

Welcome!

- **IR-4 Program: New Products and Upcoming Actives for Disease & Pest Management**
- Cristi L Palmer, IR-4 Environmental Horticulture Program Manager



Outline

- What is IR-4?
- What is the Environmental Horticulture Program?
- Recent and Newly Registered Tools for Pathogens & Pests
- How you can help



What is IR-4?

The IR-4 Project (or Inter-Regional project number 4) was created in 1963 to facilitate



Photo by Cristi Palmer

registration of sustainable pest management technology for specialty crops and minor uses

IR-4 helps growers get
the tools they need to
grow their crops.

Words matter!



a. Decorative

b. Ecological

a. Conversational

b. Attractive

a. Showy

b. Functional

Contrasts

“Ornamental” Meanings

- **Decorative**
- **Attractive**
- **Ornate**
- **Showy**

Perceptions = frivolous, not needed, extraneous

“Environmental” Meanings

- **Ecological**
- **Conservation**
- **Conservational**
- **Eco-friendly**

Perceptions = beneficial, helpful, positive impacts for world

Benefits of non-edible plants

- Purify air and water
- Sequester carbon
- Moderate impact of urban heat islands
- Provide ecosystem services such as habitat or forage
- Improve property value
- Improve mental outlook
- Provide horticulture therapy, recreation and exercise



Contrasts

“Ornamental” Meanings

- **Decorative**
- **Attractive**
- **Ornate**
- **Showy**

Perceptions = frivolous, not needed, extraneous

“Environmental” Meanings

- **Ecological**
- **Conservation**
- **Conservational**
- **Ecofriendly**

Perceptions = beneficial, helpful, positive impacts for world

**Benefits of
Non-edible
Plants**

Acknowledgements



Environmental Horticulture Program

Registration Support

NIFA IR-4 Grant 2015-34383-23710
USDA-ARS
State Agricultural Experiment Stations
Crop Protection Industry

Invasive Species

USDA-APHIS

Pollinator Protection

NIFA SCRI Grant 2016-51181-25399
“Protecting Pollinators with Economically Feasible and Environmentally Sound Ornamental Horticulture”

*Funds since 2003
(16 years)*

~\$20,000,000

\$5,155,465

\$6,509,975





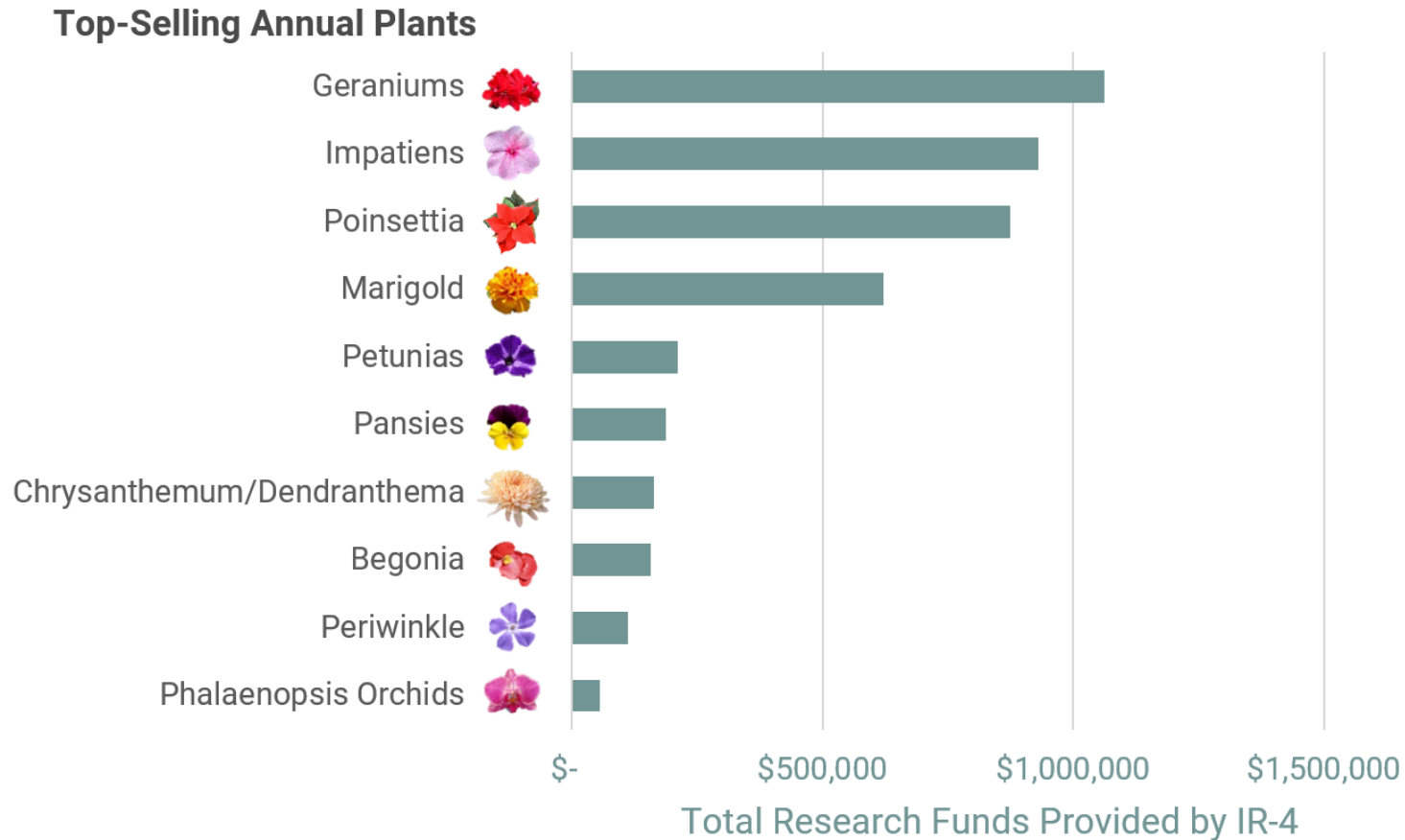
IR-4 Activities on behalf of the Green Industry

Data development for
registration support

Photos by Cristi Palmer

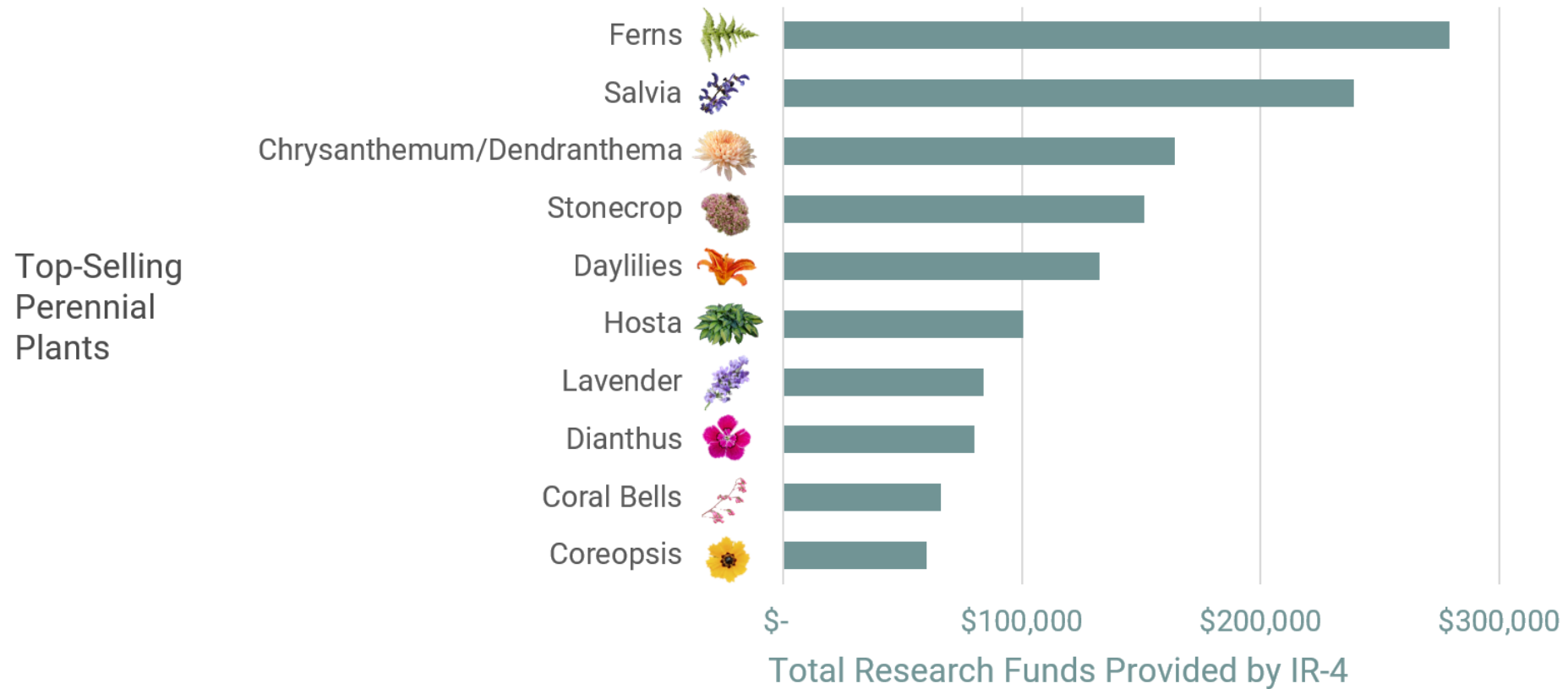
IR-4 Funding for Top Annual Crops

Since 2003, our program has contributed over **\$4 million** to pest, disease, and weed research in top-selling annual plants.



