

A close-up photograph of several sunflowers with bright orange and yellow petals and dark brown centers. The sunflowers are set against a clear blue sky. Green leaves with serrated edges are visible in the foreground and background. The text "Making the Best Fungicide Choice" is overlaid in a large, white, serif font with a black outline at the top of the image.

Making the Best Fungicide Choice

A. R. Chase

Topics covered

New Products Review
Why Choose a New Product?
Determine the Real Cost
Choosing the Best Product
Creating and Effective
Rotation
Review Most Effective
Products

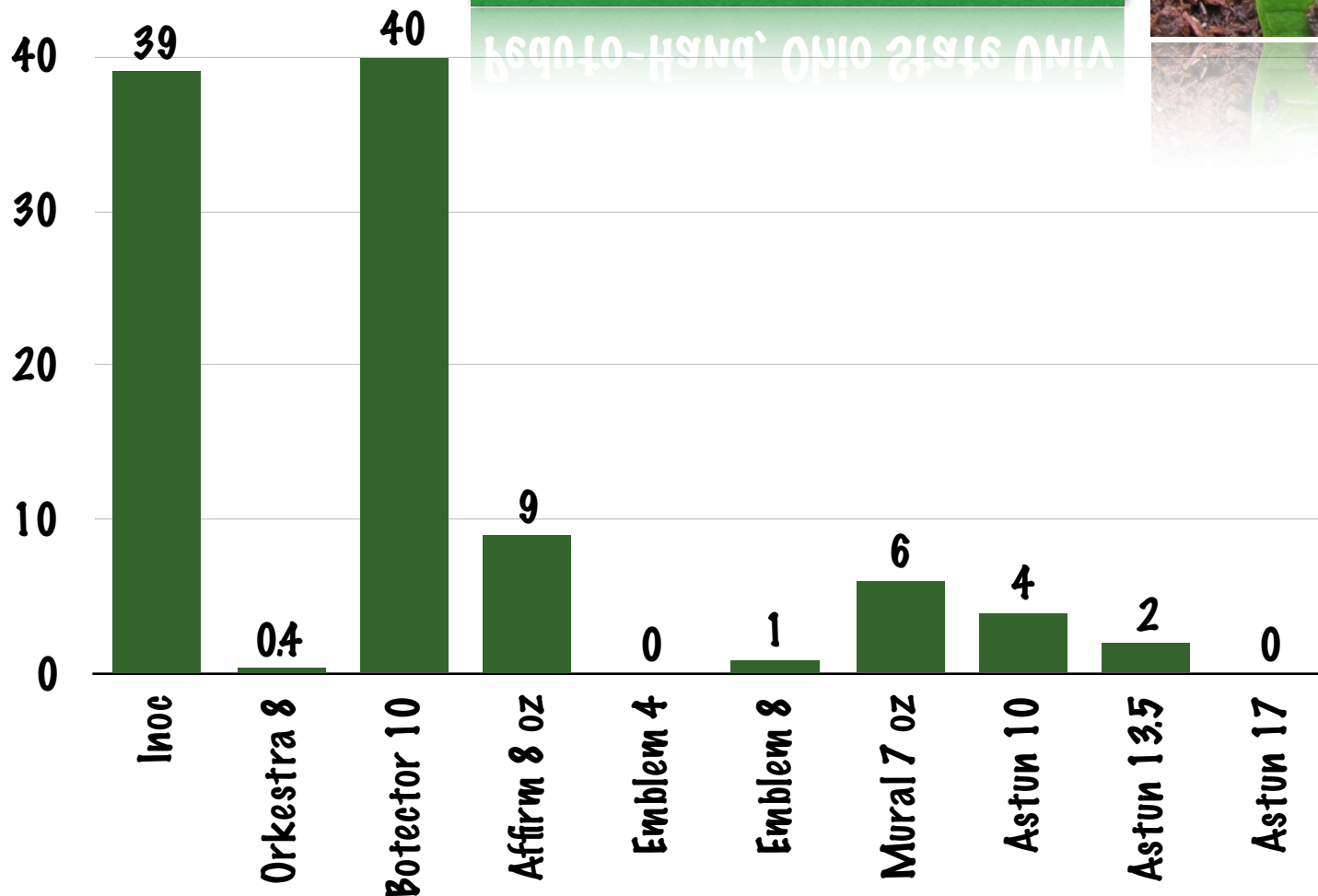
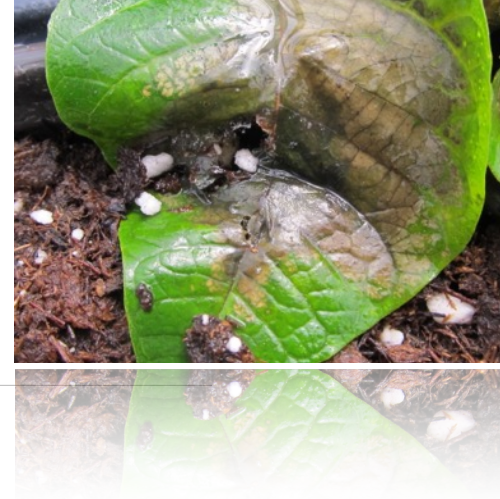
Some New Products

