECE species (issued for research and rescue) to be handled by the Permit Section. Formerly, all permits issued to botanical gardens and research institutions were tracked/managed by the Bureau of Plants and Apiary Inspection. The current review process can be summarized as follows:

1. Permit section receives application (online or via paper) and performs initial review for completion and appropriateness. Follow-up and clarification obtained as needed.
2. Botany section reviews species information and any submitted workplans (*Serenoa repens*-only applications, are reviewed by Permit section Botany designees).
3. Plant Inspection confirms nursery firm status if needed.
4. Permit section performs final review and notifies applicant of approval/denial.

FDACS-08112 – Application for License to Cultivate Hemp
After the 2018 Farm Bill separated hemp from the definition of marijuana in the Controlled Substances Act, Senate Bill 1020 marked the beginning of the State Hemp Program within FDACS by paving the way for the Industrial Hemp Pilot Project (Rule Chapter 5B-57.013 F.A.C.) Programs facilitated by the land-grant universities. This bill allowed for the licensed cultivation of specific hemp seeds and cultivars to be processed for retail sale in the form of cannabinoids, personal care products, food intended for animal or human consumption, fiber, etc. The FDACS State Hemp Production Program was approved by the USDA in April 2020. DPI was identified as one of the divisions that would play a key role in overseeing the Florida Hemp Program along with the Division of Agricultural Environmental Services (AES) and Division of Food Safety.

An online platform through AgEagle Aerial Systems Inc. was developed to streamline the application process. This allowed the Division of Licensing to process the required background checks and the Permit section to review the remaining application sections. The cultivation license application review process includes verification of the designated cultivation site as meeting the appropriate zoning criteria outlined in Rule Chapter 5B-57.014 F.A.C. Permit section staff regularly field consumer calls regarding the state hemp program and tracking cultivation license harvest activity. The team communicates with not only division plant inspectors who perform the annual audits for licensed hemp operations and nurseries, but also other department agents who regulate the additional facets of the hemp industry.

FDACS-08450 – Application for Permit to Collect Non-Prohibited Aquatic Plants
Non-prohibited aquatic plants are regulated under Rule Chapter 5B-64 F.A.C. Aquatic Plant Importation, Transportation, Non-Nursery Cultivation, Possession and Collection. This Rule currently separates aquatic plants into non-prohibited and prohibited (Class I and Class II) species. The Class I prohibited aquatic plants were added to the Noxious Weed List (5B-57.007 F.A.C.) in 2020 and may be permitted collection and cultivation for certain purposes under Rule Chapter 5B-57 F.A.C. Class II species may only be grown by registered plant nurseries and sold out of state. The three species, *Hygrophila polysperma* (hygro), *Limnophila sessiliflora* (ambulia) and *Pistia stratiotes* (waterlettuce) were also added to Rule 5B-57 in 2020. However, they remain classified as "Prohibited Aquatic Plants" due to their extremely high invasiveness potential.

To obtain an FDACS-08450 permit, applicants must provide details regarding the species to be collected, quantity of plants being harvested, and a written description of the collection site. Per the standards, safeguards, and pre-determined conditions presented on page two of the application, a written plan is required ensuring the spread of prohibited/noxious aquatic plants will not occur due to the proposed harvest activities. For any non-sovereignty submerged lands, the applicant must also provide evidence of landowner permission to collect the species and amount listed on the application. For sovereignty submerged lands, a written reasonable assurance that the native aquatic population will be maintained should also be submitted with the permit request. In 2022, records management for this permit was transferred from the Bureau of Plant and Apiary Inspection to the ENPP Permit section. The review process is multi-level and resembles the FDACS-08025 permit application process.

1. Permit section receives applications and performs initial review.
2. Botany section reviews listed taxa, collection site and written plans details.
3. Plant Inspection confirms applicant's nursery status and final permit determination.
4. Permit section notifies applicant of final decision along with any additional conditions.

FDACS-08274 – Application and Permit to Plant Citrus Pathogen Infected Stock and FDACS-08084 – Application to Introduce Citrus Plants and Citrus Plant Parts
The movement of citrus plants, plant parts, and citrus-pathogen infected stock is regulated by the DPI's Bureau of Citrus Budwood Registration. FDACS-08274 and FDACS-08084 are referenced in Rule Chapter 5B-62 F.A.C Citrus Nursery Stock Certification Program along with other citrus production-related required forms. While these two permits are facilitated through another bureau, the Permit section tracks and records copies of these requests as they correspond to other federal and state permits. When an individual seeks a PPQ 526 import permit that involves regulated citrus plants, parts, or pathogens, the state has an opportunity to review a proposed draft permit and concur with modifications or deny the request. During this time, an FDACS-08084 would be deemed necessary by the division's State Plant Regulatory Official (SPRO) representative. Applicants would send their form either directly to the Permit section or to a Budwood administrator who would forward a copy to the Permit section for processing. ENPP scientists may be consulted for additional review if the proposed movement of citrus may pose other organismal risks. Once the Budwood administrator approves the request, the Permit section will route the document to thedirector's office for final approval and any other conditions that may apply.

Federal Permits Reviewed
Under the Federal Plant Protection and Honeybee Acts, the USDA has the regulatory authority to require Plant Protection and Quarantine (PPQ) permits. Each of the following PPQ permits (526, 525, 588, and 546) are reviewed by the division and records are maintained by the Permit section. When an application for a PPQ permit is received via their online electronic filing system e-File (formerly e-Permits) and the destination of regulated articles occurs in Florida, the USDA Permit unit notifies the DPI. Upon notification from the USDA, the division has time to review the submitted application, draft permit, and related files and provide a response to the USDA Permit unit. The Permit section facilitates the SPRO review process.

PPQ 526
This permit targets activities related to importation, interstate movement, possession and environmental release of any plant pests, biological control organisms, federal noxious weeds, parasitic plants and soil (with intent to isolate/culture organisms of

concern potentially harbored in the material). The internal review process triggered by the Permit section is akin to the workflow for the FDACS-08208 permit. DPI has 14 days from the date a notification is received by the e-File system to provide a response to the USDA for this permit type.

1. Permit section notified by USDA Permit unit, intakes copy of permit application/files and performs initial review.
2. Permit items routed to respective taxonomic specialist for review and a memo.
3. Memos reviewed by the director's office and SPRO comments are added to e-File system on behalf of the state.
4. The USDA Permit unit will issue a formal response to the applicant and the Permit section will be notified of the final approved/denied permit.

When the movement or proposed activity involving regulated articles warrants the need to use a USDA-approved containment facility, a new containment facility inspection will be arranged by USDA containment officers. Permit section scientists are invited to attend these joint site inspections. Periodic compliance inspections at containment facilities are also scheduled by USDA containment officers and may be attended jointly. However, DPI also maintains regulatory authority to perform follow-up inspections at any point during the lifetime of approved permits, which is typically three years.

PPQ 525
Importation of soil from foreign sources and interstate movement of soil can only be done with authorization from APHIS via a PPQ 525 application for permit to receive soil. Permits are often obtained for physical and chemical analyses or remediation. No biological assays or extracts can be performed under a PPQ 525 permit. The review/inspection process is the same as the PPQ 526 workflow. An additional requirement for domestic soil movement within the continental US is a compliance agreement that must be signed by PPQ, FDACS and the permit holder.

PPQ 588
A Controlled Import Permit (CIP) may be obtained by submitting a PPQ 588 application. Certain species of plants may be listed as prohibited/restricted by the USDA. The review/inspection process is the same as the PPQ 526 workflow. CIPs for plants and plant products are usually issued for less than two years and intended for the following purposes as described by the USDA:

- **Experimental:** Scientific testing to collect data and perform analytical processes under controlled conditions.
- **Therapeutic:** Specific scientific processes designed to eliminate, isolate, or remove potential plant pests or diseases.
- **Developmental:** Evaluate, monitor, or verify plant material for plant health risks and/or the adaptability of plant material for certain uses or environments.

PPQ 546
High risk plants that are imported from foreign sources and intended for propagation may be subject to certain post entry quarantine requirements. These import procedures and restrictions are listed by plant part and origin in the USDA APHIS Plants for Planting Manual. Unlike the other PPQ permits, this form does not require any containment facility inspection from Permit ection scientists. However, the local district plant inspector will be responsible for certifying planting stock is free of pests and diseases. The Permit section will receive notice of a new PPQ 546 application via the e-File system and trigger the following the review process:

1. Permit section intakes application and notifies Permit review team import specialist.
2. Import specialist assigns district plant inspector (DPS) for verification of proposed planting site.
3. After initial site inspection DPS will notify import specialist of any recommendations to provide in response to applicant's request for permit.
4. Import specialist notifies Permit section of recommendation/ modifications.
5. Permit section includes applicable comments and sends response to USDA in e-File.
6. DPS performs follow-up inspection(s) upon receipt of plant shipment at site up until the end of the quarantine period to allow for safe release of healthy stock.

BRS Permits
Biotechnology Regulatory Services (BRS) is a separate branch of USDA-APHIS that regulates genetically engineered organisms that may pose a risk to plant health. In function, BRS permits are comparable to PPQ permits that regulate the importation, interstate movement and environmental release of select organisms. Applicants must specify the nature of the genetic modifications and provide adequate assurance that work with the listed organism(s) will not jeopardize local agriculture or the environment. Like the PPQ workflows described above, the e-File system will notify division SPROs within the director's office and Permit section. BRS applications often contain confidential business information (CBI) and have several redacted components that are inaccessible to Permit section staff. The reviewing SPRO must reach out to the applicant to clarify any specific details needed to draft an official memo and response to the USDA.

Outreach
To increase awareness and encourage compliance with state regulations and permit requirements, the Permit section has sought opportunities to engage with various stakeholders. These events may be attended by other division staff. Key events attended and publications created by members of the Permit section are highlighted below.

February 27, 2021: UF DPM Virtual Plant Health Professionals Meeting
Co-Facilitator: Nicole Casuso D.P.M. | Guest Speaker: Trevor Smith Ph.D.

March 31, 2021: Entomological Society of America Southeastern Branch Virtual Meeting, *Non-Traditional Degrees and Entomology: The Value of Interdisciplinary Plant Health Training Symposium* – "Plant Doctors in State Regulatory Roles"
Presenter: Nicole Casuso D.P.M.

June 16, 2021: FDACS AgScience Café – "Understanding permits for organisms regulated by DPI"
Presenters: Nicole Casuso D.P.M., James Hayden Ph.D.

August 27, 2021: FL State Science and Engineering Fair Educators Meeting – "Understanding permits for organisms regulated by DPI"
Presenter: Nicole Casuso D.P.M. | Contributors: Taylor Smith, James Hayden Ph.D.

February 18, 2022: UF DPM Plant Health Symposium
Co-Facilitator: Nicole Casuso D.P.M. | Guest Speaker: Callie Walker

February 19, 2022: UF DPM February Flora & Fauna Festival
Participants: Nicole Casuso D.P.M., James Durrell, Taylor Smith, James Snyder, Melanie Fryman

June 20, 2022: Florida Entomological Society Regulatory Symposium, *Detection, Mitigation, Compliance: The Regulatory Perspective of Pest Management* – "The Regulatory Authority and Responsibilities of The Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Permit Section
Presenter: Nicole Casuso D.P.M. | Moderators: Eric Rohrig Ph.D., Kate Fairbanks

Milestones & Achievements

The director's office and administrators from each bureau gathered on September 14 and again on December 14, 2021, to discuss all existing permits and review processes managed throughout the division. During these meetings the terms "permit," "special permit," and "master permit" were discussed at length. The following criteria were identified as a means of distinguishing "permit" from the other terms:

- Formal application via paper or electronic document
- Multi-level internal review process by authorized representatives of the division
- Issued to a singular responsible person (may have other collaborators, partners, etc. listed on the application) at approved location(s)
- Has an effective and valid until date*

*if no expiration date, threshold must be established to verify active use/need for permit

To standardize the approach to how documents that satisfy these criteria are reviewed and managed, the Permit section was selected to be the hub for intaking permit applications. Any items that did not meet the afore-mentioned criteria were to remain with their respective bureau/section. In lieu of developing a brand-new internal database tool, Smartsheet was identified by the division's training office as a potential platform for managing permit records. After extensive exploration of the software's features and functions, the Permit section adopted the program as a pivotal resource for tracking various permit types and improving the review processes through automated workflows. While copies of all permit-related documents are still maintained on the division's shared network drives, Smartsheet's mobile-friendly application allowed for quick remote/field access to pertinent permit information. FDACS acquired Enterprise licenses for Smartsheet to be deployed as a resource amongst other divisions too. As the demand for efficiency continues to evolve and the Permit section's reach amongst external stakeholders expands, alternative data management systems or add-on enhancements to the existing system may be needed in the future.

Bureau of Pest Eradication and Control

The Bureau of Pest Eradication and Control (PE&C) assists in detecting, controlling and eradicating harmful plant pests and diseases. The bureau is responsible for the division's special projects and emergency programs. With offices statewide, it is headquartered in Winter Haven, along with field stations in Avon Park, Immokalee, Quincy and Vero Beach. Upon detection and verification of a new invasive pest or disease, the necessary equipment, supplies, and staff are mobilized to carry out programs to mitigate damages and control the spread of disease and pests. The programs may be focused on controlling a pest or outright eradication.

The bureau has 98 positions, the largest percentage being commercial grove surveyors and regulatory inspectors. Other bureau staff include administration, data entry, and vehicle and equipment maintenance.

- Callie Walker, Bureau Chief of Pest Eradication and Control
- Rusty Noah, Assistant Bureau Chief
- Jason Johnson, Assistant Bureau Chief
- Douglas Batson, Jr., Statewide Regulatory Director

IMPLEMENTATION OF ESRI CITRUS INFORMATION DATABASE (CID)

DPI contracted with the Environmental Systems Research Institute (ESRI) to migrate historical data from the Pest Incident and Control System (PICS) database (which primarily tracked citrus canker) to a newly created database with a Geographic Information Systems (GIS) based interface for data collection, maintenance and reporting. Data migration from PICS to the new Citrus Information Database (CID) was completed in May and June 2020. As of July 1, 2020, CID was used for multi-pest and regulatory surveys and inspections. The database allows inspectors to track groves including modifications, archiving and documenting new multi-blocks and regulated entities across the state. The system is also used for creating compliance agreements and permits. The new system allows for mobile deployment and supports a more comprehensive range of disease survey activities and tracking additional field observations required to support the industry. In addition, ESRI has adapted the system for use on emergency programs, such as the Giant African Land Snail Eradication Program. ESRI's flexibility to quickly make program specific survey changes, create dashboards showing the work being accomplished during an emergency program, and accessibility that allows for inspectors and leadership alike to access information is a great benefit to the division.

During this reporting time, DPI created or updated permit applications, surveys, and regulatory dashboards for fruit movement between Florida, Georgia and the European Union. Surveys and applications supporting the Citrus Research and Field Trials (CRAFT) program were also created and maintained. PE&C uses ESRI's ArcGIS Survey 123 Collector, Field Maps, and Workforce mobile apps to schedule and complete survey and regulatory work. CHRP offices can access data via desktop web-based applications like the CHRP Survey and Regulatory Dashboards, Editor and Query apps, and Compliance Agreement app, and can create documents for compliance agreements and permits facilitated by an autocomplete feature.

CITRUS HEALTH RESPONSE PROGRAM

The largest initiative of the bureau is the Citrus Health Response Program (CHRP), a cooperative effort between industry, USDA and FDACS. CHRP was implemented to assist growers with managing citrus pests and diseases to protect Florida's iconic citrus industry. CHRP's comprehensive program includes the following:

- Statewide multi-pest surveys of all commercial production areas.
- Regulatory inspection and oversight with detailed data recording and mapping of all activities available for producers and trade partners.
- Increasing public awareness of the issues facing citrus and supporting the citrus industry.
- Enforcing decontamination and quarantine protocols outlined in compliance agreements to ensure compliance to limit the spread of pests and disease.

Florida is at high risk for the introduction and establishment of invasive pests and diseases due to its international seaports, cargo, and container ports, visitors to the state from around the world, and the state's subtropical climate conditions. CHRP aims to protect the citrus industry, a vital contributor to the state's economy, exceeding six billion dollars in 2020-21.

North Florida Citrus

In October 2020, DPI Director Dr. Trevor Smith and Assistant Director Dr. Greg Hodges, along with PE&C Bureau Chief Callie Walker, met with Mike Evans, Georgia's State Plant Regulatory Official, and Dr. Smith's counterpart, to discuss the creation of a Memorandum of Understanding (MOU) between the two states to facilitate the shipment of fresh fruit from Florida to Georgia packinghouses, enabling North Florida growers to transport their

Satsuma harvest for packing and shipping. DPI worked with North Florida growers and cooperatively with the USDA for two years, assisting them in getting their fruit to market. The MOU sets the conditions to ensure the fruit is disease-free from harvest through transport and ultimate distribution. PE&C has a CHRP office in Quincy, Florida, that provides support, including survey, sampling and testing, to help growers manage existing grove properties and encourage growers in their efforts to expand citrus in the panhandle. In 2020, there were over 700 planted acres in the panhandle area. In the spring of 2021, Callie Walker and the Quincy CHRP office supervisor traveled to Alabama, Georgia and parts of North Florida to meet with growers and discuss requirements and regulations for shipping fresh fruit into Florida for packing and shipping under a new federal order.

Pests and Diseases
Two of the most challenging and devastating diseases threatening the citrus industry are citrus greening (also known as Huanglongbing or HLB) and citrus black spot (CBS).

Citrus Greening is a very challenging and devastating bacterial disease initially discovered in the US in August 2005 in Miami-Dade County. HLB is a significant focus of the Citrus Health Response Program. Endemic to Florida, the state is entirely quarantined for it. The disease has not been cured, although researchers continue to search for permanent solutions and develop methods and management recommendations for growers.

Greening management/regulation includes:

- **Compliance Agreements**. Registering all citrus growers and conducting CHRP surveys of groves looking for the disease and recording it in CID. The database records detail the specific properties, location of detection or infection, the extent of infection, and any other observations recorded by inspectors.
- **Tamarixia release** (at the grower's request). This is a release of the biological control agent *Tamarixia radiata* (mass-reared by DPI) to reduce the populations of the Asian citrus psyllid. During this reporting period, CHRP offices released 531,272 *T. radiata*.

Asian Citrus Psyllid (vector for citrus greening). Surveys are conducted periodically to count psyllids for grove owners to assist them in grove management and help control the spread of the disease.

Citrus Black Spot (CBS) was first detected in the Immokalee area in March 2010. CBS is a fungal disease that blemishes fruit, causes early fruit drop that lowers yield, and results in unmarketable fruit for fresh fruit distribution. Surveys for CBS are a part of the Multi-pest Survey Program that records all data of finds and observations in CID. Quarantines are established for CBS in the following six CBS-positive counties: Collier, Polk, Hendry, Charlotte, Glades, and Lee. The movement of fruit and plant material is regulated and monitored by CHRP inspectors from harvest to transport and at the processing plants and approved dumpsite facilities to dispose of citrus debris and waste properly.

The CBS Technical Working Group, a membership of officials and representatives of FDACS-DPI, USDA-APHIS-PPQ, UF-IFAS, and industry, meets annually to review and discuss the status of citrus black spot in the state. Included in ongoing discussions has been the current USDA-APHIS policy on CBS quarantine and the development of an exit plan that would reduce the size of the quarantine to provide some economic relief to growers and other industry participants while maintaining the proper safeguards to reduce the spread.

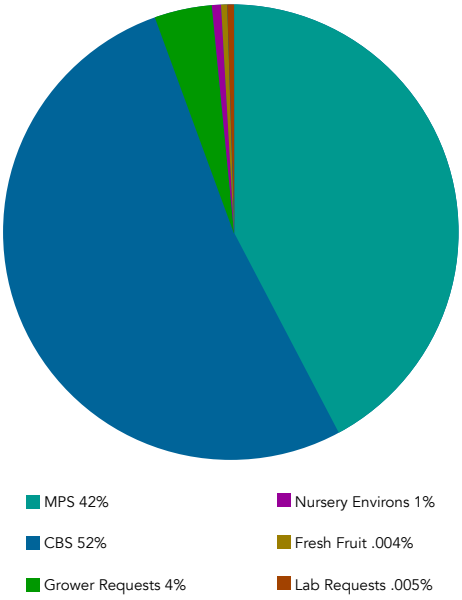
Citrus Research and Field Trials (CRAFT)
PE&C played a major role in the CRAFT program; inspectors scouted and mapped the selected sites and provided sampling and psyllid counts once the areas were planted and underway. Inspectors also trained the Division of Fruit and Vegetables staff to collect and submit samples. CRAFT was funded by the Huanglongbing Multiagency Coordination (HLB MAC) group. HLB-MAC includes representatives of USDA-APHIS, USDA's Agricultural Research Service (ARS), National Institute of Food and Agriculture (NIFA), US Environmental Protection Agency (EPA), state departments of agriculture, and citrus organizations. Based on CRAFT's success here, California and Texas created CRAFT programs in their states.

Commercial Survey
In a cooperative effort with the USDA, PE&C participates in a multi-pest commercial survey program statewide for the detection and monitoring of citrus greening, Asian citrus psyllids (vector of citrus greening), CBS, citrus canker, citrus variegated chlorosis (CVC), citrus leprosis (CL) and citrus yellow vein clearing virus (CYVCV) with the objective of early detection and to assist in the mitigation of the impact of infection and limit the spread.

During this reporting period, from July 1, 2020, through June 30, 2022, PE&C performed 18,107 citrus surveys on 421,928 acres as follows:

TYPE OF SURVEY	# OF SURVEYS COMPLETED (# OF PERMITS)	ACREAGE SURVEYED
Multiple Pest	9,215	176,355
Citrus Black Spot • Detect and collect samples for testing (DPI) • Report findings to grove owners. • Positive finds require quarantine and close monitoring by inspectors for harvest & movement of fruit • Includes general area surveys, quarantine & corridor area surveys	7,575	220,455
Fresh Fruit (preharvest) • Required by foreign trade partners for fresh fruit shipment to the European Union moving from CBS-quarantined areas moving interstate under a Memorandum of Understanding with adjoining states	• 79 – state total • Immokalee CHRP office - 37 (for EU) • Quincy CHRP office: 19 • Quincy issued 19 interstate permits for shipping to Georgia packinghouses	1,638 – State total Immokalee CHRP office: 1,236 Quincy CHRP office: 156.93
Nursery Environs • Annual inspections of commercial properties within ½ mile of commercial citrus nurseries	319	2,679
Grower Request • Pre-harvest inspection for groves with fresh fruit destined for the EU	211	5,274
Additional Surveys – Regulatory surveys for Abandoned Grove Initiative and confirm CID totals are accurate (see explanations of surveys below)		
Site Verification	11,050	292,697
Pre and Post Destruction	661 pre-destruction 451 post destruction	10,263 (pre) 5,506 (post)
Abandoned Grove	73	1.186
European Union Quality Assurance (St. Lucie, Indian River, and Charlotte counties)	751	27 blocks inspected (10% of acreage harvested for export to EU)
• New Plantings • Multiblocks created for newly planted • Pushed Acres • For various reasons, including disease pressure and economic conditions	New plantings: 939 sites	New plantings: 17,985 Pushed acres: 63,283

Surveyed Commercial Acres 2020-2022: Total 421,927



ADDITIONAL SURVEY INFORMATION

Abandoned Grove Initiative, begun in March 2009, offers growers the option to remove abandoned groves that can harbor Asian citrus psyllid (citrus greening vector) and other citrus diseases. By removing their abandoned grove trees, growers can receive an Abandoned Grove Compliance Agreement, which can be presented to local property appraisers' office for reduced property tax assessments. As of the end of this reporting period and since the program's inception, 1,523 compliance agreements were issued on properties representing 50,274 acres. Abandoned Grove surveys are completed on cleared properties, and Abandoned Grove Compliance Agreements (AGCAs) are issued. They are inspected annually to meet the requirements of the agreement, i.e., maintained and kept free of sprouts.

