Control Strategies Against the Two-spot Cotton Leafhopper (*Amrasca biguttula* (Ishida))

Alexandra M. Revynthi

Assistant Professor

Tropical Research and Education Center, University of Florida

Friday November 14, 2025

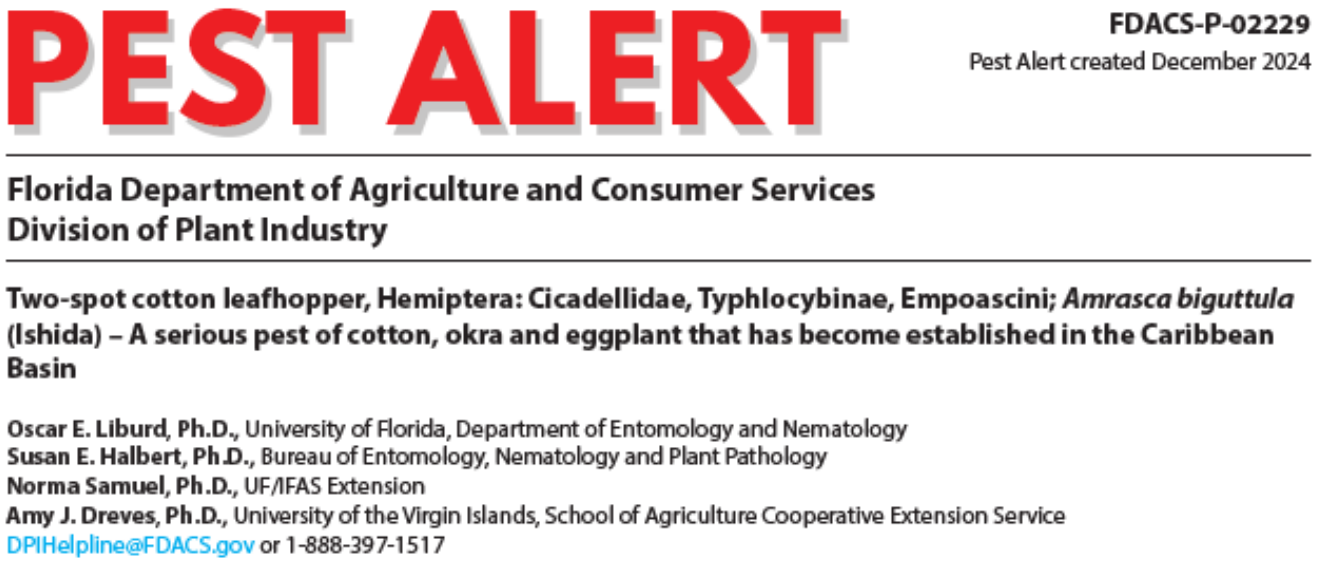
Two-spot Cotton Leafhopper

- Native to Asia and Oceania
- First detection in FL in December 2024
- A quarantinable actionable pest of regulatory significance

43 quarantined nurseries

(last update 11/14/2025 by FDACS-DPI)

UF UNIVERSITY of FLORIDA
Tropical Research and Education Center



PEST ALERT

FDACS-P-02229
Pest Alert created December 2024

Florida Department of Agriculture and Consumer Services
Division of Plant Industry

Two-spot cotton leafhopper, Hemiptera: Cicadellidae, Typhlocybinae, Empoascini; *Amrasca biguttula* (Ishida) – A serious pest of cotton, okra and eggplant that has become established in the Caribbean Basin

Oscar E. Liburd, Ph.D., University of Florida, Department of Entomology and Nematology
Susan E. Halbert, Ph.D., Bureau of Entomology, Nematology and Plant Pathology
Norma Samuel, Ph.D., UF/IFAS Extension
Amy J. Dreves, Ph.D., University of the Virgin Islands, School of Agriculture Cooperative Extension Service
DPIHelpline@FDACS.gov or 1-888-397-1517

Two-spot Cotton Leafhopper – Distribution in Continental US

- Florida
- Georgia
- South Carolina
- North Carolina
- Alabama
- Texas
- Mississippi
- Louisiana

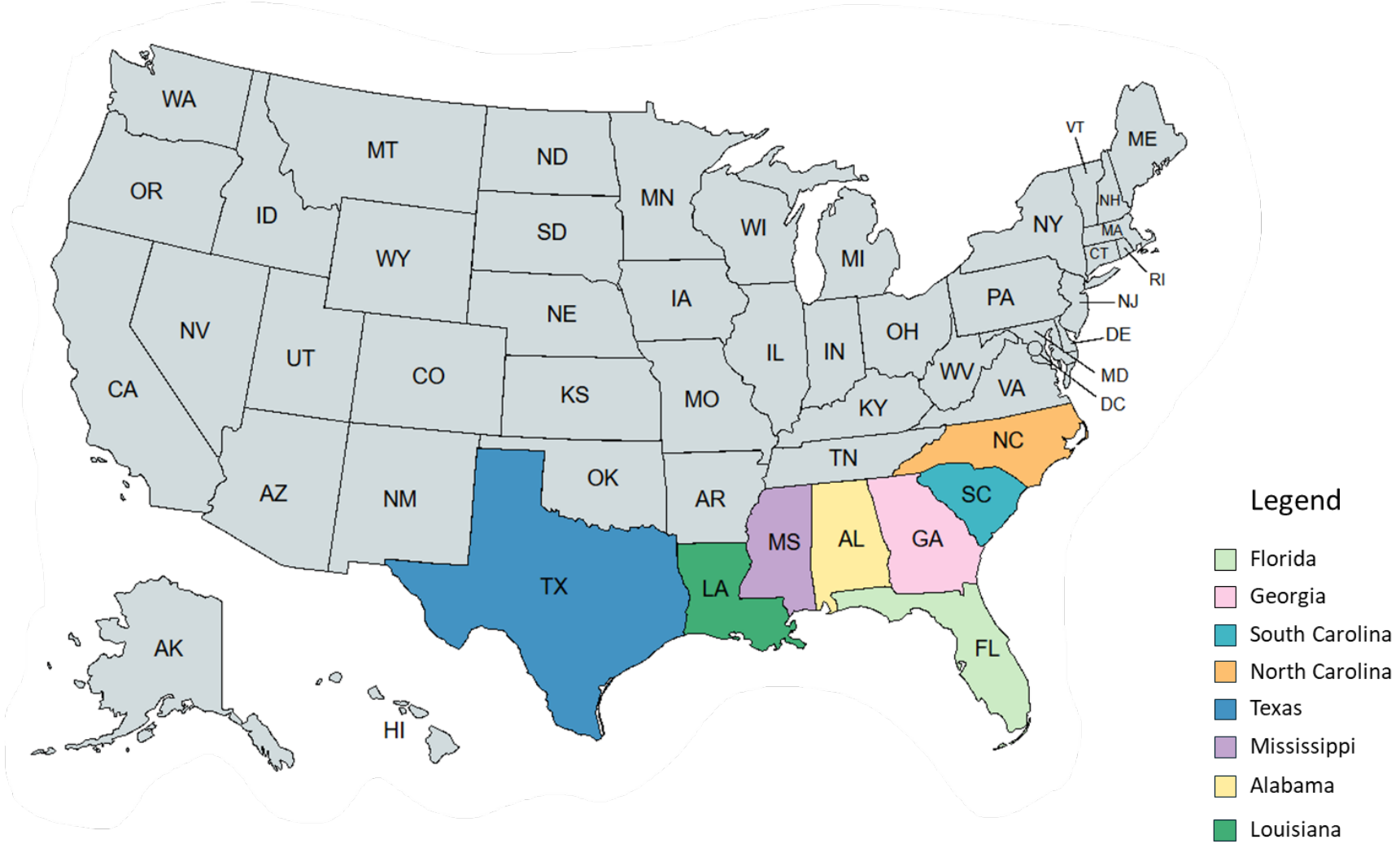


Photo: P. Villamarin

Two-spot Cotton Leafhopper - Biology

- Eggs inserted in leaf tissue (veins) → nymphs (5 instars) → adults
- Development from egg to adult: ~2–3 weeks (temperature dependent)

Photo: A. Revynthi

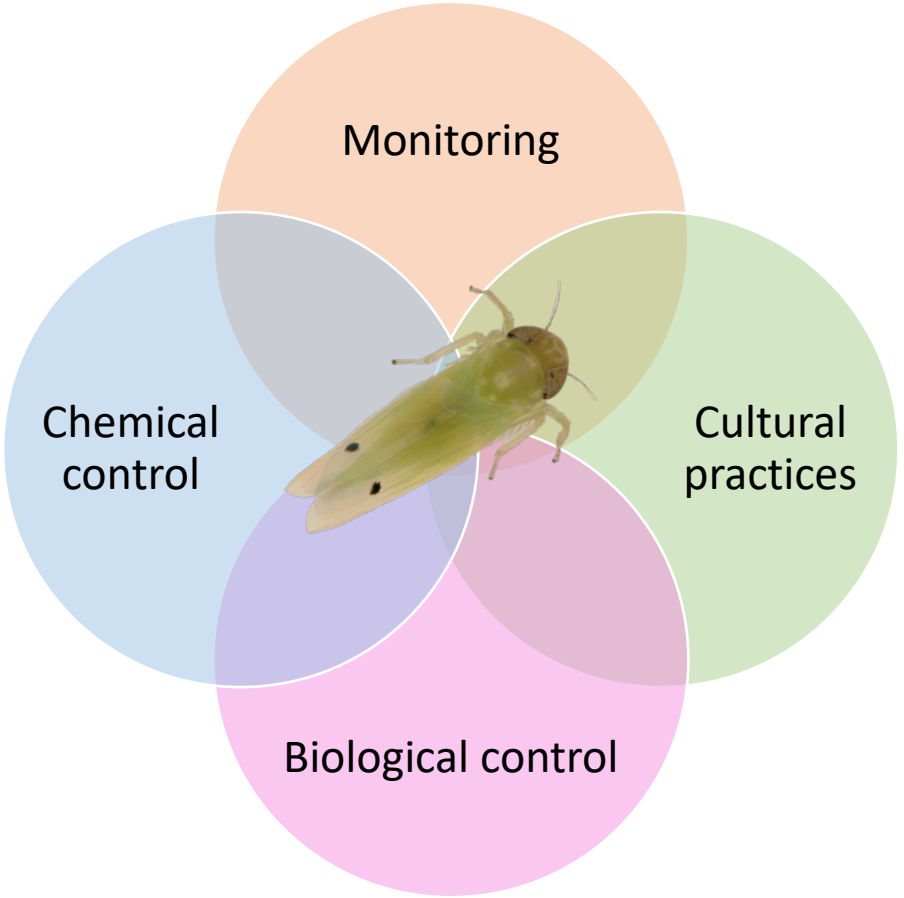
UF UNIVERSITY of FLORIDA
Tropical Research and Education Center

Two-spot Cotton Leafhopper - Biology

- Females lay 15-35 eggs, some studies report up to 60 eggs (host dependent)
- Adults live approx. 11-22 days
- Optimal conditions: 78.8 °F, 70% RH, low rainfall

Integrated Pest Management (IPM)

- Monitoring
- Cultural practices
- Biological control
- Chemical control
- Post-harvest treatments
- Production of clean propagative material



UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Chemical Control Against the Two-spot Cotton Leafhopper

Marcello De Giosa, Yisell Velazquez-Hernandez, M. Alejandra Canon, Paola Villamarin, Livia Ataide &
Alexandra M. Revynthi

UF UNIVERSITY of FLORIDA
Tropical Research and Education Center

Laboratory Bioassay

- Hibiscus (*Hibiscus rosa-sinensis* L.) leafdiscs (50 mm diameter)
- Adult leafhoppers (females and males)
- Application:
  - Direct
  - Residue toxicity
- Mortality: 1-, 2-, 3-, 4-days post treatment application
- N=15/treatment
- 27°C, 70% RH, 12L:12D

UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

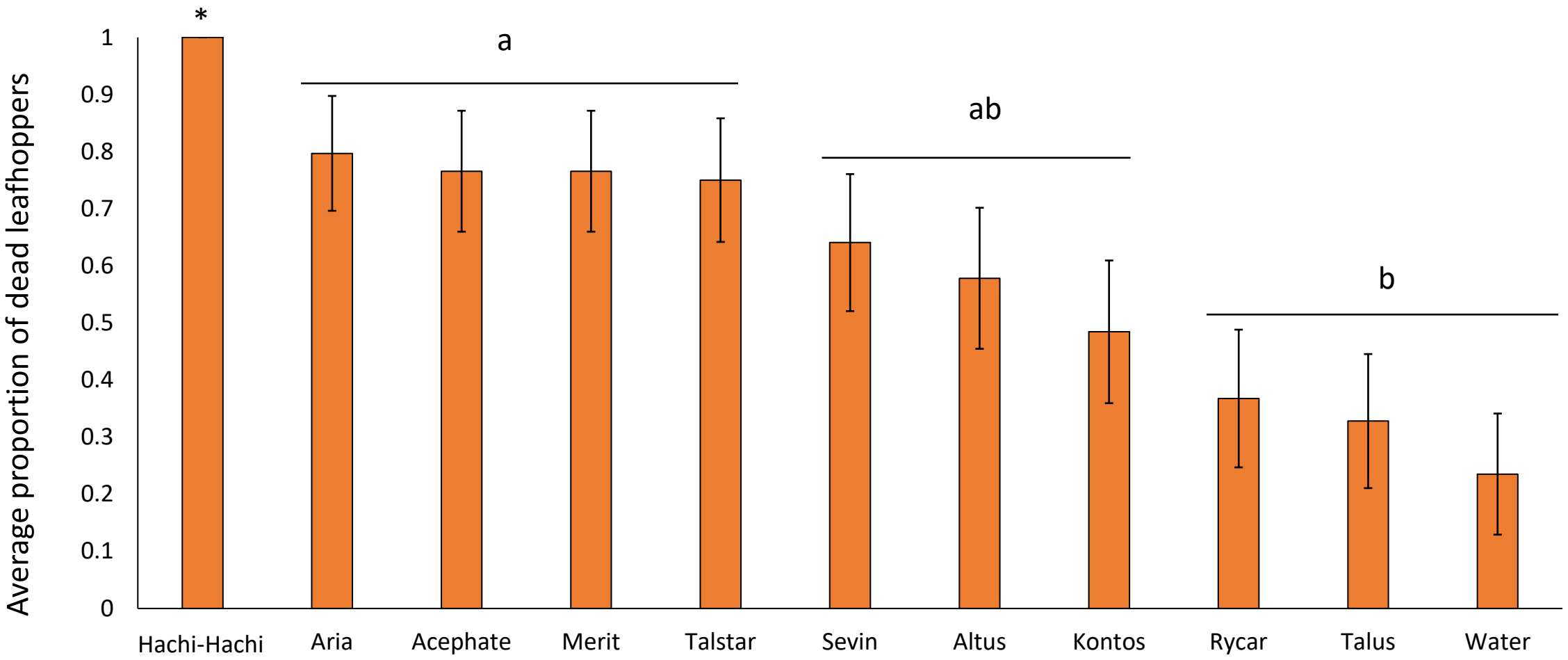
Tested Contact Conventional Insecticides

#	Product Name	Active Ingredient	Group	Rate	Site	EPA Registration #
1	Sevin SL	Carbaryl	1A	1 qt/ 100 gal	G, N, L	432-1227
2	Acephate 97 UP	Acephate	1B	12 oz/ 100 gal	G, N, L	70506-8
3	Talstar P	Bifenthrin	3A	21.7 fl oz/ 100 gal	G, N, L	279-3206
4	Merit 75 WSP	Imidacloprid	4A	1.6 oz/ 300 gal	N, L, I	432-1318
5	Altus	Flupyradifurone	4D	10.5 fl oz/ 100 gal	G, N, L	432-1575
6	Rycar	Pyrifluquinazon	9B	3.2 fl oz/ 100 gal	G	71711-37-67690
7	Talus	Buprofezin	16	12 oz/ 100 gal	N, G	71711-21-67690
8	Hachi-Hachi	Tolfenpyrad	21A	27 fl oz/ 100 gal	G, N, S, L	71711-31-67690
9	Kontos	Spirotetramat	23	3.4 fl oz/ 100 gal	G, N, I	432-1471
10	Aria	Flonicamid	29	4.3 oz/ 100 gal	G, N, L	279-3287

S: shadehouse, G: greenhouse, N: nursery, L: landscape, I: interior

Mortality Direct Contact

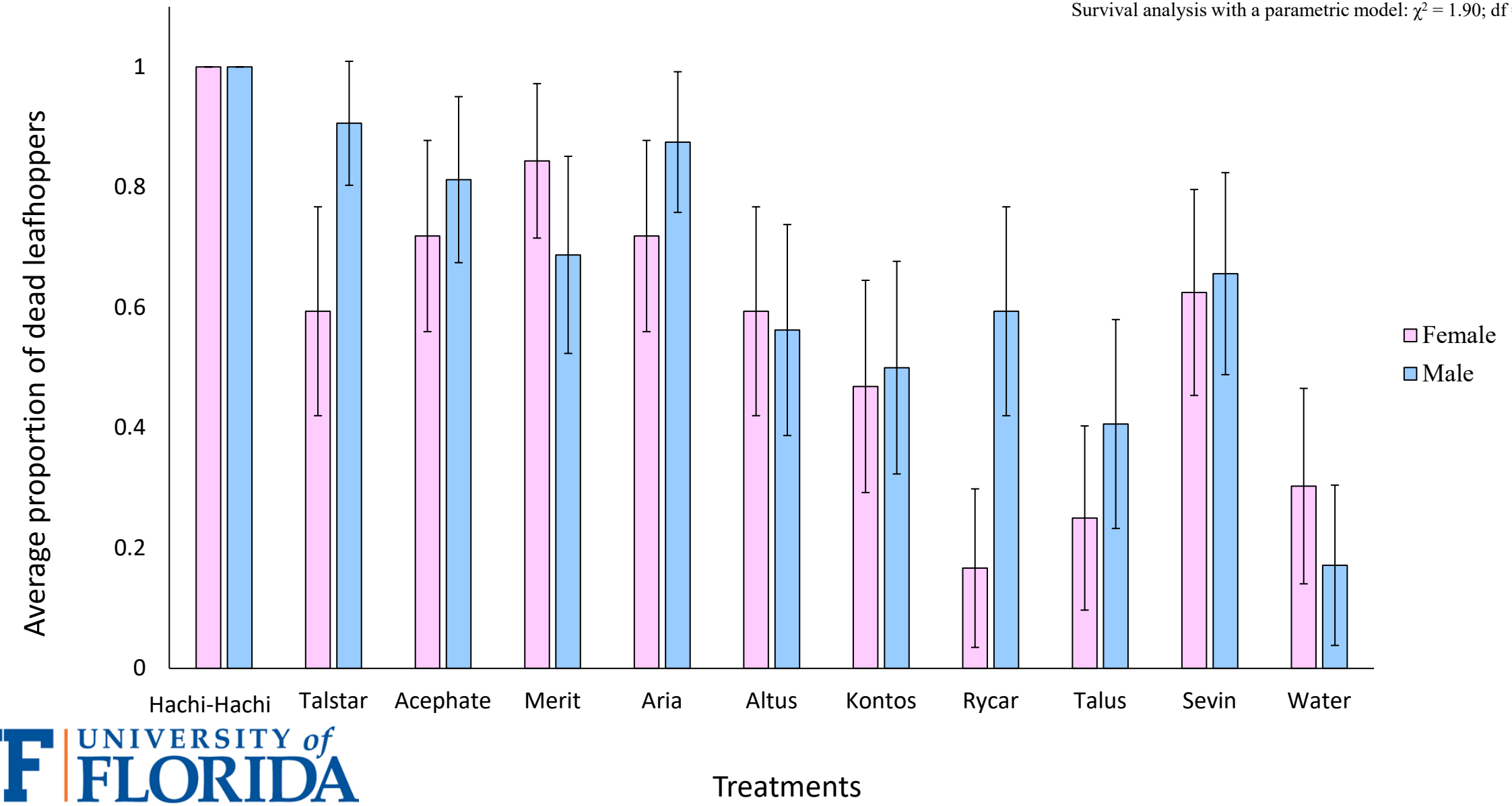
Survival analysis with a parametric model: $\chi^2 = 59.90$; df = 10; $P < 0.001$



UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Mortality Direct Contact – Females vs. Males

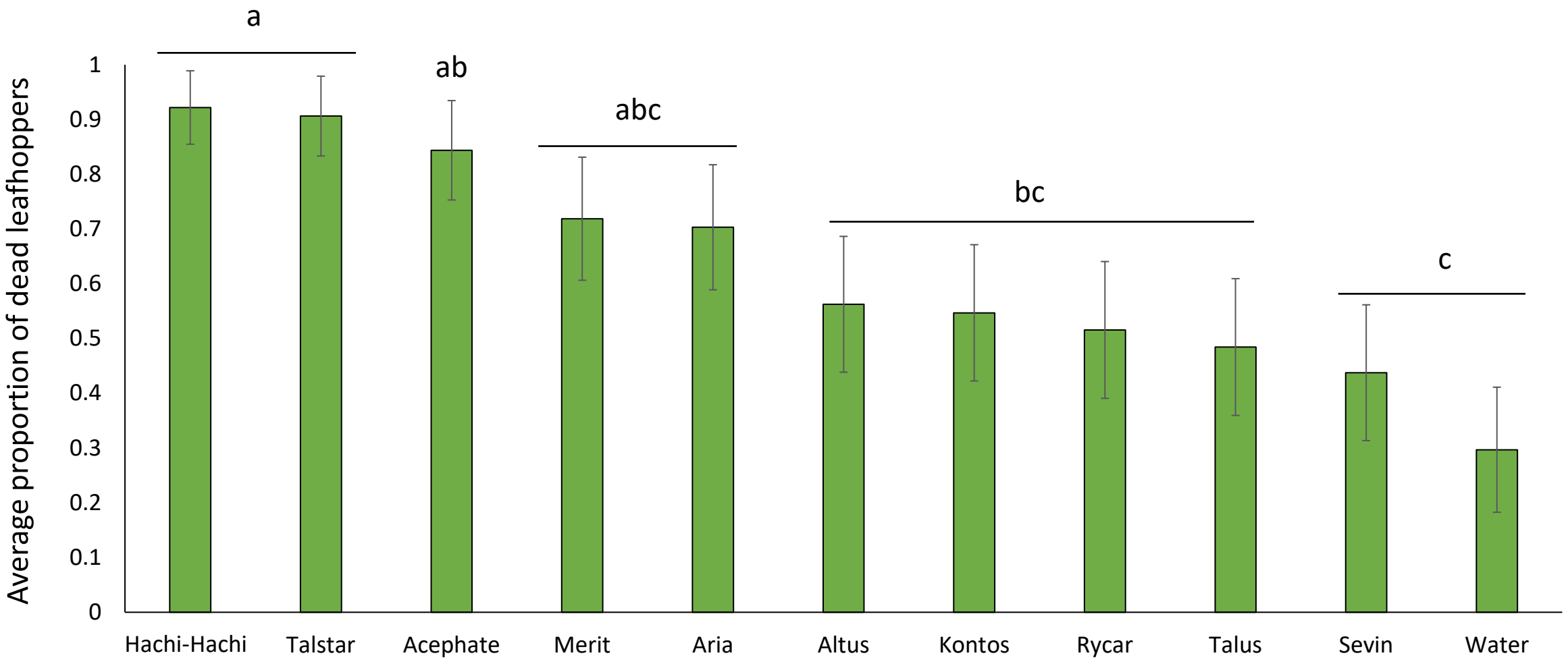
Survival analysis with a parametric model: $\chi^2 = 1.90$; df = 1; P = 0.16



UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Mortality Residue Toxicity

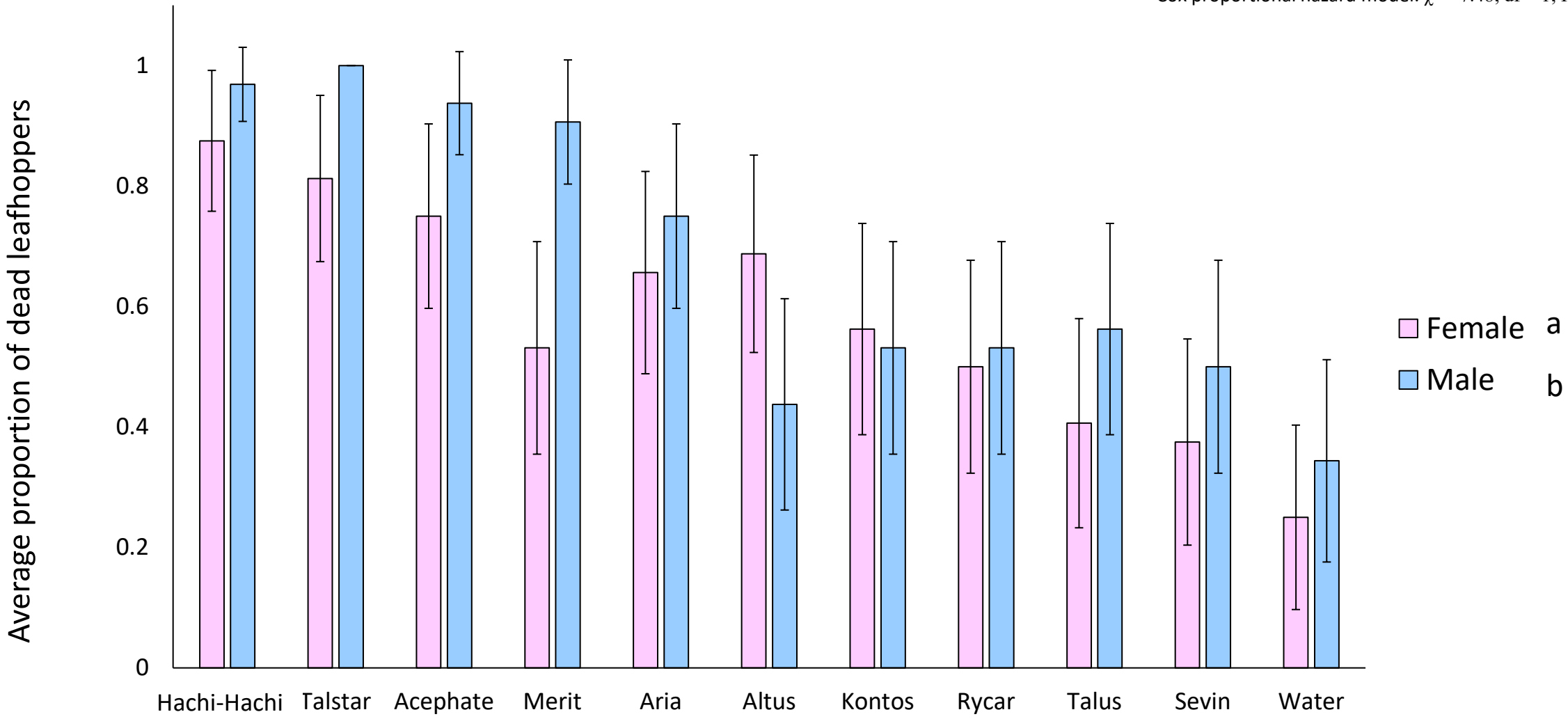
Cox proportional hazard model: $\chi^2 = 48.35$; df = 10; $P < 0.001$



UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Mortality Residue Toxicity– Females vs. Males

Cox proportional hazard model: $\chi^2 = 7.48$; df = 1; $P < 0.001$



UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

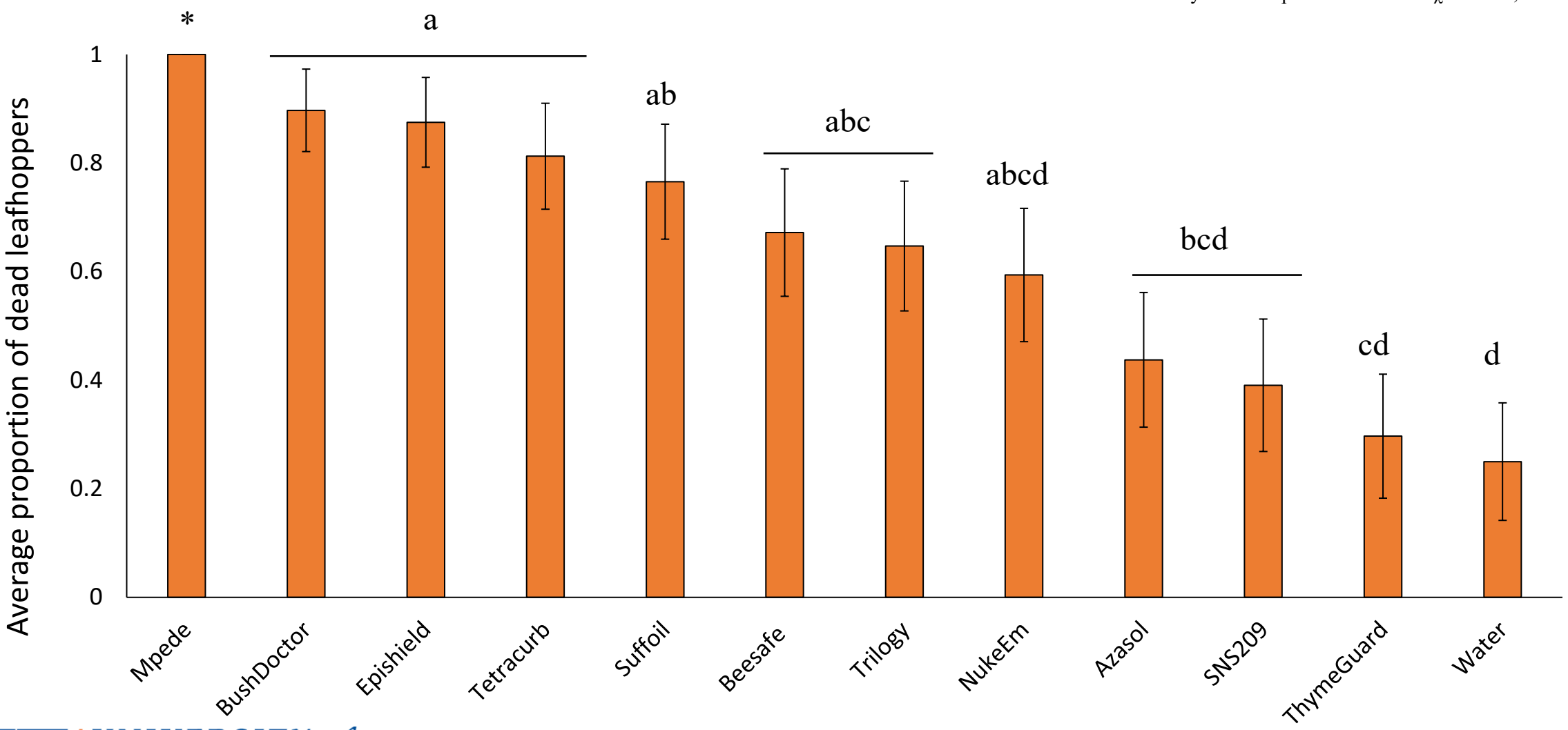
Tested Contact Biorational Insecticides

#	Product Name	Active Ingredient	Group	Rate	Site	EPA Registration #
1	Azasol	Azadirachtin	Unknown	6 oz/ 50 gal	G, N, L, I	81899-4-74578
2	Trilogy	Neem oil	Unknown	2%	N	70051-2
3	M-Pede	Potassium salts of fatty acids	Unclassified	4%	G, N, L, I	10163-324
4	SuffoilX	Mineral oil	Unclassified	2%	G, N, L	48813-1-68539
5	Thyme Guard	Thyme oil	Unclassified	0.5%	S, G, N, L	FIFRA 25 (b) exempt
6	Bush doctor force of nature insect repellent	Garlic oil	Unclassified	128 fl oz/ 100 gal	S, G, N, L	FIFRA 25 (b) exempt
7	Nuke EM	Citric Acid	Unclassified	8 fl oz / 1 gal	S, G, N, L	FIFRA 25 (b) exempt
8	Bee Safe 3-in-1	Sesame oil	Unclassified	3 fl oz/ 1 gal	S, G, N, L	FIFRA 25 (b) exempt
9	Sierra Natural Science 209	Rosemary oil	Unclassified	1 fl oz/ 1 gal	S, G, N, S	FIFRA 25 (b) exempt
10	Tetracurb	Castor, Rosemary, Clove & Peppermint oil	Unclassified	2%	G, N, L, I	FIFRA 25 (b) exempt
11	Epishield	Peppermint oil, Clove oil & Sodium Lauryl Sulfate	Unclassified	12 fl oz/ 100 gal	G, N, L, I	FIFRA 25 (b) exempt

S: shadehouse, G: greenhouse, N: nursery, L: landscape, I: interior

Mortality Direct Contact

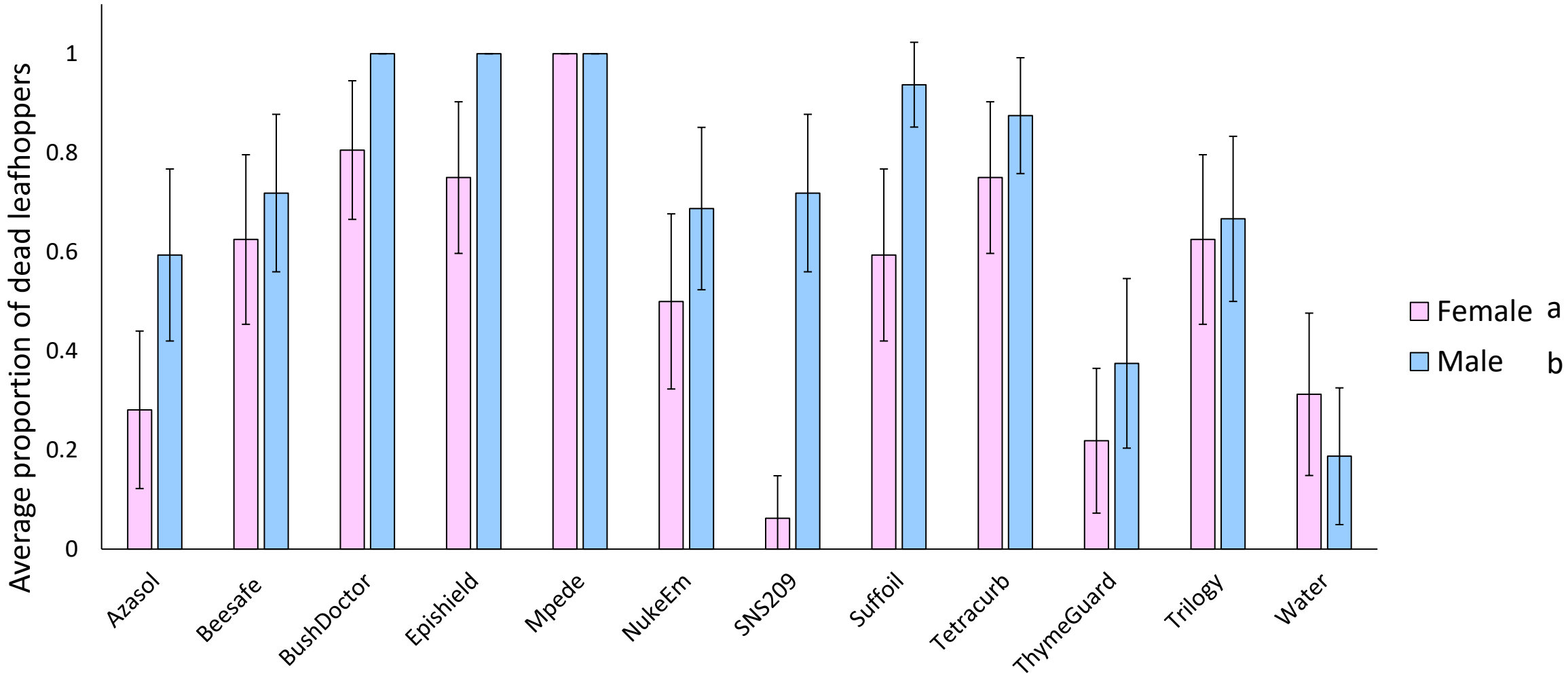
Survival analysis with a parametric model: $\chi^2 = 77.01$; df = 11; $P < 0.001$



UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Mortality Direct Contact – Females vs. Males

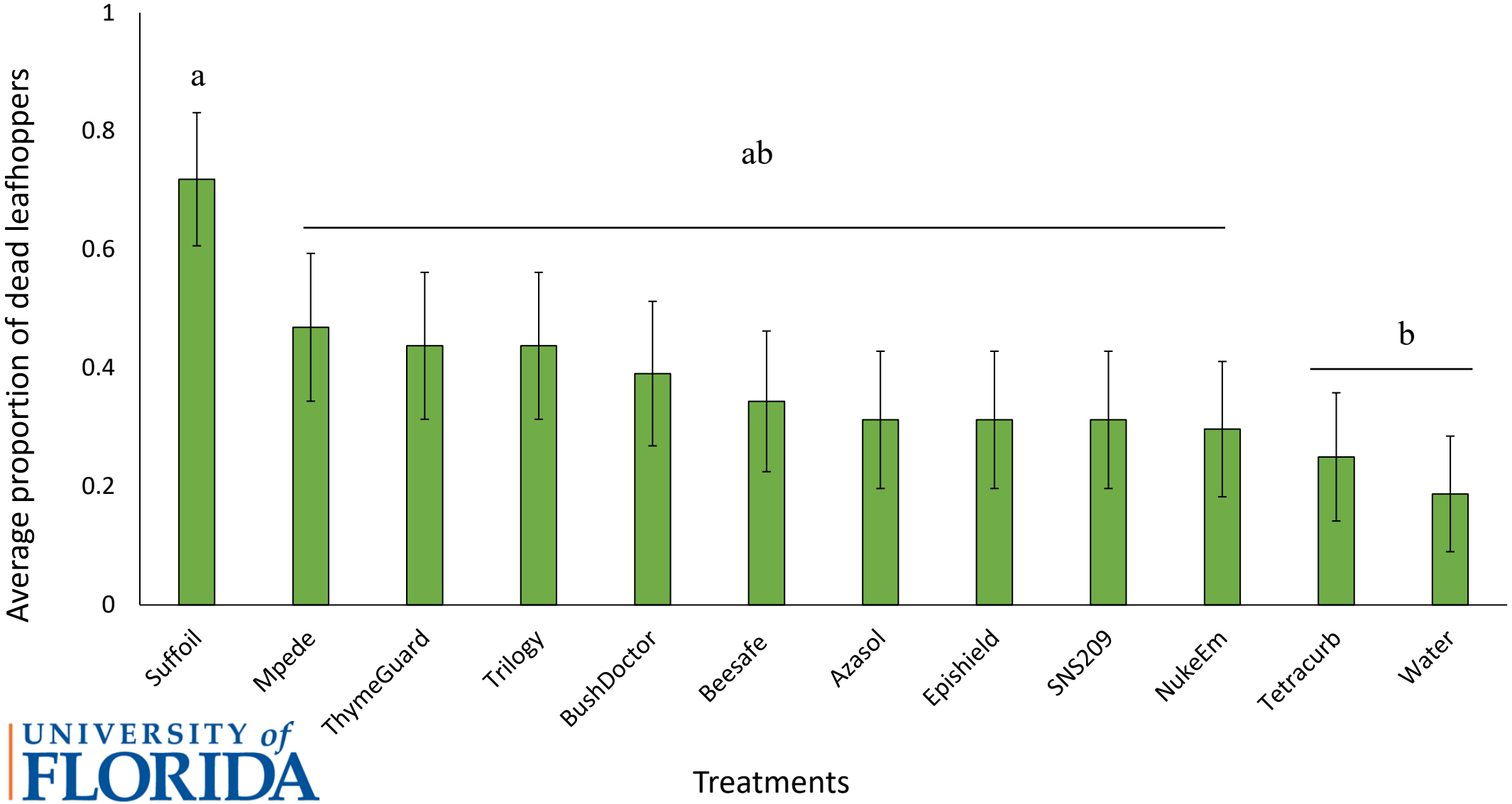
Survival analysis with a parametric model: $\chi^2 = 13.57$; df = 1; $P < 0.001$



UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

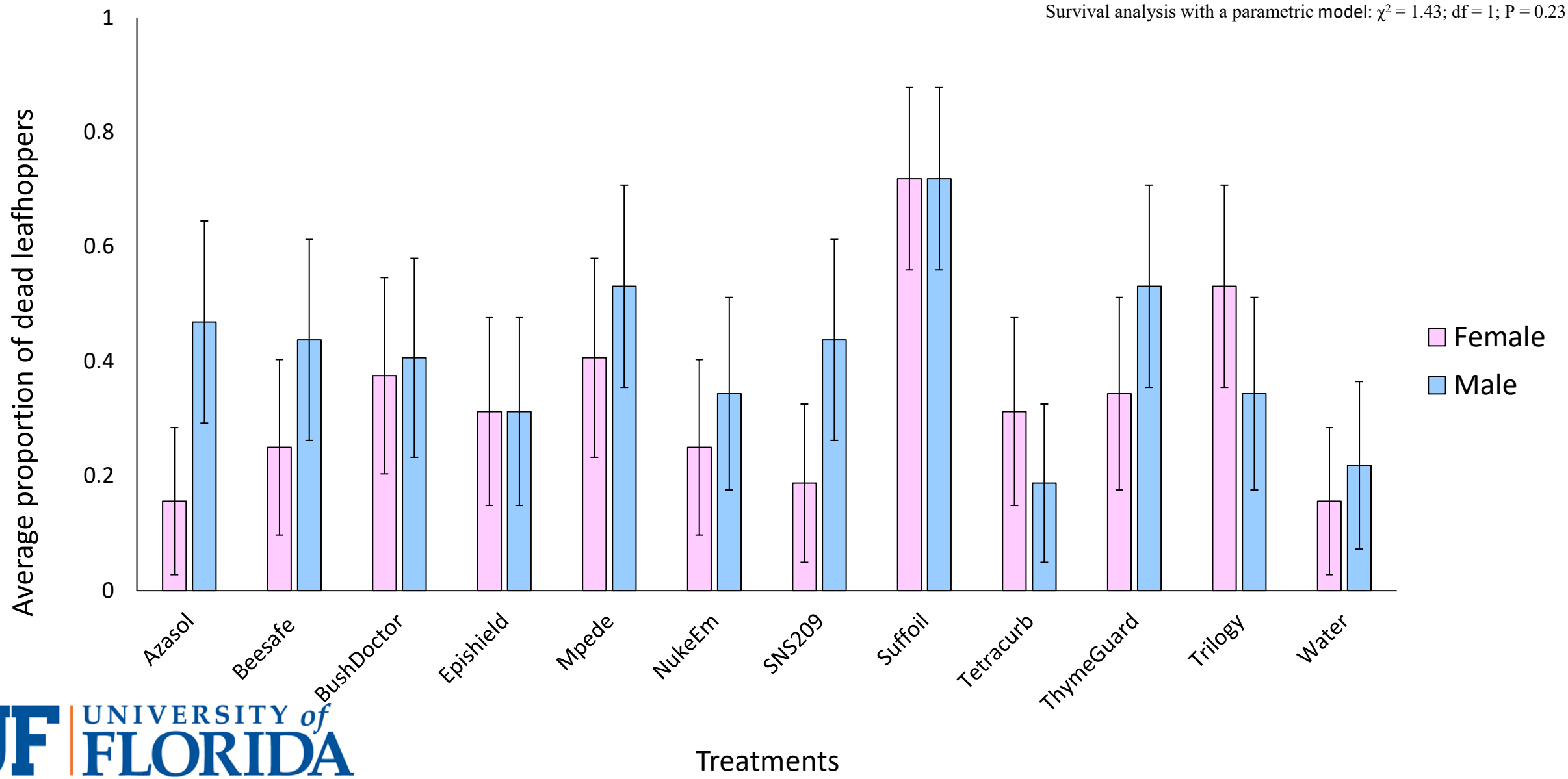
Mortality Residue Toxicity

Survival analysis with a parametric model: $\chi^2 = 21.48$; df = 11; $P < 0.001$



UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Mortality Residue Toxicity– Females vs. Males



UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Overall Efficacy – Contact Insecticides

Treatment	Group	Direct	Residue
Hachi-Hachi SC	21A	X	X
Aria	29	X	
Acephate	1B	X	X
Merit	4A	X	
Talstar	3A	X	X
Mpede	UN	X	
Bushdoctor	UN	X	
Epishield	UN	X	
SuffoilX	UN	X	X
BeeSafe	UN	X	
Neem oil	UN	X	

UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Conclusions – Ornamental Formulations Lab Assays

- Hachi-Hachi, Acephate, Talstar & SuffoilX → potential against adults
- Biorational→ only for curative applications
- Males appear more susceptible than females