Astun
BotryStop
Mural
Orkestra Intrinsic
Segovis
Triathlon BA

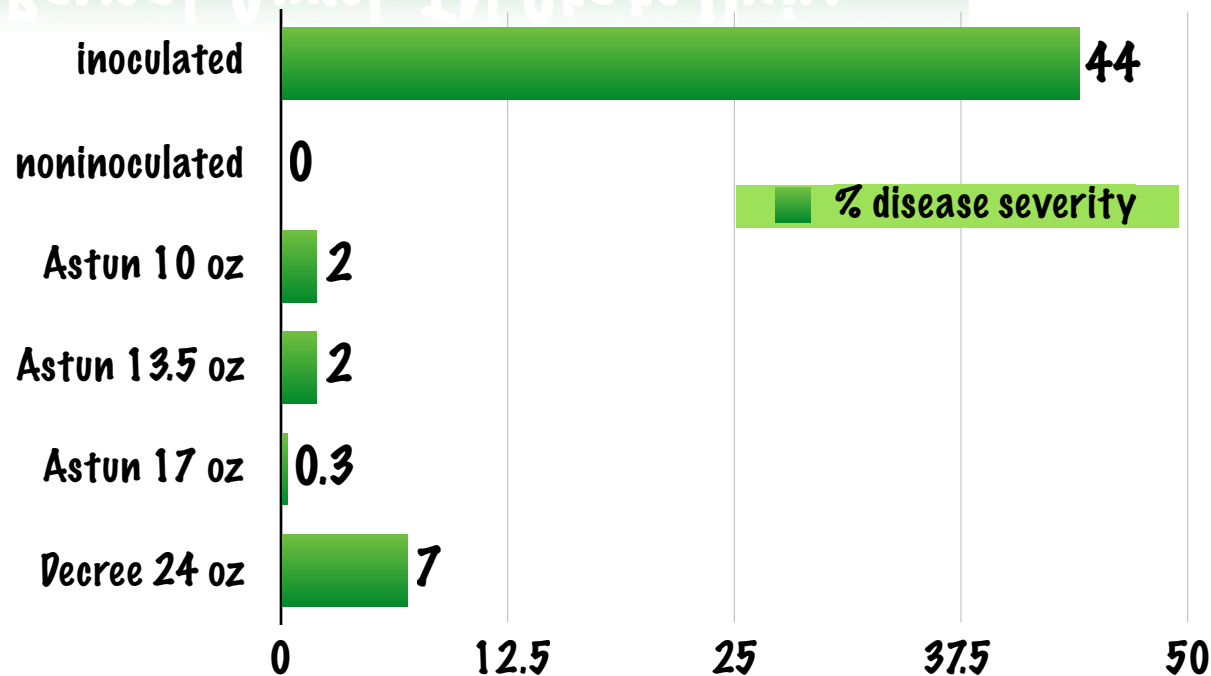


Botrytis Blight on Poinsettia

Peduto-Hand, Ohio State Univ



Efficacy of Astun on Botrytis blight on Hydrangea Baysal-Gurel, TN State Univ.

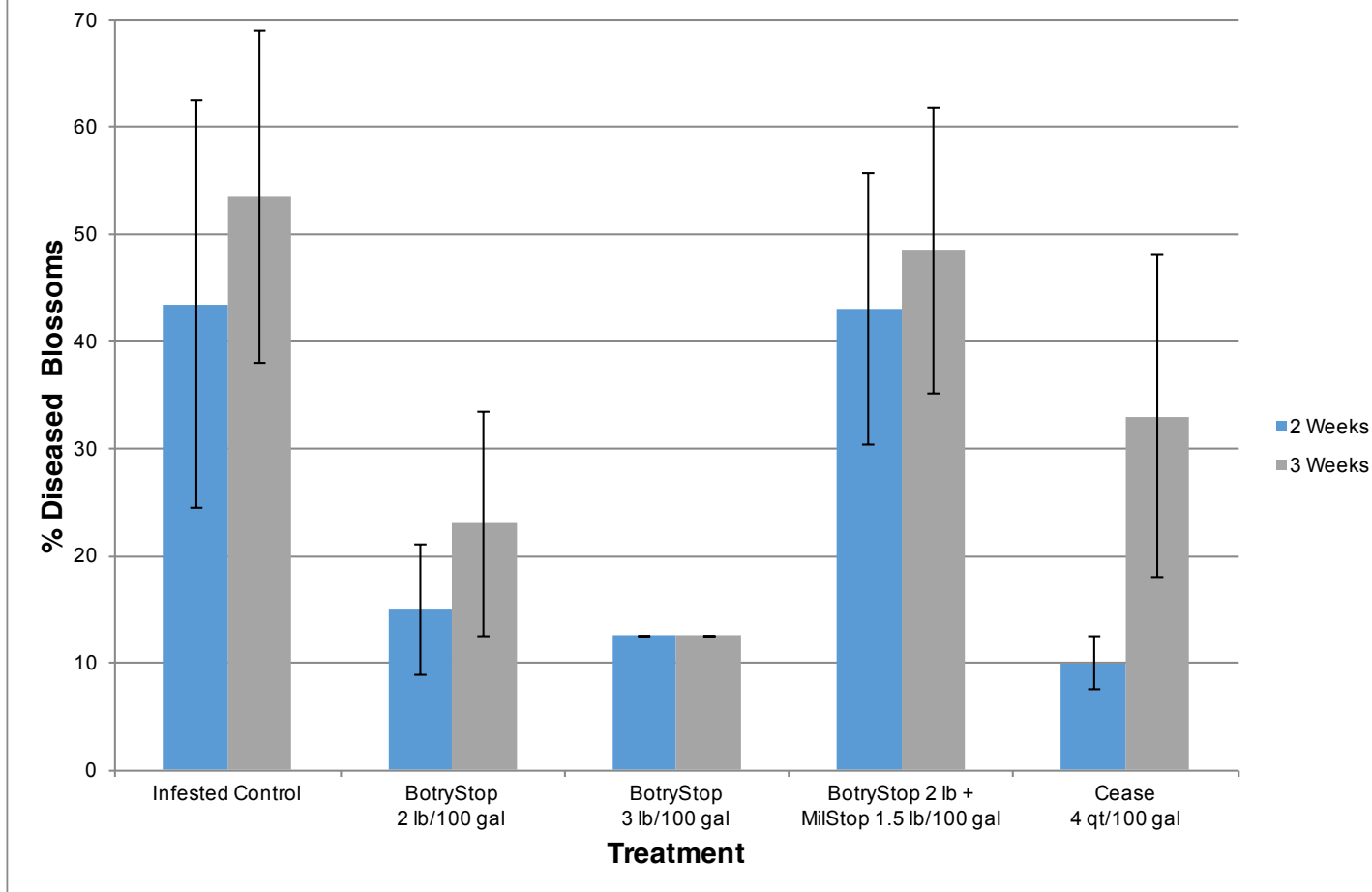


Astun Summary

Pathogen/disease	Crop	Results (each word is for a separate trial)
Anthracnose (three trials)	turf	none, none, very good
Botrytis bunch rot (four trials)	grape	very good to excellent
Botrytis leaf spot	geranium	very good
Botrytis leaf spot	poinsettia	excellent
Botrytis blight	hydrangea	excellent
Botrytis - fruit rot	blueberry	excellent
Cercospora leaf spot (two trials)	turf	very good, excellent
Fusarium leaf spot	zygocactus	none
Macrophomina (charcoal rot)	strawberry	good
Monilinia	cranberry	excellent, some, poor
Monilinia - brown rot	peach	excellent
Powdery mildew	grape, strawberry	very good to excellent, none
Rhizoctonia brown patch (three trials)	turf	some, very good, excellent
Sclerotinia blight	lettuce	none
Sclerotinia dollar spot (four trials)	turf	none, some, excellent, excellent

BotryStop and Botrytis Blight on Begonia

**Efficacy of Various Products against
Botrytis Gray Mold of Begonia cv 'Blitz'**



Botrystop Summary

Disease	Crop	BotryStop lb/100 gal	Efficacy compared to standard	Overall efficacy
Botrytis	Begonia	2, 3 lbs	equal to Cease but lasted longer	very good
Botrytis	Strawberry	3 lbs	equal to chemical standard rotations	very good
Botrytis	Strawberry	2, 4 lbs	4 lb equal to fludioxonil plus cyprodinil	very good
Botrytis	Ginseng	2, 4 lbs	equal to fludioxonil	very good to excellent
Sclerotinia	Lettuce	2, 3 lbs	equal to standard	some to good
Monilinia	Cherry	2, 4 lbs	2 lb better than	very good to excellent
Monilinia	Almond	2, 4 lbs	4 lb equal to standard	very good to excellent
Monilinia	Almond	2, 3, 4 lbs	4 lb equal to iprodione	very good to excellent
Monilinia	Apricot	2, 3, 4 lbs	all rates better than iprodione	excellent
Rhizopus	Raspberry	2, 3, 4 lbs	2 lb equal to fenhexamid	good