Site Verification Surveys are inspections of commercial properties to determine if they remain planted in citrus or have been abandoned or developed. The information is recorded in CID to keep multiblock status accurate and current.

Pre and Post Destruction Surveys are required when growers participate in the Abandoned Grove Initiative to verify the grove trees prior to removal and again after removal to issue a compliance agreement they can use to seek a tax assessment reduction through the local property appraisers' offices.

European Union Quality Assurance Surveys are performed to meet regulatory requirements. Growers were contacted and visited personally to discuss management practices, including windbreaks, tree removal and pruning, fungicidal sprays, spray scheduling, decontamination, etc.

PE&C SPECIAL PROJECTS/PROGRAMS

Citrus Leprosis, Immokalee

Immokalee inspectors discovered trees expressing citrus leprosis-like symptoms in May of 2021. The survey application in CID was modified to create a dashboard that allowed those working on the program to track real-time survey and sample collection and see determinations made by the diagnostics lab. Delimiting surveys, which included commercial, transect points, and residential trees, began immediately; the one- and five-mile arcs were completed in July 2021. A total of 484 grove surveys were performed, accounting for 23,150 commercial acres and 72 transect surveys completed. Four samples were diagnosed as leprosis-like, and the mite vector (*Brevipalpus* spp.) identified in 11 blocks. One year later, another complete survey was done, but there was no sign of the disease.

Oriental Fruit Fly, Clearwater

In May 2022, a *Bactrocera dorsalis* fruit fly was detected in Pinellas County. Subsequently, additional flies were caught in a delimiting survey that eventually triggered the establishment of a special program for eradication in an area encompassing 113 square miles. PE&C employees were involved in staging and transporting equipment and chemicals to the site for treatment and participated in the control effort .

Bureau of Methods Development and Biological Control

The mission of the bureau of Methods Development and Biological Control is to develop, investigate and implement new ideas, techniques and methods for the prevention, detection, survey, control and eradication of plant pests and diseases threatening Florida's plant and agricultural industries.

METHODS DEVELOPMENT

3D Printing Laboratory

Psyllid traps

Beginning in 2020, the 3D print lab collaborated with the Cooperative Agricultural Pest Survey (CAPS) Program to monitor for the tomato psyllid, *Bactericera cockerelli*, as part of their Old-World Tomato Commodity grant. An Asian citrus psyllid (ACP) trap was modified to have larger holes to accommodate the larger tomato psyllid. We provided CAPS with 85 traps, which CAPS deployed and serviced. Zero potato psyllids have been intercepted, but trapping has resulted in 48 county records, two Florida state records (*Entomobrya unifasciata* and *Phorodon cannabis*), and one hemispheric record (*Trichosiphonaphis polygonifoliae*).
Psyllid traps were also made for other projects. ACP traps were used to monitor for populations of parasitic wasps as part of DPI's diagnostics research. In 2021 and 2022, ACP traps were sent to monitor for ACP in DPI's Citrus Budwood programs. ACP traps were also sent to Dr. Moshe Bar-Joseph as part of his research to develop techniques for reducing HLB damage to young citrus groves in Florida. 450 ACP traps were delivered to Dr. Subhas Hajeri in 2021 to develop ACP monitoring protocols for California citrus. Finally, in April 2021, we sent traps to Dr. Stijn van Laer to monitor for the pear psyllid in Belgium.

Collaboration with Dr. Tolulope Morawo

In January 2021, a four-way olfactometer arena was made for Dr. Tolulope Morawo with the Invasive Arthropod Biological Control Program at the UF/IFAS Indian River Research & Education Center. The olfactometer was to be used in Dr. Morawo's research to test how Asian citrus psyllid biological control agents find their host amidst background plant volatiles. A plastic arena was customized to fit olfactometer parts in Dr. Morawo's lab.

Brown marmorated stink bug trap

The BMSB program is a joint effort between FDACS-DPI and the Biosecurity Research and Extension Lab at the University of Florida (Director, Dr. Amanda Hodges). The brown marmorated stink bug (BMSB), *Halyomorpha halys,* is a polyphagous pest that feeds on a variety of crops such as fruits, nuts, vegetables and row crops causing significant economic damage. BMSB is native to eastern Asia, but now threatens agricultural commodities across North America and the world. Response efforts are costly and include broad-spectrum insecticides, public awareness, detector dogs, biological control, and mass trapping. The use of insecticidal sprays is costly and can have unintended consequences such as secondary pest outbreaks. Biological control agent candidates include two egg parasitoid species: *Trissolcus mitsukurii* (Ashmead) (Hymenoptera: Scelionidae) and *Trissolcus japonicus* (Ashmead), which has been reported in North America. UF is studying parasitoids and using frozen BMSB eggs (sentinels) to collect *T. japonicus* or any other effective egg parasitoids that may already be present in Florida. Pyramid traps, yellow sticky cards and pheromone lures have been used for monitoring populations. Live capture traps would allow for retaining beneficial insects, especially in organic farms.

A BMSB nymphal trap was developed in March 2021 by DPI to monitor nymphal populations to determine if BMSB is reproducing in FL. The trap is a modified version of the pyramid trap already in use for capturing BMSB. The pyramid portion of each trap was made of two triangular pieces cut from medium density fiberboard (MDF) with a line cut along the centerline so that the pieces fit together perpendicular. These vanes were painted with bright yellow latex paint. A large plastic jar was affixed upside down on top of the pyramid using a custom 3D printed retrofitting. This part incorporated an inverted funnel that allows specimens entry into the plastic jar. The funnel piece simply screwed into the existing portion of the jar where the lid would be. Four equidistant nodules were incorporated on the inside surface of the funnel that grip on to the vanes when installed. The funnel was printed using yellow Polymaker polylactic acid (PLA) filament. UF has done some preliminary ,testing but have not caught nymphs in the field. The trap is undergoing further testing in laboratory trials.

Soybean gall midge trap

In May 2021, two soybean gall midge (*Resseliella maxima*) traps were designed and 3D printed for Dr. Justin McMechan of Nebraska University. Previous descriptions only identified to genus; in 2018, they were described as a new species. This gall midge has been found infesting soybean fields in Nebraska, Iowa, Minnesota, Missouri, and South Dakota. Further research is required to assess its persistence and spread moving forward. Currently, there are few published research-based management recommendations. The first trap component was an upgrade for their adult emergence

traps, which previously used a paper funnel inserted into a glass jar. These funnels easily deteriorate or fall off when servicing, allowing specimens to escape. Our design featured a one-piece, rigid funnel assembly that screwed directly into the jars and traps already in use. The second trap was a novel design, allowing for the capture of larvae exiting individual galls, as they move towards the soil to pupate and overwinter. It is comprised of two halves that are sandwiched around the gall and secured in place. The stem of the plant passes through small openings at the top and bottom, which are further sealed by a soft foam material. Both halves feature integrated neodymium magnets that help to hold both halves tightly around the stem and make deployment easy. The bottom portion of both halves incorporate a small 'cup' structure meant to catch, secure the falling larvae, and keep them from falling out when collecting. Additionally, two screen-covered viewing ports are on both sides allowing researchers to check traps for larvae without requiring disassembly.

Methods Fruit Fly

Evaluation of trimedlure (TML) solid dispenser (4-g) for trapping Mediterranean fruit fly (Ceratitis capitata) using comparative laboratory and field data.

A field study to evaluate longevity and performance of TML plugs (Scentry Biologicals, Inc., Billings, Montana, USA) was undertaken from July to October 2020 at a local area citrus grove, Parrish, FL. Lures aged for 1, 2, 4, 6, 8, 10 and 12 weeks outdoors at the Sterile Insect Release Facility (SIRF), Sarasota, were compared to fresh plugs and liquid TML (cotton wicks) based on sterile medfly capture after 24 hours in Jackson traps.

Trap capture among the three trimedlure treatments was unexpectedly low at one week. There was no significant difference in trap capture among the same treatments through eight weeks, except at six weeks when the fresh trimedlure liquid caught significantly more males. Also, trap capture from the weathered plug was significantly less compared to the fresh treatments at 10 weeks and only slightly less than the fresh treatments at 12 weeks. Trap capture of males varied greatly among the different trapping intervals and was most likely due to wide variations in environmental conditions (Jul-Oct) and fitness of the released flies.

Field-tested plugs from the fresh and aged trimedlure treatments were individually wrapped in aluminum foil, grouped according to treatment, sampling date and kept in a freezer. These plugs were later shipped for laboratory testing at the USDA APHIS PPQ S&T laboratory, Miami. Lab bioassay results showed that residual content declined sharply (0-6 weeks) and was 1.46 g at six weeks. Thereafter, residual content declined gradually and from 8 to 12 weeks was ≤1.35 g per plug.

Earlier research found that plugs loaded with 4-g of trimedlure may allow for longer attractancy, which translates into longer servicing intervals beyond the standard six weeks, and reduced costs in materials and labor. Performance of the 4-g plug under Florida conditions with sterile medflies was inconsistent. However, our preliminary results neither validate nor contradict more recent findings on the performance of these plugs, which did not support the premise that 4-g trimedlure plug incorporation into medfly detection programs would allow for effective trapping over longer inter-servicing intervals.

Determine the efficacy of a bait station (Wax-BS) under Florida conditions, for use against Tephritid fruit flies during emergency eradication programs.

During our Fruit Fly Methods working group meeting in July 2020, it was agreed that in its current presentation, the Wax-BS bait station is a more desirable option than the GF-120 bait station for use during emergency programs because of its enhanced attractancy, extended field life, and greater adaptability to multiple fruit fly species based on the type of lure used. Therefore, the decision was made to forego further testing of the GF-120 bait station, and instead focus exclusively on efficacy testing of the Wax-BS model for the 2020-2021 reporting period.

Phase 1 involved field cage testing of the Wax-BS at a residential site, Myakka, FL. Screen mesh field cages (2.90 m diameter x 2.0 m high) with exterior PVC frames were used. Each cage supported a single fruit or ornamental potted plant (~1.5 m), centrally placed. The target Medfly lure was the three-component (3C) cone attached with string inside the bait station box. Treatments were fresh Wax-BS + 3C cone, 4-wk old Wax-BS + 3C cone, 8-wk old Wax-BS + 3C cone and control (no Wax-BS, no 3C cone), replicated two times in 2 x 4 field cage grid. Sterile male medflies (200/cage) were released and provisioned with water and sugar agar blocks. Dead flies were aspirated at 48, 72 and 96 hr. and counted. Bait stations were removed at 72 hr. and a single TML baited trap was hung in each cage to catch surviving medflies, retrieved 24 hr. after and counted.

From October 5-9, cumulative medfly mortality was ~99% for fresh, 4-wk and 8-wk old Wax-BS. From October 19-23, mortality was 93-96% for fresh, 4-wk and 8-wk old Wax-BS. No difference in percent mortality was observed for 4-wk and 8-wk old Wax-BS compared to fresh ones for both field cage trial dates. Survival rate was <10% for fresh, 4-wk and 8-wk old Wax-BS based on TML trap counts.

Evaluation of TMR lure for trapping Mediterranean fruit fly *(Ceratitis capitata)*, melon fly *(Bactrocera cucurbitae)*, and Oriental fruit fly *(Bactrocera dorsalis)* species.

Three locations (Parrish, Immokalee and Miami) in major fruit production areas of Florida, each with its own unique climatic conditions, were used for the 'winter' and 'summer' weathering phases during 2018. The field testing was undertaken in Kaua'i (Hawaii) because the target fruit fly species attracted to this multi-lure are not established in Florida. TMR (TML, RK and ME) lures for both weathering periods were evaluated in Jackson traps in a coffee plantation at different times in 2018. Fruit fly capture data were presented in previously submitted reports. No statistically significant location differences were observed, and traps continued to catch fruit flies up to 12 weeks for 'winter' and 8 weeks for 'summer' lures.

Results of the winter chemical analysis showed that individual lure components weathered differently over the 12-week period due to their unique chemistries and volatility rates. The summer chemical analysis showed a similar weathering trend over the 8-week period. Individual trend lines showed a similar pattern of decline for the exact lure component when the winter and summer periods were compared. The estimated lure half-life for TML and ME, respectively, was less than or half the original loading dose for both weathering periods compared to RK's low volatility rate.

The trapping and chemical data suggest that the TMR lure has an extended field life greater than six weeks. However, a complete final analysis of results and recommendations gathered from this multi-year study is still not available because the Hawaiian collaborator who assumed lead investigator responsibilities for the study is no longer employed by USDA ARS-Hawaii and a final report to DPI is pending.

Field evaluation of nomedlure dispenser for trapping Mediterranean fruit fly.
A single shipment (100 units) of nomedlure solid dispensers was received in September 2020. Comparative field testing of nomedlure versus trimedlure commenced in May 2021. For phase 1, 45,000 sterile medflies were ground-released from field cages hung in the center of a citrus grove with flagged tree positions. One day later, after the flies had passively dispersed, 24 Jackson traps (12 traps baited with each dispenser type, 4-g nomedlure vs. 4-g TML) were hung from the flagged trees. Six row blocks (replicates), each with 4 Jackson traps were alternated at 25 m between traps and 25 m between tree rows. Sticky inserts were collected and counted after two days. Lures were not replaced for the duration of the experiment but were kept outdoors in a shaded area at the sterile insect release facility in Sarasota, FL prior to the next fly release/sampling interval. There were four release/sampling intervals. In general, TML traps caught more sterile medflies than NML traps across all sampling dates.

Phase 2 involving the trial incorporation of nomedlure traps within APHIS' Preventative Release Program (PRP) area was not implemented before the end of the reporting period. Various logistical issues, COVID-19 restrictions from 2020-21, and scheduling conflicts with the Tampa/Hillsborough office impeded the implementation of this experiment. However, plans are underway to deploy single nomedlure traps in 15 PRP grid sections for two consecutive baiting cycles in 2022. Mean capture rates will be compared to the standard TML trap using aerially released medflies.

Miscellaneous internal collaborations
Many solutions were made for internal programs, such as vertical water holders to maximize cage space during thrips rearing as the biological control agent for Brazilian pepper. Other collaborations involved customized outreach items, such as air potato beetle garden stakes and insect bookmarks for 2021 State Fair.

Technique Development Laboratory

Black bean bug, *Brachyplatys subaeneus* 2021
The black bean bug, *Brachyplatys subaeneus* (Westwood), is a Plataspid legume pest native to Indomalaya (India, China) that was first reported in the U.S. in Miami Beach, Florida in September 2020. Bugs were brought to DPI's Invertebrate Research and Containment Laboratory (IRCL) in April 2021 to assess pest potential in Florida. Results from biological studies to determine lifecycle timing and reproduction rates may be used later if a management strategy is needed in the future.

Preliminary 2021 host plant studies showed cuttings of two crop plants, pigeon pea and snap pea (pods), one native legume, partridge pea, and one invasive legume, kudzu; each maintained adult black bean bugs and resulted in equal outcomes of adult survival. Diets of kudzu (100%), pigeon pea (90%) and mungo black bean cuttings (80%) showed similarly high nymphal survival and maturity rates. Preliminary colony rearing data during 2021 showed that the average eggs laid per mass was 15 eggs, the average time to hatch was 10d, and the average hatch rate was 48%. It took an average of 63 days for nymphs to molt into adults and 33 days after maturity to lay eggs. Egg laying rates averaged 1.2 egg masses laid per month per adult. Finally, one extraordinary female worth noting lived for 161 days after reaching maturity and was still laying egg masses up until 131 days as an adult.

Mollusk Research

***Bulimulus bonariensis* 2021**
Bulimulus bonariensis is a snail in the family Bulimulidae native to the West Indies. It is mainly a detritivore, but will eat fresh plant material, at least in the laboratory. They have been reported on peanuts, cotton, soybeans and citrus groves, but no plant damage has been seen. Peanut sorting is affected due to peanut and snail shells being the same size and shape. They also tend to aggregate on tractors and other work equipment, possibly causing spread between fields and have clogged irrigation pipes. Research continues to explore the biology of this species in hopes to determine possible control measures.

In the laboratory, mortality is high (27%) after hatch and until snails reach about 10mm. They reach maturity at about six months and when they are about 15-20mm in height. They are best reared on peanut detritus and carrot and did not grow well or lay many eggs when reared on either diet alone. Field snails larger than **20mm** reared individually and in pairs laid similar clutch sizes (122 eggs) and hatch rates (74%). These snails laid an average of two clutches per snail in eight months, or 24 viable eggs per snail per month. Snails experienced **death instantaneously** when the freezer temperature reached **-7.4 C** on average. Several traps were tested against a commercially available snail and slug trap(the Snailer) without success.

Biological Control

Brazilian Peppertree

Brazilian peppertree (BP), *Schinus terebinthifolia* Raddi (Anacardiaceae), is one of the worst invasive plants worldwide. Native to Argentina, Brazil, Paraguay and Uruguay, Brazilian peppertree is invasive in the US and is distributed in Florida, Texas, California, Hawaii, Puerto Rico and Virgin Islands. After its introduction to Florida in the 1840's, it has become one of the most aggressive and widespread invasive plants in the state covering over 280,000 hectares. Brazilian peppertree is listed as a noxious weed by the Florida Department of Agriculture and Consumer Services and a category I invasive plant– "species that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives" by the Florida Invasive Species Council. Brazilian peppertree spreads rapidly, tolerates a wide range of environmental conditions and is a prolific seed producer. Seeds have a high germination rate and are fed and dispersed by birds and mammals. Brazilian peppertree also produces allelopathic compounds that can suppress the growth of surrounding vegetation. These characteristics favor BP to outcompete native plants and form monocultural stands. It is a major threat to natural and disturbed areas as well as agricultural and pastural lands.

The conventional methods to control the BP such as chemical and mechanical are expensive, labor intensive, non-selective, and in most cases, control is temporary. Moreover, access is difficult in many remote areas infested with BP. Classical biological control provides a low cost, selective and self-sustaining means to reduce BP pressure throughout Florida and other infested regions of the US.

The Brazilian peppertree biological control program involves mass rearing and release of the insect agent *Pseudophilothrips ichini* (Hood) (Thysanoptera: Phlaeothripidae), the Brazillian peppertree feeding thrips, throughout Florida. Field release of this agent was recommended by the Technical Advisory Group for the Biological Control of Weeds (TAG) in August 2016 and approved by USDA-APHIS in May 2019. *Pseudophilothrips ichini* is native to Brazil and is highly specific to Brazilian peppertree. Both adults and larvae of *P. ichini* gregariously feed on flushed leaves and stems of Brazilian peppertree, causing death of the apical meristem. The thrips also feed on reproductive tissue when few flushing tips are available, thereby impacting Brazilian peppertree reproduction. A second insect agent, *Calophya latiforceps* (Burckhardt) (Hemiptera: Calophyidae), the yellow Brazilian pepper tree leaf-galler, was approved for release by USDA-APHIS in May 2019, but its mass rearing has not been achieved yet due to difficulty in colony establishment. The colony under quarantine in the UF-BCRCL collapsed, and new field collections will be required to re-establish the colony. This agent will also be imported into FDACS, DPI Biological Control Rearing Facility in Gainesville, FL for mass rearing when available.

Mass rearing of *P. ichini* and release throughout Florida is being conducted jointly by the Florida Department of Agriculture and Consumer Services–Division of Plant Industry (FDACS DPI), U.S. Department of Agriculture/Agricultural Research Service–Invasive Plant Research Laboratory (USDA ARS–IPRL), and the University of Florida–Biological Control Research and Containment Lab (BCRCL). The Division of Plant Industry–Biological Control Rearing Facility produced approximately 1.1 million *P. ichini* thrips during this reporting period with 395,235 thrips produced in the FY2020-2021, and 700,175 thrips in the FY2021-2022 with expanded and improved rearing operations. Of the total thrips produced, 445, 900 thrips were sent to the collaborators at the USDA ARS- IPRL for release, and 276,475 thrips were released by DPI at the Brazilian pepper infested sites during the reporting period. Limited releases by DPI were made mostly to state and federal parks during this reporting period.

The initial results suggest that the thrips have persisted variably on the released sites. Reduced flower production on BP caused by the thrips has also been observed on the release sites. The establishment of *P. ichini* thrips populations supplemented by the release and establishment of another biocontrol agent, *Calophya latiforceps* is expected to minimize the spread of BP by reducing its reproductive ability and through seedling herbivory thereby giving the native vegetation opportunities to outcompete the BP. Future program activities in addition to mass rearing and release of the biological control agents include examination of the factors affecting establishment and evaluation of impact on BP populations.

Asian citrus psyllid (ACP)

The programs' objective is to mass rear and release ACP (*Diaphorina citri*) two parasitoids, *Tamarixia radiata* (5 biotypes from Taiwan, China, Pakistan, Vietnam and Texas (biotype brought from Texas mass rearing laboratory), and *Diaphorencyrtus aligarhensis* from Taiwan and Pakistan, both imported into Florida for controlling Asian Citrus Psyllid. The Biological Control Laboratory II linked to the Bureau of Methods and Development in Gainesville Florida, for the past two decades, has been rearing two species of parasitoid, *Tamarixia radiata* (5 biotypes) and *Diaphorencyrtus aligarhensis* for classical biological control of the Asian Citrus Psyllid (ACP), *Diaphorina citri*. Both the ectoparasitoid *T. radiata* and the endoparasitoid *D. aligarhensis* kill ACP nymphs through parasitism and host feeding. These parasitoids have a significant impact on reducing populations of *D. citri*, which is the most important citrus pest because it vectors the bacterium causal agent of Huanglongbing (HLB) or citrus greening disease.

Tamarixia radiata is known to be established in Florida, but augmentative releases throughout different locations in Florida, including conventional, low/no spray, organic citrus, abandoned but still flushing citrus, and dooryard citrus or *Murraya* sp. are being scheduled on weekly basis. FDACS CHRP scouts have hand released parasitoids following regularly scheduled ACP monitoring surveys and between pesticide sprays (in areas receiving sprays). Releasing parasitoids after a spray provides time for the wasps to attack those psyllids missed by the insecticide or that move into the area in between sprays. If parasitoids maintain low psyllid levels following a spray, the next scheduled spray may be postponed, thereby saving the grower money, reducing insecticide

resistance, secondary pest outbreaks and environmental damage. Additional direct releases of *T. radiata* were conducted by various private citrus grove owners/managers and collaborating agencies. During this reporting period 2,795,600 *T. radiata* and 74,843 *D. aligarhensis* were reared, of which 2,661,772 *T. radiata* and 59,895 *D. aligarhensis* were released throughout Florida with the remainder kept for colony maintenance (see Table 1 for distribution of *T. radiata*). This represents 175,356 or 6.7% increase over the previous biennial reporting period (July 1, 2018-June 30, 2020). During this reporting period, production reached its highest numbers since program inception.

Murraya paniculata plants are used to rear ACP. Large *M. paniculate* "mother plants" that are isolated from ACP rearing were planted and utilized for propagation of new host plants via seed production. First berries production is expected in the spring of 2023. This is a long-term solution that should prevent rearing crashes due to host plant availability. Plant stock at the beginning of the reporting period was about 7.000 plants and by June 30, 2022, 4,000 suitable plants were available to use in the mass rearing system. Renewing plant material will take place in 2023 and in the meantime, from June 30, 2022, and throughout 2023, citrus plants (2.500 plants) will be added to the rearing cycle while *M. paniculata* plants are ready to enter into the production system.

Diaphorencyrtus aligarhensis is not known to have established in Florida, although released individuals do provide some mortality to ACP nymphs. Resources dedicated to *D. aligarhensis* rearing have been reallocated to Tamarixia production. By the end of this reporting period, the small colony maintained for research purposes with the remainder released in southwest Florida organic citrus groves where they can be monitored for establishment, is being terminated.

Tamarixia radiata has also been shipped to other agencies for research purposes, 161,450 *T. radiata* or 5.78% of total production. This amount considerably increased if compared with the previous reporting period.