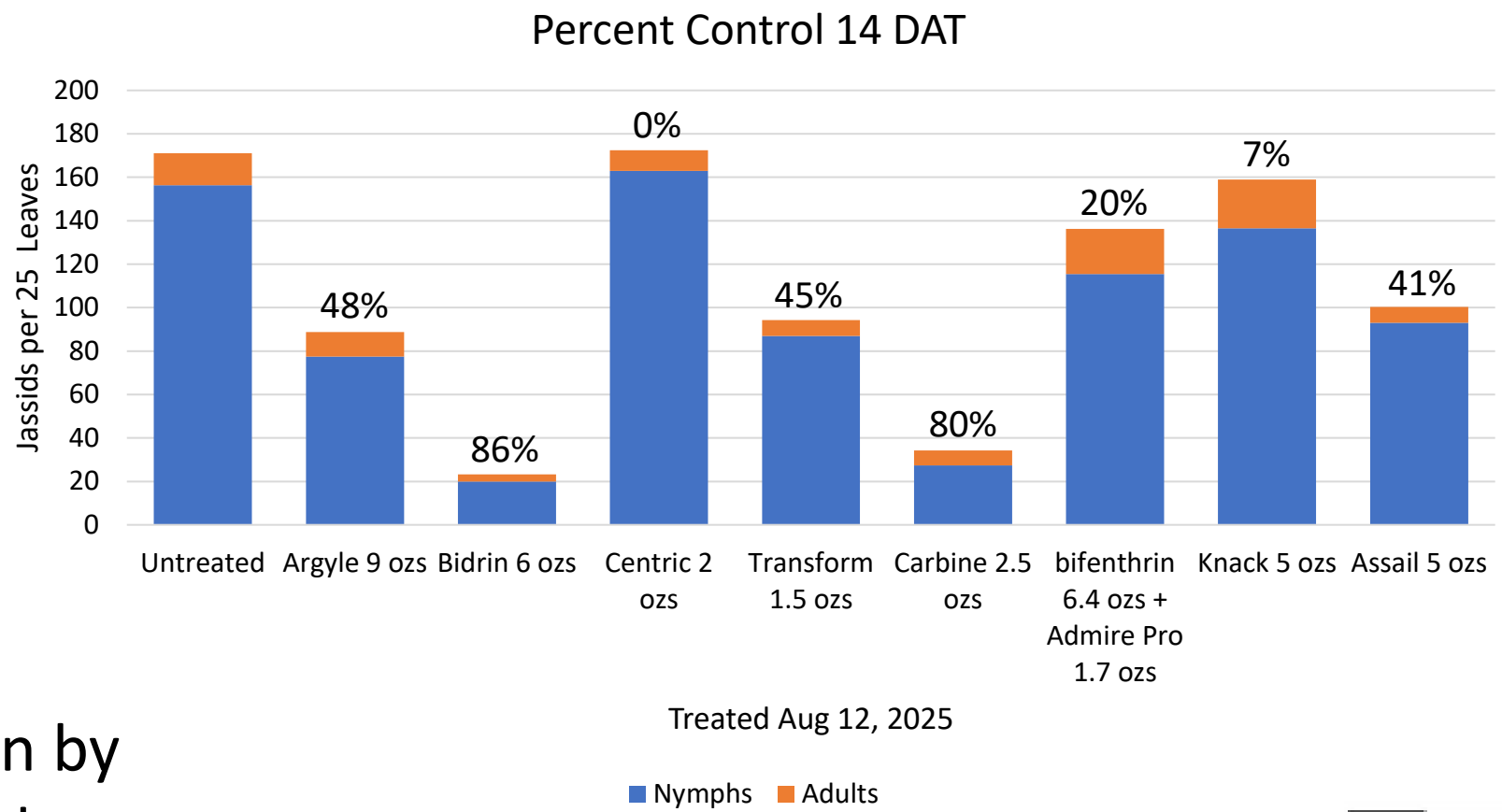
Tested Contact Insecticides in Field Trials Cotton

#	Product Name	Active Ingredient	Group	Ornamental Label
1	Bidrin	Dicrotophos	1B	NA
2	Orthene 97	Acephate	1B	Acephate 97UP
3	Dimethoate	Dimethoate	1B	NA
4	Brigade	Bifenthrin	3A	Talstar
5	Argyle	Bifenthrin + Acetamiprid	3A+4A	Talstar+Tristar
6	Assail	Acetamiprid	4A	Tristar
7	Centric	Thiamethoxam	4A	Flagship
8	Venom	Dinotefuran	4A	Safari
9	Admire Pro	Imidacloprid	4A	Merit
10	Transform	Sulfoxaflor	4C	Xxpire (+spinetoram)
11	Sivanto	Flupyradifurone	4D	Altus
12	Knack	Pyriproxyfen	7C	Fulcrum
13	Sefina	Afidopyropen	9D	Ventigra
14	Diamond	Novaluron	15	Pedestal
15	Courier	Buprofezin	16	Talus
16	Portal	Fenpyroximate	21A	Akari
17	Steward	Indoxacarb	22A	Provaunt (T+L)
18	Carbine	Flonicamid	29	Aria
19	NA	Plinazolin	30	NA

UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Cotton Jassid

Appling County (14 DAT)

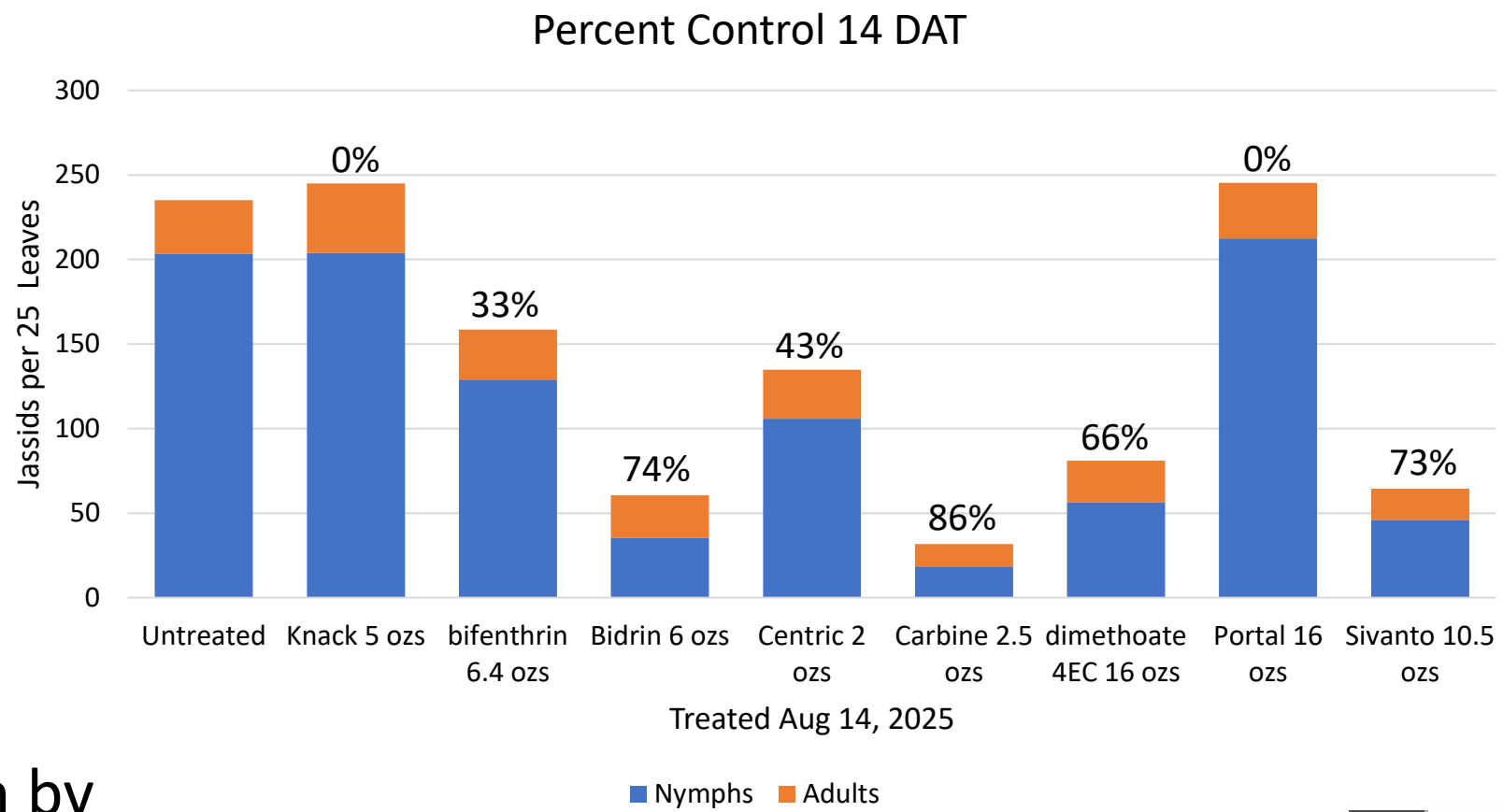


Information by
Dr. Phillip Roberts

UNIVERSITY OF GEORGIA
EXTENSION

Cotton Jassid

Brooks County (14 DAT)



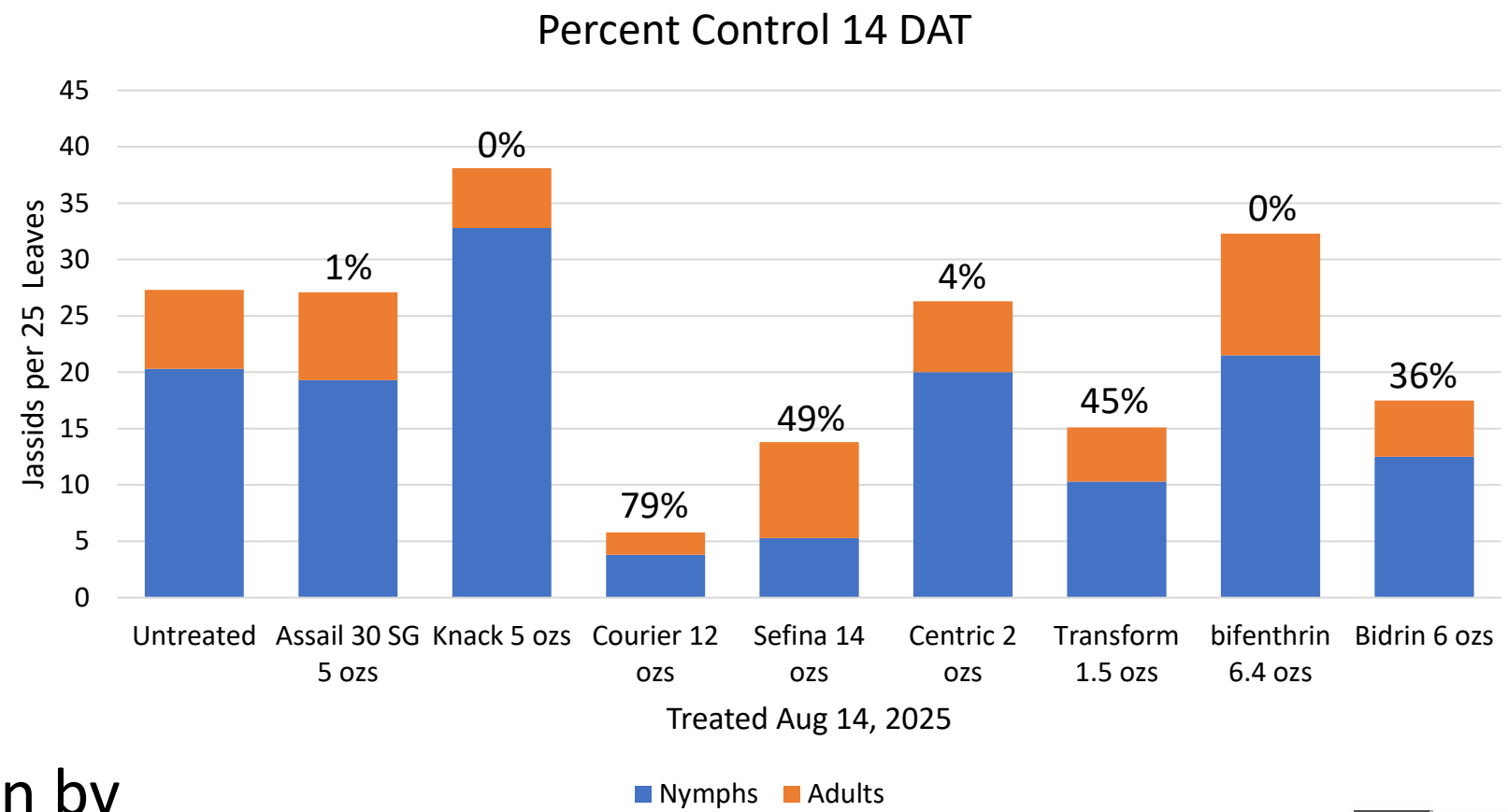
Information by
Dr. Phillip Roberts

UNIVERSITY OF GEORGIA
EXTENSION

Cotton Jassid

Colquitt County (14 DAT)

Cotton ready to defoliate.
Infestations spotty in green areas.