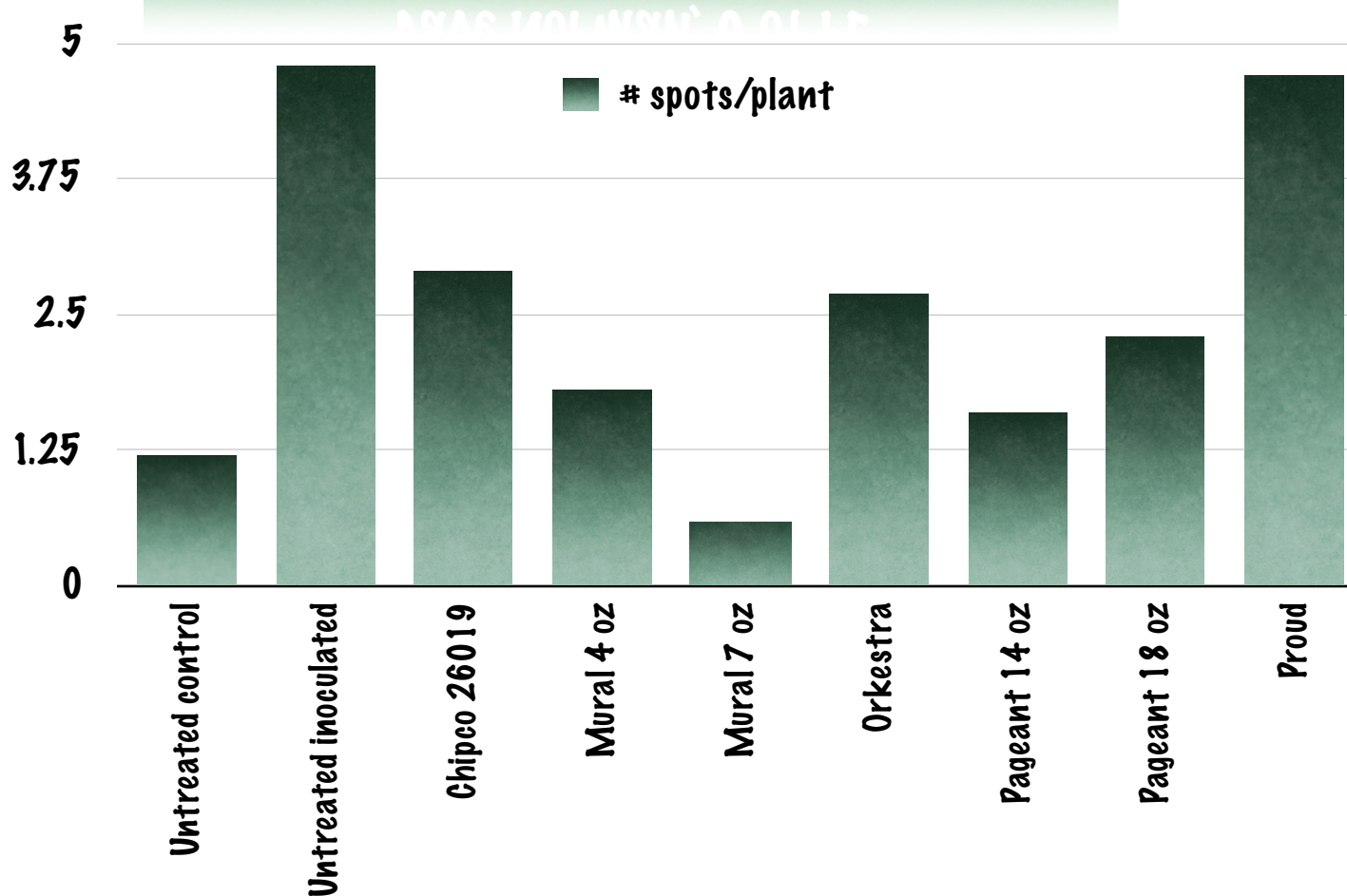
Powdery Mildew control on Verbena

Treatment	Rate/100 gal	4 Aug	13 Aug	22 Aug
Inoculated control	— — —	3.4 a	12.2 a	16.9 a
Mural	4 oz	0.2 b	0.1 b	0 b
Mural	7 oz	0 b	0.9 b	0 b
Pageant Intrinsic	12 oz	0 b	0 b	0 b
Non-inoculated control	— — —	0 b	0 b	0 b



Helminthosporium Leaf Spot on Calathea

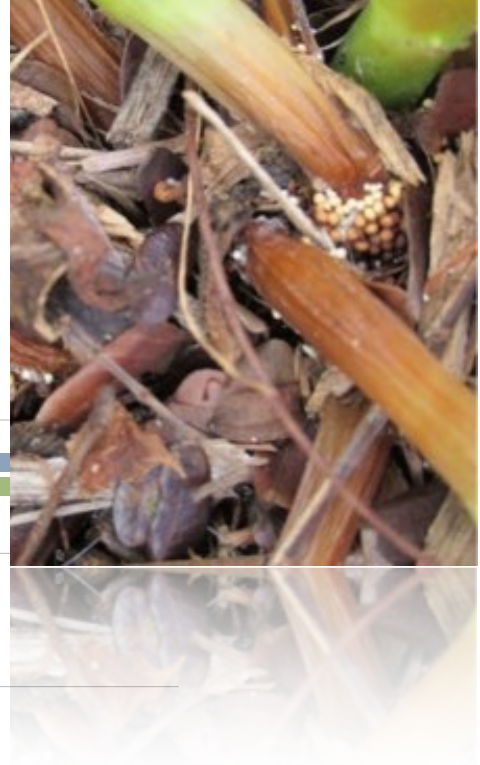
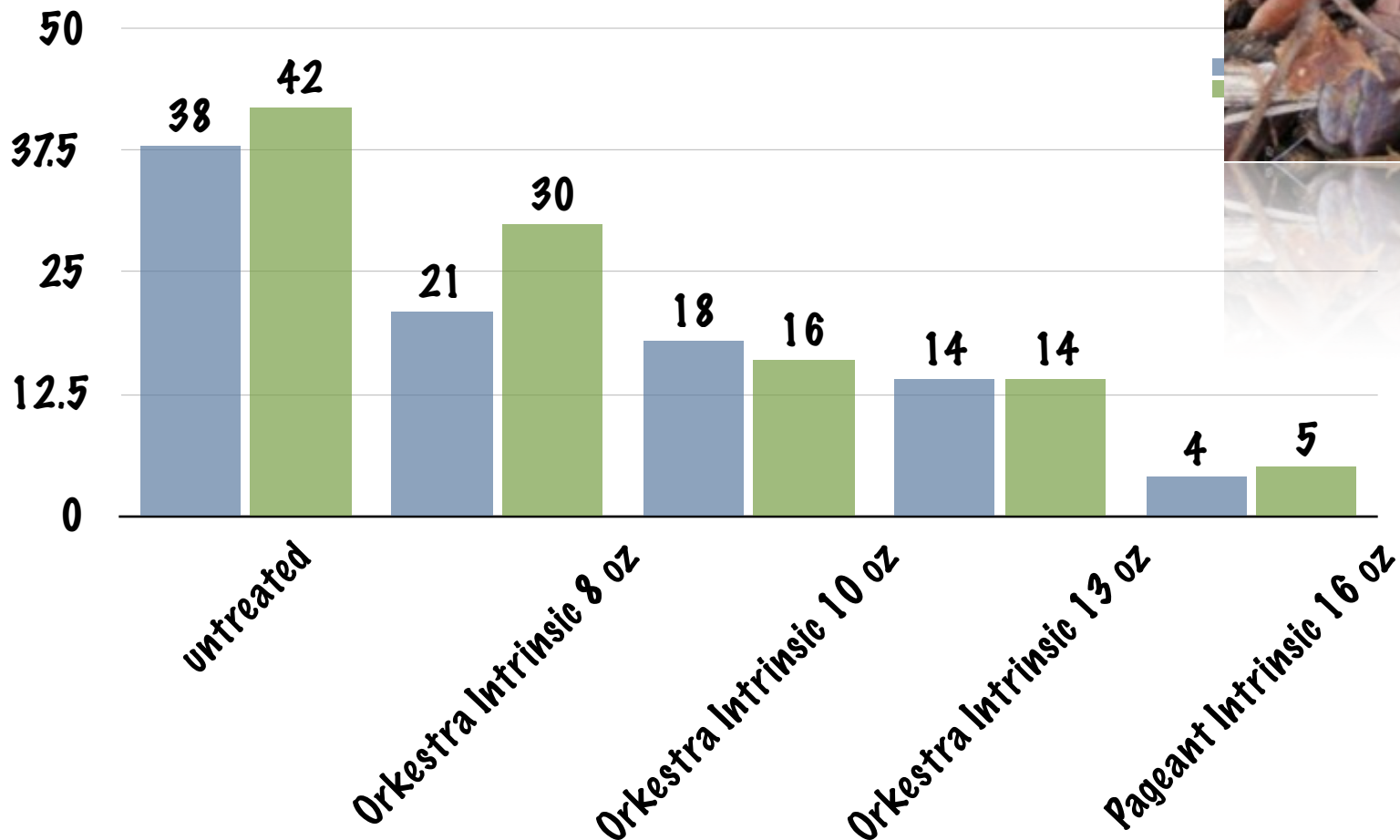
Dave Norman, U of FL