Considering the ACP mobility between different areas in search of mates and oviposition sites, a Dooryard (citrus and citrus related host plants) program has been running. The program's objective is to target those ACP that are not under any form of insect management, that reproduce freely, acquiring HLB inoculum, and disperse into nearby commercial citrus groves. FDACS-DPI webpage (Tamarixia Release Application / Asian Citrus Psyllid Biological Control / Biological Control / Plant Pests and Diseases / Pests and Diseases / Agriculture Industry / Home - Florida Department of Agriculture & Consumer Services (fdacs.gov) provides an application for release of parasitoids on a homeowner's dooryard citrus plantings. Information on identifying and controlling ACP, alternative host plants of ACP, common symptoms of HLB and links to additional information sources are provided. The Tamarixia request form is posted on the webpage allowing anyone in Florida the opportunity to request quickly and easily, at no cost, parasitoids for release on their property. A significant amount of outreach was conducted through the UF/IFAS extension and local news outlets to inform the public of this service during the previous reporting period and due to these efforts, many homeowners have signed up to participate. A total of 66,450 *T. radiata* (2.38% of total production) has been released through the Dooryard program, comprising 221 dooryard releases. This amount decreased considerably due in part to the insignificant amount of outreach conducted this period due to COVID-19 if compared with the amount of outreach conducted through UF/IFAS extension during the last reported period. The targeted goal for upcoming years is to achieve and maintain at least 5% of the total *T. radiata* released to be used on dooryard citrus over the citrus growing regions of Florida. It is difficult to predict when coordinated efforts with extension agents will resume.

Table 1. *T. radiata* released through July 1, 2020 - June 30, 2022

Distribution		Amount	Percentage	Total Amount Released
Used in Production		133,828	4.79%	133,828
Sent to field	CHRP	313,297	11.20%	2,661,772
	NON-CHRP	1,875,500	67.08%	
	RESEARCH	161,450	5.78%	
	DOORYARD	66,450	2.38%	
	USDA	245,075	8.77%	
TOTAL			**100%**	**2,795,600**

During this reporting period, additional coordination with USDA-APHIS-PPQ CHRP counterparts was implemented to conduct releases on residential citrus plantings on selected target sites within three to five miles of commercial groves. The addition of the well-trained USDA inspectors' assistance in releasing on appropriate sites will greatly increase the overall effectiveness and fiscal efficiency of FDACS-DPI's current dooryard citrus component. The USDA CHRP inspectors currently monitor an average of >32,000 residential sites throughout the major citrus production regions of Florida every three months. The USDA inspectors started to release *T. radiata* at selected sites throughout their normal scheduled inspections only when active ACP nymph populations are identified, ensuring better population establishment, reducing shipping costs for dispersal, and limiting releases on less-than-ideal sites that invariably will occur through our current homeowner releases. A modified sampling protocol is used that includes flush and ACP nymphs' density data to compare the proportion of infested to non-infested flush with various aspects of ACP infestation and the levels of control elicited by *T. radiata* parasitism. A sampling event of the northern citrus production regions was conducted during 2020. Results of this sampling events on parasitism will be used to generate area-wide maps of *Tamarixia* impact. However, by the end of 2021, no data had been provided to DPI. Preliminary data indicate low parasitism levels by *T. radiata* in conventional and reduced-spray groves; however, significant parasitism was normally found in no-spray groves. Future surveying will focus only on organic, no-spray, or dooryard plantings due to the historically low parasitism levels identified under conventional management practices. The results from these data sets could be used to continually evaluate DPI's

release strategy and to adjust or improve field release protocols to ensure parasitoids are used in the most effective manner. During this reporting period 245,075 (8.77% of total production) *T. radiata* were provided to the USDA for this effort and 313,297 *T. radiata* to the CHRP program (11.20%). Collectively, 19.97% of the total wasp production in this period. Due to a decline in production at Dundee mass rearing laboratory, USDA and CHRP programs received fewer wasps and changes in distribution of wasps had been made in Gainesville mass rearing laboratory to greatly shift production towards these programs.

The MAC HLB group (Florida, Texas and California) led by USDA-APHIS counterparts. currently has a biostatistician developing a metadata analysis of all program data collected between the three states. All program data has been forwarded to the group for the metadata analysis. Results from this analysis have not been released.

Air Potato

Air potato *Dioscorea bulbifera* L. (Dioscoreaceae) is an invasive, high-climbing vine capable of out-competing native vegetation and displacing other organisms. It forms dense blankets that smother native trees and understory plant species. It is a rapid climber, capable of several inches of daily growth. Air potato is listed as a noxious weed by the Florida Department of Agriculture and a Category I invasive plant by the Florida Exotic Pest Plant Council. The vine's primary means of spread is through the production of aerial bulbils, known as "air potatoes."
A biological control program to combat air potato was initiated by the USDA-ARS-IPRL in Ft. Lauderdale, FL following the 2002 discovery of an air potato vine-feeding chrysomelid beetle in Nepal and later in China. Permission for release was granted from the USDA-APHIS in 2011 and limited releases began in 2012. For over a decade, the air potato biological control program has been a collaborative effort among FDACS-DPI, USDA-ARS, USDA-APHIS and UF/IFAS. Since 2012, thousands of *Lilioceris cheni* Gressitt and Kimoto (Coleoptera: Chrysomelidae) have been released yearly. From 2020 to 2022, DPI released 155,885 *L. cheni* beetles across 51 counties in Florida and 12 counties across Alabama, Georgia, Louisiana and Texas. Studies were conducted on the effect of insecticidal and herbicidal contamination, utility of artificial diet, beetle longevity under ideal conditions and mortality under stressful conditions.

In October 2021, a new species of beetle, *Lilioceris egena*, was obtained from scientists at the USDA (IPRL) in Fort Lauderdale to begin rearing for small-scale field releases and research. *Lilioceris egena* feeds and reproduces primarily on the air potato bulbils, attacking the infestation from a different angle than the leaf-feeding beetle. Between October 2021 and May 2022, 16,927 *L. egena* beetles were reared from the initial 200 we received. 900 *L. egena* beetles were released at three long term research sites during this period. Mass rearing and widespread release of this species will commence in summer 2023 once initial field studies are completed.

Cactus Moth

The cactus moth (*Cactoblastis cactorum*) is a recently introduced pest with the potential to harm habitats in the U.S. and neighboring Mexico (where cacti are commercially and culturally important). Work is being conducted to investigate the use of a braconid parasitoid, *Apanteles opuntiarum*, as a biological control agent for cactus moth mitigation. This parasitoid is native to South America, and populations used for research at the division are descended from parasitized moth larvae, collected and imported from Argentina. The division has continued cooperative agreements with the USDA for financial and field support on this project.

Using an artificial diet, the BCRF produced 112,868 and 116,096 cactus moth pupae for FY21 and FY22, respectively. Early instar larvae were provided for parasitization by *A. opuntiarum*, which was held in DPI's containment facility. For FY21, 10,652 larvae were provided and in FY22, 14,390 larvae were provided. *A. opuntiarum* wasp production was 36,797 and 54,699 for FY21 and FY22, respectively.

A. opuntiarum has thus far demonstrated itself to be an effective biological control agent for *C. cactorum*. Consequently, efforts at DPI have begun to focus on testing and evaluating the host-specificity of the parasitoid. During this time interval, twelve different non-target lepidopteran species were investigated for wasp parasitism through no-choice or choice tests. The results of all the exposure tests showed no parasitism in non-target larvae. There are at least seven additional non-target species in the potential wasp release zones that still need to be evaluated.
To ensure the captive parasitoid population remains reproductively and functionally viable, ongoing research has focused on wasp fecundity and offspring sex-ratios. Refinement of rearing procedures to successfully rear non-target species were also investigated. In February 2022, a new cactus plot was planted in LaCrosse, Florida, about 34 miles NW of the original two plots in Citra. This will help safeguard the supply of the needed cactus pads from weather events and pest/disease infestations. In March of 2022, a trip to Argentina secured 197 *C. cactorum* pupae parasitized by *A. opuntiarum* to introduce wild genes into the captive colony. Additional shipments of the parasitoid from Argentina are expected to maintain an adequately diverse and functionally robust parasitoid population.

Chinese Tallow

Chinese tallow tree, *Triadica sebifera* (L.) Small (*Sapium sebiferum* (L.) Roxb.), is an invasive plant native to parts of East Asia. It is designated as a noxious weed by the state of Florida and is listed as a Category I invasive plant. Tallow trees grow and spread rapidly, outcompeting native plant species, and reducing overall biodiversity by creating monocultures. A specialist flea beetle, *Bikasha collaris* (Baly), feeds and reproduces on Chinese tallow in its native range. A colony of *B. collaris* beetles was established at the USDA-ARS-Invasive Plant Research Laboratory quarantine facility in Ft. Lauderdale, Florida in November 2008. Extensive host specificity testing was conducted to determine that *B. collaris* is host-specific and cannot complete its life cycle on anything other than Chinese tallow. While the release of *B. collaris* has not yet been

formally approved, a recommendation to release *B. collaris* was issued by the Technical Advisory Group for the Biological Control Agents of Weeds (TAG) on August 10, 2016. Additionally, USDA-APHIS published an Environmental Assessment on the potential release of *B. collaris* in 2020. On March 7, 2022, FDACS-DPI received 25 adult *B. collaris* beetles from the USDA-ARS IPRL facility in Ft. Lauderdale, Florida. With these individuals, DPI established a colony in our quarantine facility and began working on perfecting rearing methods for potential mass release. Since then, the *Bikasha collaris* colony has grown to over 100 individuals and research is currently underway to develop more effective rearing methods, investigate herbivory at different age groups and investigate the sublethal effects of temperature on the beetles.

Phantasma Scale

Fiorinia phantasma Cockerell & Robinson (Hemiptera: Diaspidodae), phantasma scale, is a significant pest of at least 24 families and 44 genera of nursery and ornamental plants, particularly palms and several fruit crops. Scales feed on plant leaves causing blotchy yellow leaf damage, leaf drop and plant death. This pest has the potential to cause major economic harm in the US to nursery and landscape industries as well as to homeowners. The first US continental record of this pest was collected on a Canary Island date palm in Miami-Dade County, Florida on March 1, 2018. A subsequent survey of the area found 27 additionally infested palms. To develop mitigation strategies for the pest, the following research priorities were developed.

- Conduct plant host range evaluation through field surveys to calculate its potential spread.
- Evaluate the control potential of natural enemies that become associated with the scale in south Florida.

The division collaborated through a cooperative agreement with the USDA and UF-IFAS for financial and field support on this project.

Host plant surveys in Florida showed a range represented by 25 families and 56 genera, including many important ornamental plants (including bamboo, cycads, and jasmine), and several fruit crops (including Mango and Lychee). There were 475 reports of *F. phantasma* from 30 plant species in 28 genera and nine host plant families over the course of the study. The greatest number of infestations were in the palm genera's *Phoenix* and *Wodyetia*. Nurseries raising and moving these palms must be vigilant in their surveys to prevent the spread of the pest.
Monthly sampling of *F. phantasma* infested palm fronds at three locations in Miami-Dade County and one in West Palm Beach County found multiple natural enemies associated with and feeding on the scale. Coccinellids, thrips, dipterans and lacewings were found throughout the study, but in relatively low numbers. In contrast, large numbers of *C. nipponicus* were found and their number increased significantly during the same period. They were also located where the phantasma scale was most prevalent, on the lower fronds and bottom of the leaf. These predators were seen to feed on the scale both as adults and larvae. Some cyclical biological control of the scale by natural enemies already present in Florida may put some pressure on the scales population density and spread in a given area.

Brown Marmorated Stink Bug

The brown marmorated stink bug (BMSB), *Halyomorpha halys* (Stål), has established throughout much of the U.S. Recent survey efforts have discovered a BMSB population of limited distribution at several different agricultural sites in Lake County, Florida. This marks the first report of an established, reproducing population of BMSB in Florida. The BMSB feeds on a variety of plants including fruits, ornamental, legumes, vegetables, and weedy plants. It survives the winter by invading houses and other enclosed structures, and then in the spring it migrates back into crop fields in search of host plants. In cooperation with UF-IFAS, DPI initiated and maintained a rearing colony of BMSB and the parasitoid, *Trissolcus japonicus*, in support of ongoing field research.

DPI received BMSB egg masses or adults from the New Jersey Department of Agriculture and a cooperator in Maryland to start a colony in the division's containment facility. For FY 21, 1,400 BMSB egg masses were produced, and in FY 22, 2,012 BMSB egg masses were produced in DPI's containment facility. These egg masses were used to rear *T. japonicus*, frozen to be used as sentinel egg masses in the field to assess parasitoid presence, and to produce nymphs for trap design research. BMSB egg masses parasitized by *T. japonicus* were obtained from the USDA-ARS-BIIRU in Delaware. Several thousand parasitoids through fourteen generations were reared, showing the potential to easily rear this species if permits are approved for field release in Florida.

Additionally, DPI assisted in the construction of 25 new BMSB field traps for use in UF's field surveillance program and the monitoring of four of these deployed traps in Marion County. DPI also performed taxonomic identifications on 48 samples containing 58 insects submitted for identification, 57 were *Halyomorpha halys*. The following parasitoids were identified after emergence from sentinel BMSB egg masses; *Anastatus tenuipes*, *Anastatus* near *hirtus*, *Anastatus* spp. (suspected to be *A. furnissi*), *Anastatus* spp. (suspected to be *A. mirabilis*), *Trissolcus solocis* and Encyrtidae. These identifications helped assess the Florida field distribution of BMSB and the natural enemies already present in the environment.

Medfly Eclosion/Release for SIT/RIP

Aerial release of sterile Mediterranean fruit flies to deter the establishment of introduced wild flies continued via the Preventive Release Program (PRP). The facility, located in Sarasota, Florida, also acts as a reserve for Sterile Release Programs should new infestations occur. Guatemala continues to support Florida's PRP endeavors by providing quality fruit fly pupae. A total of 3,922,102,606 sterile Medflies were released in FY2020-2021 and 4,133,895,575 in FY2021-2022. Research of fruit fly traps and lures is ongoing thanks to a long-standing collaborative effort between the division and USDA.

Permitting

Industrial Hemp Pilot Program

Industrial Hemp Pilot Program Permits (IHPP) allow universities and colleges in Florida to cultivate and conduct research on industrial hemp. Additionally, they may partner with private companies and individuals seeking to perform research or certify hemp cultivars for subsequent sale to private and commercial hemp growers within and outside Florida. The Division issued 16 IHPP to three universities including University of Florida, Florida A&M University, and South Florida State College. Permitted sites include laboratory, greenhouse, field production and research of industrial hemp.

Non-Native Species Planting Permits

Non-Native Species Planting Permits are required when anyone wants to plant two or more acres of a plant species DPI deems as invasive. Growers are required to follow specific mitigation techniques to prevent inadvertent spread of the plant species outside the cultivation area. DPI issued NNSPP #21 for 10 acres of *Phyllostachis edulis* in Bell Court, Florida and NNSPP #22 also for 10 acres of *Phyllostachis edulis* in Newberry, Florida. *Phyllostachys edulis*, commonly known as moso bamboo, tortoise-shell bamboo or edible bamboo, is a rhizomatous species of timber bamboo native to China that will grow in favorable conditions to 25-60' tall, but less frequently to as much as 90' tall. Previous attempts by other individuals at growing this species in Florida have failed. Moso bamboo appears unsuited for Florida's climate.

Bureau of Citrus Budwood Registration

The Bureau of Citrus Budwood Registration has been providing budwood to the citrus industry since 1952. Through the selection of superior parent trees which are made available from our Chiefland Budwood Foundation, this program provides disease-free, true-to-type budwood and has improved fruit yield and quality.

For this biennial period, the bureau has been at the forefront to help bring recovery to Florida's citrus industry. One of those developments is the discovery of the Donaldson tree, a tree that has continued to yield strong production despite citrus greening disease. Starting with one tree at a USDA-Whitmore Farm in Groveland, Florida, the Division was tasked with providing clean budwood for the industry to produce millions of trees within 5 years. The bureau partnered with a citrus nursery to obtain 2,976 embryonic rescue (ER) Donaldson seedlings produced from tissue culture taken from the original tree. In addition, the bureau has provided 23 nurseries with shoot tip grafted (STG) source trees that nurseries can take cuttings from for mass production. In addition to the Donaldson tree, Parson Brown, Roble, Carney 2 and Carney 3 varieties showing HLB tolerance are being produced for the industry.

The agency and the bureau have taken steps to lease and maintain a nursery facility in Trenton, Florida to accelerate the production of the Donaldson tree and additional promising varieties that can hold their own against citrus greening. Budwood introduced a new program during this time, the Accelerated Budwood Initiative (ABI). This program is tasked with rapidly making budwood of promising varieties that show evidence of HLB tolerance or resistance available for the industry. The funding for this program was acquired through the efforts of Florida's citrus industry working closely with the state legislature.

The bureau continues to be very involved in the Indian River Grapefruit Scion/Rootstock trial. Since HLB was detected in Florida in 2005, the citrus acreage has dropped from 750,000 to under 480,000 acres. Over 80% of Florida's grapefruit production occurs in the Indian River District (Brevard, Indian River, Martin, Okeechobee, and St. Lucie counties). This is a multi-year project (8-10 years) and data collection has begun to help find a scion/rootstock combination that shows successful results. Our commitment remains strong for providing clean material to the industry.

Chiefland

The Chiefland Seed Source Block continues to expand with new additions of rootstocks coming into the program while ensuring that industry standard sources are maintained. During the 2020 winter, there were 16 nights of below freezing temperatures; however, with the use of microjet irrigation, only two trees were lost to the freeze. Seed was harvested from the block to help supplement the bureau's need for introduction liners. In this biennial period, 274 trees of the most popular commercial rootstock varieties were planted; the seed source block now has full rows of Swingle, Kuharske, Sour Orange, US- 812, US 942, X 639 and Volkamer.

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
A+FD UF 19-11-10			1	®
A+Volk UF 19-11-31			1	®
Abers S/O US 8-35	1	8	1	
Acid Fruit Hyb UF C4-15-8			1	®
Acid Fruit Hyb UF C4-3-35			1	®
Acid Fruit Hyb UF C4-5-20			1	®
Acid Fruit Hyb UF C4-8-40			1	®
Akcay Sekeri 3-3-10			1	
Ambersweet US 10-14-65	1	1		
Ambersweet US 10-5-65	1	1	3	

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Ann Sat 911	1	1		
Atalantia US 11-8-76			1	
Atwood Navel CGIP-201			2	
Australian Finger Lime 697 CGIP-233			4	
Avana 4N CGIP-189			2	
Baboon Le US 2-25			1	
Bahianinha Navel US 9-6-47			9	
Bangladesh Le DPI-633-1			1	
Barao UF 135			1	®
Bearss Le SPB-341-95-33	5	15	7	

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Benton UF	1	5	1	
Bergamot US 9-12-15			1	
Berna UF			2	®
Bigaradier Apepu S/O US 13-39			1	
Bingo UF 7-6-27	6	53	5	®
Bittersweet F-21-14	1	5		
Bloomsweet Gft DPI-50-38-1			1	
Blue Lake Orange 956-2			1	®
Bouquet De Fleurs UF 18			1	
Bower Mandarin			1	
Bower Mandarin			1	®
Brazilian Le US 3-18			1	
Brown Select Sat 61-0-1	1	1	3	
Budd B/O DPI-82	1	1	3	
Buddhas Hand F-8-7	1	2	1	
Burgundy Gft 416-7-1			1	
C excelsa US 60-169-502			1	
C Iyo Tangor US 9-1-23			1	
C latipes DPI-203-19-b	1	4	1	®
C macrophylla DPI-226			4	
C micrantha UF			1	
C moi F-11-8W			1	
C neoaurantium DPI-50-46			1	
C tachibana US 1-67			1	
C-146 UF	3	82	2	
C-22 Bitters UF	3	54	2	
C5282 CGIP-153			2	®
Calamandarin F-9-14			1	
Calamondin DPI-555	4	20	4	
Cambria Navel CGIP-179	1	4	2	
Cameron Le US			1	
Cara Cara Navel CGIP-104	5	12	14	
Carney Orange DPI-229-2	2	3	2	
Carney Orange DPI-229-3	3	7	1	
Carrizo F-52-16	2	28	3	
Carrizo-Mthionin-1 US TG			3	®
Carrizo-Mthionin-2 US TG			3	®
Carrizo-Mthionin-3 US TG			3	®
Carrizo-ScFv-1 US TG			3	®
Carrizo-ScFv-2 US TG			2	®
Carrizo-ScFv-3 US TG			3	®
Carrizo SPB-330	2	19		
Carrizo-Thionin-LBP-1 US TG			2	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Carrizo-Thionin-LBP-2 US TG			2	®
Carvalhal 3-3-37			1	
Centennial Kum US	1	2	1	
Changsha + Benton UF 18-9-6			1	®
Changsha US 9-12-9			1	
Chinese Pum UF 5-17			1	
Chinotto S/O US 8-41	1	2	1	
Chislett Late Navel CGIP-190			2	
Cipo US 10A-7-10			1	
Citrandarin CGIP-222			1	
Citrange C-32 US	1	34	1	
Citrange C-35 F-24-10	6	156	1	
Citrangequat Hyb US 10-3-4			1	
Citron DPI-201			1	
Citron DPI-201			1	
Citrum F-80-6			1	
Citrum F-80-8			1	
Citrum F-W-4			1	
Clem X Yuzu DPI-50-38-2			1	
Clementine Haploid CGIP-180			1	®
Clementine US			1	
Cleopatra F-1-7	7	123	2	
Cleopatra F-47-2	3	40		
Cocktail Gft DPI-50-38-5			1	
Crassifolia Kum CGIP-105			1	
Crisafulli Navel DPI-221-1			1	
Cybrid Dancy KW-5-7			2	®
Cybrid Flame UF C4-3-32			1	®
Daisy CGIP-120	1	1	2	
Daisy LS CGIP-191			1	
Dancy F-59-8	3	5	3	
C-54 Carpenter UF	4	341	2	
C-57 Furr UF	3	85	2	®
Cadenera US 5-15			1	
Dickinson Gold Valencia 595-1	2	3	1	
Disticha DPI-50-24			1	
Dobashi Sat DPI-50-28			1	
Dream Navel DPI-58			5	
Duncan Gft F-56-33	1	2	3	
Duncan Gft F-57-19	2	3	2	
Dweet Tangor F-8-18			1	
Early Pride US 1-62-122	6	11	6	®
Earlygold UF 33-4	2	2	2	