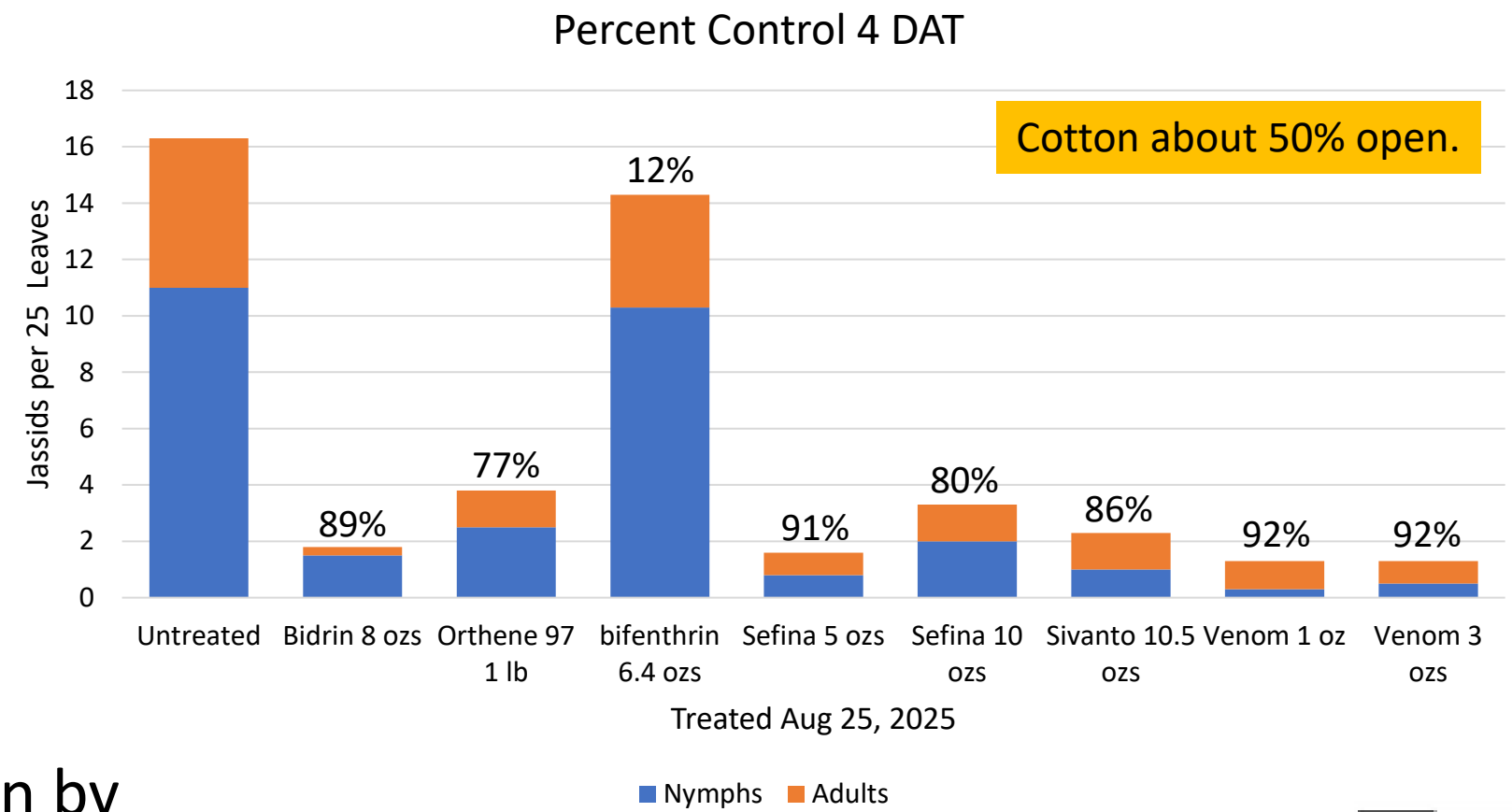


Information by
Dr. Phillip Roberts

UNIVERSITY OF GEORGIA EXTENSION

Cotton Jassid

Attapulgus Research and Education Center Dryland (4 DAT)

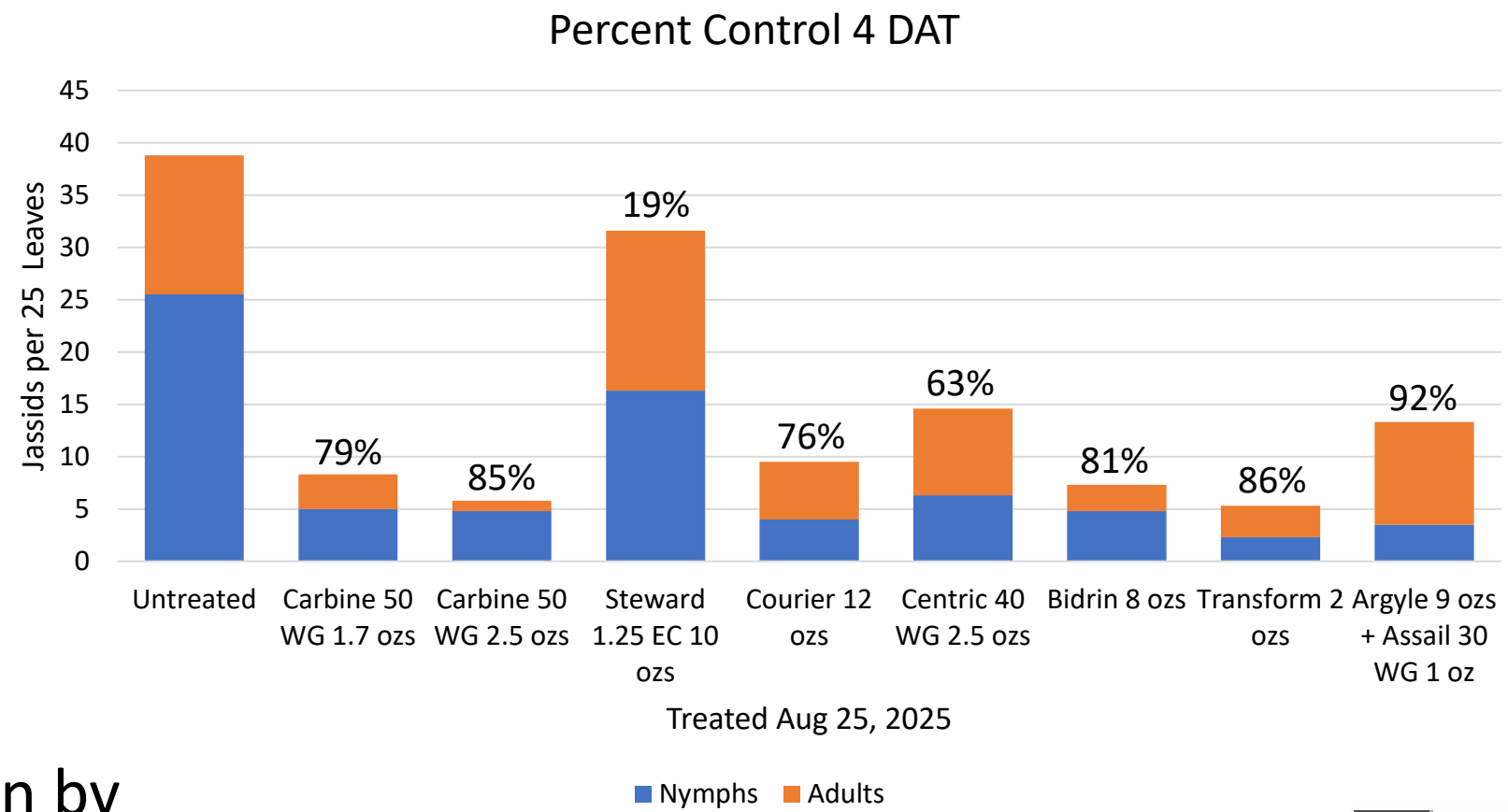


Information by
Dr. Phillip Roberts

UNIVERSITY OF GEORGIA
EXTENSION

Cotton Jassid

Attapulgus Research and Education Center Irrigated (4 DAT)