Mural Summary

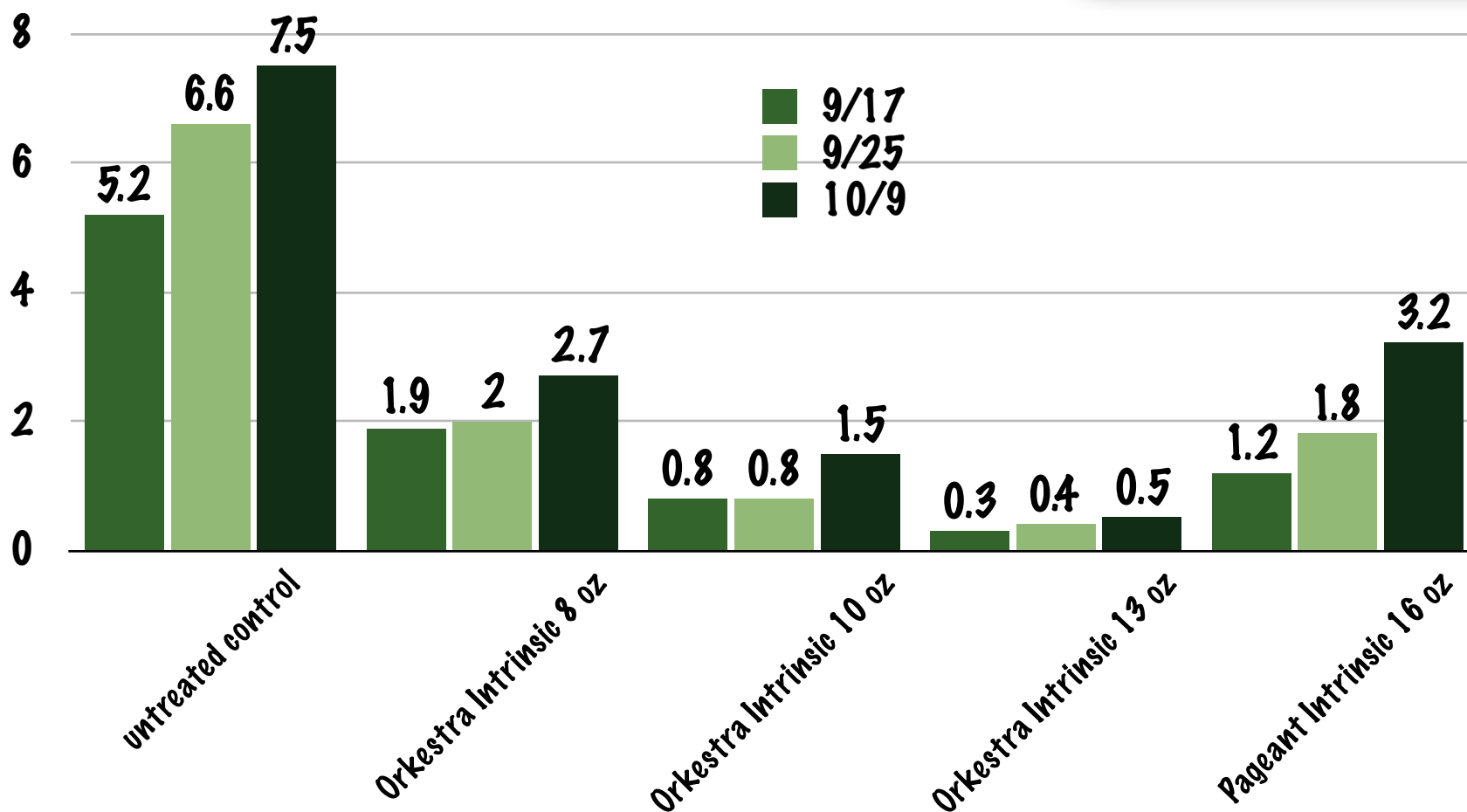
Pathogen	Disease	plant	labeled rate/ 100 gal	results
Botrytis cinerea	Gray mold	zinnia, geranium, peony	4-7 oz	good to very good
Botrytis elliptica	Fire	Lilium	4-7 oz	excellent
Colletotrichum	Anthrachnose	impatiens, dieffenbachia, sansevieria	4-7 oz	some to excellent
Cylindrocladium	Boxblight	Buxus, spathiphyllum	5-7 oz	very good
Corynespora	Target spot	hydrangea	4-7 oz	excellent
Oidium	Powdery mildew	verbena	4-7 oz	excellent
Podosphaera	Powdery mildew	petunia	4-7 oz	excellent
Microsphaera	Powdery mildew	lilac	4-7 oz	excellent
Helminthosporium (Drechslera)	Helminthosporium leaf spot	Calathea	4-7 oz	excellent
Myrothecium	Myrothecium leaf spot	Spathiphyllum	4-7 oz	excellent
Peronospora	Downy mildew	rose	4-7 oz	very good
Coleosporium	Rust	plumeria, annual vinca, goldenrod	4-7 oz	excellent
Puccinia	Rust	switchgrass, daylily	4-7 oz	very good to excellent
Sclerotinia	white mold	zinnia	5-7 oz	some