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Ellendale DPI-84-11-32			1	
Eloise CGIP-155			1	®
Enterprise 609-14-17			1	
Erem X Shek US 3-67			1	
Eremocitrus US			1	
Escondido Le UF			1	
Etrog Citron DPI-223-861	1	3	1	
Eureka Le DPI -	3	12	2	
Eureka Le SL #2 CGIP-226	2	12	6	®
Eureka Le SL CGIP-223	1	5	1	
Eureka Le UF 3-27			1	
Eureka Le UF C4-9-30			1	®
Eustis Lqt US 16-6-12	1	1	1	
Everbearing Le US 9-1-64			1	
Fairchild US 6-8			4	
Fallglo US 10-61-3	2	6	2	
Faustrimedin DPI-205-3			1	
Fertic Te DPI-216			3	
FG-1731 UF			1	®
Fina Sodea Clem CGIP-123			5	
Finger Lime DPI-205-1	1	1	2	
Finger Lime Giant DPI-205-4	2	2	3	
Finger Lime UF KB-31			1	
Finger Lime UF KB-8			2	
Fisher Navel CGIP-135			2	
Flame Gft US 1-26-71	7	29	7	
Florida EV1 UF B7-70	8	41	2	®
Florida EV2 UF SF14W-65	8	31	2	®
Flying Dragon US	3	50	5	
Folha Murcha UF 211			1	®
Fortune US 9E-10-23			1	
Foster Gft 65-1-8-27			1	
Fremont US 6-49			1	
Fukumoto Navel CGIP-133			2	
Furr LS UF 18A-10-11			1	®
Furr LS UF B-A-32.5			1	®
Gardner US 6-16			3	
Dancy UF 12-32			1	®
Delta CGIP-118			2	
Dickinson 595	2	59	1	
Grapefruit Hyb US 6-20-151			2	®
Grapefruit Hyb US 6-59-158			1	®
Grapefruit UF 00-02			2	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Grapefruit UF 11-06			2	®
Grapefruit UF 12-04			1	®
Grapefruit UF 14-09			1	®
Grapefruit UF 17-14			1	®
Grapefruit UF 9-5-16			2	®
Grapefruit UF N40-16-11-11			1	®
Hadas CGIP-221	1	1	2	®
Hamlin 1-4-1	21	467	37	
Hamlin 8-1-4	5	45	24	
Hamlin 8-1-5	3	11	15	
Hamlin UF N13-32	1	1	4	®
Hamlin US 1262			1	®
Hamlin US 1266			1	®
Hamlin US 1612			1	®
Hamlin-Mthionin-1 US TG			2	®
Hamlin-Mthionin-2 US TG			3	®
Hamlin-Mthionin-3 US TG			2	®
Harvey Le F-41-39	3	10	3	
Hass Pink Navel DPI-203-21			1	
Hesperethusa UF			1	
Hirado Pum US 1-65	4	20	5	
Homosassa 56-10-28			1	
Hong Kong Kum US 10-2			4	
Hudson Gft US			1	
Hyuganatsu US 12-43			1	
Iapar 73 UF 217			1	®
Ice Tea Le UF C4-6-49			1	®
Ichang Le US 2-33			1	
Imperial Gft CGIP-151			1	
Isle O Pine Gft US			1	
Itaborai UF 31-6	1	1	2	
Jackson Gft DPI-16	1	1	5	
Jaffa F-53-38			1	
Jincheng UF 175			1	®
Joe's Early CGIP-238	1	1	1	
K X R UF			1	
Kaffir Lime UF	3	4	2	
Kao Phuang Pum UF 5-2			1	
Kara US 9E-9-21			1	
Karna US			1	
Kedem CGIP-147	1	1		
Keraji DPI-50-38-3			1	
Key Lime Giant US	1	1	1	

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Gillets UF			1	
Glen Navel F-56-11	7	28	12	
Glen Navel F-56-12	1	1		
Gold Nugget CGIP-139	3	4	3	®
Goutou US-3	1	20	1	
Grapefruit Hyb UF P1			1	®
Grapefruit Hyb US 1-83-179			2	®
Grapefruit Hyb US 1-83-227			2	®
Grapefruit Hyb US 4-4-1			2	®
Kinokuni US 11-65			1	
Kirkwood Red Navel CGIP-239			2	
Kishu SL CGIP-137	2	5	3	
Kiyomi Tangor CGIP-136			1	
Kuharske 100-1-10	14	509	3	
Kunembo US 3-10-3			2	
Lakeland Lqt F-55-26	1	5	3	
Lane Navel CGIP-121	2	4	6	
Large Pink Pum US 6-57			1	
Le Pum 748-29			2	
Le Pum 748-32			1	
Lee US 2-56			3	
Lemon Hyb UF C4-3-4			1	®
Lemon Hyb UF C4-4-16			1	®
Lemon Hyb UF C4-5-14			1	®
Lemon Hyb UF C4-8-3			1	®
Lemon Hyb UF C4-8-34			1	®
Lemon Hyb UF LB-6-17			1	®
Lemon UF 1-10-56			1	®
Lemon UF 1-14-10			1	®
Lemon UF 1-1-42			1	®
Lemon UF 1-14-24			1	®
Lemon UF 1-1-55			1	®
Lemon UF 1-15-50			2	®
Lemon UF 1-19-55			2	®
Lemon UF 1-20-31			2	®
Lemon UF 1-20-6			1	®
Lemon UF 1-2-8			1	®
Lemon UF 1-3-17			1	®
Lemon UF 1-6-18			1	®
Lemon UF 1-8-57			1	®
Lemon UF 1-9-42			1	®
Lemon UF 2-0-19			1	®
Lemon UF 2-21-5			1	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Lemon UF 2-23-39			1	®
Lemon UF 2-2-48			1	®
Lemon UF 2-3-28			2	®
Lemon UF 2-3-33			2	®
Lemon UF FP 18-03			1	®
Lemonquat US 2-31	1	1	1	
Key Lime SPB-51-12	6	13	4	
Key Lime Thornless F-59-39	2	2	1	
Khalily US 2-29			1	
Kiella Calusa S/O DPI-666-4	1	4	1	
Kimbrough Sat CGIP-108			2	
King 18-1-1	1	2	3	
Kinkoji DPI-50-44	5	133	1	
Kinnow LS CGIP-193			1	
Kinnow US 9E-9-27			2	
Long Fruit Kum DPI-603-20-50	1	5	2	
Loretto Lime 874-1	1	1	2	
Lue Gim Gong F-53-18			3	
M-7 Early Navel CGIP-194	1	11		
M+LB8-8			1	®
Madam Vinous UF 13			1	
Malayan Kum UF 10			1	
Man Hyb UF VNB-36-4			1	®
Man Hyb UF VNB-40-4			2	®
Man x Org LT UF RBB-7-34			3	®
Man X Org UF 6-2-55			1	®
Man X Org UF RBB-6-25			2	®
Man X Org UF RBB-7-34			2	®
Mandalate CGIP-154			1	®
Mandalime UF 13-08			2	®
Mandalime UF 15-04			1	®
Mandarange UF 4-71			2	®
Mandarange UF SB-7-13			2	®
Mandarange UF SB-8-17			2	®
Mandarange UF SB-8-70			2	®
Mandared CGIP-166			3	®
Mandarin 4x Cybrid 304 UF			1	®
Mandarin DPI-50-34			1	
Mandarin LS UF N40W-5-1			1	®
Mandarin LS US 1-22-79			1	
Mandarin LS US 1-22-79			1	®
Mandarin LS US 4-13-31			1	
Mandarin LS US 4-13-31			1	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Mandarin LS US 4-13-39			1	
Mandarin LS US 4-13-7			1	
Mandarin LS US 4-13-7			1	®
Mandarin Mid UF 711			3	®
Mandarin Mid UF 711 Mixup			2	®
Mandarin SL UF C4-15-21 (19)			4	®
Mandarin SL US 1-35-21			1	
Mandarin SL US 1-35-81			2	®
Mandarin SL US 1-87-170			1	®
Mandarin SL US 1-88-113			1	®
Mandarin SL US 6-1-41			2	®
Mandarin SL US 6-2-110			1	®
Lemorlime UF C4-5-27			1	®
Leo X Te US 5-8-122			3	®
Liang Ping Pum UF 8811			3	
Lime Hyb UF C4-10-11			1	®
Lime Hyb UF C4-10-8			1	®
Lime Hyb UF C4-6-52			1	®
Lime Hyb UF C4-8-14			1	®
Lime Hyb UF C4-8-48			3	®
Lime Hyb UF C4-9-33			1	®
Lime Hybrid UF 17-02			1	®
Lime SL Hyb UF C4-4-26			1	®
Lime SL Hyb UF C4-6-35			1	®
Limeberry DPI-50-43			1	
Limonia UF			1	
Lisbon Le UF 3-9	3	4	2	
Mandarin UF 13-14			2	®
Mandarin UF 13-17			2	®
Mandarin UF 14-04			1	®
Mandarin UF 14-06			1	®
Mandarin UF 14-08			1	®
Mandarin UF 1424			2	®
Mandarin UF 1425			1	®
Mandarin UF 15-03			1	®
Mandarin UF 15-05a			2	®
Mandarin UF 15-05b			1	®
Mandarin UF 15-06			1	®
Mandarin UF 15-07			2	®
Mandarin UF 15-08			1	®
Mandarin UF 15-09			2	®
Mandarin UF 15-17			1	®
Mandarin UF 16-33			1	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Mandarin UF 16-34			1	®
Mandarin UF 1703			1	®
Mandarin UF 17-04			1	®
Mandarin UF 17-08			1	®
Mandarin UF 17-11			1	®
Mandarin UF 17-12			1	®
Mandarin UF 1715			1	®
Mandarin UF 1722			1	®
Mandarin UF 1723			1	®
Mandarin UF 1724			1	®
Mandarin UF 1750			1	®
Mandarin UF 1751			2	®
Mandarin UF 1780			1	®
Mandarin UF 1801			1	®
Mandarin UF 18-04			1	®
Mandarin UF 1806			1	®
Mandarin UF 18-07			1	®
Mandarin UF 1818			1	®
Mandarin SL US B1-SH-6-9			1	®
Mandarin UF 05-04			1	®
Mandarin UF 09-08			1	®
Mandarin UF 10-04			1	®
Mandarin UF 11-01			1	®
Mandarin UF 11-08			1	®
Mandarin UF 11-10			1	®
Mandarin UF 12-01			2	®
Mandarin UF 12-03			1	®
Mandarin UF 12-06			2	®
Mandarin UF 12-07			1	®
Mandarin UF 12-08			2	®
Mandarin UF 13-09			4	®
Mandarin UF 13-12			1	®
Mandarin UF 13-13			1	®
Mandarin UF 411			4	®
Mandarin UF 6-13-30			2	®
Mandarin UF 7-8-55			2	®
Mandarin UF 7-8-87			1	®
Mandarin UF 7-9-7			1	®
Mandarin UF 900			4	®
Mandarin UF 9-10-28			2	®
Mandarin UF 9-14			1	®
Mandarin UF 916			2	®
Mandarin UF 950			4	®
Mandarin UF 9-8-20			2	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Mandarin UF B3-18-2			2	®
Mandarin UF B7-2-59			2	®
Mandarin UF BB4-8-20			2	®
Mandarin UF C1-1-1			1	®
Mandarin UF C1-4-28			1	®
Mandarin UF C1-7-30			1	®
Mandarin UF C1-8-34			1	®
Mandarin UF C2-1-5			2	®
Mandarin UF C2-3-26			3	®
Mandarin UF C4-10-42			1	®
Mandarin UF C4-11-45			1	®
Mandarin UF C4-14-1			3	®
Mandarin UF C4-14-15			1	®
Mandarin UF C4-14-3			1	®
Mandarin UF C4-14-51			1	®
Mandarin UF C4-14-53			1	®
Mandarin UF C4-15-3			1	®
Mandarin UF C4-15-43			1	®
Mandarin UF C4-15-50			3	®
Mandarin UF C4-16-23			1	®
Mandarin UF C4-5-50			1	®
Mandarin UF C4-7-29			1	®
Mandarin UF C7-10-47			3	®
Mandarin UF 1819			2	®
Mandarin UF 1859			1	®
Mandarin UF 18A-1-25			1	®
Mandarin UF 18A-1-40			1	®
Mandarin UF 18A-2-14			1	®
Mandarin UF 18A-2-28			1	®
Mandarin UF 18A-2-31			1	®
Mandarin UF 18A-4-35			1	®
Mandarin UF 18A-4-46			1	®
Mandarin UF 18A-8-25			2	®
Mandarin UF 18A-8-42			1	®
Mandarin UF 18A-8-48			1	®
Mandarin UF 18A-9-27			1	®
Mandarin UF 18A-9-43			1	®
Mandarin UF 1904			1	®
Mandarin UF 304			2	®
Mandarin UF 3-13-51	1	1	1	®
Mandarin UF 3-13-86			1	®
Mandarin UF 3-14-45			1	®
Mandarin UF 3-3-52			1	®
Mandarin UF 3-7-92			1	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Mandarin UF RES-10-39			1	®
Mandarin UF RES-19-22			2	®
Mandarin UF RES-19-56			2	®
Mandarin UF SB-2-48			1	®
Mandarin UFDawn 09-13			2	®
Mandarin UFGlow 10-02	1	1	2	®
Mandarin UFSunrise 09-04			2	®
Mandarin US 1-10-90			1	®
Mandarin US 1-20-68			2	®
Mandarin US 1-23-130			2	
Mandarin US 1-24-48			2	®
Mandarin US 1-26-52			1	®
Mandarin US 1-30-52			2	®
Mandarin US 1-34-11			2	®
Mandarin US 1-57-105			2	®
Mandarin US 1-62-205			1	®
Mandarin US 1-63-77			2	®
Mandarin US 1-63-85			2	®
Mandarin US 1-78-62			2	®
Mandarin US 1-81-193			1	®
Mandarin US 1-84-2			1	®
Mandarin US 1-8-70			2	
Mandarin US 1-88-71			1	®
Mandarin US 1-88-82			1	®
Mandarin US 1-8-96			1	®
Mandarin US 5-13-227			1	®
Mandarin US 5-6-165			1	®
Mandarin US 6-32-43			2	®
Mandarin UF C7-10-50			1	®
Mandarin UF C7-12-14			2	®
Mandarin UF C7-12-18			2	®
Mandarin UF C7-12-19			1	®
Mandarin UF C7-12-24			3	®
Mandarin UF E20-42-13			2	®
Mandarin UF E20-45-14			2	®
Mandarin UF E20-45-19			2	®
Mandarin UF FP 18-04			1	®
Mandarin UF KE-7-39			3	®
Mandarin UF KE-9-9			1	®
Mandarin UF KW5-12			1	®
Mandarin UF LB3-11			1	®
Mandarin UF LB5-3			2	®
Mandarin UF LB7-11			2	®
Mandarin UF LB8-10			2	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Mandarin UF LS-13-51			3	®
Mandarin UF N18A-8-17			1	®
Mandarin UF N18A-9-39			1	®
Mandarin UF NB17-25			2	®
Mandarin UF RBS-13-8			2	®
Midsweet LS UF 2-23			1	®
Midsweet LS UF SF11-1-24			4	®
Midsweet LS UF SF11-2-31			2	®
Midsweet US 6-9	5	11	5	
Miho Wase Satsuma CGIP-235	1	1		
Milam UF A			1	
Miller B/O UF			2	®
Mini-Mandarin UF N18A-10-18			1	®
Minneola F-60-5	5	19	5	
Minnie Finger Lime			2	
Monreal Clem CGIP-109			1	
Moria CGIP-164	1	1		
Moro B/O 3-3-11	2	2	3	
Moro B/O DPI-50-19	1	4		
Moro X Tar B/O 3-2-66			1	
Morton US 1-3	1	33	1	
Mott Gft DPI-45			1	
Murcott 130-1-1S	7	12	6	
Murcott LS UF LB2-19			2	®
Murcott LS UF N40-18A-10-09			2	
Murcott UF 18A-10-47			2	®
Murcott UF 18A-3-16			2	®
Nagami Kum SPB-323-1-1	3	4	5	
Nakon Pum US			2	
Nansho Daidai DPI-50-45			1	
Nasnaran DPI-50-49			1	
Natsumikan DPI-50-48			1	
Naugle Le DPI-206-1			4	
Mandarin US 6-32-67			2	®
Mandarin US 6-34-45			2	®
Mandarin US 6-35-90			2	
Mandarin US C54-4			2	®
Mandarin US N-10-7			1	®
Mandarin US N-8-6			2	®
Mandarin USDA PS-N-4-26			1	®
Mandarin USDA PS-N-5-33			1	®
Marathon	3	13	2	®
Marisol Clem CGIP-124	1	1	2	

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Marsh Gft 74-1-1			5	
Marsh Gft F-57-4	4	9	5	
Marsh Gft F-58-6	1	10		
Marumi Kum DPI-50-47	1	3	2	
Mayaca Navel 63-18-2			3	
McCarty Gft F-53-11			1	
McTeer Murcott			1	®
Mediterranean Swt F-58-38			1	
Meiwa Kum F-27-29	5	11	6	
Melogold CGIP-112			4	
Merav CGIP-146	1	1		
Meravit CGIP-220	1	1	2	®
Meyer Le US	7	20	3	
Microcitrus Inodor US 80-527A			1	
Microcitrus Papuana US			1	
Midknight CGIP-119	1	2	4	
Midsweet LS UF 12-2-33			2	®
Orange Hyb US 1-75-55			1	®
Orange Hyb US 1-85-109			1	®
Orange Hyb US 1-85-119			1	®
Orange Hyb US 1-85-124			1	®
Orange Hyb US 1-85-82			1	®
Orange Hyb US 1-90-251			1	®
Orange Hyb US 5-6-36			1	®
Orange Hyb US 6-45-137			1	®
Orange Hyb US 6-47-9			1	®
Orange Hyb US 6-68-163			1	®
Orange Hyb US 6-9-96			2	®
Orange Hyb US 7650			1	
Orange Hyb US 7651			2	
Orange Hyb US 7652			2	
Orange Jasmine F-			1	
Orangequat Hyb DPI-203-5			1	
Orlando F-57-5	4	5	3	
Oroblanco CGIP-111	1	2	4	
Orri CGIP-134	1	19	9	®
Ortanique F-24-26	1	1	5	
Osceola US 3-58			2	
Oval Pink Pum DPI-212			1	
Navel Gft US 4-1			2	
Navel US 2-C			2	®
Navel US 3-S			2	®
Navel US1-N			2	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Navelo 81-16-15			1	
Nectar CGIP-148	1	1		
Nine Pound Le DPI-201-21			3	
Nocatee F-25-26			1	
Nordmann Kum DPI-203-1			1	
Norton SPB-306			1	
Nour CGIP-149			4	
Nova LS CGIP-200			2	
Nova US 7-41	2	2	3	
Nova+Osceola UF			2	®
Nules Clem CGIP-125	3	6	3	
Odem CGIP-219	1	4	2	®
Okitsu Wase Satsuma CGIP-234	1	1		
Orange Hyb LT US 1-76-52			2	
Orange Hyb US 1-10-1			1	®
Orange Hyb US 1-4-12			1	®
Orange Hyb US 1-46-15			2	®
Orange Hyb US 1-5-213			2	
Orange Hyb US 1-5-35			2	®
Orange Hyb US 1-65-55			2	®
Orange Hyb US 1-74-52			1	
Orange Hyb US 1-74-92			1	®
Orange Hyb US 1-75-113			2	®
Pummelo DPI-203-3			2	
Pummelo DPI-203-4			2	
Pummelo Hyb UF 3-1-21			1	®
Pummelo Hyb UF 3-1-22			1	®
Pummelo Hyb UF 3-1-43			1	®
Pummelo Hyb UF 914			5	®
Pummelo Hyb UF C2-5-03			1	®
Pummelo Hyb UF C4-10-36			1	®
Pummelo Hyb UF NB17-4-0219			1	®
Pummelo Hyb UF NB19-17-0218			1	®
Pummelo Hyb UF NB19-18-0218			1	®
Pummelo Hyb UF NB19-22-0218			1	®
Pummelo Hyb UF NB19-28-0218			1	®
Pummelo Hyb UF NRB15-43			1	®
Pummelo Hyb UF P2			1	®
Pummelo Hyb US 10A-1-21			3	®
Pummelo Hyb US 1-17-170			1	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Pummelo Hyb US 4-3-168			1	®
Pummelo Hyb US 5-93-42			2	®
Pummelo Hyb US 6-16-172			2	®
Pummelo Hyb US 6-16-29			1	®
Pummelo Hyb US 6-16-43			1	®
Owari Sat 874	2	5	5	
Owari Sat F-60-23	2	6		
Owari Sat F-60-25B	1	2	1	
P Tri DPI-50-7			2	
P Tri Rubidoux F-16-20	2	13	1	
P Tri Wacissa F-18-1	3	74	1	
P+(CxS)			1	®
Page US 2-58	2	4	3	
Pandan Wangi Pum US			1	
Parana Gft CGIP-167			1	
Parson Brown F-56-2	3	4	3	
Parson Special US			1	
Pera 3-3-85			1	
Pera US 18-11			1	
Pera US 7-39			1	
Persian Lime SPB-7	6	24	9	
Pineapple 53-10-10	1	4	5	
Pineapple F-60-3	2	4	3	
Pineapple SL US 10B-6-30	2	4	5	
Pineapple SPB-150-	1	2		
Pink Gft US FF-1-26-51-BS			1	®
Pink Pum Hyb US 10-1-1			1	
Pink Sensation Pum 884			1	
Pixie Man CGIP-181			3	
Ponderosa Le DPI-203-8	3	6	3	
Ponkan DPI-50-6	3	4	5	
Pope F-53-28			1	
Procimequat UF			1	
Pum X Gft UF 4-1			2	®
Pummelette UF 5-1-99-2			2	®
Pummelette UF KWP-1-1			2	®
Pummelo 61-12-			1	
Pummelo DPI-203-2			1	
Robinson US 3-56	1	2	4	
Roble 502-4-12			6	
Rohde Red 472-11-43	5	16	10	
Rohde Red DPI-50-3-1			1	
Rohde Red DPI-50-3-2			1	
Rohde Red DPI-50-3-8			1	

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Rohde Red DPI-50-3-9			1	
Rohde Red UF B3-42			1	®
Rosa UF 156			1	®
Rough Le 199	1	23		
Rough Le Red UF 8-7	1	16	2	
Round Lime DPI-205-2			1	
Royal Gft US 4-39			1	
RS UF 16-03			1	®
RS UF 16-04			1	®
RS UF 16-05			1	®
Pummelo Hyb US 6-17-16			2	®
Pummelo Hyb US 6-17-28			2	®
Pummelo Hyb US 6-17-48			2	®
Pummelo Hyb US 6-47-117			1	®
Pummelo Hyb US LP-36-39			2	®
Pummelo UF 16-29			1	®
Pummelo UF 23-5-36			2	®
Pummelo UF N40-16-12-7			2	®
Pummelo UF N7-4			1	®
Pummelo US 10a-7-15			1	
Pummelo US 145 NE			3	
Pummelo US NW			3	
Queen 25-2-15			3	
Rangpur Lime F-3-8			1	
Rasnake Tangelo 625	1	1		
Ray Ruby Gft CGIP-103	8	41	10	
Red Finger Lime DPI-50-36	2	2	3	
Red Gft UF 16-11-17			2	®
Red Gft UF N11-29			2	®
Red Gft UF N40-16-11-15			2	®
Red Gft UF N40-16-11-3			2	®
Red Gft UF N40-16-11-7			2	®
Red Java Pum UF 6-4A			1	
Red Lime 899	2	4	1	
Red Pum UF 5-1-99-5			2	®
Red Pum UF C2-5-12			1	®
Red Pum UF C4-11-19			1	®
Red Pum UF C4-2-8			1	®
Red Pum UF KW-1-50			2	®
Red Pum UF UKP-1			1	®
Red Shaddock UF 5-4A			1	
Ridge Pi SPB-602-36			1	
Rio Red Gft CGIP-110	6	30	6	