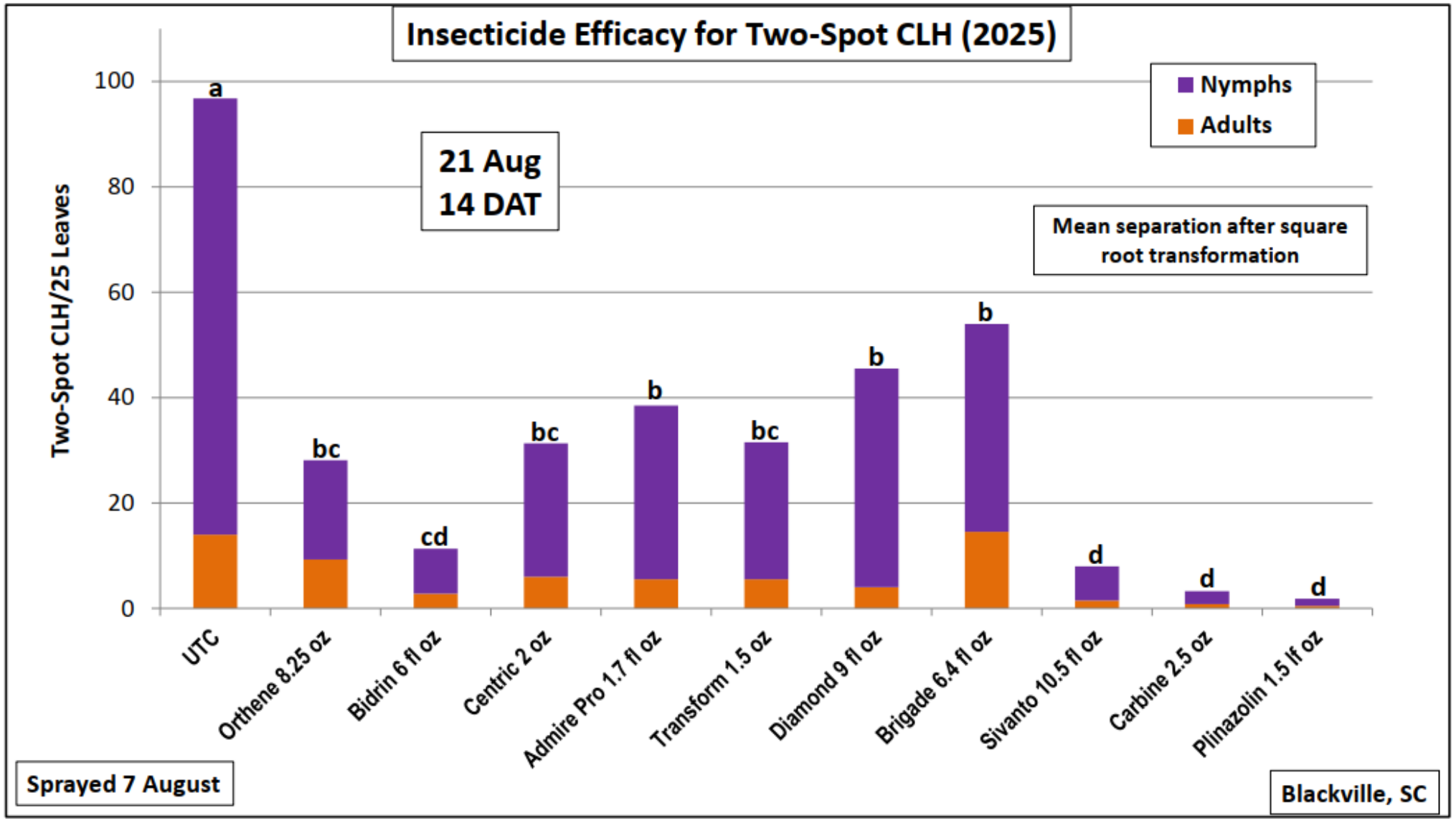


Information by
Dr. Phillip Roberts

UNIVERSITY OF GEORGIA
EXTENSION

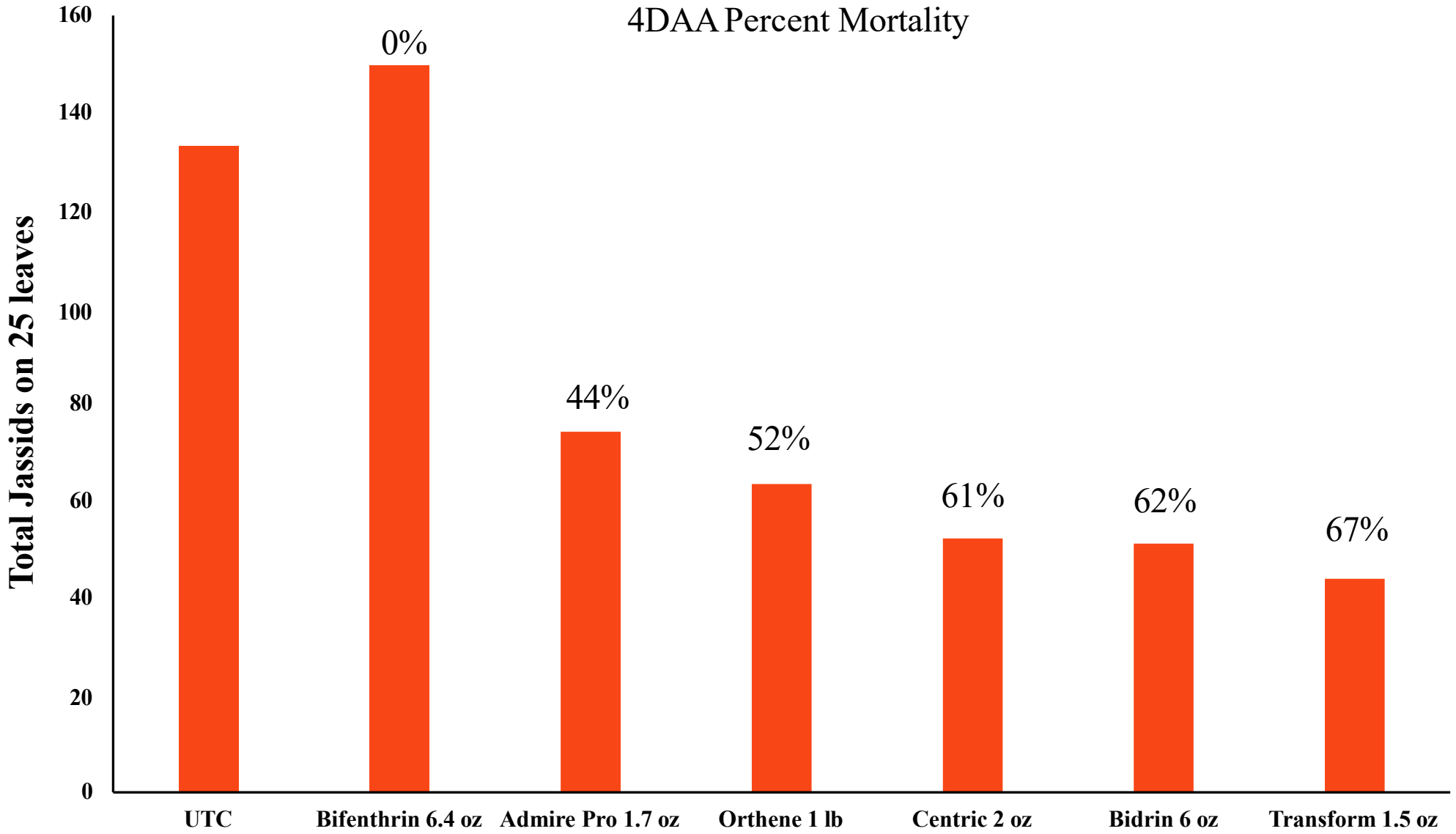
Cotton Jassid

Blackville SC (Dr. Jeremy Greene, Clemson)



Jackson Co. On-Farm Efficacy Trial

(Drs. Isaac L. Esquivel & Scott Grahm-Auburn)



Treated
Aug 15

Tested Contact Insecticides in Field Trials Cotton

→ Efficacy on cotton (field)

→ Efficacy on hibiscus (lab)

#	Product Name	Active Ingredient	Group	Ornamental Label
1	Bidrin	Dicrotophos	1B	NA
2	Orthene 97	Acephate	1B	Acephate 97UP
3	Dimethoate	Dimethoate	1B	NA
4	Brigade	Bifenthrin	3A	Talstar
5	Argyle	Bifenthrin + Acetamiprid	3A+4A	Talstar+Tristar
6	Assail	Acetamiprid	4A	Tristar
7	Centric	Thiamethoxam	4A	Flagship
8	Venom	Dinotefuran	4A	Safari
9	Admire Pro	Imidacloprid	4A	Merit
10	Transform	Sulfoxaflor	4C	Xxpire (+spinetoram)
11	Sivanto	Flupyradifurone	4D	Altus
12	Knack	Pyriproxyfen	7C	Fulcrum
13	Sefina	Afidopyropen	9D	Ventigra
14	Diamond	Novaluron	15	Pedestal
15	Courier	Buprofezin	16	Talus
16	Portal	Fenpyroximate	21A	Akari
17	Steward	Indoxacarb	22A	Provaunt (T+L)
18	Carbine	Flonicamid	29	Aria
19	NA	Plinazolin	30	NA

UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Conclusions – Cotton Formulations Field trials

- Bidrin, Carbine, Sivanto, Courier, Sefina, Venom, Transform & Plinazolin→ potential against adults and nymphs
- Bidrin (1B) showed high efficacy within 3 days post application
- Bifenthrin (3A) did not provide acceptable control

Actions to Avoid Resistance

- Implement multiple control methods → IPM
- Chemical control applications alone will exacerbate the problem!
- Rotate products with active ingredients that belong to different IRAC groups
- Do not apply back-to-back products that share an active ingredient from the same IRAC group

Potential of Biological Control Against the Two-spot Cotton Leafhopper

Livia Ataide, Marcello De Giosa, Yisell Velazquez-Hernandez, Alexandra M. Revynthi

UF UNIVERSITY of FLORIDA
Tropical Research and Education Center

Reports of Natural Enemies

Contents lists available at ScienceDirect

Journal of Asia-Pacific Entomology

journal homepage: www.elsevier.com/locate/jape

Full length article

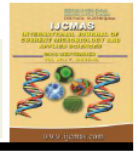
Egg parasitoids (Hymenoptera: Mymaridae) of *Amrasca biguttula* (Ishida) (Hemiptera: Cicadellidae) on Okinawa Island, a pest of okra in Japan

Tetsuya Adachi-Hagimori[a,*], Serguei Vladimirovich Triapitsyn[b], Takumi Uesato[c]

[a] Organization for Promotion of Tenure Track, University of Miyazaki, Miyazaki, Japan
[b] Entomology Research Museum, Department of Entomology, University of California, Riverside, CA 92521, USA
[c] Okinawa Prefectural Agricultural Research Center, Makabe, Itoman, Okinawa, Japan

Int.J.Curr.Microbiol.App.Sci (2018) 7(9): 2026-2031

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 7 Number 09 (2018)**
Journal homepage: http://www.ijcmas.com



Original Research Article https://doi.org/10.20546/ijcmas.2018.709.245

In vitro Efficacy of Bio Control Agents against Cotton Leafhopper, *Amrasca biguttula biguttula* (Ishida) (Homoptera: Cicadellidae)

A. Manivannan, R. Philip Sridhar, A. Kamalakannan*, N. Ganapathy and S. Karthikeyan

[1]Department of Agricultural Entomology, [2]Department of Plant Pathology, Centre for Plant Protection Studies, Tamil Nadu Agricultural University, Coimbatore-641003, Tamil Nadu, India

EUROPEAN ACADEMIC RESEARCH
Vol. III, Issue 10/ January 2016

Impact Factor: 3.4546 (UIF)
DRJI Value: 5.9 (B+)

ISSN 2286-4822
www.euacademic.org

Preliminary Studies on Egg Parasitoids of Cotton Jassid *Amrasca Biguttula Biguttula* (Ishida)

RIAZ MAHMOOD
ASHFAQUE AHMED NAHIYOON[1]
HAKIM ALI SAHITO
IRFAN-UL HAQ
CABI Central & West Asia
Rawalpindi-Pakistan

Biological Control-Potential of Green Lacewings

- Green lacewings -> aphids, mealybugs, spider mites, leafhopper nymphs, moth eggs, scales, thrips, and whiteflies
- Crops -> perennials and semi-annuals
- Commercially available in the U.S.

nymphs are predators

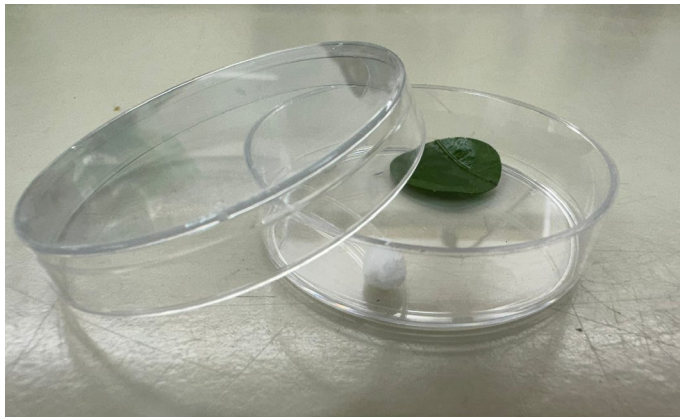
adults feed on nectar

eggs

UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Pilot Experiments Testing Green Lacewings

- No-choice experiment → hibiscus leafdiscs in petri dishes
- Mortality of leafhopper 2nd and 5th instar nymphs and adults → presence of carcasses after 24h
- Prey:Predator density → 1:1, 3:1, 5:1