Southern Blight Control on Hosta





Fusarium Crown Rot on Hosta



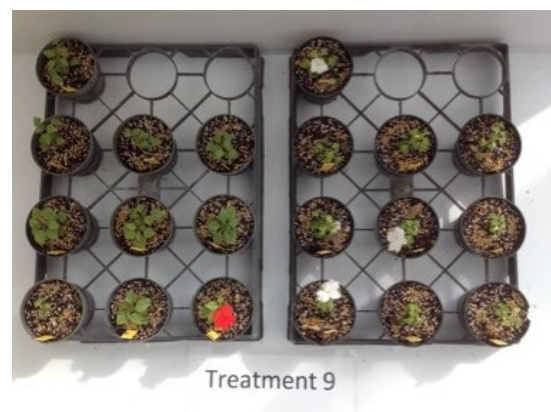
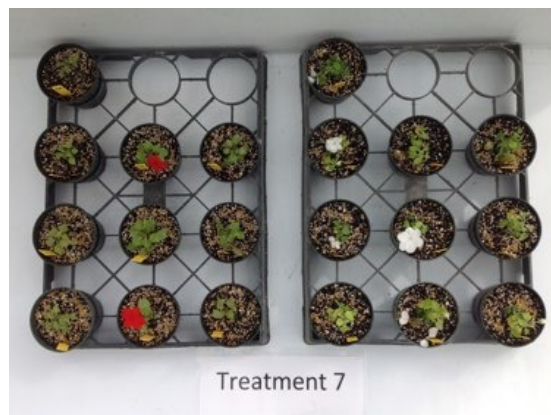
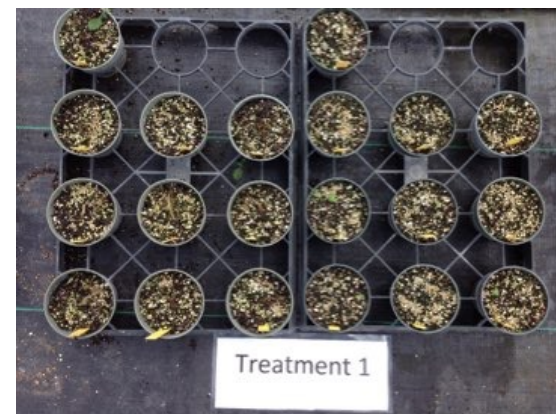
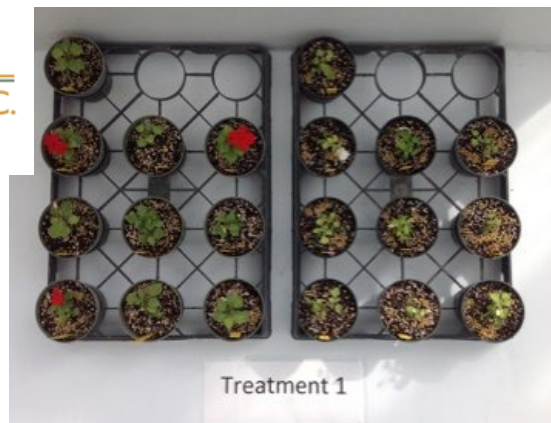
Orkestra Intrinsic Summary

Pathogen	Disease	plant	labeled rate/	results
Alternaria	Alternaria leaf spot	coneflower,	4-6 oz	excellent
Botrytis cinerea	Gray mold	rose, peony,	8 oz	some-
Botrytis elliptica	Fire	Lilium	8 oz	excellent
Botrytis tulipae	Fire	tulip, tulip	8 oz	excellent
Cercospora	Cercospora leaf spot	ligustrum, mollucella	8-10 oz	excellent
Coleosporium	Rust	frangipani	4-11 oz	excellent
Colletotrichum	Anthrachnose	sansevieria	8-10 oz	excellent
Cylindrocladium	Root and crown rot	Spathiphyllum	8-10 oz	very good
Golovinomyces	Powdery mildew	zinnia, zinnia	6-8 oz	excellent
Microsphaera	Powdery mildew	lilac	6-8 oz	excellent
Helminthosporium	Helminthosporium leaf	Calathea	8-10 oz	some
Myrothecium	Myrothecium leaf spot	dieffenbachia	8-10 oz	very good
Peronospora	Downy mildew	coleus	8-10 oz	excellent
Plasmopara	Downy mildew	impatiens	10 oz	excellent
Uredo	Rust	Flax lily	6-8 oz	excellent
Sclerotium	southern blight	hosta	8-10 oz	good

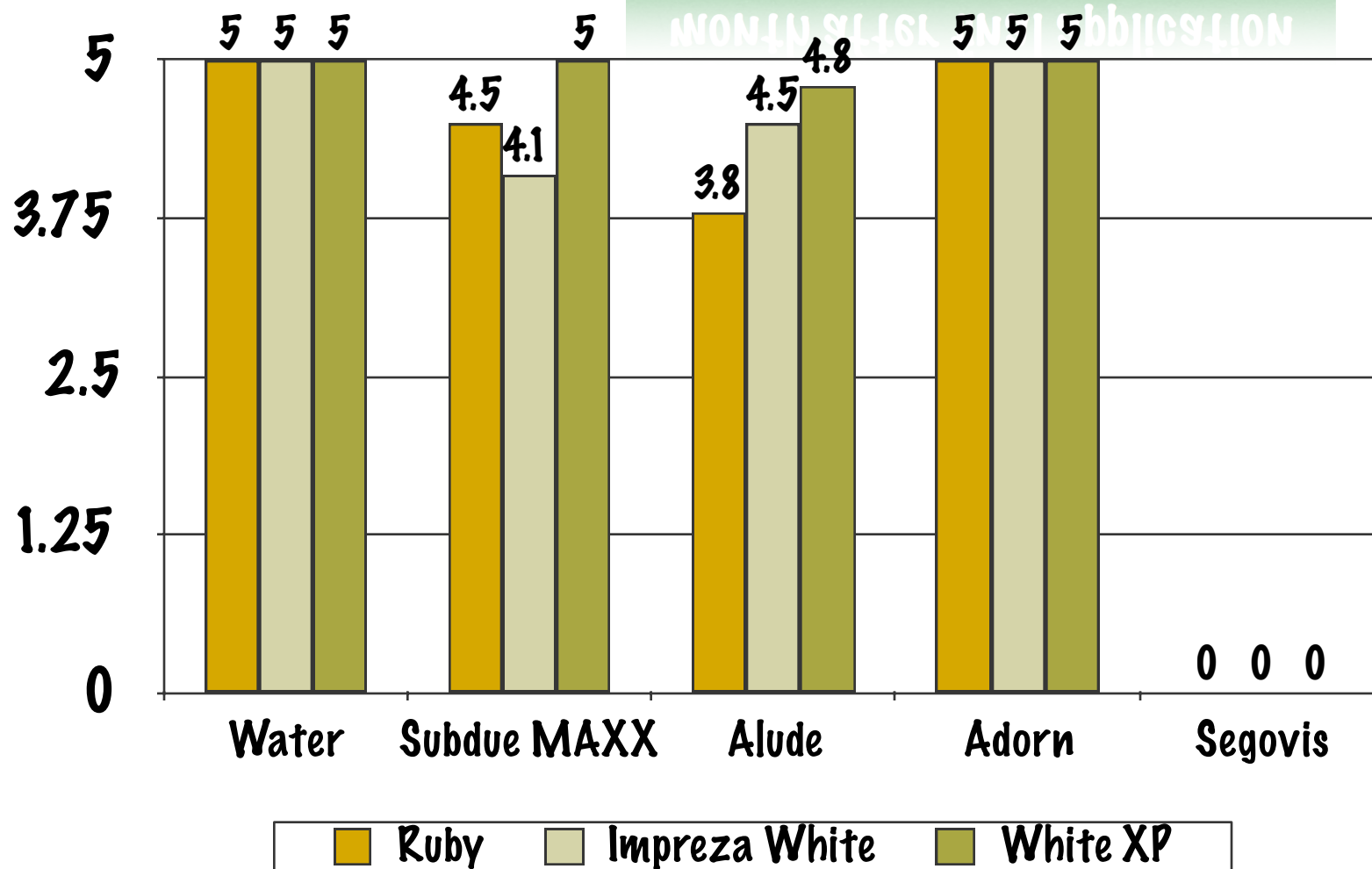
Treatment List:

1. Untreated control
2. Stature 12.25 fl oz
3. Adorn 4 fl oz
4. Subdue MAXX 2 fl oz
5. Inosco 64 fl oz
6. Segway 0 3.5 fl oz
7. Segovis 0.6 fl oz
8. Segovis 1.2 fl oz
9. Segovis 24 fl oz
10. Segovis 3 fl oz

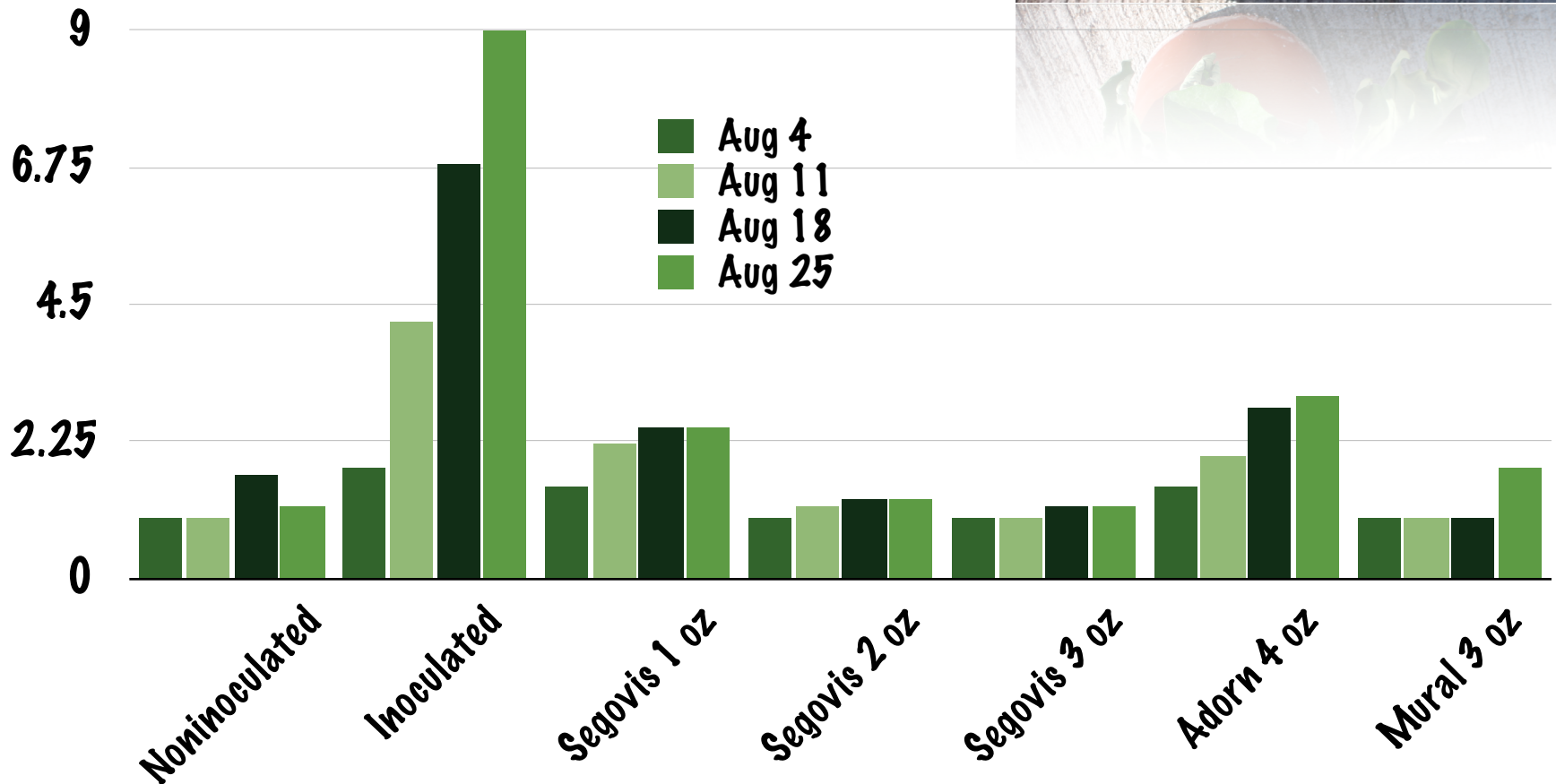
Fungicides were applied on a 7-day schedule on 1/27 and 2/3. The rate is per 100 gal. Pictures were taken 6 weeks after the final application.