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
RS UF 46x20-04-S13			1	®
RS UF 46x20-04-S15			1	®
RS UF 46x43-05-SDLG-51			1	®
RS UF A+HBJL-1-OP-09-36			2	®
RS UF A+HBPxOrange 19-08-2			2	®
RS UF A+Volk x Orange 19-11-8			2	®
RS UF AMB+HBJL-2			1	®
RS UF B21-R1-T2-11-2			1	®
RS UF B21-R1-T25-11-6			1	®
RS UF Blue 1			1	®
RS UF Cleo+Carrizo			1	®
RS UF Gft + 50-7			2	®
RS UF Green x Orange 14-09-32			1	®
RS UF Milam+HBP x Orange 14-09-10			2	®
RS UF Milam+HBP x Orange 14-09-9			2	®
RS UF Milam+HBPxOrange 14-09-14			2	®
RS UF 16-06			1	®
RS UF 16-07			1	®
RS UF 16-08			1	®
RS UF 16-09			1	®
RS UF 16-10			1	®
RS UF 16-11			3	®
RS UF 16-12			1	®
RS UF 16-13			1	®
RS UF 16-14			1	®
RS UF 16-15			1	®
RS UF 16-16			3	®
RS UF 16-17			1	®
RS UF 16-18			1	®
RS UF 16-19			1	®
RS UF 16-20			1	®
RS UF 16-21			1	®
RS UF 16-22			1	®
RS UF 16-23			1	®
RS UF 16-26			1	®
RS UF 16-41			1	®
RS UF 16-42			1	®
RS UF 16-43			1	®
RS UF 16-44			2	®
RS UF 16-52			2	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
RS UF 16-5-28 Orange16			1	®
RS UF 16-53			2	®
RS UF 16-5-5 Orange14			2	®
RS UF 18-01			1	®
RS UF 18-02			1	®
RS UF 18-13			1	®
RS UF 18-2-19 White-1			2	®
RS UF 18-2-8 Green-7			2	®
RS UF 2247x1571-00-3 White-3			1	®
RS UF 2247x2075-01-2			1	®
RS UF 2247x2075-02-26			2	®
RS UF 2247x6070-02-2			2	®
RS UF 46x20-04-32			2	®
RS UF 46x20-04-48			2	®
RS UF 46x20-04-6			2	®
Silver Hill Sat US			3	
Sinton Citrqt US			1	
Smooth Flat Sev US 2-2-14	1	20	1	
Sour Orange DPI-50-9	2	6		
Sour Orange F-49-7	7	152	4	
Sour Orange UF 18-11			1	®
Star Ruby Gft DPI-60	7	229	4	
Succari US 7-21			1	
Sue Linda Temple CGIP-237			1	
Sugar Belle LS UF 1-3			2	®
RS UF Murcott+Rubidoux			1	®
RS UF Purple 4			1	®
RS UF SG-50-6			1	®
RS UF SO + 50-7			2	®
RS UF SO + FDT			1	®
Ruby Red Gft F-58-39	7	27	10	
Ruby Swt (35) UF 32-10	1	1	2	
Ruby Valencia CGIP-195	1	6	2	®
Ryan Navel CGIP-186	1	2	2	
Salustiana 3-1-71	1	1	1	
Salustiana UF			3	®
Sampson UF 9-1A			3	
Sanbokan US 7-55	1	2	1	
Sanguinelli B/O US 10-5-17	2	3	4	
Sanguinello Riccio UF 200			1	®
Santa Cat Navel US 1			1	
Scott Red Gft #3 DPI-666-6			2	®
Scott Red Gft #369 DPI-666-9			1	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Scott Red Gft #5 DPI-666-7			2	®
Scott Red Gft #6 DPI-666-8			2	®
Scott Red Gft #63 DPI-666-10			1	®
Scott Red Gft #79 DPI-666-11			5	®
Scott White Gft #10 DPI-666-12			1	®
Seduced S/O DPI-666-13			1	®
Seedless Snack UF N40W-6-3	1	1	2	®
Seleta Agrocitros UF 132			1	®
Seleta Branca UF 166			1	®
Seminole SPB-342-3-3			1	
Serra D Agua UF 210			1	®
Setoka CGIP-187	1	3	2	
Sexton F-47-24			4	
Shambar Gft US 3-63			1	
Shasta Gold CGIP-159	1	1	3	®
Shatian Pum CGIP-126			3	
Shekwasha US 9-1-27			1	
Shiranui CGIP-132	2	2	4	
Siamese Pink Pum UF 6-12A			3	
Siamese Pum UF 6-9A			1	
Siamese Swt Pum DPI-203-16	1	1	3	
Tangor UF 18-09			1	®
Tangor UF 98-01			1	®
Tankan US 2E-4-25			1	®
Tarocco B/O UF 30-37			1	
Tavares Lqt US 9-4-48			3	
TDE-1 CGIP-158			3	®
Te X Or US 10-15-67			1	®
Temple 33-6-15	3	5	3	
Temple LS DPI-75			3	
Thomasville Citrqt US 1-20			1	
Sugar Belle UF LB8-9	8	43	8	®
Sukega Gft CGIP-182			1	
Summer Gold Gft UF N2-28	1	1	2	®
Summerfield Navel DPI-70-4-9	1	6	2	
Sun Chu Sha US 9-12-12	3	41	1	
Sun Hing Pum DPI-203-7			3	
Sunburst US 5	4	11	8	
Sundiatgo US 5-17			1	
Sunki DPI-50-50			1	
Sunquat DPI-50-27			1	
Sunshine US 10-13			1	
Sunstar US 6-6			5	

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
SuperSour 1			2	
Supersour 2	1	4	2	
SuperSour 3			3	
Sweet Lime F-10-10	2	3	1	
Sweet Orange SL UF C4-16-12			2	®
Sweet Orange UF 12-05			2	®
Sweet Orange UF 7-9-35			1	®
Sweet Orange UF 99-01			4	®
Sweet Orange UF C1-41-B			2	®
Sweet Orange UF N10-25			2	®
Sweet Orange UF OLL10			2	®
Sweet Orange UF OLL-20IR-46			1	®
Sweet Orange UF OLL-20IR-54			2	®
Sweet Orange UF OLL23			2	®
Sweet Orange UF OLL4	9	104	9	®
Sweet Orange UF OLL6	9	126	2	®
Sweet Orange UF OLL7			2	®
Sweet Orange UF OLL8			6	®
Sweet Orange UF RBA-22-29			1	®
Swingle DPI-227	2	95		
Swingle US 22-55	9	973	3	
Sydney Hyb US			2	
Tahoe Gold CGIP-140	1	1	2	®
Tami CGIP-145	1	1		
Tango CGIP-168	5	11	11	®
Tangor UF 00-04			1	®
Tangor UF 04-10			1	®
Tangor UF 11-07			1	®
Tangor UF 13-07			1	®
Tangor UF 13-15			1	®
Tangor UF 15-01			3	®
Tangor UF 16-46			1	®
Tangor UF 16-47			1	®
US-1287			3	®
US-1293			3	®
US-1297			3	®
US-1305			2	®
Thompson Gft 25-3-6	3	5	4	
Thomson Navel US 6-6			1	®
Thong Dee Pum UF 5-8A			1	
Tresca US 10C-2-4			5	®
Triumph Gft DPI-32-4			1	

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
UF 11-4-1			1	®
UF 40-2-21			1	®
UFR-01 Orange3	3	42	1	®
UFR-02 Orange4	3	19	2	®
UFR-03 Orange15	5	48	2	®
UFR-04 Orange19	9	293	2	®
UFR-05 White4	5	93	2	®
UFR-06	2	91	2	®
UFR-07			3	®
UFR-08			1	®
UFR-09			3	®
UFR-10			3	®
UFR-11			2	®
UFR-12			2	®
UFR-14			2	®
UFR-15	2	11	2	®
UFR-16	4	44	2	®
UFR-17 Green2	4	32	2	®
Ugli DPI-74	1	1	1	
US Furr	1	3	2	
US Furr-ST			5	
US Honeycoat			2	
US Ortanique-LS			2	
US Seedless Surprise			3	®
US Sundragon	2	3	2	
US Superna			2	®
US-1102			3	®
US-1103			1	®
US-1104			2	®
US-1105			2	®
US-1130			3	®
US-1137			3	®
US-119			1	®
US-1271			2	®
US-1279	2	12	3	
US-1280			1	®
US-1281	1	34	3	
US-1282	1	42	3	
US-1283	2	26	3	
US-1284	2	21	3	
US-1805			1	®
US-1837			1	®
US-1845			2	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
US-1851			2	®
US-1317			3	®
US-1318			2	®
US-1319			3	®
US-1321			3	®
US-1460			3	®
US-1473			3	®
US-1481			3	®
US-1516	4	84	2	
US-1627			1	®
US-1629			1	®
US-1637			1	®
US-1644			1	®
US-1645			3	®
US-1649			3	®
US-1650			1	®
US-1659			1	®
US-1660			1	®
US-1663			2	®
US-1664			2	®
US-1671			3	®
US-1672			1	®
US-1673			2	®
US-1676			1	®
US-1678			2	®
US-1679			3	®
US-1680			1	®
US-1681			3	®
US-1687			1	®
US-1688			2	®
US-1689			1	®
US-1690			3	®
US-1692			1	®
US-1694			3	®
US-1695			2	®
US-1696			1	®
US-1701			2	®
US-1705			2	®
US-1709			1	®
US-1710			2	®
US-1721			1	®
US-1730			2	®
US-1740			2	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
US-1741			2	®
US-1742			1	®
US-1744			1	®
US-1745			1	®
US-1750			2	®
US-1753			2	®
US-1755			1	®
US-1859			1	®
US-1865			2	®
US-1867			1	®
US-1872			1	®
US-1879			1	®
US-1888			1	®
US-1892			1	®
US-2101			2	®
US-2102			2	®
US-2103			2	®
US-2104			2	®
US-2105			2	®
US-2106			2	®
US-2107			1	®
US-2108			2	®
US-2109			1	®
US-2110			2	®
US-2111			3	®
US-2121			1	®
US-2122			1	®
US-2127			1	®
US-2131			1	®
US-2132			1	®
US-2135			3	®
US-2136			1	®
US-2137			1	®
US-2158			1	®
US-2160			1	®
US-2175			2	®
US-2195			1	®
US-2209			1	®
US-2234			1	®
US-2249			1	®
US-2250			1	®
US-2255			1	®
US-2259			1	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
US-2264			1	®
US-2272			1	®
US-2276			1	®
US-2280			1	®
US-2287			1	®
US-2290			1	®
US-2293			1	®
US-2301			1	®
US-2303			1	®
US-2315			1	®
US-2331			1	®
US-2336			1	®
US-2338			1	®
US-1756			1	®
US-1757			2	®
US-2491			1	®
US-2492			1	®
US-2493			2	®
US-2494			1	®
US-376-10			3	®
US-376-5			2	®
US-376-6			2	®
US-376-8			2	®
US-377-V1			2	®
US-377-V2			2	®
US-378-G1			2	®
US-378-G2			1	®
US-801			2	®
US-802	17	725	5	
US-812	14	689	2	
US-852			3	
US-896	1	10	1	®
US-897	16	655	5	
US-942	20	1609	6	
USDA 1-105-106			4	®
USDA 1-25-1			2	®
USDA 1-37-12			2	®
USDA 1-42-65			2	®
USDA 1-42-70			2	®
USDA 1-43-21			2	®
USDA 1-46-30			2	®
USDA 1-49-105			3	®
USDA 5-51-2			3	®

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
USDA 6-15-150			2	®
USDA 6-2-53			2	®
Valencia -	1	1		
Valencia 10-12-7			1	
Valencia 51-3-3			1	
Valencia Appleby UF 11-71			1	®
Valencia F-55-1			1	
Valencia F-55-23	1	4	1	
Valencia F-55-28			1	
Valencia F-55-4	9	126	37	
Valencia Jenner UF 19-39			2	®
Valencia Late UF N10-13			3	®
Valencia Late UF N7-2			2	®
Valencia Mid UF OLL20	3	9	2	®
Valencia Navel 522-15-14	1	13		
Valencia SL UF 2-21			2	®
Valencia SPB-1-12-7			3	
Valencia SPB-1-14-19	22	607	99	
Valencia SPB-1-14-31	3	36	5	
US-2343			1	®
US-2345			1	®
Valenfresh UF N7-3			4	®
Valquarius LT UF SF14W-62	5	11	7	®
Valquarius UF SF14W-62	3	5	2	®
Vangasay Le US 9-1-23			1	
Variegated Minneola F-2-4			1	
Variegated Pink Le US	3	5	4	
Variegated Rough Le US 10-6-11			1	
Variegated S/O US 18-4			1	
Varn Navel SPB-194-10-2			2	
Verna Le DPI-203-20-b	1	3	1	®
Vernia UF 35-15	15	319	18	
Vernia UF 35-16	1	2		
Vernia UF C2-2-1			2	
Vernia UF C2A-1-10	1	1	4	®
Volkamer Le US 9-2-19	3	59	3	
W Murcott CGIP-122	4	10	5	
Wash Navel F-60-13	1	1		
Wash Navel F-60-18	1	3	2	
Wash Navel F-60-19	2	2	5	
Weeping Dragon			1	
Wekiwa US 11-7			3	
Westin UF 47-13	1	1		

Budwood Availability	Scion Trees		Chiefland Trees	
Variety Clone	# Part	#Trees	# Trees	Restricted
Westin UF 47-2			2	
WG Man 911-02	1	3		
WG Man 911-03	1	3	2	
WG Man 911-17	1	1	2	®
WG Man 911-32	1	2	2	
WG Man 911-B-23	1	1	1	
WG Man 911-B-24	1	1	1	
WG Man 911-B-26	1	1	1	
WG Man 911-B-37	1	1	1	
WG Man 911-C-34	1	1	1	
WG Man 911-C-37	1	4	3	
WG Man 911-E-22	1	1	4	
WG Man 911-E-26	1	1	3	®
WG Man 911-E-28	1	1	1	
Wheeny Gft CGIP-183			2	
White Man UF 6-16-116			2	®
White Orange DPI-203-18			2	
White Tangelo 956-1			1	
Wild Turkey Navel 941-11-30-1			1	
Willits US 12-8-19	2	83	1	
Willowleaf Man SPB-89-1-1			1	
Willowleaf S/O F-12-9			1	
Winola CGIP-165	1	2		
X-639 DPI-50-8	15	857	3	
Xie Shan Sat CGIP-163	1	1	4	
Valencia UF 1-56			2	®
Valencia UF 1-62			2	®
Valencia UF B9-65	4	14	5	®
Valencia UF BHG2-68			2	®
Valencia UF C2A-1-23			1	®
Valencia UF N40-16-7-11			1	®
Valencia UF N7-10			2	®
Valencia UF N9-12			2	®
Yellow Gft 345-1-15	1	1		
Yosemite Gold CGIP-141	1	1	3	®
Yuzu F-9-15	1	1	1	

Statistics for 2020-2022

Data	2021-2022	2020-2021
Total bud eyes distributed from Chiefland	141,041	157,567
Total # of trees in Chiefland	2,010	2,175
Total # of varieties represented by trees in Chiefland	1,162	1,084
# of trees propagated by nurseries	3,572,190	4,825,343
# of pathogen tests performed in bureau greenhouse & lab	77,574	85,077
Total # of selections entered into bureau's parent trees indexing program for testing & shoot tip grafting	42	90
# of new varieties released after completing indexing process (above)	38	74
Most popular varieties (variety clones and rootstocks)	Variety clones: Valencia SPB 1-14-19 Vernia UF 35-15 Hamlin 1-4-1 Valencia F-55-4 Meyer Le US Valencia SPB 1-14-31 Hamlin 8-1-4 Star Ruby Gft DPI-60 Orri CGip-134 Persian Lime SPB-7 Rootstocks: US-942 Kuharske X-639 Swingle Sour Orange US 812 Volkamer Lemon Own Root C-146 US-897	Variety clones: Valencia SPB 1-14-19 Vernia UF 35-15 Hamlin 1-4-1 Valencia F-55-4 Meyer Le US Star Ruby GFT DPI-60 Key Lime SPB-51-12 Valencia SPB 1-14-31 Ray Ruby GFT CGIP-103 Bearss LE SPB-341-95-33 Rootstocks: US-942 Kuharske X-639 Swingle Own Root US-812 Sour Orange US-897 Volkamer US-802
# of active nurseries inspected monthly	68 (2022)	70 (2021)

LaCrosse
There are over 200 trees planted at the LaCrosse backup facility, with 100 new releases to be available soon to citrus nurseries. We are continually streamlining the collection and extraction process, and strive to provide timely results to the industry while still maintaining the "gold standard" cleanup process for all new introductions from all over the world.

Citrus Germplasm Laboratory and Greenhouses – Winter Haven
Functionality has been improved in the Winter Haven Laboratory with the installation of an updated DIRO water system and a new glassware dishwasher. We have also acquired a new microscope that incorporates the use of video for training of shoot tip grafting. The greenhouses have also been updated with upgraded cooling pads and the installation of a new brick paver walkway and new pushcarts in Greenhouse 2.

Florida Citrus Arboretum
The Arboretum, housed at our Winter Haven location, currently showcases over 250 unique and historical citrus varieties and citrus relatives. We continue to make improvements to the grounds that enhance the Arboretum. Originally planted in 1978 on six and a half acres, the Arboretum contains citrus germplasm from all over the world. Commercial citrus along with many unique citrus hybrids and relatives are available for researchers, breeders, FFA groups, college students and tourists to observe, evaluate and taste.

Improvements to the grounds include the latest technologies. We have upgraded the irrigation well and pump to include a new acid injection pump to help better control the pH. A state-of-the-art weather monitoring station was added to record rain amounts, wind speeds, temperatures, etc. Sensors for soil moisture, temperature and salinity were also installed that can be viewed by a cell phone app. The irrigation is automated to allow for after hours and weekend use.

HLB remains our largest challenge, and we continue to replant using our own specially designed Individual protection covers (IPCs) and follow standard industry caretaking practices. The Arboretum reflects newer releases as well as older line varieties, hybrids and relatives. Vacant spots are always available to leave room for the next great variety.

Location	Variety Clone	Rootstock	Date Set	Comments
ARB-01-01	Mandarin UFDawn 09-13	US-897	3/31/2016	
ARB-01-02	W Murcott CGIP-122	FDT	3/31/2011	
ARB-01-03	US Furr-ST	KJ	3/31/2011	
ARB-01-04	Tango CGIP-168	S/O	4/2/2014	
ARB-01-05	Kishu SL CGIP-137	S/O	3/31/2011	
ARB-01-06	Cleopatra F-1-7	OWN	3/2/1978	
ARB-01-07	Sun Chu Sha US 9-12-12	US-897	3/30/2020	
ARB-01-08	Nasnaran DPI-50-49	CLEO	7/17/1991	
ARB-01-09	Shekwasha US 9-1-27	FDT	7/9/2012	
ARB-01-10	Batangus US 10-45	KJ	2/26/2020	
ARB-01-11	Fremont US 6-49	2247x2075-01-2	3/4/2020	
ARB-01-12	Sunki DPI-50-50	US-897	3/31/2016	
ARB-01-13	Mandarin UF 13-09	VOLK	5/19/2021	
ARB-01-14	Mandarin UFGlow 10-02	US-897	4/6/2020	
ARB-02-01	Mandarin UFSunrise 09-04	US-897	3/31/2016	
ARB-02-02	Mandarin Mid UF 711	BS	3/3/2020	
ARB-02-03	Orri CGIP-134	US-897	4/2/2014	
ARB-02-04	Tahoe Gold CGIP-140	KJ	3/31/2011	
ARB-02-05	Gold Nugget CGIP-139	KJ	3/31/2011	
ARB-02-06	Tami CGIP-145	KJ	3/31/2011	
ARB-02-07	Owari Sat F-60-25B	KJ	6/14/2004	
ARB-02-08	Silver Hill Sat US	KJ	4/2/2014	
ARB-02-09	Ponkan DPI-50-6	S/O	5/26/2010	
ARB-02-10	Fallglo US 10-61-3	KJ	6/14/2004	
ARB-03-01	Summer Gold Gft UF N2-28	US-897	3/31/2016	
ARB-03-02	Isle O Pine Gft US	CLEO	4/11/1990	

Location	Variety Clone	Rootstock	Date Set	Comments
ARB-03-03	Royal Gft US 4-39	FDT	8/11/2014	
ARB-03-04	Siamese Pum UF 6-9A	CLEO	6/15/1978	
ARB-03-05	Star Ruby Gft DPI-60	S/O	6/12/2019	
ARB-03-06	US Seedless Surprise	S/O	7/14/2021	
ARB-03-07	Dobashi Sat DPI-50-28	OWN	9/11/1997	
ARB-03-08	Early Pride US 1-62-122	US-897	3/31/2016	
ARB-03-09	Seedless Snack UF N40W-6-3	US-897	3/31/2016	
ARB-03-10	Minneola F-60-5	KJ	10/4/1994	
ARB-03-11	Minneola F-60-5	FDT	4/2/2014	
ARB-03-12	Minneola F-60-5	S/O	6/12/2019	
ARB-03-13	Mandarin UF 411	US-897	3/31/2016	
ARB-03-14	Nocatee F-25-26	KJ	3/16/2000	
ARB-03-15	Cipo US 10A-7-10	GT	9/11/1997	
ARB-04-01	Red Pum UF C2-5-12	US-897	3/31/2016	
ARB-04-02	Red Pum UF 5-1-99-5	US-897	3/31/2016	
ARB-04-03	Red Pum UF C4-11-19	SWG	9/1/2020	
ARB-04-04	Red Shaddock UF 5-4A	CLEO	4/11/1990	
ARB-04-05	Red Pum UF UKP-1	SWG	9/1/2020	
ARB-04-06	Ruby Red Gft -	SWG	6/12/2019	
ARB-04-07	Pummelette UF 5-1-99-2	US-897	3/5/2020	
ARB-04-08	Early Pride US 1-62-122	US-942	6/12/2019	
ARB-04-09	Ponderosa Le DPI-203-8	VOLK	3/10/2021	
ARB-04-10	Variegated Pink Le US	2247x2075-01-2	3/30/2020	
ARB-04-11				Vacant
ARB-04-12	Nova US 7-41	KJ	4/14/1999	
ARB-04-13	Page US 2-58	KJ	4/2/2014	
ARB-04-14	Mandarin UF 950	US-897	3/31/2016	
ARB-04-15	Dweet Tangor F-8-18	CLEO	7/17/1991	
ARB-04-16	Murcott 130-1-1S	FDT	4/2/2014	
ARB-05-01				Vacant
ARB-05-02	Kao Phuang Pum UF 5-2	CLEO	4/11/1990	
ARB-05-03	Le Pum 748-32	KJ	3/16/2000	
ARB-05-04	Hirado Pum 939-10	KJ	5/26/2010	
ARB-05-05	Siamese Pink Pum UF 6-12A	KJ	4/14/1999	
ARB-05-06	Shambar Gft US 3-63	FDT	4/2/2014	
ARB-05-07	Duncan Gft F-57-19	S/O	6/3/2020	
ARB-05-08	Citron DPI-201	KJ	5/26/2010	
ARB-05-09	Nine Pound Le DPI-201-21	KJ	4/2/2014	
ARB-05-10	Volkamer Le US 9-2-19	CLEO	7/17/1991	
ARB-05-11	Harvey Le F-41-39	S/O	6/12/2019	
ARB-05-12	Rough Le Estes SPB-602	S/O	5/26/2010	
ARB-05-13	Rough Le Red UF 8-7	KJ	3/31/2011	
ARB-05-14	Bangladesh Le DPI-633-1	VOLK	2/25/2020	
ARB-05-15	Vangasay Le US 9-1-23	S/O	3/31/2020	