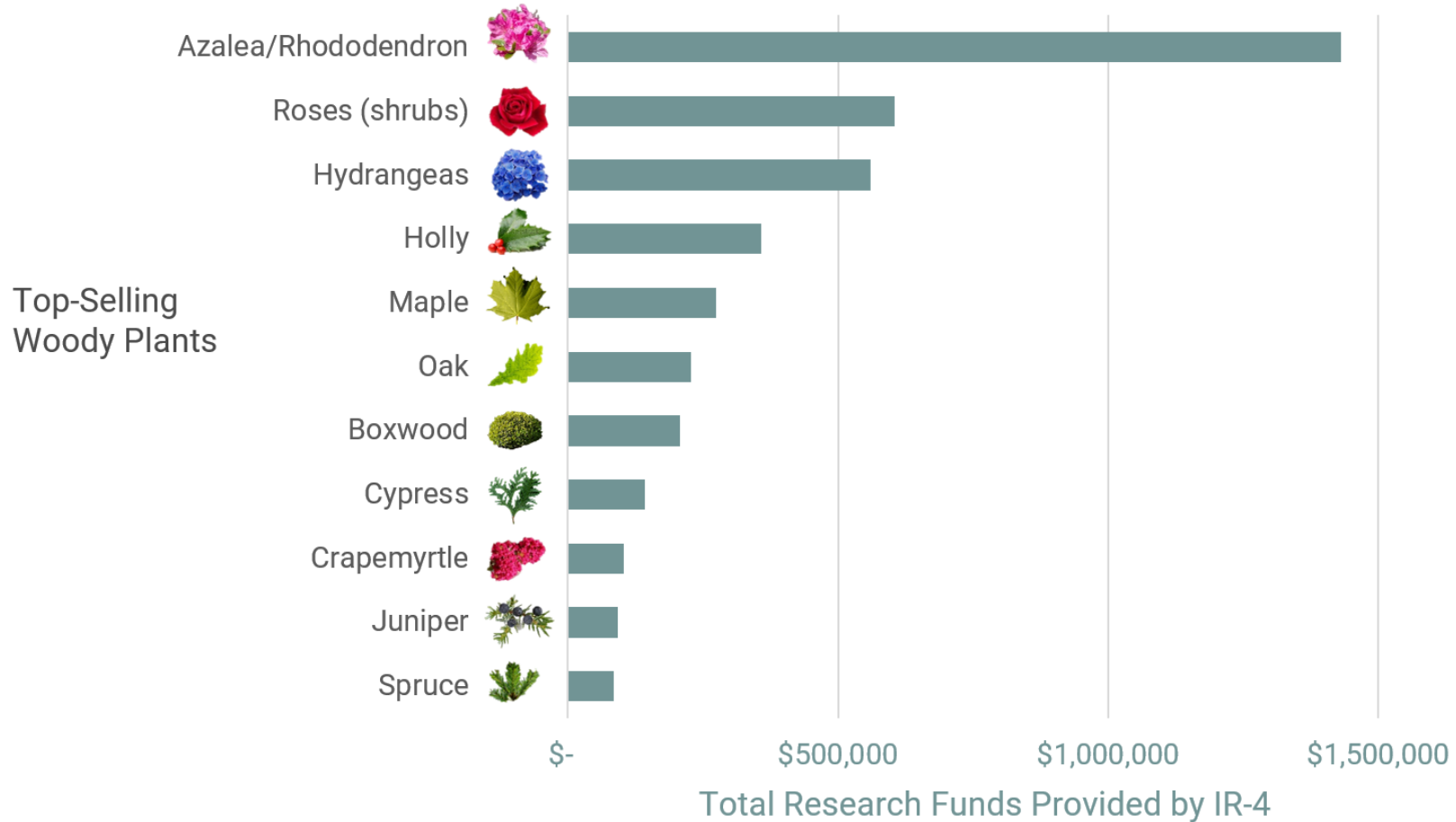
IR-4 Funding for Top Herbaceous Perennial Crops

Since 2003, our program has contributed over **\$1.3 million** to pest, disease, and weed research in top-selling perennial plants.