Effect of fungicides on Impatiens downy mildew - one month after final application



Effect of fungicides on Gerber daisy crown rot



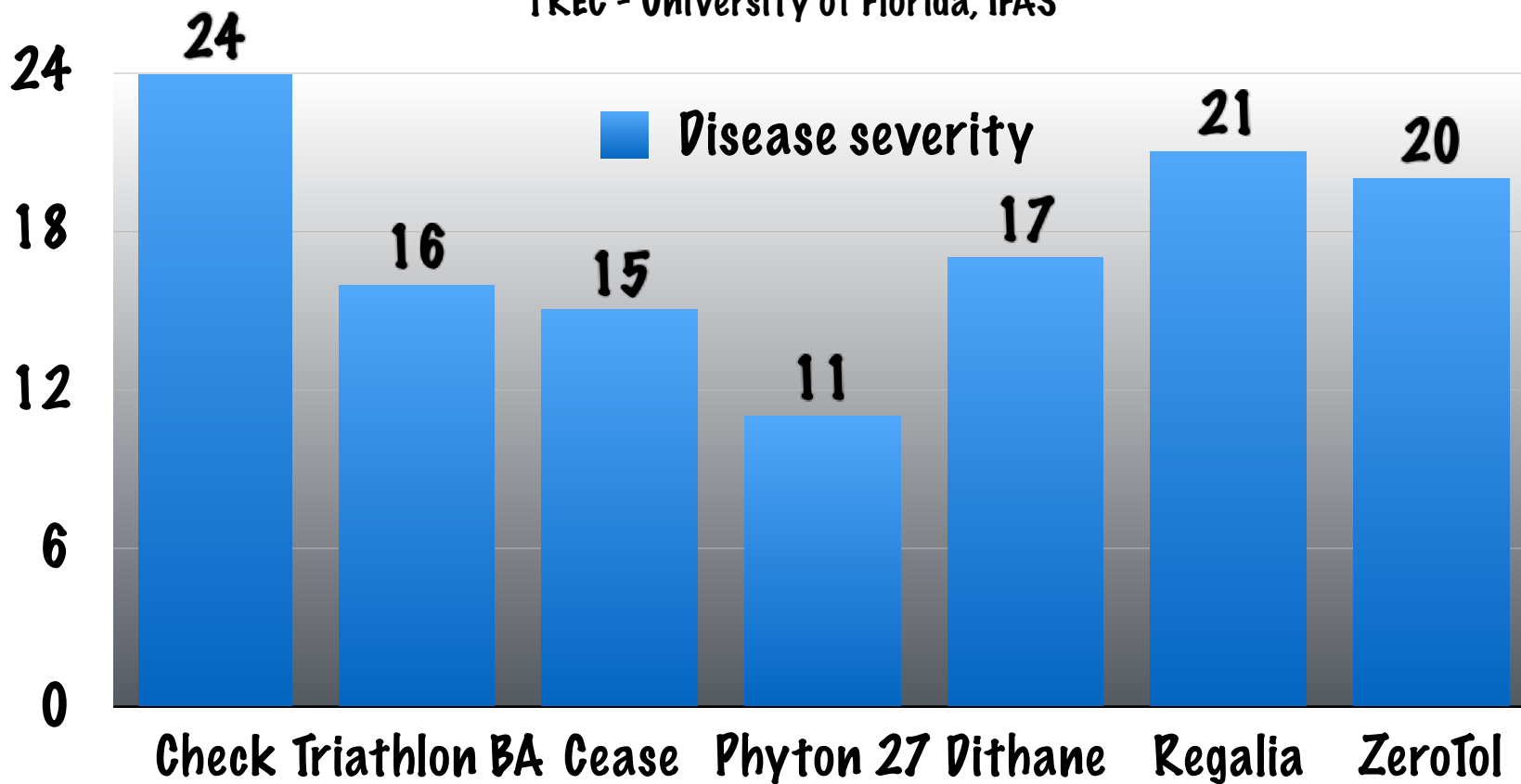
Segovis Summary

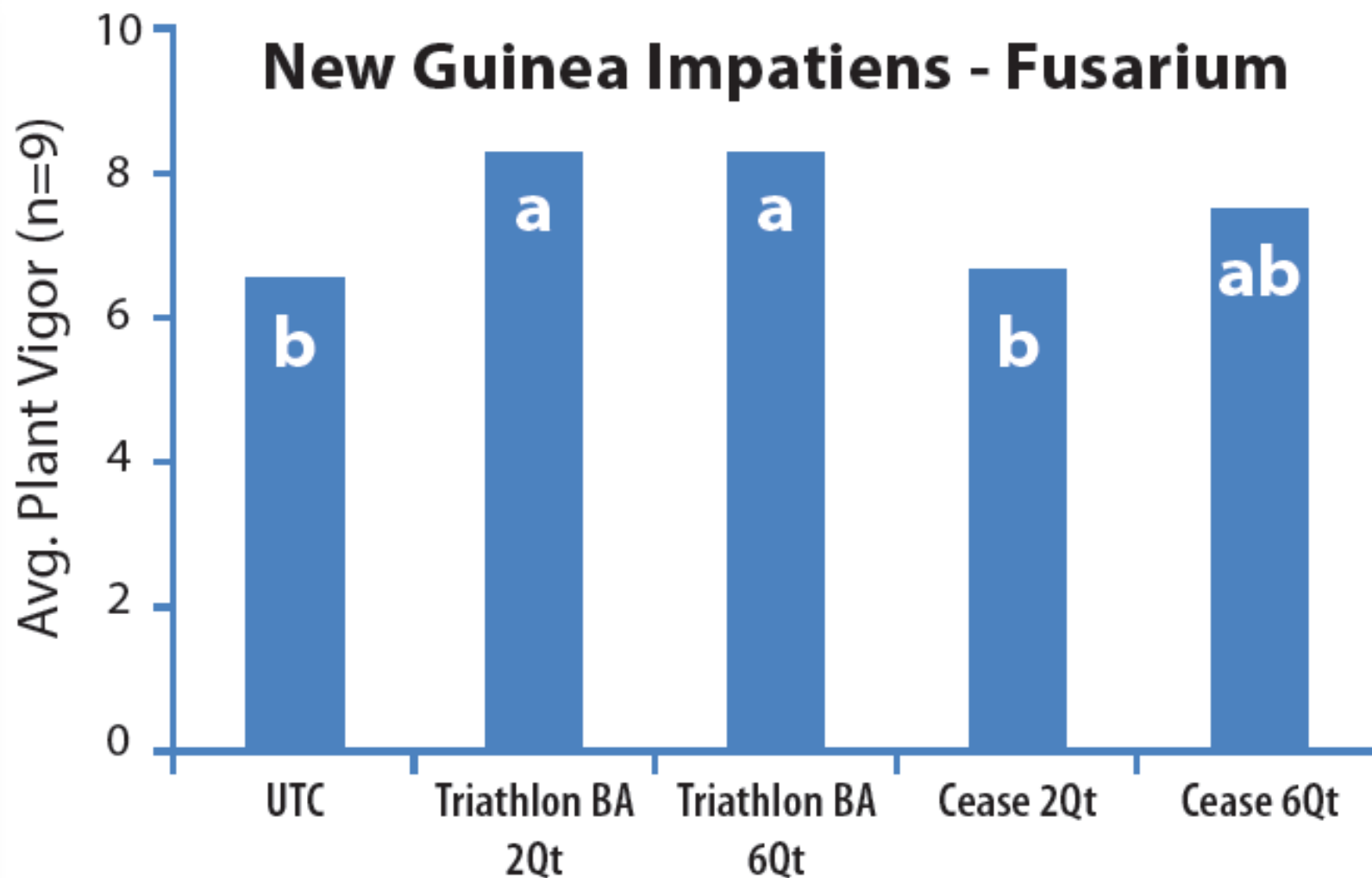
Pathogen	plant	result
Phytophthora capsici	watermelon	very good
Phytophthora cryptogea	gerbera daisy gerbera daisy	very good very good-excellent
Phytophthora nicotianae	vinca	very good to excellent
Phytophthora tropicalis	Hedera	excellent
Hyaloperonospora parasitica	kale	good-excellent
Peronospora behlbarii	basil (4 trials)	excellent at highest rate, very good, good, excellent
Plasmopara obducens	impatiens (2 trials)	excellent, excellent