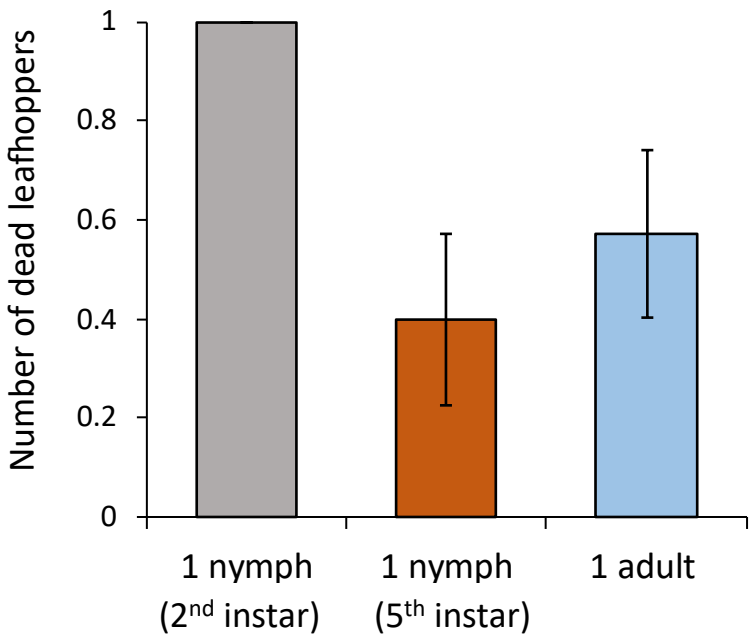


UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

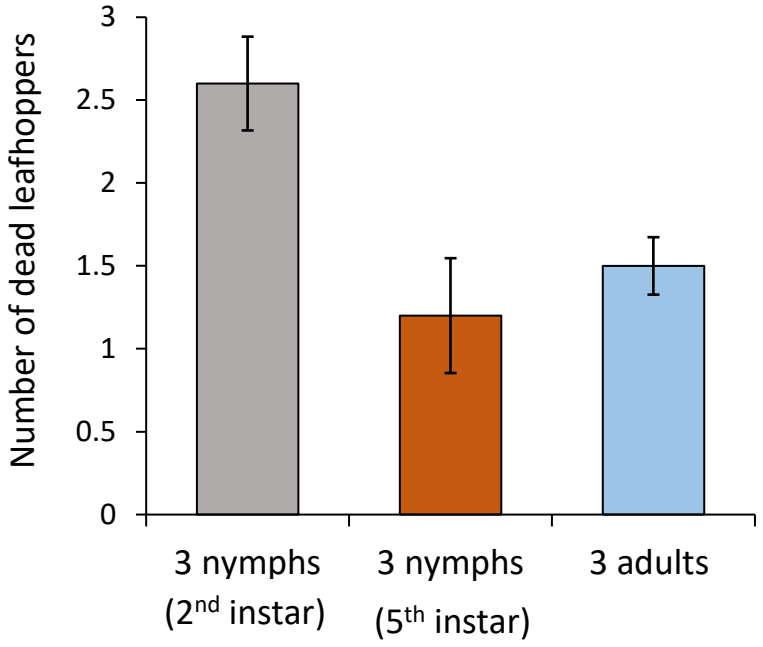
Photos: L. Ataide

Pilot Experiments Testing Green Lacewings

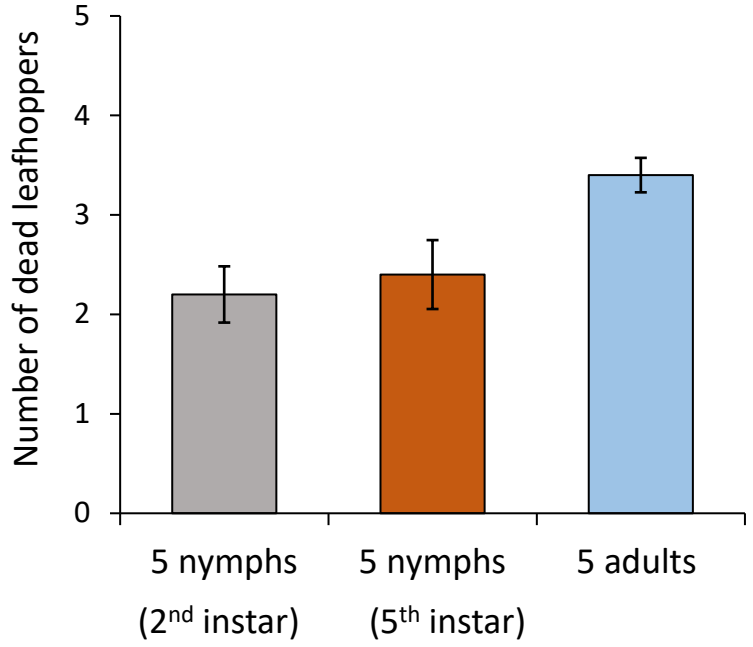
1:1/Prey:Predator



3:1/Prey:Predator



5:1/Prey:Predator



UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Pilot Experiments Testing Green Lacewings

Green lacewing 2nd instar nymph preying on a nymph leafhopper

Green lacewing 3rd instar nymph preying on an adult leafhopper

UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Videos: L. Ataide

Biological Control-Potential of Minute Pirate Bugs

- *Orius* spp.


whiteflies


aphids

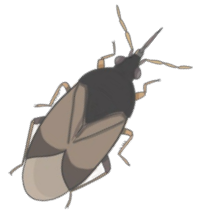

caterpillars


Western flower thrips

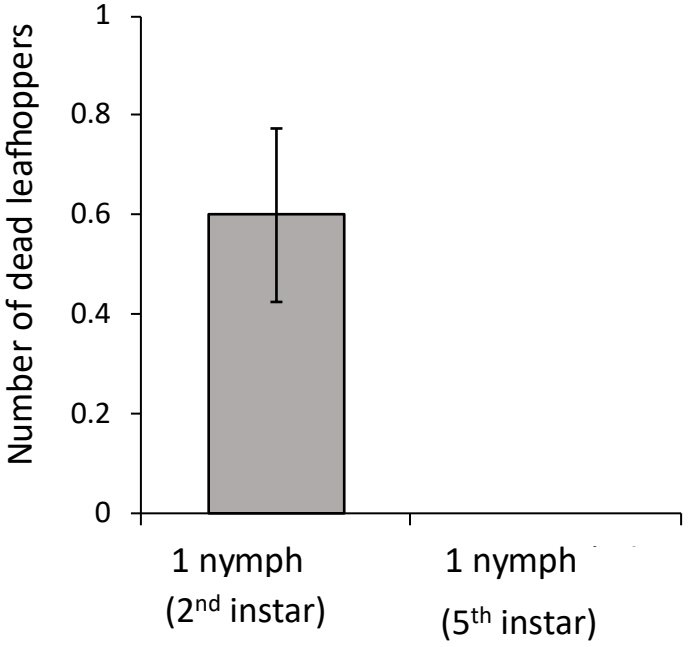

aphids

UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

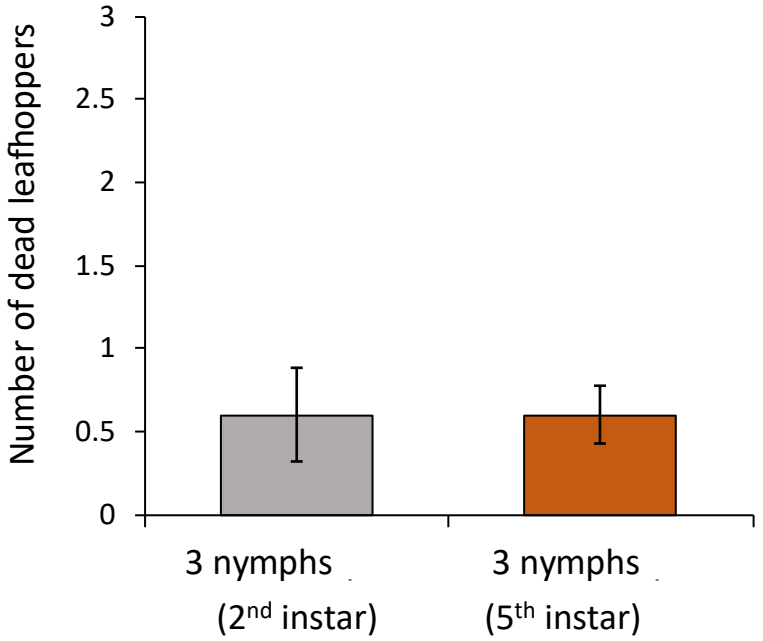
Pilot Experiments Testing Minute Pirate Bugs



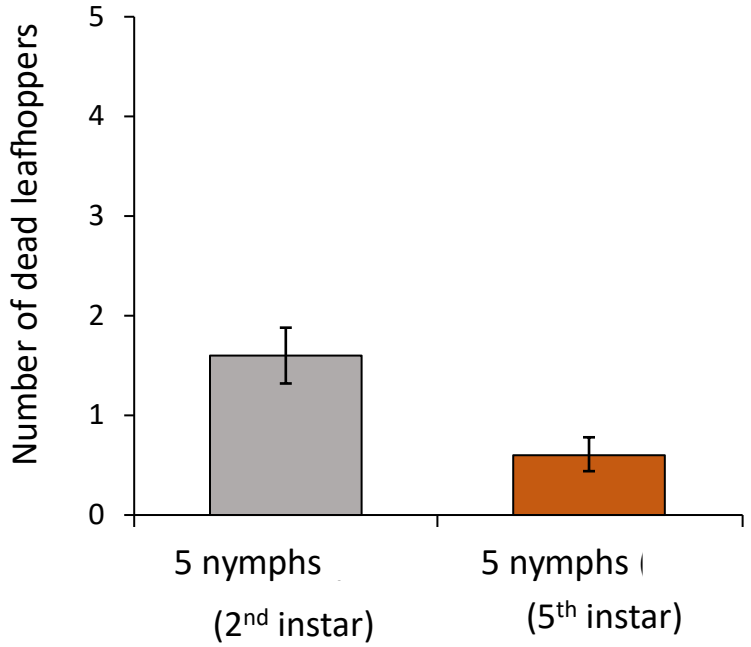
1:1/Prey:Predator



3:1/Prey:Predator



5:1/Prey:Predator



UF UNIVERSITY of FLORIDA
Tropical Research and Education Center

Next Steps

- Continue research on chemical and biological control
- Develop treatments for hibiscus cuttings
- Intergrade multiple bios
- Define appropriate monitoring tools

UF | UNIVERSITY of FLORIDA
Tropical Research and Education Center

Two-spot Cotton Leafhopper

The invasive insect two-spot cotton leafhopper *Amrasca biguttula* (Ishida) (Hemiptera: Cicadellidae) is a serious pest of cotton, okra, eggplant, sunflower, and roselle. Tropical hibiscus (*Hibiscus rosa-sinensis* L.) is also a host. The two-spot cotton leafhopper was found in Florida in December 2024. It is a regulated pest by the Florida Department of Agriculture and Consumer Services-Division of Plant Industry (FDACS-DPI).

More Information

Photo Credit: A. Revynthi, UF/IFAS TREC

For questions regarding the two-spot cotton leafhopper, please call the Division of Plant Industry Helpline at **1-**

UF UNIVERSITY of FLORIDA
Tropical Research and Education Center

UF UNIVERSITY of FLORIDA
IFAS Extension

MIAMI-DADE COUNTY

Tropical Research and Education Center
18905 SW 280 St.
Homestead, FL 33031
Tel: 305-246-7001
Website: http://trec.ifas.ufl.edu

Miami-Dade County Extension
18710 SW 288 St.
Homestead, FL 33030
Tel: 305-248-3311
Website: https://sfyl.ifas.ufl.edu/miami-dade/

September 5, 2025

The two-spot cotton leafhopper (*Amrasca biguttula*): a new invasive pest in Florida

Alexandra M. Revynthi, Entomologist/Acarologist – Ornamental Crops, Qingchun Liu, Commercial Agriculture/Ornamentals Extension Agent, UF/IFAS Extension Miami-Dade County

The two-spot cotton leafhopper *Amrasca biguttula* (Ishida) (Hemiptera: Cicadellidae) (Fig 1) was detected in Florida in December 2024 (Liburd et al. 2024). This is a quarantinable actionable pest of regulatory significance in the United States. Surveys conducted by the Florida Department of Agriculture and Consumer Services-Division of Plant Industry (FDACS-DPI) are currently underway and aim to assess the pest's distribution. Nurseries found with the leafhopper are being placed under "Stop Sale and Hold Order".

Thank You!

Alexandra Revynthi, PhD
Assistant Professor
Ornamental Entomology & Acarology

University of Florida, IFAS
Tropical Research and Education Center
18905 SW 280 Street
Homestead, FL 33031

arevynthi@ufl.edu
T: +1 786-217-9244

Miami-Dade County Agricultural Manager's Office
Costa Farms
Railroad Nursery
Morejon Farms
Helena Agri-Enterprises LLC
OHP, Inc.
BASF

FNGLA
FLORIDA NURSERY, GROWERS AND LANDSCAPE ASSOCIATION
MIAMI-DADE CHAPTER

UF UNIVERSITY of FLORIDA
Tropical Research and Education Center

USDA ARS

FLORIDA FARM BUREAU
VOICE OF AGRICULTURE
DADE COUNTY

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES
EST. 1868