Location	Variety Clone	Rootstock	Date Set	Comments
ARB-05-16	Daisy CGIP-120	CLEO	8/27/2020	Reset
ARB-05-17	Valencia SPB-1-14-19	BS	6/1/2019	
ARB-05-18	King 18-1-1	BS	4/1/2020	
ARB-06-01	US Seedless Surprise	VOLK	7/14/2021	
ARB-06-02	Jackson Gft DPI-16	US-897	4/2/2014	
ARB-06-03	Large Pink Pum US 6-57	KJ	6/14/2004	
ARB-06-04	Siamese Swt Pum DPI-203-16	KJ	6/14/2004	
ARB-06-05	Flame Gft US 1-26-71	SWG	6/12/2019	
ARB-06-06	Ray Ruby Gft CGIP-103	SWG	6/12/2019	
ARB-06-07	Ray Ruby Gft CGIP-103	SWG	4/2/2014	
ARB-06-08	Citron DPI-201	KJ	4/17/2009	
ARB-06-09	Etrog Citron DPI-223-861	OWN	6/3/2005	
ARB-06-10	Garrett B/O DPI-666-1	VOLK	6/8/2020	
ARB-06-11	Garrett B/O DPI-666-2	BS	6/17/2020	
ARB-06-12	Garrett B/O DPI-666-3	S/O	6/11/2020	
ARB-06-13	Sweet Orange UF OLL8	UFR-04	9/2/2020	
ARB-06-14	Variegated Rough Le US 10-6-11	S/O	3/1/2021	
ARB-06-15	Variegated Cara Blush 941-4	OWN	4/7/2020	
ARB-06-16	Wekiwa US 11-7	KJ	6/9/2010	
ARB-06-17	Succari US 7-21	S/O	3/31/2020	
ARB-06-18	White Tangelo 956-1	KJ	7/9/2012	
ARB-07-01	Sunstar US 6-6	FDT	4/16/2003	
ARB-07-02	Liang Ping Pum UF 8811	CLEO	7/17/1991	
ARB-07-03	Pummelo UF N7-4	US-897	3/31/2016	
ARB-07-04	Pink Pum Hyb US 10-1-1	CLEO	7/17/1991	
ARB-07-05	Pandan Wangi Pum US	CLEO	7/17/1991	
ARB-07-06	Ichang Papeda US 42	OWN	4/17/2009	
ARB-07-07	Ichang Le US 2-33	KJ	3/16/2000	
ARB-07-08	Mel Papeda US	FDT	9/20/2012	
ARB-07-09	Kaffir Lime UF	CLEO	7/17/1991	
ARB-07-10	Meyer Le SPB-199-1-1	CLEO	7/17/1991	
ARB-07-11	Lisbon Le UF 3-9	US-897	3/31/2016	
ARB-07-12	Sweet Orange UF OLL4	UFR-04	9/2/2020	
ARB-07-13	Baboon Le US 2-25	FDT	3/31/2011	
ARB-07-14	Bearss Le SPB-341-95-33	SWG	3/16/2000	
ARB-07-15	Ugli DPI-74	KJ	4/14/1999	
ARB-07-16	Sweet Orange SL UF C4-16-12	US-897	3/3/2020	
ARB-07-17	Temple 33-6-15	US-897	3/31/2016	
ARB-07-18				Vacant
ARB-07-19	Dancy F-59-8	S/O	5/19/2021	
ARB-08-01	US-942	VOLK	3/1/2021	
ARB-08-02	Crisafulli Navel 956-6	US-897	4/2/2014	
ARB-08-03	Kuharske 100-1-10	KJ	4/14/1999	

Location	Variety Clone	Rootstock	Date Set	Comments
ARB-08-04	Madam Vinous UF 13	US-897	4/6/2021	
ARB-08-05	Flying Dragon US	OWN	4/17/2009	
ARB-08-06	P Tri DPI-50-7	OWN	7/21/1986	
ARB-08-07	Buddhas Hand F-8-7	KJ	3/31/2016	
ARB-08-08	Chinotto S/O US 8-41	SCS	7/10/2015	
ARB-08-09	Meyer Lemon -	S/O	6/12/2019	
ARB-08-10	Sundiatgo US 5-17	KJ	7/9/2012	
ARB-08-11	Sanbokan US 7-55	KJ	6/14/2004	
ARB-08-12	Hyuganatsu US 12-43	SCS	8/1/1994	
ARB-08-13	Everbearing Le US 9-1-64	KJ	7/9/2012	
ARB-08-14	Calamandarin F-9-14	CLEO	4/14/1999	
ARB-08-15	Yuzu F-9-15	KJ	7/21/2000	
ARB-08-16	Parson Special CGIP-101	CLEO	3/16/2000	
ARB-08-17	Yosemite Gold CGIP-141	US-897	3/31/2020	
ARB-08-18	Dancy F-59-8	SCS	6/14/2004	
ARB-09-01	Itaborai UF 31-6	FDT	4/16/2003	
ARB-09-02	Nagami Kum SPB-323-1-1	CLEO	3/2/1978	
ARB-09-03	Sinton Citrqt US	US-812	6/3/2005	
ARB-09-04	Centennial Kum US	2247x2075-01-2	2/27/2020	
ARB-09-05	P Tri DPI-50-7	VOLK	6/18/2020	
ARB-09-06	Nordmann Kum DPI-203-1	KJ	4/2/2014	
ARB-09-07	Marumi Kum DPI-50-47	FDT	8/11/2014	
ARB-09-08	Procimequat UF	OWN	4/30/2010	
ARB-09-09	Torregrossa US 7-3	FDT	7/21/2000	
ARB-09-10	Limeberry DPI-50-43	OWN	5/26/2010	
ARB-09-11	Rangpur Lime F-3-8	FDT	4/17/2009	
ARB-09-12	Sweet Lime F-10-10	KJ	4/14/1999	
ARB-09-13	Lakeland Lqt F-55-26	CLEO	7/17/1991	
ARB-09-14	Orangequat Hyb DPI-203-5	SFS	4/25/1997	
ARB-09-15	Sunquat DPI-50-27	GT	6/14/2004	
ARB-09-16				Vacant
ARB-09-17	Fina Sodea Clem CGIP-123	S/O	8/24/2020	Reset
ARB-09-18	Monreal Clem CGIP-109	SWG	6/14/2004	
ARB-09-19	Keraji DPI-50-38-3	OWN	7/9/2012	
ARB-09-20				Vacant
ARB-10-01	Westin UF 47-2	FDT	4/16/2003	
ARB-10-02	Microcitrus Inodor US 80-527A	KJ	2/25/2020	
ARB-10-03	Glen Navel F-56-11	US-942	6/12/2019	
ARB-10-04	Finger Lime Giant (possible Sydney Relative)	OWN	6/27/2012	
ARB-10-05	Sydney Hyb US	FDT	6/27/2012	
ARB-10-06	Microcitrus Papuana US	US-812	7/10/2015	
ARB-10-07	Finger Lime Giant DPI-205-4	VOLK	1/9/2020	

Location	Variety Clone	Rootstock	Date Set	Comments
ARB-10-08	Finger Lime DPI-205-1	SWG	1/9/2020	
ARB-10-09				Vacant
ARB-10-10	Microcitrus Papuana US	US-812	5/26/2010	
ARB-10-11				Vacant
ARB-10-12	Red Finger Lime DPI-50-36	OWN	5/26/2010	
ARB-10-13	Eustis Lqt US 16-6-12	CLEO	8/12/2020	Reset
ARB-10-14	Key Lime SPB-51-12	FDT	7/9/2012	
ARB-10-15	Persian Lime SPB-7	US 897	10/17/2016	
ARB-10-16	Key Lime SPB-51-12	KUH	7/9/2012	
ARB-10-17	Round Lime DPI-205-2	CLEO	3/5/2020	
ARB-10-18	Key Lime Thornless F-59-39	KJ	8/11/2014	
ARB-10-19	Persian Lime SPB-7	S/O	6/6/2016	
ARB-10-20				
ARB-10-21	Orange Jasmine	OWN	10/23/2019	Murraya Paniculata; Ornamental
ARB-11-01	Earlygold UF 33-4	FDT	4/16/2003	
ARB-11-02	Valquarius		6/12/2019	
ARB-11-03	C moi F-11-8W	S/O	5/26/2010	
ARB-11-04	Pineapple SL US 10B-6-30	KJ	10/4/1994	
ARB-11-05	Raratonga Swt US	SWG	2/21/1992	
ARB-11-06	Florida EV2 UF SF14W-65	SWG	6/12/2019	
ARB-11-07	Florida EV1 UF B7-70	SWG	6/12/2019	
ARB-11-08	Valencia SPB-1-14-19	FDT	9/11/1997	
ARB-11-09	Valencia F-55-4	FDT	9/11/1997	
ARB-11-10	Willowleaf S/O F-12-9	OWN	6/13/1980	
ARB-11-11	Natsumikan DPI-50-48	OWN	5/1/1980	
ARB-11-12	Kinkoji DPI-50-44	OWN	5/1/1980	
ARB-11-13	Smooth Flat Sev US 2-2-14	KJ	4/14/1999	
ARB-11-14	Corniculata DPI-50-35	OWN	6/9/2010	
ARB-11-15	Orange Jasmine	OWN	10/23/2019	Murraya Paniculata; Ornamental
ARB-12-01	Cadenera US 5-15	KJ	5/26/2010	
ARB-12-02	Homosassa 56-10-28	CLEO	6/14/2004	
ARB-12-03	Mediterranean Swt F-58-38	SFS	4/14/1999	
ARB-12-04	Parson Brown F-56-2	KJ	9/11/1997	
ARB-12-05	Enterprise 609-14-17	US-897	7/9/2012	
ARB-12-06	Vernia UF 35-15	US-942	6/12/2019	
ARB-12-07	Jaffa F-53-38	KJ	4/17/2009	
ARB-12-08	Sugar Belle UF LB8-9	S/O	9/24/2020	Reset
ARB-12-09	Bigaradier Apepu S/O US 13-39	MIL	3/26/1981	
ARB-12-10	Bittersweet SPB-400-40-179N	US-812	6/3/2005	
ARB-12-11	Variegated S/O US 18-4	US-812	6/3/2005	
ARB-12-12	Sour Orange F-49-7	US-812	7/9/2012	

Location	Variety Clone	Rootstock	Date Set	Comments
ARB-12-13	Bouquet De Fleurs UF 18	SFS	4/14/1999	
ARB-13-01	Gardner US 6-16	KJ	6/3/2005	
ARB-13-02	Wild Turkey Navel 941-11-30-1	KJ	5/26/2010	
ARB-13-03	Pera US 7-39	KJ	7/21/2000	
ARB-13-04	Roble 502-4-12	KJ	4/16/2003	
ARB-13-05	Pope F-53-28	SFS	4/14/1999	
ARB-13-06	Midsweet US 6-9	80-5	7/31/2000	
ARB-13-07	Goutou US-1	R/L	7/3/1985	
ARB-13-08	Zhu Luan DPI-50-21	OWN	4/11/1990	
ARB-13-09	Nansho Daidai DPI-50-45	CLEO	4/6/2020	
ARB-13-10				
ARB-14-01	Akcay Sekeri 3-3-10	FDT	4/16/2003	
ARB-14-02	Dream Navel DPI-58	FDT	4/17/2009	
ARB-14-03	Navelo 81-16-15	FDT	5/7/2009	
ARB-14-04	Santa Cat Navel US 1	KJ	3/16/2000	
ARB-14-05	Thomson Navel US 4-5	KJ	6/27/1996	
ARB-14-06	Cara Cara Navel CGIP-104	OR/TA	8/18/1986	
ARB-14-07	Pineapple 1-27-11	X-639	4/25/1997	
ARB-14-08	Ruby Swt (35) UF	SWG	10/4/1994	
ARB-15-01				Vacant
ARB-15-02	Marmelos F-16-1	OWN	6/5/1987	
ARB-15-03	Afraegle F-16-2	OWN	4/11/1990	
ARB-15-04	Gabonensis F-16-3	OWN	4/11/1990	
ARB-15-05	Cara Cara Navel CGIP-104	C-35	8/11/2014	
ARB-16-01	C excelsa US 60-169-502	S/O	5/26/2010	
ARB-16-02	Curry Leaf DPI-50-51	OWN	9/22/1979	
ARB-16-03	Afraegle F-16-2	OWN	4/11/1990	
ARB-17-01	Calamondin DPI-555	SCS	3/31/2016	
ARB-17-02	Jackfruit	OWN	3/1/2019	4 Trees
ARB-17-03	Glycosmis F-17.5-2	OWN	3/1/1978	
ARB-17-04	Atalantia US 11-8-76	OWN	8/20/1992	
ARB-17-05	Hesperethusa UF	OWN	9/28/1990	
ARB-17-06	Hesperethusa UF	OWN	9/28/1990	
ARB-17-07	Hercules F-17-7S	OWN		Volunteer PLANT
ARB-17-08	Buxifolia DPI-50-40	OWN	12/11/2019	
ARB-18-01	Eremocitrus US	SFS	5/8/1992	
ARB-18-02	Hercules F-17-7S	OWN	9/11/1987	
ARB-18-03	Prickly Ash F-17-8	OWN	4/20/1988	
ARB-18-04	Hamlin -		6/12/2019	
ARB-18-05	Cara Cara Navel CGIP-104		6/12/2019	
ARB-19-01				
ARB-19-02	Thomasville Citrqt US 1-20	KJ	4/25/1997	
ARB-19-03	Bouquet De Fleurs UF 18			

Location	Variety Clone	Rootstock	Date Set	Comments
ARB-19-04	Rohde Red 472-11-43	KJ	6/14/2004	
ARB-19-05	Valencia -		6/12/2019	
ARB-19-06	Akcay Sekeri 3-3-10	UNK	11/18/2020	
ARB-20-01	Pamburus US	OWN	8/18/1983	
ARB-20-02	Bouquet De Fleurs UF 18			
ARB-20-03	Sea Amyris F-19-7	OWN	8/18/1986	
ARB-20-04	Wild Turkey Navel 941-11-30-1	KJ	3/31/2011	
ARB-20-05	Lane Navel CGIP-121	KJ	4/14/1999	
ARB-20-06	Bahianinha Navel US 9-6-47	KJ	4/2/2014	
ARB-21-01	Sapote W W US	OWN	10/6/1981	
ARB-21-02	Sapote W F-20-7	OWN	5/1/1978	
ARB-21-03	Sapote W DPI-204	OWN	8/18/1983	
ARB-21-04	Budd B/O DPI-82	VOLK	4/27/2021	
ARB-21-05	Midknight CGIP-119	US-897	7/9/2012	
ARB-21-06				Vacant
ARB-21-07	Tresca US 10C-2-4	KJ	7/9/2012	
ARB-21-08	Tarocco B/O UF 30-37	KJ	6/27/1996	
ARB-21-09	Sanguinelli B/O US 10-5-17	US-897	7/9/2012	
ARB-OFF-01	Chinotto S/O US 8-41	SCS	4/2/2014	
ARB-OFF-02	Procimequat UF	OWN	3/1/1978	Two Trees
ARB-OFF-03	Procimequat UF	VOLK	6/22/2021	
ARB-OFF-03				Vacant
ARB-OFF-04	Hong Kong Kum US 10-2	OWN	8/11/2014	
ARB-OFF-05	Meiwa Kum F-27-29	US-897	6/17/2020	
ARB-OFF-06	Round Lime DPI-205-2	S/O	8/25/2020	Reset
ARB-OFF-07	Long Fruit Kum DPI-603-20-50	CLEO	2/5/1992	
ARB-OFF-08	Crassifolia Kum CGIP-105	R/L	7/17/1991	
ARB-OFF-09				Vacant
ARB-OFF-10				Vacant
ARB-OFF-11				Vacant
ARB-OFF-12	Limeberry DPI-50-43	OWN	9/9/9999	
ARB-OFF-13	Red Finger Lime DPI-50-36	OWN	8/11/2014	
ARB-OFF-14	Meiwa Kum F-27-29	CLEO	3/16/2000	
ARB-OFF-15				Vacant
ARB-OFF-16				Vacant
ARB-OFF-17	Chinotto S/O US 8-41	SCS	7/9/2012	
ARB-POT-04	Chinotto S/O US 8-41	VOLK	6/22/2021	
ARB-POT-05	Nordmann Kum DPI-203-1	VOLK	4/10/2020	
ARB-POT-06	Hong Kong Kum US 10-2	US-897	4/7/2020	
ARB-POT-07	Eremocitrus x Shekwa	OWN	4/10/2020	

The Citrus Budwood Technical Advisory Committee provides oversight to the Citrus Nursery Stock Certification Program. The committee did not meet in 2020 due to the outbreak of SARS-CoV-2 coronavirus.

CITRUS BUDWOOD TECHNICAL ADVISORY COMMITTEE MEMBERS

Grower
Peter Chaires

Nursery
Michael Monroe
John Gose
Nate Jameson
*Phillip Rucks
Tommy Thayer
Clay Pederson

Regulatory
Dr. Susan Halbert
Kristen Aslan
Ben Rosson
Justin Ezell

Research
Dr. Kim Bowman
Dr. Fred Gmitter
Dr. Mark Hilf

*Committee Chairman

Citrus Nursery Inspection
Our Citrus nursery inspectors continue to diligently inspect all certified nursery sites and greenhouse structures to ensure that insect pests and disease are not present. Samples of leaves, stems and fruit are sent to DPI's plant pathology lab for testing and identification, as well as soil samples to our nematology lab for identification. Scion and seed source trees are tested annually for pathogens and sent to the Florida Citrus Repository labs in LaCrosse.

Citrus Propagations by County	
County	**Propagations**
Polk	1,845,701
Sumter	478,660
Highlands	314,707
Hillsborough	296,913
Desoto	269,481
Lake	131,552
Hardee	80,092
Charlotte	69,541
Orange	44,555
Taylor	23,579
Madison	6,218
Gilchrist	5,787
Pasco	3,149
Washington	2,255

Citrus Nursery Production	2020-2021	2021-2022
Propagations Reported	4,825,343	3,572,190
Propagations Change (Increase or Decrease)	891,528	(1,253,153)
Percent Change (Increase or Decrease)	18.48%	(25.97)%
Nurseries Increasing Production	20	12
Nurseries Decreasing Production	15	29
New or Resumed Production	10	3

Florida Citrus Nursery Participants

45 commercial citrus nurseries and 2 research agencies reported propagations in the 2020-2021 fiscal year.					
Part #	**Participant Name**	**Nursery Type**	**Part #**	**Participant Name**	**Nursery Type**
0968	Agromillora Florida, Inc.	TC	0199	Lykes Citrus Division	C
0888	James H. Albritton	OU	0882	McGill Citrus Nursery, Inc.	C
0821	Robert J. Barben, Inc.	C	0952	Murphy Citrus Nursery, Inc.	C
0979	BL Citrus Nursery, LLC	C	0965	North Florida Citrus Nursery, LLC	C
0955	Blue Heron Nurseries, LLC	C	0972	Old South Nursery	C
0805	Brewer Citrus Nursery	C	0817	Petteway Growers	C
0876	Brite Leaf Citrus Nursery, LLC	C	0535	Pokey's Lake Jem Citrus Nursery	C
0969	Citrific Holdings, Inc.	C	0974	Propagations Unlimited, Inc.	C
0960	CitriSun Nurseries, LLC	C	0625	Rasnake Citrus Nursery	C
0913	Cutrale Farms, Inc.	C	0778	Reclamation Trees	C
0961	Dilley Citrus Nursery, Inc.	C	0832	Record Buck Farms, Inc.	DY, WHSL
0799	K & C Farmer Citrus Nursery, Inc.	C	0721	Phillip Rucks Citrus Nursery, Inc.	C
0801	Fiddler's Ridge Farms, Inc.	C	0962	Sawmill Citrus Nursery, LLC	C
0728	Flood Clinch Lake Nursery	C	0033	Southern Citrus Nurseries, LLC	C
0702	Floyd & Associates, Inc.	C	0700	Southern Gardens Citrus Nursery, LLC	C
0929	Gose Growers, Inc.	C	0753	Southridge Citrus Nursery, Inc.	C
0522	W. E. Green & Sons Citrus Nursery, Inc.	C	0891	Stinson Citrus	C
0519	Ben Hill Griffin, Inc.	C	0948	Sun Ag LLC	C
0773	Harris Citrus Nursery	C, DY	0740	Timmermann's Citrus Nursery	C, DY
0433	Himrod Citrus Nursery, Inc.	C	0214	W.A. Williams Citrus Nursery & Svc., Inc.	C
0355	Holmberg Farms, Inc.	C, DY	0920	W.W. Citrus Nursery	C
0738	Joshua Citrus Nursery	OU	0001	Wards Nursery, Inc.	C
0980	L&L Citrus Trees, Inc.	DY			
Nursery Type C = Commercial OU = Own use DY = Dooryard WHSL = Wholesale RE = Research TC = Tissue culture or micro-propagation			PART#	Research Agencies Propagating	
			1004	UF - CREC	RE
			1008	USDA - FT. Pierce	RE
			3730 propagations were reported by research agencies.		

Special Projects

GIANT AFRICAN LAND SNAIL ERADICATION PROGRAM

The giant African land snail (GALS), *Lissachatina (Achatine) fulica*, is an invasive pest to the state of Florida. It has a lifespan of up to eight years, the ability to grow up to eight inches long and produce 2,000 eggs per year. They feed on more than 500 host plants and can damage structures by consuming stucco to obtain calcium necessary to build shells. They can carry the rat lungworm parasite, known to cause a form of meningitis in humans and animals, making them a significant threat to landscapes, crops, buildings and human and animal health.

After GALS were found in Miami in 2011, FDACS-DPI and the USDA began emergency eradication efforts. The FDACS-DPI quickly established a presence in Miami and began a decade-long partnership with the community. Outreach, inspections, surveys and treatments were just some of the regular practices of GALS program personnel.

The GALS eradication program is a collaborative effort of the USDA Animal and Plant Health Inspection Service Plant Protection and Quarantine, FDACS, Miami-Dade County, and its various municipalities. Other community involvement including homeowners' associations, landscaping companies, green waste facilities, cultural groups, and the nursery industry made the program's success possible.

Since the inception of the program, data tracking was a crucial part of the program's success. Over the program's 11-year span, DPI's inspectors transitioned from paper tracking to real-time GPS data entry and viewing on tablets. DPI's GIS specialists built and maintained thousands of maps. Compiling essential data into consistently updated GIS systems provided GALS staff with the records and maps necessary for planning and task execution. On-screen output identified quantities and locations of snails within specific properties.

Because of the proactive outreach efforts, FDACS-DPI communicated the importance of the program to the public strategically and efficiently. Up to 97% of live snail finds were the product of the public reporting snail sightings to FDACS-DPI. Strong communication tactics gave the public understanding and the conviction to act.

The Public Information and Outreach section of DPI developed the communication strategy for this program including billboard, radio and TV ads, mall banners, bus benches, newspaper articles and movie theater ads. Eventually, program vehicles were wrapped with GALS messaging to simultaneously assist with safety and outreach. In addition to paid advertising campaigns, DPI distributed printed materials and promotional items to reach millions of people. Press events, news media coverage, community tabling events, blogs and social media contributed to raising awareness about the eradication program and how the public should help.

Throughout the 2020 fiscal year, Cores 2, 9, 27, 29, 31, and 32 were decommissioned according to the decommissioning criteria.

In September 2021, the final cores (12, 28 and 30) were decommissioned and the eradication of giant African land snail was officially declared for the second time in history. Florida remains the only place in the world this pest had been successfully eradicated.

Final Statistics:

- 719 positive properties
- 240,595 core surveys
- 56,846 non-core visual surveys across 14,554.57 acres
- 102,085 control treatments
- 168,538 total snails collected
- 4.2 million pounds of debris removed
- 92 employees assigned to the program
- 751,960 total hours of labor
- 27,368.13 acres – total size of GALS quarantine zones
- 5,400 total K9 surveys completed

Collections

FLORIDA STATE COLLECTION OF ARTHROPODS 2020-2022
The Florida State Collection of Arthropods (FSCA), contains over 12 million specimens [see website at https://thefsca.org/]. The museum's mission is to build the best possible worldwide collection of terrestrial and aquatic arthropods in support of research, education, and the regulatory functions of FDACS-DPI.

Research Associates program. This Biennial period 2020-2022 was rough on our associates. The Covid-19 Pandemic greatly hindered activities including travel, specimen shipments, and collaborative projects. Activities slowly increased in 2022. We are expecting great things in the next Biennium period.

FSCA Recent passings. As noted in [another section] of this Biennial report, we lost two emeritus staff members: Robert Woodruff in July 2021 and Harold Denmark in November 2021. The contributions they made during their careers and afterward as emeritus will not be forgotten. We also lost some notable long-time Research Associates.

James Wappes passed in January 2021. Jim was a long-time Research Associate who collected beetles and was well known for his interest and publications with long-horned beetles (Cerambycidae). Jim's passion for beetles in general and willingness to help others will live on.

Byrd Dozier passed in April 2021. Byrd was a Research Associate of the FSCA from the very beginning of the program. His father was an entomologist and a founding member of the Florida Entomological Society. Thus, Byrd and his brother, Herbert, grew up with an entomological slant, both collecting beetles. Byrd's passion was Buprestidae; Herb's was Coccinellidae. Both of their collections were donated to the FSCA. Byrd remained active collecting various insects and collaborating with staff for years after the donation of his collection.