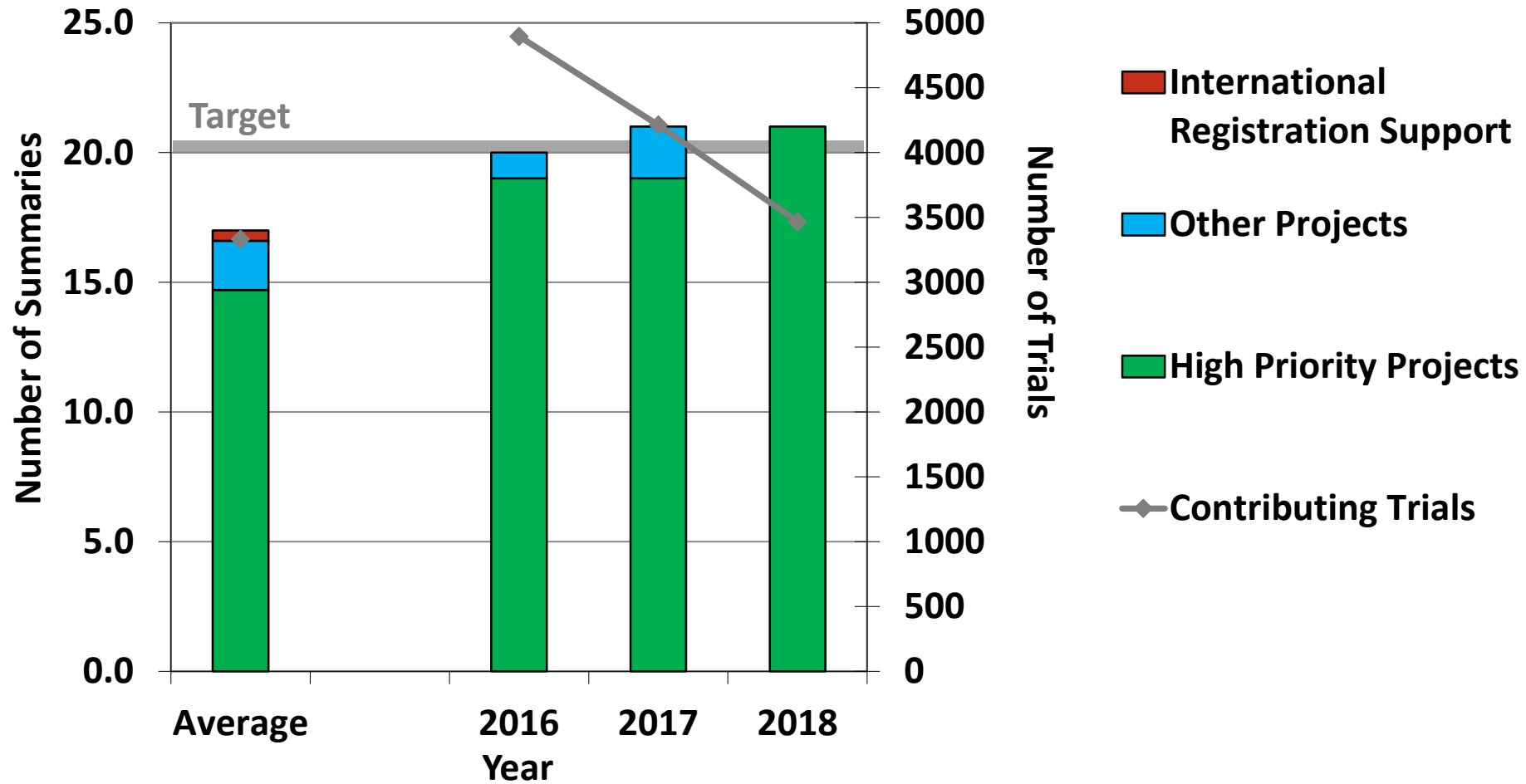


IR-4 Funding for Top Woody Crops

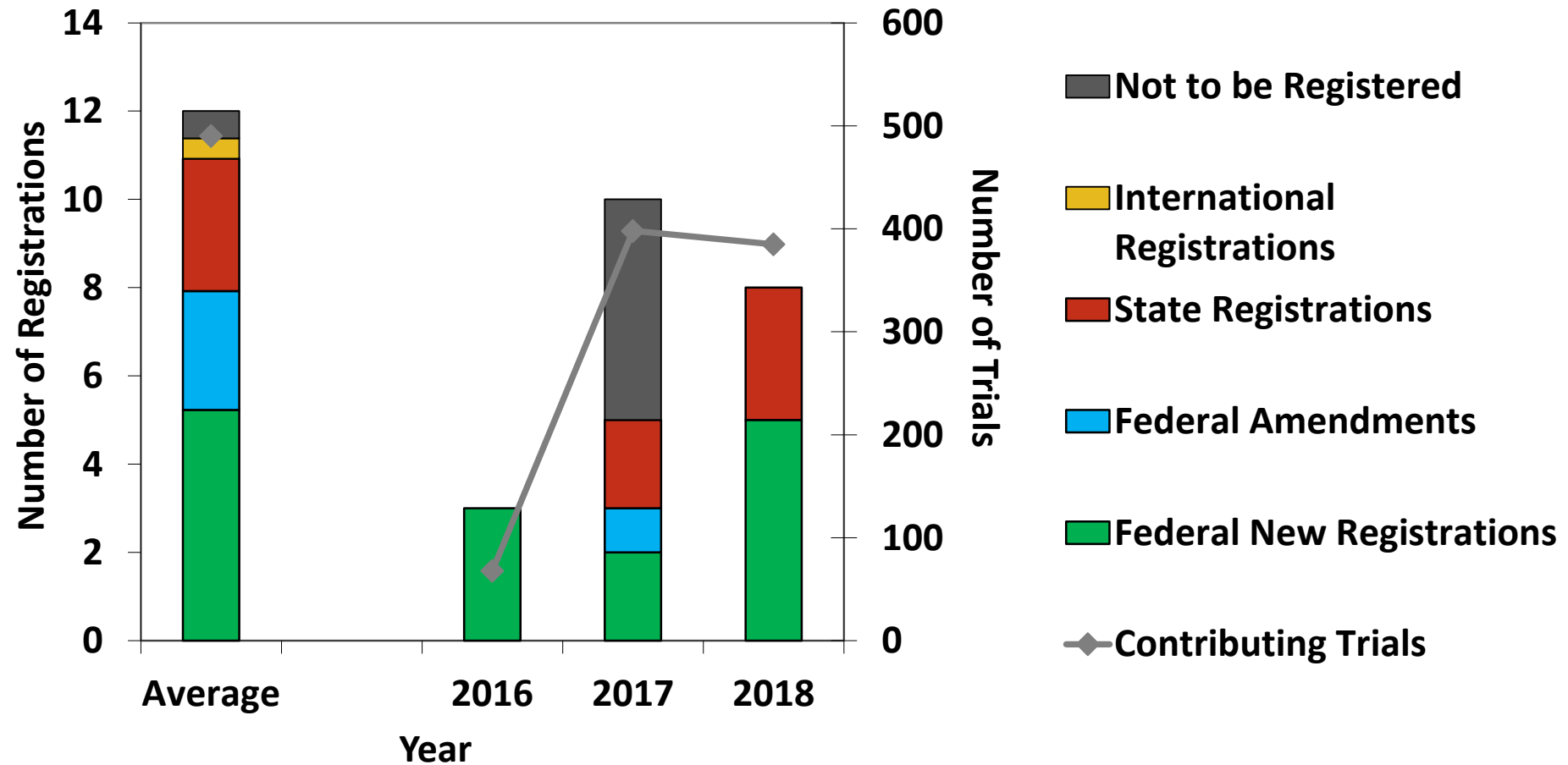
Since 2003, our program has contributed over **\$4 million** to pest, disease, and weed research in top-selling woody plants.



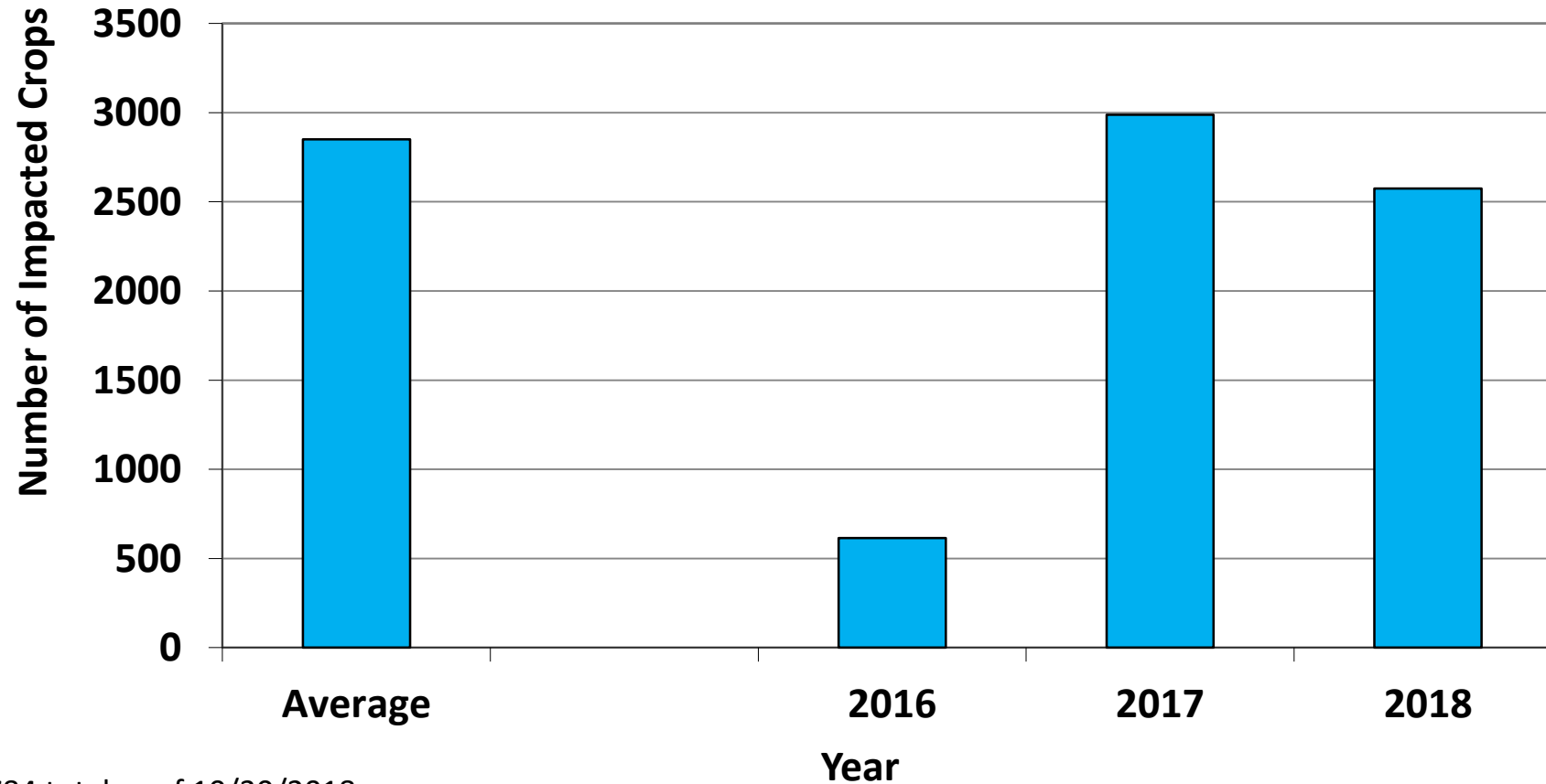
Environmental Horticulture Program Data Summaries – 2018 Final



Environmental Horticulture Program – Registrations – 2018 Final



Environmental Horticulture Program – Crops Impacted by Registrations – 2018 Final



44,784 total as of 10/30/2018



What does this mean for **Environmental Horticulture**?

Since the EnvironHort Program was started in 1977,

- more than **840** products & numbered active ingredients have been screened for performance
- over **34,500** trials have been conducted
- and more than **44,000** crop uses are now available for growers and landscape managers



Photo by Cristi Palmer

Program statistics as of Nov 2018



Registration Support Research

Recent Data

Photos by Cristi Palmer

Products Registered with IR-4 supporting data since 2017

- Fungicides
 - Astun (isofentamid) **
 - Obtego (*Trichoderma asperellium* ICC012 + *Trichoderma gamsii* ICC080)
 - Picatina / Posterity (pydiflumetofen)
 - Plentrix (azoxystrobin + mefenoxam)
 - Regime (F9110/problad)
 - Orkestra (fluxapyroxad + pyraclostrobin) **
 - Segovis (oxathiapiprolin) **
 - Insecticides/Miticides
 - Altus (flupyradifurone)
 - Ventigra (afidopyropen)
 - Xxpire (spinetoram + sulfoxaflor)
 - Weed Science
 - Biathlon (oxyfluorfen + prodiamine) **
 - Dismiss (sulfentrazone)
 - Fortress (isoxaben + dithiopyr)
- ** IR-4 data supported CA registration



Obtego (*Trichoderma asperellium* ICC012 + *Trichoderma gamsii* ICC080)

- Preventative root rot
 - Labelled for fungal root diseases such as Armillaria, Fusarium, Phytophthora, Pythium, Rhizoctonia, Rosellinia, Sclerotinia, Sclerotium rolfsii, Thielaviopsis and Verticillium
- IR-4 research was on the individual components

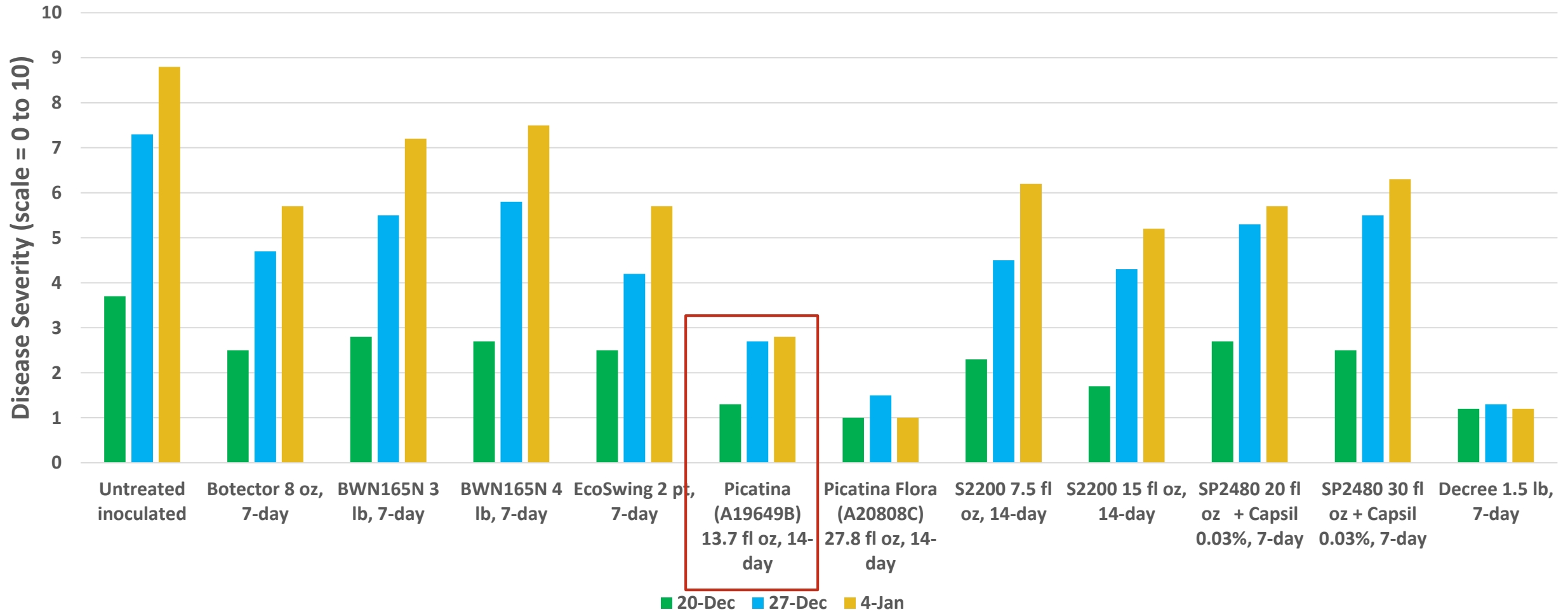


Picatina / Posterity (pydiflumetofen)

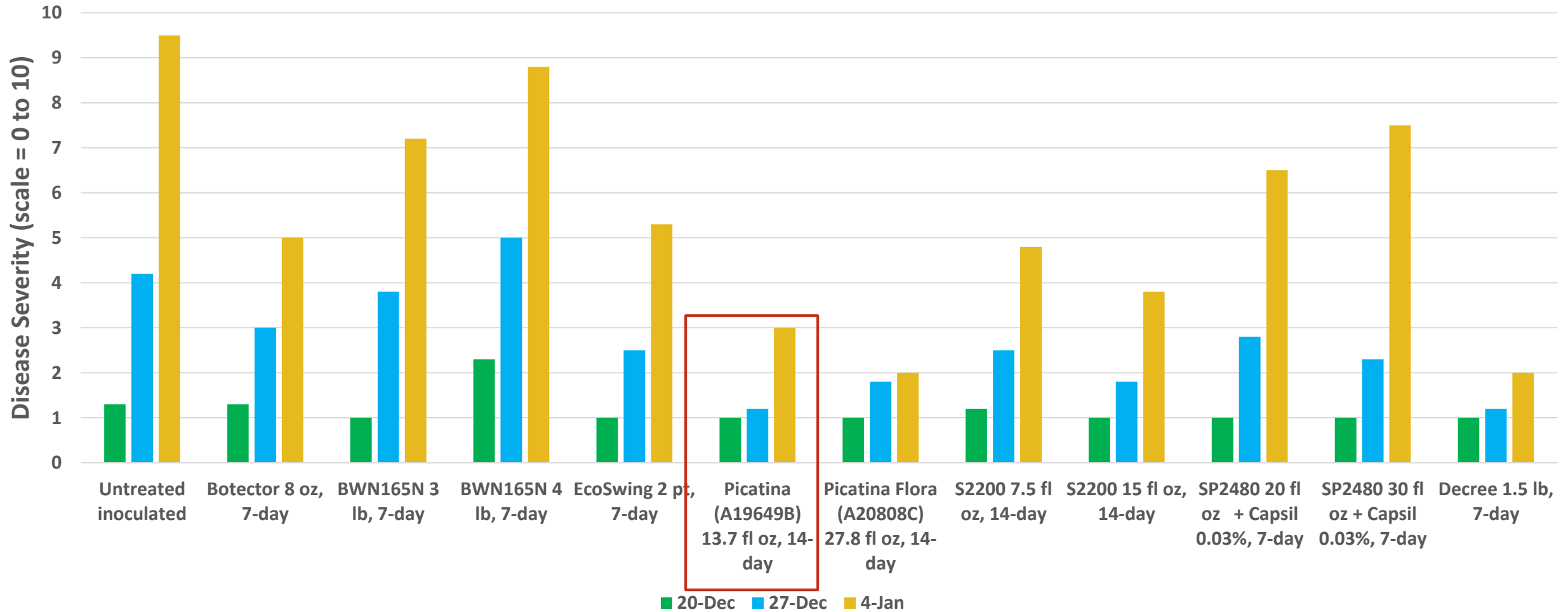
- NOTE: EPA approval received, but not yet available for sale
- IR-4 has sponsored research for Botrytis and crop safety
- Mary Hausbeck & Inga Meadows data