J. Eric Cronin came to the Gainesville area in the mid-1990s and was homeless by choice. He quickly showed his entomological expertise and passions. He became a Research Associate and was given a spot in the Museum, where he worked for years on his collection as well as the FSCA's. He did not travel far but built a tremendous collection of local insects including many rare species. In the late 2010s, his visits became less frequent and he was in poor health during his last visit. We are in the process of integrating his collection into the FSCA. His most notable find was literally outside of the FSCA's back door, the "ruby bug", *Curalium cronini* Schuh, Weirauch and Henry, 2008 (Curaliidae), which was an entirely new family of Hemiptera. Most known specimens were collected by Eric from the DPI campus. *Schuh, R. T., Weirauch, C., Henry, T. J., & Halbert, S. E. (2008).* Curaliidae, a new family of Heteroptera (Insecta: Hemiptera) from the Eastern United States. Annals of the Entomological Society of America. ***101*** *(1): 20–29.* doi:10.1603/0013-8746(2008)101[20:CANFOH]2.0.CO;2.*]*

Acquisitions. For the Biennium 2020-2022, the FSCA received 30 separate donations, totaling over 214,000 specimens, with an estimated value of $2 million. Non-staff generated acquisitions include materials from Bob Belmont, James Berry, Dave Bixler, Edward Coher, Terry Dickel, Joe Eger, Vince Golia, Janet Hyland, Robert and Janice Matthews, William Mauffray, Roy Morris, Weston Opitz, Zach Prusak, Mark Rothschild, Fred Skillman, Jeff Slotten, Mac Tidwell, James Wappes, Robert Woodruff, and Richard Worth.

Along with the donations, annual contributions by Research Associates, and staff additions, the FSCA received two outstanding donations this period. Long-time Research Associate, Terry Dickel, worked on small moths his entire life, mostly in South Florida. His collection started long before many developmental and environmental changes took place in Florida. The collection contained many rare natives, along with the first known specimens of many immigrant species into the continental US. It is a historic collection for the state, containing almost 55,000 specimens.

The FSCA inherited long-time Research Associate, James Wappes' collection of beetles (primarily Cerambycidae) that was built over his entire life. Using the name American Coleoptera Museum, Texas (ACMT), Jim's collection was referenced and described by many researchers world-wide in dozens of publications. The collection contained almost 83,000 beetles (including over 5,200 species of Cerambycidae). This acquisition complimented other holdings at the FSCA, including the Ed Giesbert cerambycid collection, making the FSCA one of the largest and most representative collections of the family for the New World.

FSCA Loans. The FSCA staff sent a total of 115 loans of specimens during the FYs 2020–2022. Mostly Coleoptera and mostly in the second half of the Biennium.

FSCA Tours and Visitors. Due to the Covid-19 Pandemic concerns and restrictions, there were only 21 visitors and 12 tours during 2020-2022.

Renovations and upgrades at the FSCA. The Covid-19 Pandemic restrictions allowed more time to focus on internal affairs and make progress on long-term projects.

Growing collections and better use of space gave us the idea to add shelving for the scale, mealybug, and whitefly slide collections in E-113, adjacent to the Entomologist in charge of those taxa. A couple years before the Covid-19 Pandemic , the collection was moved and placed on stationary shelving. However, we were able to purchase new high-density shelving for this room which was modified in the summer of 2021.

The old, unused fumigation building was repurposed and became the Woodruff-Weems Special Collection Building for the wet collections previously housed in multiple places around the DPI campus. Over a couple of years, different upgrades were made, the old wet collections high-density shelving in E-123 of the main Doyle Connor Building was moved and additional new shelving installed. By Spring of 2022, the building was available and all wet collections from various areas around the DPI campus were moved into the new facility by the end of the Summer. Some tasks to make the facility fully functional are ongoing (power strips, lighting, etc.), as well as cleaning, organizing and re-curating all of the materials now housed in the building. Formal dedication of the building is pending.

For many years, parts of the FSCA library were housed in "temporary" storage areas around DPI campus. In early 2022, we were able to purchase new high-density shelving for the library. Now, all library materials are properly stored and available in one place.

Appendix A

Employee Directory

OFFICE OF THE DIRECTOR

Org Name	Full Name	Class Title
Maintenance	Bair, Douglas	Maintenance Mechanic
Maintenance	Bency, Roseanna	Senior Clerk
Office Of Director Of Plant Industry	Benson, Bryan	Operations And Program Manager
Technical Assistance	Burton, Scott	Publications Production Specialist II
Maintenance	Caraballo, Ivan	Custodial Worker
Technical Assistance	Chitty, Christina	Public Information Director - SES
Maintenance	Coggins, Vester	Maintenance Mechanic
Personnel - Plant Industry	Cook, Daisy	Senior Management Analyst I - SES
Fiscal Office - Plant Industry	Cornman, Lee	Grants Specialist Supervisor II - SES
Technical Assistance	Davis, Kara	Administrative Secretary
Fiscal Office - Plant Industry	Dawkins, Aragod	Accounting Services Administrator - SES
Data Processing - Plant Industry	Dawkins, Drake	Systems Project Analyst
Data Processing - Plant Industry	Duever, Carolyn	Data Processing Manager - SES
Data Processing - Plant Industry	Dunn, Anthony	Distributed Computer Systems Analyst - S
Technical Assistance	Dwyer, Paula	Information Specialist III
Fiscal Office - Plant Industry	Fairbanks, Regina	Grants Specialist Supervisor II - SES
Office Of Director Of Plant Industry	Godinez, Esteban	OPS Environmental Specialist I
Data Processing - Plant Industry	Greco, Daniel	Information Tech Business Consult - SES
Maintenance	Hall Jr, James	OPS Custodial Worker
Division Training Coordinator	Hames, Darci	Operations Analyst II
Personnel - Plant Industry	Hamm, Denise	Operations & Mgmt Consultant I - SES
Office Of Director Of Plant Industry	Hildebrandt, Stephen	Environmental Manager - SES
Office Of Director Of Plant Industry	Hodges, Greg	Assistant Dir Of Plant Industry-DACS
Technical Assistance	Howell, Shelby	Publications Production Specialist II
Fiscal Office - Plant Industry	Huggins, Kareema	Professional Accountant
Technical Assistance	Hughes, Holly	Public Information Specialist - SES
Personnel - Plant Industry	Inkel, Lee Ann	Senior Management Analyst II - SES
Technical Assistance	Jones, Alyssa	OPS Information Specialist I
Maintenance	Joseph, David	Maintenance & Construction Supt - SES
Data Processing - Plant Industry	Lawrence, Alicia	Systems Project Analyst - SES
Data Processing - Plant Industry	Love, Katherine	Geographic Information System Technician
Office Of Director Of Plant Industry	Mcmahon, Sheila	Administrative Assistant III - SES
Technical Assistance	Miller, Brooke	Information Specialist II
Data Processing - Plant Industry	Montilla Nolasco, Arturo	Distributed Computer Systems Specialist
Maintenance	Ocasio-Rodriguez, Ricardo	Property Administrator III - SES
Fiscal Office - Plant Industry	Palmer, Maria	Professional Accountant
Division Training Coordinator	Paris, Elizabeth	Senior Management Analyst I - SES
Personnel - Plant Industry	Parker, Patricia	Administrative Assistant I - SES
Technical Assistance	Ray, Katie	Information Specialist II
Fiscal Office - Plant Industry	Ridgway, Ronald	Accountant Supervisor II - SES
Maintenance	Rowley, Steven	Maintenance Mechanic
Maintenance	Scoular-Baker, Thomas	OPS Groundskeeper
Technical Assistance	Shepard, Kathryn	Information Specialist II - SES
Office Of Director Of Plant Industry	Smith, Trevor	Director Of Plant Industry-DACS
Data Processing - Plant Industry	Spence, Holly	Administrative Secretary
Data Processing - Plant Industry	Vu, Don	Computer Programmer Analyst I
Fiscal Office - Plant Industry	Wen, Li	Accountant I

BUREAU OF METHODS DEVELOPMENT AND BIOLOGICAL CONTROL

Org Name	Full Name	Class Title
Methods Development	Ammann, Daniel	Laboratory Technician IV
Biological Control Rearing Facility	Banaszek, Michael	Biological Scientist III - SES
Biological Control Rearing Facility	Benda, Nicole	Biological Scientist IV - SES
Methods Development	Bill, Nicole	Laboratory Technician IV
Methods Development	Bracey, Donald	OPS Laboratory Technician IV
Methods Development	Croft, Amy	Biological Scientist I
Biological Control Rearing Facility	Davis, David	Laboratory Technician III
Methods Development	Davis, Emilie	OPS Laboratory Technician IV
Biological Control Rearing Facility	Dickens, Katrina	Biological Scientist IV - SES
Methods Development	Emerson, Justin	Laboratory Technician IV
Methods Development	Fairbanks, Katherine	Biological Administrator III - SES
Methods Development	Fife, Austin	Biological Scientist IV - SES
Methods Development	Flanagan, Matthew	OPS Laboratory Technician IV
Methods Development	George-Hill, Darleen	Laboratory Technician IV
Methods Development	Gonzalez Rodriguez, Frances	OPS Laboratory Technician IV
Methods Development	Harn, Rebecca	Staff Assistant
Methods Development	Herr, Jeffrey	OPS Laboratory Technician IV
Biological Control Rearing Facility	Hoskinson, Patrick	Laboratory Technician III
Methods Development	Klemm, Doris	Laboratory Technician IV
Methods Development	Levy, Andrew	OPS Laboratory Technician IV
Methods Development	Lotz, Gloria	Biological Scientist III - SES
Methods Development	Menocal Sandoval, Octavio	Biological Administrator II - SES
Methods Development	Murphy, Michael	Biological Scientist II - SES
Methods Development	Murray, Rosemary	Biological Scientist II - SES
Methods Development	Needham, Zion	OPS Laboratory Technician IV
Biological Control Rearing Facility	Noto, Diana	OPS Laboratory Technician IV
Methods Development	Padilla-Feliberty, Kentsy	OPS Laboratory Technician IV
Biological Control Rearing Facility	Pappas, Ashley	Laboratory Technician IV
Methods Development	Quirico Bautista, Carolina	OPS Laboratory Technician IV
Methods Development	Ramos Perez, Paola	OPS Laboratory Technician IV
Methods Development	Rohrig, Eric	Chief, Method Dev& Biologic Control-DACS
Biological Control Rearing Facility	Rojas, Ronald	Laboratory Technician IV
Biological Control Rearing Facility	Schneider, George	Biological Administrator I - SES
Methods Development	Shaw, Tyler	Biological Scientist IV - SES
Methods Development	Shepherd, Sierra	OPS Laboratory Technician IV
Biological Control Rearing Facility	Snyder, James	Laboratory Technician IV
Methods Development	Williams, Grace	OPS Biological Scientist I
Methods Development	Wilson, A	Laboratory Technician IV

BUREAU OF ENTOMOLOGY, NEMATOLOGY AND PLANT PATHOLOGY

Org Name	Full Name	Class Title
Office Of Systematic Botany	Anderson, Patti	Biological Scientist IV - SES
Caps Combined Survey	Ashman, Krystal	Biological Scientist IV - SES
Entomology	Bolton, Samuel	Biological Scientist IV - SES
Entomology	Bremer, Jonathan	OPS Laboratory Technician IV
Nematology	Brito, Janete	Biological Scientist IV - SES
Entomology	Burnette, Kevin	OPS Laboratory Technician I
Entomology	Buss, Eileen	OPS Biological Scientist I
Entomology	Carfagno, Maximilian	OPS Environmental Specialist I
Entomology	Casuso, Nicole	Biological Scientist IV - SES
Entomology	Cayia, Edward	OPS Biological Scientist I
Plant Pathology	Changa, Charles	Research Scientist I
Plant Pathology	Clark, Jackie	Administrative Assistant I
Hemp/Permitting	Cline, Victor	Senior Clerk
Diagnostics	Combee, Lynn	OPS Laboratory Technician IV
Entomology	Daly, Kathryn	OPS Laboratory Technician I
Caps Infrastructure	Danner, Bradley	Biological Administrator III - SES
Office Of Systematic Botany	De La Paz, Alexander	Biological Scientist II
Entomology	Deeter, Lily	Biological Scientist II - SES
Entomology	Deuel, Trudi	OPS Laboratory Technician IV
Plant Pathology	Dey, Kishore	Biological Scientist IV - SES
Nematology	Dombeck, Lucas	OPS Laboratory Technician IV
Entomology	Dorman, Nicholas	Biological Scientist III - SES

Entomology	Dunn, Ann	Biological Scientist I
Hemp/Permitting	Durrell, James	Biological Scientist IV
Library	Eby, Jeffrey	Librarian Specialist
Plant Pathology	Fryman, Melanie	OPS Laboratory Technician IV
Diagnostics	Fulton, James	Research Scientist I
Caps Combined Survey	Furgeson, Sara	Laboratory Technician IV
Entomology	Gasparro-Brewer, Jude	OPS Laboratory Technician IV
Plant Pathology	Gonzalez, Alyssia	OPS Laboratory Technician IV
Entomology	Greer, Deborah	Senior Clerk
Entomology	Halbert, Susan	Biological Scientist IV - SES
Plant Pathology	Hansen, Jodi	Biological Scientist IV - SES
Entomology	Hao, Minjin	Laboratory Technician IV
Entomology	Hayden, James	Research Scientist I
Nematology	Inserra, Renato	Biological Scientist IV - SES
Plant Pathology	Jones, Callie	Laboratory Technician IV
Entomology	Keller, Oliver	OPS Biological Scientist III
Entomology	Kenlon, Philip	Administrative Assistant II
Plant Pathology	Li, Chunfang	Biological Scientist II
Entomology	Mader, Timothy	OPS Laboratory Technician I
Hemp/Permitting	Martin, Jane	Administrative Assistant I
Entomology	Mcgathey, Natalie	OPS Laboratory Technician IV
Plant Pathology	Mcvay, John	Biological Administrator III - SES
Caps Infrastructure	Moncrief, Cynthia	Information Specialist II
Caps Infrastructure	Montoya, Alejandro	OPS Laboratory Technician IV
Diagnostics	Moore, Matthew	Biological Scientist IV - SES
Entomology	Needham, Mayumi	OPS Laboratory Technician I
Entomology	Perez, Phellicia	OPS Environmental Specialist I
Nematology	Platinetty, Alfredo	Laboratory Technician IV
Entomology	Powell, Erin	Biological Scientist IV - SES
Nematology	Ramachandra, Bryann	Administrative Assistant II
Diagnostics	Roberts, Cheryl	Biological Scientist II
Entomology	Schnepp, Kyle	Biological Scientist I
Entomology	Scoates, Carol	OPS Laboratory Technician I
Entomology	Skelley, Paul	Biological Administrator III - SES
Plant Pathology	Smith, Taylor	Biological Scientist III
Entomology	Somma, Louis	OPS Biological Scientist III
Plant Pathology	Soria, Patricia	OPS Laboratory Technician IV
Entomology	Soto-Adames, Felipe	Biological Scientist IV - SES
Nematology	Stanley, Jason	Biological Administrator III - SES
Entomology	Steck, Gary	Biological Scientist IV - SES
Entomology	Sturgill, Ashley	OPS Laboratory Technician I
Entomology	Sweeney, Catherine	OPS Laboratory Technician I
Entomology	Talamas, Elijah	Biological Scientist IV - SES
Plant Pathology	Urbina Yanez, Hector	Biological Scientist IV - SES
Entomology	Vargas, Mileydis	Biological Scientist II
Nematology	Vau, Silvia	Biological Scientist II
Plant Pathology	Velez Climent, Maria	Biological Scientist II
Entomology	Wagner, Hannah	Biological Scientist II
Entomology	Walsh, Diana	OPS Laboratory Technician I
Entomology	Welch, Craig	Biological Administrator I - SES
Entomology	Whilby, Leroy	Chief, Entmolgy,Nematolgy&Plnt Path-DACS
Entomology	White, Catherine	Biological Scientist I
Nematology	Xue, Ruimin	Laboratory Technician IV
Caps Combined Survey	Yong Cong, Mary	Biological Scientist IV

BUREAU OF PLANT AND APIARY INSPECTION

Org Name	Full Name	Class Title
Plant Inspection	Aguilera, Carlos	OPS Agricultural Technician II
Plant Inspection	Alarcon, Jazmin	OPS Agricultural Technician II
Plant Inspection	Aleman Martinez, Juan	Environmental Supervisor I - SES
Apiary Inspection	Alonso, Christopher	Agriculture And Consumer Protect Spec
Plant Inspection	Alvarado, Ernesto	OPS Agricultural Technician II
Plant Inspection	Anderson, Glenda	Administrative Secretary
Hemp/Permitting	Anderson, James	Environmental Specialist II
Plant Inspection	Arbelaez, Alexander	Environmental Specialist I

Fruit Fly Protocol	Armao, Patrick	Agriculture & Consumer Protect Inspector
Plant Inspection	Averhoff Chirino, Carlos	Environmental Supervisor I - SES
Plant Inspection	Averhoff, Elizabeth	Operations Analyst I
Plant Inspection	Avila, Robert	OPS Agricultural Technician II
Plant Inspection	Avila-Caceres, Iliana	Environmental Specialist I
Plant Inspection	Aviles, Elsie	Administrative Secretary
Plant Inspection	Bachar, Sarah	Environmental Specialist I
Apiary Inspection	Barnett, Harold	Agriculture And Consumer Protect Spec
Plant Inspection	Bartlett, Abby	Environmental Supervisor I - SES
Plant Inspection	Baumgardner, Tracy	Administrative Assistant III - SES
Plant Inspection	Benjamin, Victoria	Environmental Specialist I
Plant Inspection	Bentley, Michael	Environmental Specialist I
Plant Inspection	Berryman, Scott	Environmental Specialist I
Fruit Fly Protocol	Blakey, Lisa	Agriculture & Consumer Protect Inspector
Plant Inspection	Blaney, Richard	Environmental Specialist II
Fruit Fly Protocol	Blatch, William	Agricultural Technician III
Plant Inspection	Bloom, Richard	Environmental Specialist I
Plant Inspection	Brodie, Matthew	Environmental Supervisor I - SES
Plant Inspection	Brown, David	Environmental Specialist I
Plant Inspection	Brown, Lance	Environmental Specialist I
Plant Inspection	Brown, Ryan	OPS Ag & Consumer Protection Inspector
Plant Inspection	Brown, Sean	Environmental Specialist I
Plant Inspection	Bryan, Jacob	Environmental Specialist I
Plant Inspection	Burgos, Frank	Environmental Specialist I
Plant Inspection	Bushue, Nichole	Environmental Specialist II
Plant Inspection	Bussell, Patricia	OPS Agricultural Technician II
Plant Inspection	Cambana, Carlos	OPS Agricultural Technician II
Plant Inspection	Campbell, Sammy	OPS Agricultural Technician II
Plant Inspection	Carmenate German, Hanoy	Environmental Specialist I
Plant Inspection	Carrasquilla, Suhayla	Environmental Specialist II
Plant Inspection	Casanas, Reinaldo	OPS Agricultural Technician II
Plant Inspection	Churchill, William	Environmental Specialist II
Plant Inspection	Collier Cundumi, Kevin	Environmental Specialist I
Plant Inspection	Conklin, Rachel	Environmental Specialist I
Plant Inspection	Counts, William	Environmental Specialist I
Plant Inspection	Crocker, Harry	Environmental Specialist I
Plant Inspection	Cutts, Logan	Environmental Specialist I
Apiary Inspection	Cutts, Stephen	Agriculture And Consumer Protect Spec
Plant Inspection	Daniels, Cathy	Senior Word Processing Systems Operator
Plant Inspection	Davis, Charles	OPS Agricultural Technician II
Plant Inspection	Davis, Jakira	OPS Environmental Specialist I
Apiary Inspection	Davis, James	Agriculture And Consumer Protect Spec
Plant Inspection	Destefano, Karen	Environmental Specialist I
Plant Inspection	Dewitz, Lorenna	Environmental Specialist II
Plant Inspection	Diaz Varona, Leicet	Environmental Specialist I
Apiary Inspection	Dineen, Rebecah	Agriculture And Consumer Protect Spec
Plant Inspection	Doeblin, Kristin	Environmental Specialist I
Plant Inspection	Dougherty, Eric	Environmental Specialist I
Plant Inspection	Douglas, Kelly	Environmental Supervisor I - SES
Plant Inspection	Dulzaides, Maria	Environmental Specialist I
Plant Inspection	Echevarria-Garcia, Maria	OPS Agricultural Technician II
Plant Inspection	Echols, Mary	Environmental Specialist I
Plant Inspection	Ellis, Kenneth	Environmental Specialist I
Plant Inspection	Emery, Tyson	Chief Of Plant & Apiary Inspection-DACS
Plant Inspection	Escobar, Haydee	Environmental Supervisor I - SES
Plant Inspection	Espino Martinez, Renan	Environmental Specialist I
Plant Inspection	Farina, Gregg	Environmental Specialist II
Apiary Inspection	Finnerty, Timmi	Agriculture & Consumer Protect Supv -SES
Plant Inspection	Floyd, Bobby	Environmental Specialist I
Plant Inspection	Frechette, Jeanie	Environmental Specialist I
Plant Inspection	Furnas, Maria	Administrative Secretary
Fruit Fly Protocol	Galbraith, Robert	Agricultural Technician III
Plant Inspection	Garami, Nouredine	Environmental Specialist I
Plant Inspection	Gardner, Glen	Systems Project Analyst
Fruit Fly Protocol	Gentile, Sarah	Agriculture & Consumer Protect Inspector

Apiary Inspection	Gill Sanabria, Jose	Agriculture & Consumer Protect Supv -SES
Plant Inspection	Gmitter, Kacie	Environmental Specialist I
Plant Inspection	Golden, Walter	Environmental Specialist I
Plant Inspection	Gomez Lostalo, Fabian	Environmental Specialist I
Plant Inspection	Gonzalez, Charles	Environmental Supervisor II - SES
Plant Inspection	Gonzalez, Gloria	OPS Agricultural Technician II
Plant Inspection	Gonzalez, Katherine	Environmental Specialist I
Plant Inspection	Gordon, Tavia	Environmental Specialist I
Plant Inspection	Gracia Delfin, Heathcliff	Environmental Specialist I
Plant Inspection	Graham, Mary	Environmental Specialist I
Plant Inspection	Groninger, Chase	Environmental Specialist I
Plant Inspection	Grume, Grayson	Environmental Specialist I
Fruit Fly Protocol	Haley, Justin	Agriculture & Consumer Protect Supv -SES
Plant Inspection	Hansen, Deann	Environmental Specialist I
Plant Inspection	Harrity, Catherine	Administrative Assistant I
Plant Inspection	Hart, Sam	Environmental Specialist II
Plant Inspection	Hartz, Stefan	Environmental Specialist I
Plant Inspection	Hawes, Austin	Environmental Specialist I
Plant Inspection	Hawk, Joseph	Environmental Specialist III - SES
Plant Inspection	Hernandez, Miguel	OPS Agricultural Technician II
Plant Inspection	Hesse, Jennifer	OPS Agricultural Technician II
Plant Inspection	Holton, Karen	Environmental Specialist III - SES
Apiary Inspection	Horsburgh, Robert	Agriculture And Consumer Protect Spec
Plant Inspection	Howard, Tracy	Environmental Supervisor I - SES
Plant Inspection	Hudnall, Surita	Administrative Secretary
Apiary Inspection	Humphrey, Randall	OPS Staff Assistant
Plant Inspection	Hutcherson, Angela	Environmental Specialist II
Plant Inspection	Hymes, Terri	Staff Assistant
Plant Inspection	Jarboe, Holly	Environmental Specialist I
Plant Inspection	Jarrett, Raymond	Environmental Supervisor I - SES
Apiary Inspection	Jenkins, Erin	Agriculture And Consumer Protect Spec
Plant Inspection	Jenner, Stephen	Environmental Specialist I
Plant Inspection	Jones, Cheryl	Environmental Manager - SES
Fruit Fly Protocol	Jordan, Ray	Agricultural Technician III
Plant Inspection	Karppe, Carrie	Environmental Specialist I
Plant Inspection	Keen, Emily	Environmental Specialist I
Plant Inspection	Kej, Elena	OPS Agricultural Technician II
Plant Inspection	Kelly, Charles	Environmental Specialist I
Plant Inspection	Khousakoun, Philayrack	OPS Agricultural Technician II
Plant Inspection	Krok, Jesse	Environmental Specialist I
Plant Inspection	Krueger, Scott	Environmental Specialist I
Plant Inspection	Laster, Jeff	OPS Agricultural Technician II
Plant Inspection	Lastrapes, Thomas	Environmental Specialist I
Plant Inspection	Laurint, Mark	Environmental Specialist I
Plant Inspection	Lee, James	Environmental Specialist I
Plant Inspection	Lorenzo, Alina	Environmental Specialist II
Plant Inspection	Luiggi, Edgardo	OPS Agricultural Technician II
Plant Inspection	Marquez, Nora	Environmental Specialist I
Plant Inspection	Mccoll, Diane	Environmental Specialist II
Plant Inspection	Mcgill, Patricia	Environmental Specialist I
Plant Inspection	Mcgiveron, Shaelyn	Environmental Specialist I
Plant Inspection	Mckeever, Jennifer	Environmental Specialist I
Plant Inspection	Mcray, Linda	OPS Agricultural Technician II
Plant Inspection	Menendez Torres, Juan	Environmental Specialist I
Plant Inspection	Merced, Daniel	Environmental Supervisor I - SES
Plant Inspection	Milian, Ciro	Environmental Specialist I
Plant Inspection	Miller, Matthew	Environmental Supervisor I - SES
Plant Inspection	Morrison, Harry	Environmental Specialist I
Plant Inspection	Mulrooney, Shanelle	Environmental Specialist II
Plant Inspection	Neglia, Sarah	Environmental Specialist I
Plant Inspection	Negron, Noemi	Environmental Specialist I
Plant Inspection	Newman, Stepanka	Environmental Specialist I
Plant Inspection	Nunez, Alexis	Environmental Specialist I
Plant Inspection	Ochoa, Juan	Environmental Specialist I
Plant Inspection	Ortelli, Teresa	OPS Agricultural Technician II