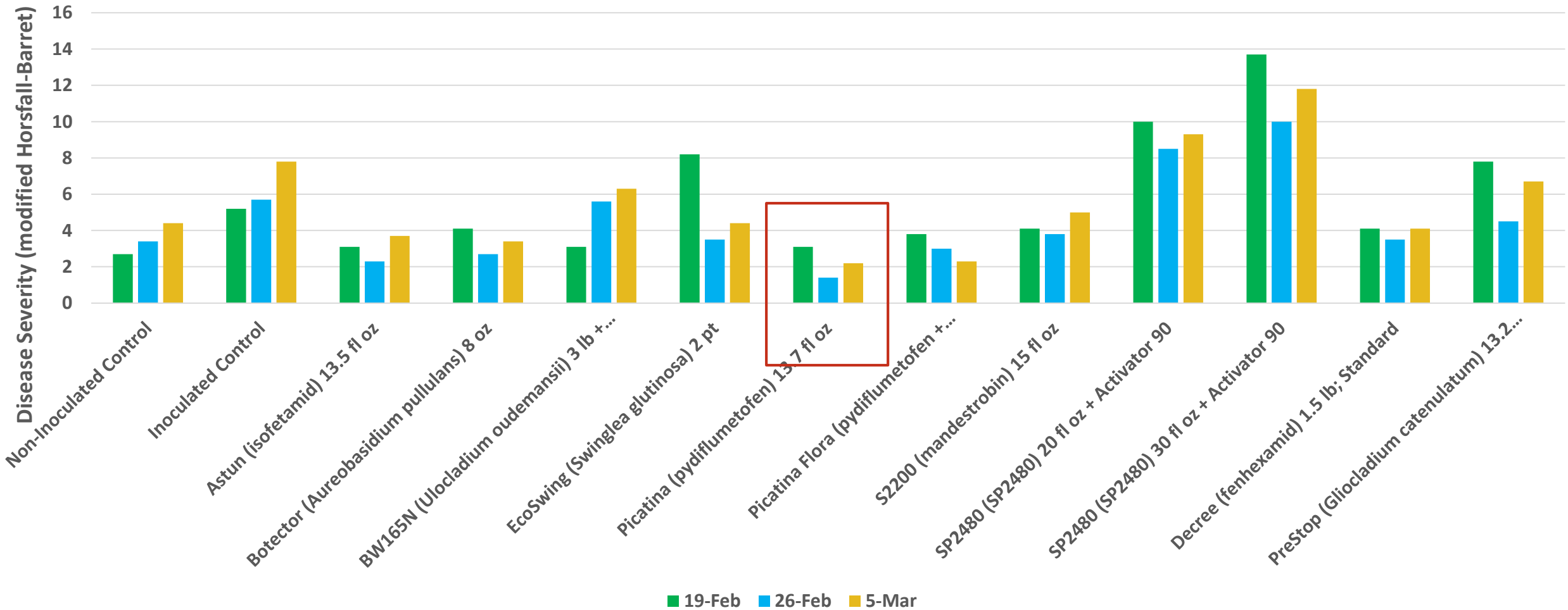
Botrytis Efficacy on Geranium Foliage, Hausbeck & Harlan, 2018

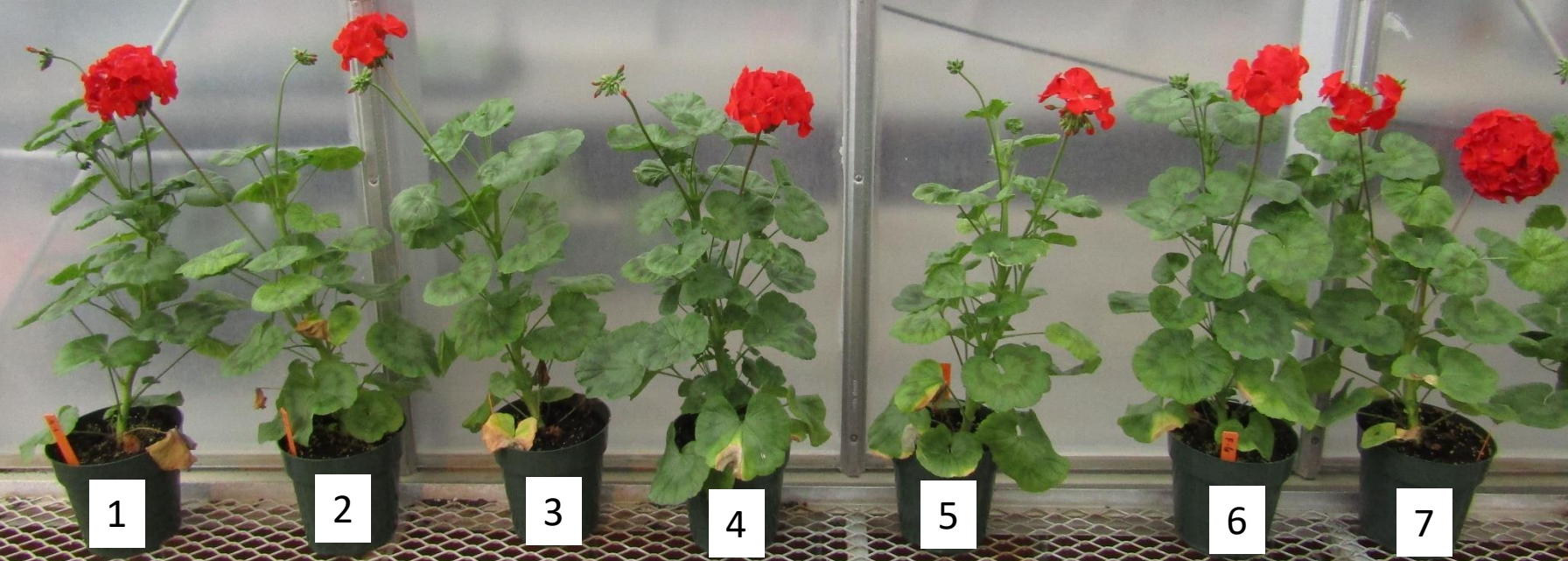


Botrytis Efficacy on Geranium Flowers, Hausbeck & Harlan, 2018



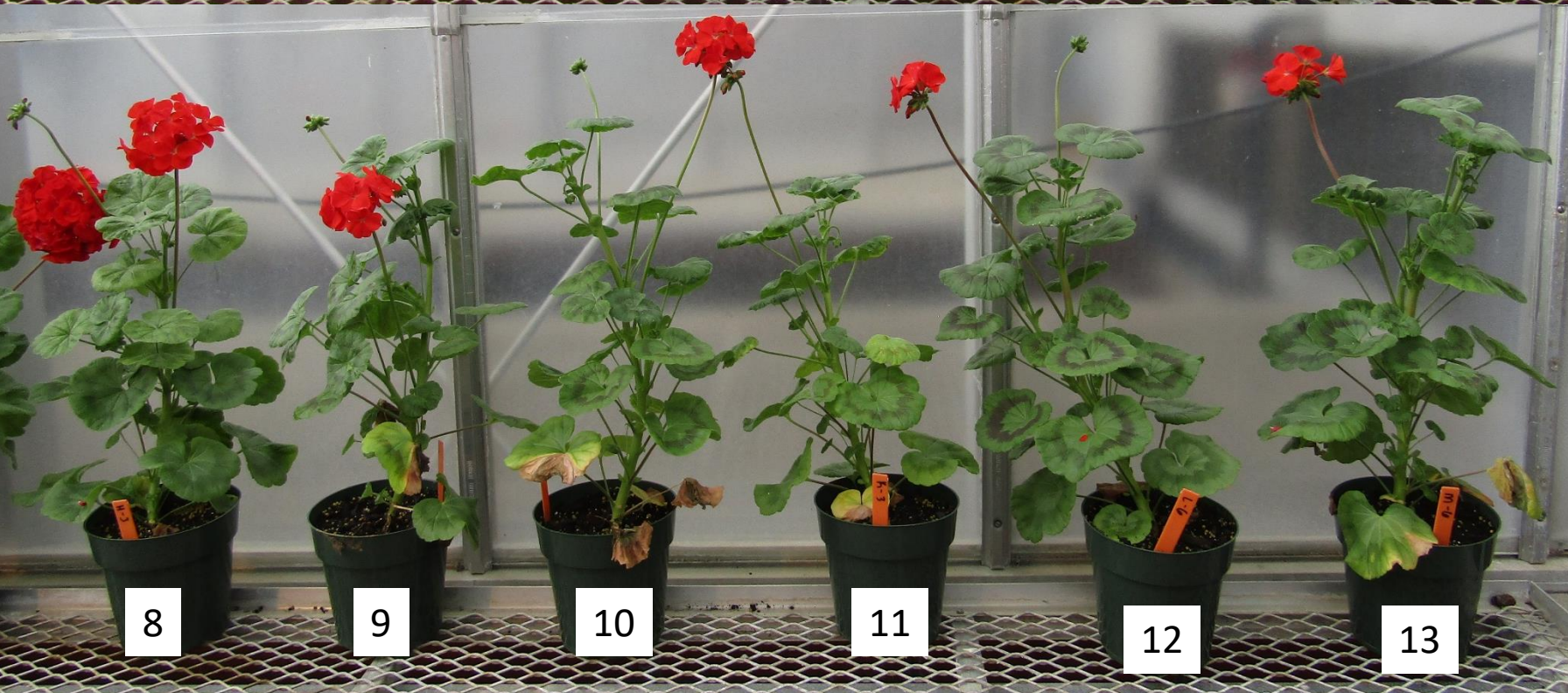
Botrytis Efficacy on Geranium Foliage, Meadows, 2018





Left to Right:

- 1. Non-Inoculated Control**
- 2. Inoculated Control**
- 3. Botector**
- 4. BW165N**
- 5. EcoSwing**
- 6. Picatina**
- 7. Picatina Flora**



Left to Right:

- 8. S2200**
- 9. SP2480 (20 fl oz)**
- 10. SP2480 (30 fl oz)**
- 11. Astun**
- 12. Decree**
- 13. PreStop**

Picatina / Posterity Crop Safety

- Begonia (Begonia sp.)
- Buzzy Lizzy; Impatiens, Common Garden (Impatiens walleriana)
- Calibrachoa (Calibrachoa sp.) 'Kabloom Deep Blue'
- Daisybush (Osteospermum sp.) 'Asti Purple'
- Garden Snapdragon (Antirrhinum majus)
- Geranium, Zonal (Pelargonium x hortorum) 'Zonal Tango Orange'
- Hardy Mum (Chrysanthemum/Dendranthema x morifolium) 'Dark Roanole'
- Impatiens, New Guinea (Impatiens hawkeri)
- Lupine (Lupinus sp.)
- Madwort (Alyssum sp.) A. montanum
- Madwort (Alyssum sp.) 'Clear Crystal Lavender'
- Palm, Mediterranean Fan (Chamaerops humilis)
- Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana)
- Petunia (Petunia sp.)
- Pink (Dianthus sp.)
- Poinsettia (Euphorbia pulcherrima)
- Sage (Salvia sp.)
- Tickseed (Coreopsis sp.) 'Early Sunrise Yellow'
- Transvaal Daisy (Gerbera sp.)
- Vervain (Verbena sp.) V. x hybrida
- Violet (Viola sp.) V. x wittrockiana



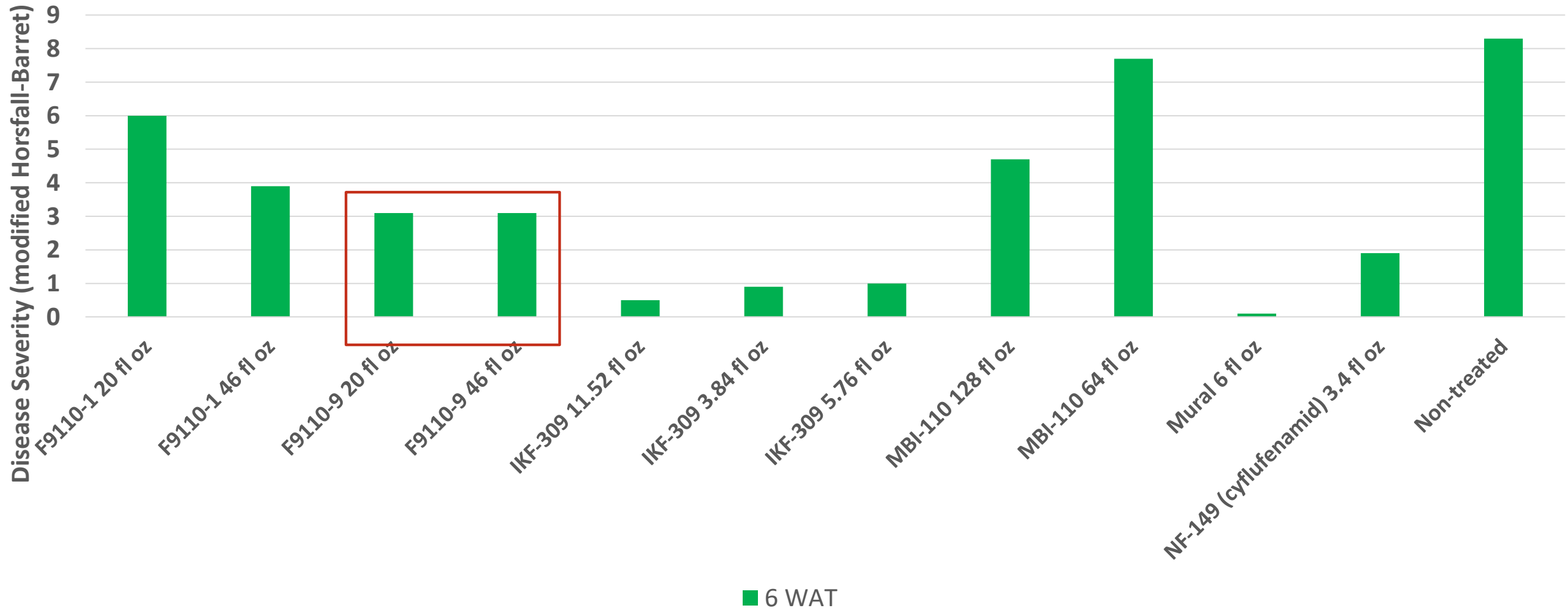
Regime (*Banda de Lupinus albus doce* or BLAD)

- ~~• NOTE: EPA approval received, but not yet available for sale **~~
- IR-4 has sponsored research for Powdery Mildew
- Tom Freiburger/Dave Bodine data

**** Commercially available
Spring 2019**



Powdery Mildew Efficacy on Zinnia, Freiburger/Bodine, 2017

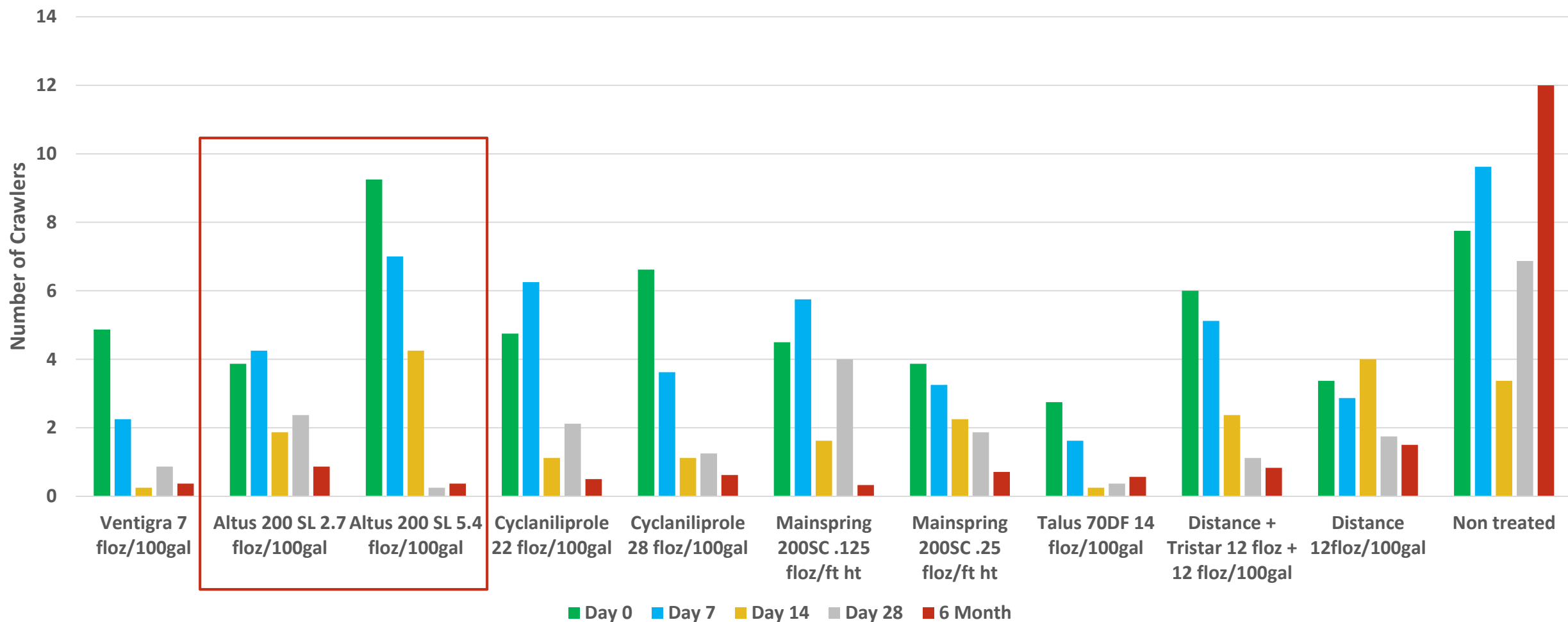


Altus (flupyradifurone)