Plant Inspection	Ortiz, David	OPS Agricultural Technician III
Plant Inspection	Parkes, Clarence	Environmental Specialist I
Plant Inspection	Paz, Stephanie	OPS Agricultural Technician II
Plant Inspection	Pelfrey, Deanne	OPS Agricultural Technician II
Fruit Fly Protocol	Pickett, Ashley	Agriculture & Consumer Protect Inspector
Apiary Inspection	Pippin, Jeffrey	Agriculture And Consumer Protect Spec
Hemp/Permitting	Pitchford, Kelsey	Environmental Specialist II
Plant Inspection	Podos, Christine	Environmental Specialist I
Plant Inspection	Poock, Caleb	Environmental Specialist I
Plant Inspection	Post, Charles	OPS Agricultural Technician II
Plant Inspection	Prieto Reschop, Ramon	OPS Ag & Consumer Protection Inspector
Plant Inspection	Puppelo, Anthony	Environmental Supervisor I - SES
Fruit Fly Protocol	Quigley, John	Agriculture & Consumer Protect Inspector
Fruit Fly Protocol	Quigley, Marilyn	Administrative Secretary
Plant Inspection	Quinones, Rosamaria	Environmental Supervisor I - SES
Plant Inspection	Reece, Carolina	Agriculture And Consumer Protect Spec-Se
Plant Inspection	Reed, Mary	Environmental Administrator - SES
Plant Inspection	Rentas Muller, Jose	Environmental Specialist I
Plant Inspection	Restrepo, Sara	Environmental Supervisor I - SES
Apiary Inspection	Reynes, Lisa	Agriculture And Consumer Protect Spec
Fruit Fly Protocol	Rish, Steven	OPS Agricultural Technician II
Plant Inspection	Rivera Martinez, Lizbeth	OPS Agricultural Technician II
Plant Inspection	Rivera, Karianne	Environmental Specialist II
Plant Inspection	Rodriguez Medina, Narciso	Environmental Specialist I
Plant Inspection	Rodriguez, Julio	Staff Assistant
Plant Inspection	Rojas, Eric	Environmental Specialist I
Apiary Inspection	Rosario, Tommy	Agriculture And Consumer Protect Spec
Plant Inspection	Rose, Bobbe	Environmental Specialist I
Plant Inspection	Russell, Dyrana	Biological Scientist IV - SES
Plant Inspection	Saengphaxay, Onanong	OPS Agricultural Technician II
Plant Inspection	Safran, Emily	Environmental Specialist I
Plant Inspection	Salway, William	Environmental Specialist I
Plant Inspection	Sargeant, Carlene	Environmental Specialist I
Fruit Fly Protocol	Scher, Barbara	Senior Clerk
Plant Inspection	Sellers, Mary	Environmental Specialist I
Fruit Fly Protocol	Serra, John	Agriculture & Consumer Protect Inspector
Plant Inspection	Serviss, Jennifer	Environmental Specialist I
Fruit Fly Protocol	Sharpe, Mona	OPS Agricultural Technician II
Plant Inspection	Shim, Robert	OPS Agricultural Technician II
Plant Inspection	Simmons, Sallie	Environmental Specialist I
Plant Inspection	Simos, Alexia	Staff Assistant
Plant Inspection	Smith, Elizabeth	OPS Senior Clerk
Plant Inspection	Smith, Lane	Environmental Specialist I
Plant Inspection	Snyder, Calvin	OPS Agricultural Technician II
Plant Inspection	Solis, Eduardo	Environmental Specialist I
Apiary Inspection	Stanford, Branden	Assistant Chief-Inspection - SES
Plant Inspection	Steele, Sherry	Environmental Specialist I - SES
Plant Inspection	Steinkamp, Katherine	Environmental Specialist I
Plant Inspection	Stornaiuolo, Serena	Environmental Supervisor II - SES
Plant Inspection	Striker, Colton	Environmental Specialist I
Plant Inspection	Stumpp, Timothy	Environmental Specialist I
Plant Inspection	Tapias, Nubia	OPS Agricultural Technician II
Hemp/Permitting	Tasi, Alexander	Environmental Specialist II
Plant Inspection	Tordi, Riccardo	Environmental Supervisor I - SES
Plant Inspection	Tuz, Alex	Environmental Specialist I
Plant Inspection	Tyler, Lisa	Environmental Specialist I
Plant Inspection	Ureta, Laura	Environmental Specialist I
Plant Inspection	Velazquez, Alicia	OPS Agricultural Technician II
Plant Inspection	Viloria, Chantelle	OPS Agricultural Technician II
Plant Inspection	Violett, Larry	Environmental Supervisor II - SES
Plant Inspection	Wallace, Howard	Environmental Supervisor I - SES
Plant Inspection	Warden, George	Environmental Specialist I
Plant Inspection	Webb, Gary	Environmental Specialist I
Plant Inspection	Webb, Shannan	Environmental Specialist I
Plant Inspection	West, Leann	Environmental Specialist I

Plant Inspection	White, Richard	Environmental Supervisor I - SES
Plant Inspection	White, Sara	OPS Senior Clerk
Fruit Fly Protocol	Whiteman, Lisa	Certification Specialist-DACS - SES
Plant Inspection	Wiggins, John	Environmental Specialist III - SES
Plant Inspection	Youngblood, Susan	Environmental Specialist I
Plant Inspection	Yumar Pinares, Juan	Environmental Specialist I
Plant Inspection	Zamora, Christine	Environmental Manager - SES
Plant Inspection	Zito, John	Environmental Specialist I
Plant Inspection	Zugar, Keith	Environmental Specialist I
Plant Inspection	Zuniga, Elizabeth	Environmental Specialist I

BUREAU OF CITRUS BUDWOOD REGISTRATION

Org Name	Full Name	Class Title
Bureau Of Citrus Budwood Registration	Aslan, Kristen	Biological Administrator III - SES
Bureau Of Citrus Budwood Registration	Bongiovanni, Antonio	OPS Agricultural Technician II
Bureau Of Citrus Budwood Registration	Bouie, James	OPS Agricultural Technician II
Bureau Of Citrus Budwood Registration	Brady, Robert	Environmental Supervisor I - SES
Bureau Of Citrus Budwood Registration	Burrell, Marcus	OPS Laboratory Technician I
Bureau Of Citrus Budwood Registration	Carbon, Peter	Environmental Specialist II
Bureau Of Citrus Budwood Registration	Coleman, James	Biological Scientist IV - SES
Bureau Of Citrus Budwood Registration	Dean, Randall	Environmental Supervisor I - SES
Bureau Of Citrus Budwood Registration	Devalerio, James	Laboratory Technician IV
Bureau Of Citrus Budwood Registration	Di Genova, Dario	Biological Scientist III
Bureau Of Citrus Budwood Registration	Ezell, Justin	Operations & Mgmt Consultant Mgr - SES
Bureau Of Citrus Budwood Registration	Hanus, Joseph	Groundskeeping Supervisor II - SES
Bureau Of Citrus Budwood Registration	Hernandez, Jimmy	Environmental Specialist II
Bureau Of Citrus Budwood Registration	Jusino, Mercedes	Laboratory Technician II
Bureau Of Citrus Budwood Registration	Kooliyottil, Rinu	Biological Scientist IV
Bureau Of Citrus Budwood Registration	Lai, Kin-Kwan	Biological Scientist IV - SES
Bureau Of Citrus Budwood Registration	Landress, Craig	Environmental Specialist II
Bureau Of Citrus Budwood Registration	Lebron-Rivera, Ana Margarita	Environmental Specialist II
Bureau Of Citrus Budwood Registration	Maclean, Liam	OPS Agricultural Technician II
Bureau Of Citrus Budwood Registration	Mccaskill, Marc	Operations & Mgmt Consultant Mgr - SES
Bureau Of Citrus Budwood Registration	Miller Jr, George	Agriculture And Consumer Protect Spec
Bureau Of Citrus Budwood Registration	Nolen, Ashley	Environmental Specialist II
Bureau Of Citrus Budwood Registration	Ouellette, Karen	Operations Analyst II
Bureau Of Citrus Budwood Registration	Pappas, Amy	OPS Agricultural Technician II
Bureau Of Citrus Budwood Registration	Rosson, F	Chief Of Citrus Budwood Reg-DACS
Bureau Of Citrus Budwood Registration	Roth, Meta	Agricultural Technician III
Bureau Of Citrus Budwood Registration	Sharkey, Emily	Biological Scientist III
Bureau Of Citrus Budwood Registration	Sheppard, Shelby	Administrative Secretary
Bureau Of Citrus Budwood Registration	Stanley, Kelsie	OPS Laboratory Technician IV
Bureau Of Citrus Budwood Registration	Stover, Kayla	OPS Laboratory Technician IV
Bureau Of Citrus Budwood Registration	Taylor, Donald	Environmental Specialist II
Bureau Of Citrus Budwood Registration	Walker, Kaleigh	Biological Scientist III - SES
Bureau Of Citrus Budwood Registration	Waters, Christina	OPS Senior Clerk
Bureau Of Citrus Budwood Registration	Webster Jr, Robert	OPS Agricultural Technician II
Bureau Of Citrus Budwood Registration	Yates, Johnny	Environmental Specialist II

BUREAU OF PEST ERADICATION AND CONTROL

Org Name	Full Name	Class Title
Pest Eradication & Control	Andrews, Ethan	Environmental Supervisor I - SES
Pest Eradication & Control	Bateman, Thomas	Environmental Specialist I - SES
Pest Eradication & Control	Batson Jr, Douglas	Environmental Administrator - SES
Pest Eradication & Control	Bear Ii, Gary	Environmental Specialist I - SES
Pest Eradication & Control	Beesley, Ethan	OPS Agricultural Technician II
Pest Eradication & Control	Bennett, Carl	OPS Agricultural Technician II
Pest Eradication & Control	Branch, Kenneth	Agricultural Technician II
Pest Eradication & Control	Brown, Alleen	OPS Agricultural Technician II
Pest Eradication & Control	Buice, Kristina	Environmental Supervisor I - SES
Pest Eradication & Control	Burke, Richard	OPS Agricultural Technician II
Pest Eradication & Control	Carter, Donna	Property Specialist
Pest Eradication & Control	Carter, James	Environmental Supervisor I - SES
Pest Eradication & Control	Cruz, Maria	OPS Ag & Consumer Protection Inspector
Pest Eradication & Control	Davila, Alexander	Agriculture And Consumer Protect Spec

Pest Eradication & Control	Day, Janet	OPS Property Clerk
Pest Eradication & Control	Esquivel, Geovani	Environmental Supervisor I - SES
Pest Eradication & Control	Estrada, Selina	Environmental Supervisor II - SES
Pest Eradication & Control	Falletta, David	Environmental Specialist I - SES
Pest Eradication & Control	Fitzpatrick, Donna	OPS Agricultural Technician II
Pest Eradication & Control	Garibay, Maria	OPS Agricultural Technician II
Pest Eradication & Control	Garibay, Martha	OPS Agricultural Technician II
Pest Eradication & Control	Garrett, Sharon	Environmental Specialist I
Pest Eradication & Control	Gaspar, Petrona	OPS Agricultural Technician II
Pest Eradication & Control	Gilbert, Jeremy	Environmental Supervisor I - SES
Pest Eradication & Control	Glass, Dennis	OPS Agricultural Technician II
Pest Eradication & Control	Golden, Kevin	Agricultural Technician II
Pest Eradication & Control	Gomez, Juan	OPS Agricultural Technician II
Pest Eradication & Control	Gonzalez, Margarita	OPS Agricultural Technician II
Pest Eradication & Control	Guzman, Magdony	OPS Agricultural Technician III
Pest Eradication & Control	Harris, Gari	OPS Agricultural Technician II
Pest Eradication & Control	Henry, Holly	OPS Agricultural Technician II
Pest Eradication & Control	Herrera, Dolores	OPS Ag & Consumer Protection Inspector
Pest Eradication & Control	Hinshaw, Cathy	Administrative Secretary
Pest Eradication & Control	Hommel, Virginia	Administrative Assistant I
Pest Eradication & Control	Jimenez, Linda	OPS Agricultural Technician II
Pest Eradication & Control	Johnson, Jason	Operations & Mgmt Consultant II - SES
Pest Eradication & Control	Joseph, Tyler	OPS Senior Clerk
Pest Eradication & Control	Kisner Jr, David	OPS Citrus Regulatory Inspector
Pest Eradication & Control	Lamb, Phillip	OPS Agricultural Technician II
Pest Eradication & Control	Mackey, William	Environmental Specialist I - SES
Pest Eradication & Control	Martinez, Milagros	OPS Agricultural Technician II
Pest Eradication & Control	Newberry, William	OPS Agricultural Technician II
Pest Eradication & Control	Noah, Harvey	Environmental Administrator - SES
Pest Eradication & Control	Nobles, Joseph	OPS Ag & Consumer Protection Inspector
Pest Eradication & Control	Nunez, Emelia	Environmental Specialist I - SES
Pest Eradication & Control	Perez - Tapia, Leticia	OPS Ag & Consumer Protection Inspector
Pest Eradication & Control	Perez, Laura	Agriculture And Consumer Protect Spec
Pest Eradication & Control	Puga, Alicia	OPS Agricultural Technician II
Pest Eradication & Control	Ramirez, Alma	OPS Agricultural Technician II
Pest Eradication & Control	Ramirez, Norma	OPS Agricultural Technician II
Pest Eradication & Control	Retana, Annavell	OPS Agricultural Technician II
Pest Eradication & Control	Sampson, Robbie	OPS Agricultural Technician II
Pest Eradication & Control	Schwarz, Larry	OPS Agricultural Technician II
Pest Eradication & Control	Skladany, Brooke	Environmental Specialist II - SES
Pest Eradication & Control	Solis, Patricia	Environmental Specialist I - SES
Pest Eradication & Control	Spikes, Ruthie	OPS Agricultural Technician II
Pest Eradication & Control	Summerville, Brandon	OPS Agricultural Technician III
Pest Eradication & Control	Turrubiartez, Maria	OPS Agricultural Technician III
Pest Eradication & Control	Valdez, Sylvia	OPS Agricultural Technician II
Pest Eradication & Control	Walker, Caroline	Chief Of Pest Erad And Control-DACS
Pest Eradication & Control	Williams, Fige	Administrative Secretary
Pest Eradication & Control	Williams, Jacqueline	OPS Agricultural Technician III
Pest Eradication & Control	Zamora, Rocio	Administrative Secretary
Pest Eradication & Control	Zuniga, Maria	OPS Agricultural Technician II

Appendix B

Peer-Reviewed Publications

Ahmed, M. Z. & Deeter, L. (2022). Rapid species-level hemolymph color test for all life stages of *Nipaecoccus viridis* (Newstead) (Hemiptera: Pseudococcidae), an invasive and regulatory pest in the United States, *Journal of Applied Entomology, 146*, 454–460.

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Ahmed, M. Z., Moore, M.R., Rohrig, E., McKenzie, C.L., Liu, D., Feng, J., Normark, B.B., Miller, D.R. (2021). Taxonomic and identification review of adventive *Fiorinia* Targioni Tozzetti (Hemiptera, Coccomorpha, Diaspididae) of the United States. *ZooKeys*, @@: #–##. https://doi.org/10.3897/zookeys.@@.69171.

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Appendix C

DPI Publications

DACS #	*Publication Title*	*Edition Date*
DACS-P 01313	WHAT IS NOT A HONEY BEE? BEE SAFE AND BEE AWARE!	08/2021
DACS-P 01746	EXOTIC FRUIT FLY QUARANTINE NOTICE (ENGLISH/SPANISH DOOR HANGER)	06/2022
DACS-P 01791	PEST ALERT: ACERIA LITCHII (KEIFER, 1943), LYCHEE ERNOSE MITE	05/2021
DACS-P 01835	GIANT AFRICAN SNAIL ERADICATION PROGRAM	02/2022
DACS-P 01884	PEST ALERT: BACTROCERA DORSALIS, ORIENTAL FRUIT FLY (HENDEL) (TEPHRITIDAE)	06/2022
DACS-P 01925	PEST ALERT: THE HORNTAIL SNAIL, MACROCHLAMYS INDICA BENSON, DETECTED IN SOUTH FLORIDA	08/2020
DACS-P 01926	THRIPS PARVISPINUS (KARNY)	08/2020
DACS-P 01927	UPCOMING TREATMENT NOTICE FOR EXOTIC, INVASIVE SNAILS	08/2020
DACS-P 01928	LYCHEE ERINOSE MITE ERADICATION 24 HOUR NOTICE	09/2020
DACS-P 01929	PEST ALERT: FIORINIA PROBOSCIDARIA GREEN (HEMIPTERA: DIASPIDIDAE), SNOUT SCALE, A POTENTIAL PEST OF CITRUS IN FLORIDA	09/2020
DACS-P 01930	POTATO PSYLLID ADVISORY	10/2020
DACS-P 01935	HORNTAIL SNAIL ERADICATION PROGRAM DOORHANGER	10/2020
DACS-P 01936	PEST ALERT BRACHYPLATYS SUBAENEUS (WESTWOOD), BLACK BEAN BUG, DETECTED IN SOUTH FLORIDA	10/2020
DACS-P 01937	HORNTAIL SNAIL POSTER FOR NURSERIES	10/2020
DACS-P 01938	FLORIDA IS ON THE LOOKOUT FOR THE POTATO PSYLLID (BACTERICERA COCKERELLI)	11/2020
DACS-P 01939	PEST ALERT -VITEX ROTUNDIFOLIA L.F., BEACH VITEX OR ROUNDLEAF CHASTETREE, A RECENTLY LISTED STATE NOXIOUS WEED	12/2020
DACS-P 01940	PEST ALERT - DOLICHANDRA UNGUIS-CATI (L.) L.G. LOHMANN, CATCLAW VINE, A RECENTLY LISTED STATE NOXIOUS WEED	12/2020
DACS-P 01941	CIRCULAR - SABAL PALMETTO, OUR STATE TREE: IS IT A TREE?	12/2020
DACS-P 01942	PEST ALERT - LONICERA JAPONICA THUNB., JAPANESE HONEYSUCKLE, A RECENTLY LISTED STATE NOXIOUS WEED	01/2021
DACS-P 01943	MASS-REARING LILIOCERIS CHENI GRESSITT AND KIMOTO, AIR POTATO BETTLE (APB): STANDARD OPERATING PROCEDURES	03/2021
	DACS-P 01945 HOW TO IDENTIFY HEMP, CANNABIS SATIVA L. (AND LOOKALIKE) PLANTS	04/2021
DACS-P 01946	RHYNCHOSPORA OF FLORIDA	04/2021
DACS-P 01954	PEST ALERT: ACANTHOCOCCUS LAGERSTROEMIAE (KUWANA), CRAPEMYRTLE BARK SCALE, DETECTED IN THE FLORIDA PANHANDLE	06/2021
DACS-P 01955	PEST ALERT: SINOMEGOURA CITRICOLA (VAN DER GOOT) DETECTED IN PALMETTO, FL ON MANGOS	08/2021
DACS-P 01957	CITRUS MULTI-PEST SURVEY	08/2021
DACS-P 01958	NOTICE OF FOLIAR TREATMENT	09/2021
DACS-P 01959	NOTICE OF FRUIT REMOVAL	09/2021
DACS-P 01960	NOTICE OF SOIL TREATEMENT	09/2021
DACS-P 01962	GIANT AFRICAN LAND SNAIL ERADICATION PROGRAM MEDIA KIT	10/2021
DACS-P 01963	MILK SNAIL SURVEY DOORHANGER	10/2021
DACS-P 01964	ABANDONED GROVE INITIATIVE	10/2021

DACS-P 01966	IDENTIFYING GRASSES: STARTING WITH A FEW EASY ONES, CIRCULAR ISSUE NO. 45	11/2021
DACS-P 01967	HELP US PROTECT FLORIDA'S AGRICULTURE	01/2022
DACS-P 01968	BRAZILIAN PEPPERTREE BIOLOGICAL CONTROL	02/2022
DACS-P 01969	PEST ALERT: SWEETGUM INSCRIBER, ACANTHOTOMICUS SUNCEI	02/2022
DACS-P 01970	CLASSICAL BIOLOGICAL CONTROL	02/2022
DACS-P 01981	PEST ALERT -LYCORMA DELICATULA (WHITE) (HEMIPTERA: FULGORIDAE), SPOTTED LANTERNFLY	11/2020
DACS-P 01982	PEST ALERT: CITRUS YELLOW VEIN CLEARING VIRUS	05/2022
DACS-P 01983	MALE ANNIHILATION TECHNIQUE DOORHANGER	05/2022
DACS-P 01985	CITRUS GERMPLASM INTRODUCTION PROGRAM	06/2022
DACS-P 01986	PUBLIC NOTICE OF ORIENTAL FRUIT FLY QUARANTINE	06/2022
DACS-P 01987	EXOTIC FRUIT FLY SAFEGUARDING GUIDELINES	06/2022
DACS-P 02054	WHAT YOU NEED TO KNOW ABOUT THE FLORIDA APIARY INDUSTRY	04/2021
DACS-P 02133	CHRP REQUIRED COMPLIANCE INFORMATION NEEDED FOR A COMPLETED FIELD/TRIP TICKETS	01/2021
DACS-P 02158	HEMP CULTIVATION LICENSE REQUIREMENT CHART	07/2020
DACS-P 02163	AIR POTATO VINE MANAGEMENT GUIDE: COMBINING MANAGEMENT STRATEGIES TO ACHIEVE ERADICATION OF THE NOXIOUS WEED DIOSCOREA BULBIFERA (AIR POTATO VINE), CIRCULAR ISSUE NO. 2	02/2021
DACS-P 02171	PLANTS FOR BEES	11/2020