- Labelled for aphids, leafhoppers, planthoppers, mealybugs, plant bugs, psyllids, scales, thrips, and whiteflies
- IR-4 has sponsored research for scale; however, rates were lower than those ultimately registered
- Kris Braman, Tea scale



Tea Scale on Camelia, Braman, 2015

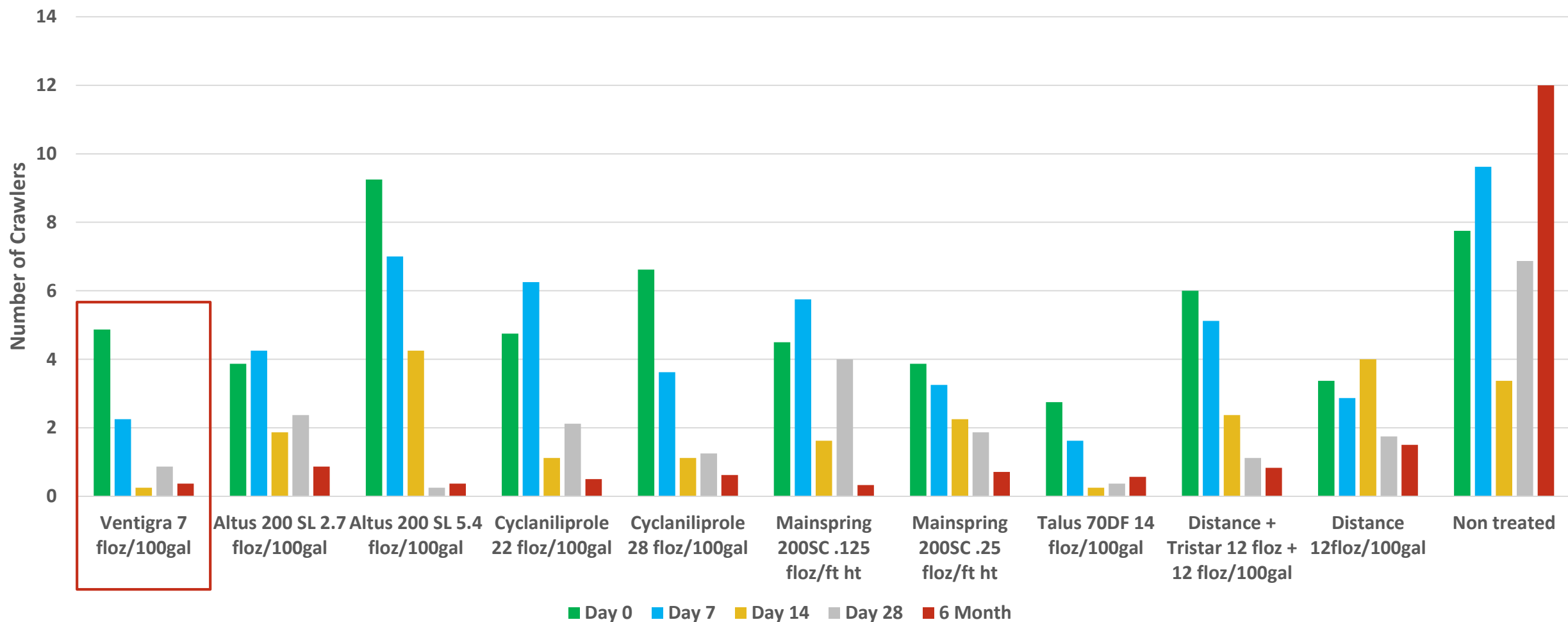


Ventigra (afidopyropen)

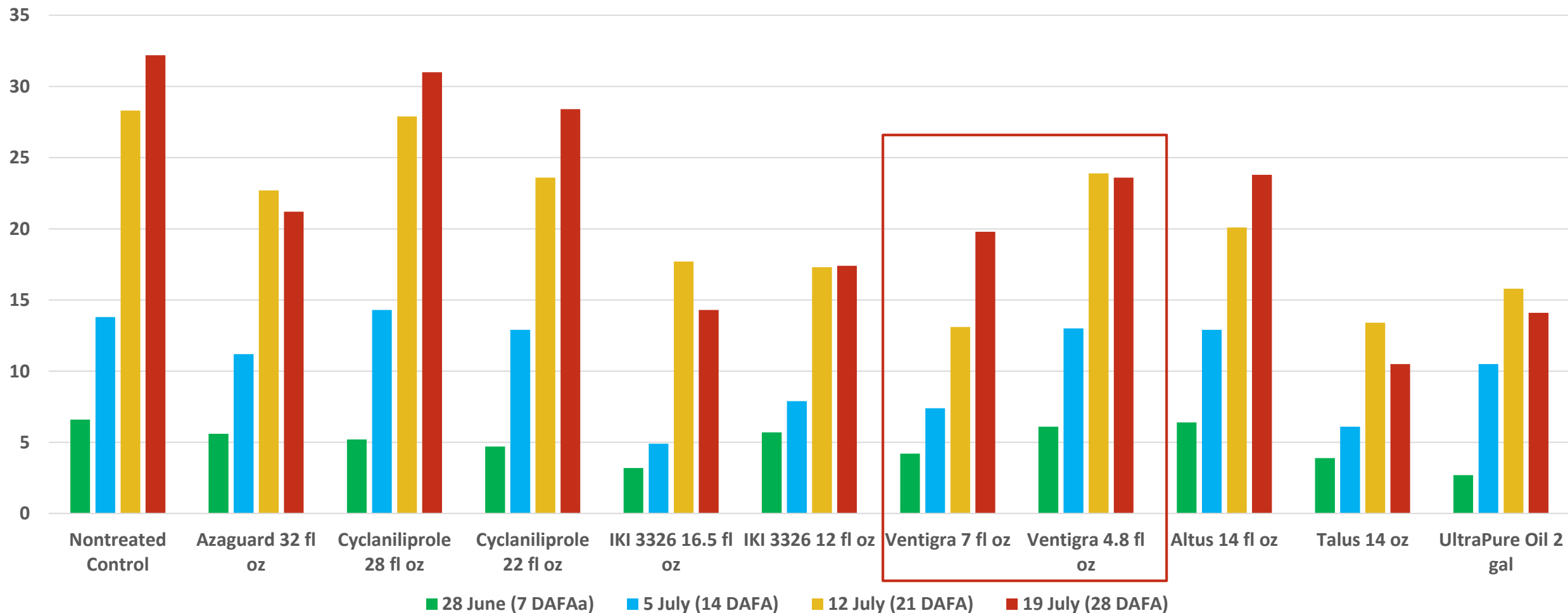
- Labelled for aphids, whiteflies, mealybugs, scale
- IR-4 has sponsored research for scale, mealybug, and crop safety
- Kris Braman, Tea scale
- Shimat Joseph, Citrus mealybug
- Dan Gilrein, Madeira mealybug



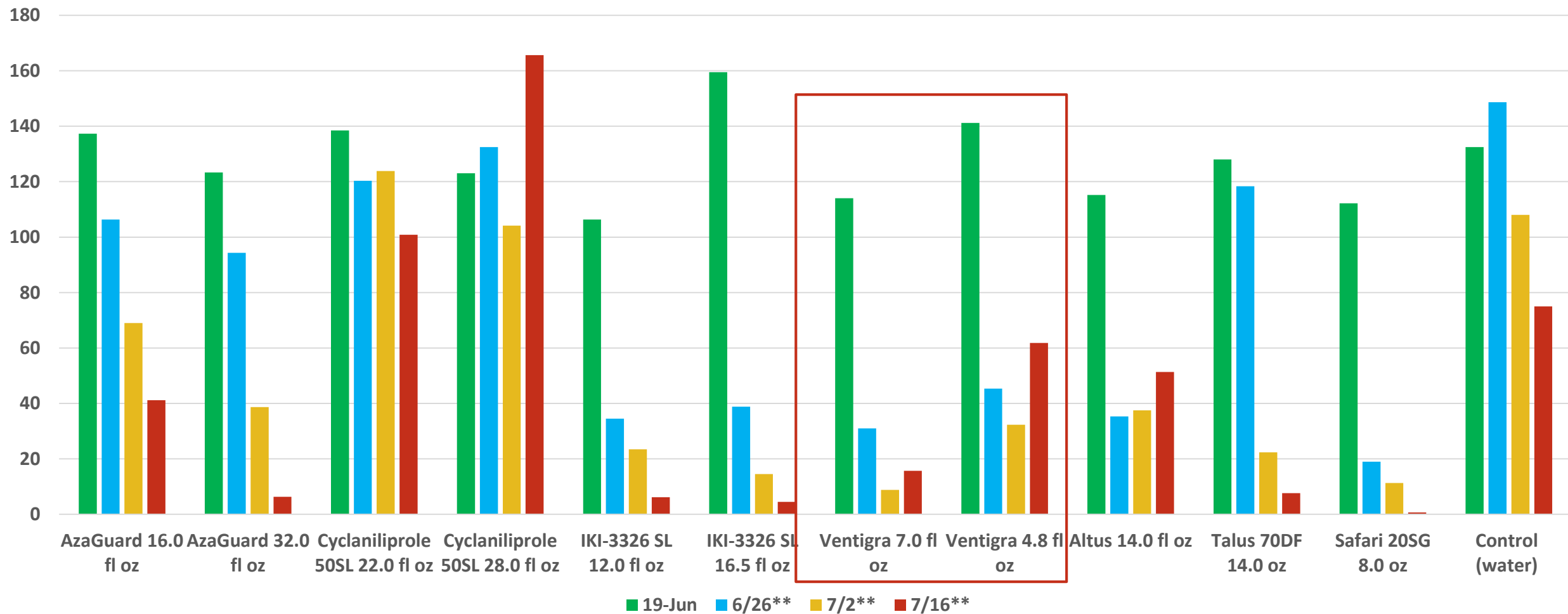
Tea Scale on Camelia, Braman, 2015



Citrus Mealybug on Coleus, Shimat Joseph, 2018



Madeira Mealybug on Coleus, Dan Gilrein, 2018



Returning Soon: Xxpire (spinetoram + sulfoxaflor)

- Breaking news!!!
- EPA reregistered sulfoxaflor last week
- Label includes: aphids, leaf feeding beetles, lep larvae, sawfly larvae, midges, lacebugs, whiteflies, scale, spider mites



Upcoming Actives for Pathogens in IR-4 Testing Program

- Astun (isofetamid) for postharvest Botrytis, root rots
- BAS 750 for Botrytis, root rots
- Broadform (fluopyram + trifloxystrobin) for postharvest Botrytis, root rots
- Indemnify (fluopyram) for nematodes
- Botector (*Aureobasidium pullulans* strains DSM 14940 and DSM 14941) for Botrytis
- BW165N (*Ulocladium oudemansii* strain U3) for Botrytis, for postharvest Botrytis
- EcoSwing (*Swinglea glutinosa*) for Botrytis
- MBI-110 (*Bacillus amyloliquefaciens* strain F727) for root rots
- MBI-304 for nematodes
- MBI-305 for nematodes
- MBI-601 (*Muscodor albus* strain SA-13) for root rots
- Orkestra (fluxapyroxad + pyraclostrobin) for postharvest Botrytis
- Oxiphos for postharvest Botrytis
- Postiva (pydiflumetofen + difenconazole) for Botrytis, for root rots
- ProMax (thyme oil) for nematodes
- S2200 (mandestrobin) for Botrytis
- SP2480 for Botrytis, for postharvest Botrytis
- SP2700 for root rots
- ZeroTol (hydrogen dioxide + peroxyacetic acid) for nematodes
- Zio (*Pseudomonas chlororaphis*) for root rots



Upcoming Actives for Pests in IR-4 Testing Program

- Acelypryn (chlorantraniliprole) for foliar feeding beetles
- Ancora (*Isaria fumosorosea* Apopka Strain 97)
- Altus (flupyradifurone) for mealybugs & scale
- BCS-507 for foliar feeding beetles, ambrosia beetles, and thrips
- BotaniGard Maxx (pyrethrins + *Beauveria bassiana* Strain GHA) for Japanese beetle
- IKI-3106 (cyclaniliprole) for foliar feeding beetles, mealybugs & scale and thrips **
- IKI-3326 SL (cyclaniliprole + flonicamid) for mealybugs & scale and thrips
- Mainspring GNL (cyantraniliprole) for foliar feeding beetles
- KOC22018-8 (botanical oil blend) for foliar feeding beetles, mealybugs & scale and thrips
- SP3014 for thrips
- SpinOut LF 100 (copper hydroxide) for molluscs
- TetraCURB (rosemary oil) for foliar feeding beetles, mealybugs & scale and thrips
- V-10433 for foliar feeding beetles, ambrosia beetles, thrips and molluscs

**** Commercially available
Summer 2019**



How are research projects selected?

Stakeholder Input *balanced with*

Researcher & Registrant Input



Online Project Request Form

The screenshot shows the top navigation bar with links like Home, Food, Ornamental Horticulture, etc. Below is the title 'IR-4 Ornamental Horticulture Project Request Form' and a brief introduction. The form is divided into sections: 1. REQUESTER (Name, Address, City, State, Zip, Phone Number, Email), 2. SELECT PROJECT TYPE (with radio buttons for various options), 3. ORNAMENTAL HORTICULTURE CROPS (with dropdown menus for Plant Group, Common Name, Scientific Name, Plant Stage, and Application), and 4. PRODUCT (with text boxes for Trade Name, Active Ingredient, and Rate Per Application).

Paper or Online Biennial Survey

The screenshot shows the title '2016/2017 IR-4 Ornamental Horticulture Survey' and a 'Thank you for your participation in this survey.' message. The survey is divided into four main sections: 1. Please check our affiliation (with checkboxes for various roles like Grower, Landscaper, etc.), 2. Please check all types of operations and pest management strategies relevant to your business (with checkboxes for Biological Control, Chemical Control, etc.), 3. Please check all plant materials relevant to your business (with checkboxes for various plant types like Bulbous Perennials, Cacti, etc.), and 4. Consider the plant materials you grow or maintain (with a table for recording data on various plant types).

Plant Material	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Bulbous Perennials																					
Cacti																					
Deciduous Trees																					
Evergreen Trees																					
Palms																					
Shrubs																					
Herbaceous Perennials																					
Flowering Annuals																					
Non-flowering Annuals																					
Ground Cover Plants																					
Grasses																					
Other																					

- Project Criteria
- Availability & effectiveness of current options
 - Damage potential of target
 - Performance and crop safety of proposed products
 - Compatibility with IPM, resistance management programs
 - Economics
 - Geographic distribution
 - Registrant interest in labeling product(s)
 - Other

2019 Workshop

- Overall Schedule
 - Monday – ‘Plenary’ Session, Food Crop Product Presentations
 - Tuesday – Food Crop Residue Analysis Priority Setting
 - Wednesday – Food Crop Integrated Solutions Priority Setting, IR-4 Strategic Planning Session
 - Thursday – Environmental Horticulture Crop Priority Setting



2019 Environmental Horticulture Prioritization

- Grower Survey
- Potential Solutions (biological & chemical)
- Prioritize Projects
- Sticker Caucus
- Biopesticide Project Card Sorting
- Follow up Discussions
- Regional Priority Breakouts



Help!

- Fill out the Grower & Extension Survey
- Promote completing the survey to growers in your network
- Submit potential Biopesticide-related projects through Project Request form
- All are on the IR-4 EnvironHort Website:
<https://www.ir4project.org/ehc/>



For more information: <https://www.ir4project.org/ehc/>



About IR-4 ▾

Programs ▾

Workshops and Events

Contacts: HQ, Regions, Directory ▾

Upload File

Submit a Request >

Environmental
Horticulture



About Environmental
Horticulture

- Registration Support
- Research
- Invasive Species
- Pollinator Protection
- Program History
- Crop Vignettes
- History of Environmental (Ornamental) Horticulture in the United States
- Data Management (Authorized Users)

Grower Needs

Biennial Workshop

Grower Resources

Researcher Resources

About Environmental Horticulture



To facilitate regulatory approval of sustainable pest management technology for environmental horticulture crops to promote public health and wellbeing.

The IR-4 Environmental Horticulture Program fosters a diverse selection of healthy plants for bouquets, houseplants, landscapes and urban forests.



Thank you !



Funding for IR-4 Research:

USDA-NIFA (IR-4 & SCRI)

USDA-ARS

USDA-APHIS

Land Grant Institutions

Researchers:

All the fine researchers throughout the US and in cooperating countries

Growers:

Who donate time to complete the biennial survey and all those plant materials!

IR-4 Personnel:

Janine Spies

Marylee Ross

Susan

Tony

Bierbrunner

VanWoerkem

Mika Pringle-

Ely Ve

Tolson

Thank you !