Xanthomonas Blight on Ficus 'Green Island'



Aaron J. Palmateer
TREC - University of Florida, IFAS





Triathlon BA Summary

Disease target	plants	results
alternaria	tomato, cabbage, collards, cole crops	some, none, good, none, none
blue mold	tobacco	some
botrytis	grape, tomato	excellent, good, very good
charcoal rot	strawberry	none
fireblight	apple	none, good
fusarium	New Guinea impatiens	some-good
powdery mildew	squash, grape	some, very good
rhizoctonia	bean, cotton	none, good, very good, very good
rust	quince, cedar apple	excellent, none, none
xanthomonas	cabbage, tomato, citrus, ficus	excellent, very good, very good, good

Making a Change

What is your rotation now?
What moa/frac is the new product?
Does it offer something special?

- ✦ **broader spectrum**
- ✦ **safer to people**
- ✦ **environment or plants**
- ✦ **easier to apply**
- ✦ **less costly**
- ✦ **lower REI**
- ✦ **better control**
- ✦ **resistance management**

Fine-tuning your choices

- ✿ Level of control desired - do you want to wipe it out or accept loss of quality = loss of crop value
- ✿ Cost of prevention vs. cure - interval and rate and type of product - want to wait for disaster to strike?
- ✿ What does a 14 day interval of lower efficacy product cost for a year vs. an “expensive” product on a 4-10 day interval once disease starts.

Interval is important

Interval	Advantages	Disadvantages
Short	<ul style="list-style-type: none">✦ More control usually✦ Can use lower efficacy product	<ul style="list-style-type: none">✦ More frequent water is more disease✦ REI concerns✦ More residue✦ Higher labor costs
Long	<ul style="list-style-type: none">✦ Less frequent water is more control✦ Fewer REI concerns✦ Less residue✦ Lower labor costs	<ul style="list-style-type: none">✦ Less control usually✦ Must use high efficacy product for best effect

Other Costs of Disease Prevention

- ✿ Heat/vent – energy \$\$ and labor \$
- ✿ Spacing – less product on bench is less \$\$
- ✿ Fans for humidity reduction is equipment \$ (one time expenditure)
- ✿ Time of day for irrigation is management decision – can be the key to downy control
- ✿ Eliminate overhead irrigation – equipment and labor \$\$\$

It is not all
about
fungicides!!!

Other non-targets controlled

- ✿ Limited with Aliette, FenStop, Subdue MAXX and Stature – Phytophthora, downy mildew and Pythium (in some cases)
- ✿ Broad with strobilurins – most foliar diseases.

Potential for crop damage

- ✿ Low with most products
- ✿ Higher with copper and some DMIs

Residue

- ✿ Low with many newer products
- ✿ High with mancozeb and chlorothalonil

Determine the real cost of use per month

COST OF USE PER MONTH

Step 1. Cost of the product

Camelot 0 \$124/gal (\$1/oz)

Compass 0 \$263/8 oz (\$33/oz)

Daconil Ultrex \$88/6.5 lb (88¢/oz)

Decree \$271/2.5 lb (\$7/oz)

Heritage \$525/16 oz (\$33/oz)

Pageant \$80/16 oz (\$5/oz)

Protect DF \$80/6 lb (83¢/oz)

Spectro 90WDG \$124/5 lb (\$1.55/oz)

Step 2. Use rate per 100 gal and interval

Camelot 0 48 oz (7 days)
Compass 0 1-4 oz (7-14 days)
Daconil Ultrex 1.4 lb (7-14 days)
Decree 12-24 oz (7-10 days)
Heritage 1-4 oz (7-14 days)
Pageant 12-18 oz (7-14 days)
Protect DF 16-24 oz (7 days)
Spectro 90WDG 1-2 lbs (7-14 days)

Step 3. Cost per month

Daconil Ultrex \$57

Protect DF \$53

Spectro 90WDG \$100

Camelot \$192

Compass 0 \$198

Heritage \$198

Pageant \$240

Decree \$336

Expensive is
determined by
the wallet of
the owner

Step 4. Other benefits

Daconil Ultrex \$57 broad-spectrum, moderate to high efficacy

Protect DF \$53 broad-spectrum, moderate efficacy

Spectro 90WDG \$100 broad-spectrum, moderate efficacy

Camelot \$192 very broad-spectrum, moderate efficacy

Compass 0 \$198 broad-spectrum, high efficacy

Heritage \$198 broad-spectrum, high efficacy

Pageant \$240 broad-spectrum, high efficacy

Decree \$336 very narrow-spectrum, high efficacy

Basic Facts for Making the Best Choices

- **ROTATION** - this means FRAC group - (NOT the same as for insects/mites)
- Highest efficacy
- Legal use sites
- Prevention vs. eradication
- Cost of use

Matching the Fungicide to the Disease

- where is the infection? vascular - like Fusarium wilt, stem, root or leaves
- treat the right part of the plant
- use a systemic product if the infection is internal (fusarium or verticillium wilt and some downy mildews)
- use a contact product if the infection is superficial (like Botrytis)
- use the right rate at the right interval

Bactericide Rotation

- **Copper** (M1-Camelot O, Kocide and Phyton 27)
(effective on most bacteria)
- **Cease** (nc-Bacillus subtilis) (best for Pseudomonas and Xanthomonas)
- **Triathlon BA** (Bacillus amyloliquifaciens)
(effective on most bacteria)
- **Agri-Mycin** (antibiotic-streptomycin sulfate)
(best for Erwinia)
- **KleenGrow** (nc-quaternary ammonium)
(effective on most bacteria)

Bactericide Rotation

- **Erwinia soft rot or fireblight**

- **AgriStrep**

- **KleenGrow**

- **Copper**

- **Xanthomonas leaf spot**

- **KleenGrow**

- **Copper**

- **Triathlon BA/Cease**

Botrytis/Sclerotinia Rotation

- **Decree (1 7-fenhexamid)**
- **Daconil Ultrex (M5-chlorothalonil)**
- **Medallion (1 2-fludioxonil) or Palladium (1 2 and 9-cyprodinil)**
- **Chipco 26019, 26GT (2-iprodione)**
- **Pageant Intrinsic (1 1-pyraclostrobin and 7-boscalid) or Mural (1 1-azoxystrobin and 7-solatenol)**

Botrytis/Sclerotinia Rotation

- Botrytis Blight**

- Palladium**

- Mural or Pageant Intrinsic**

- Decree**

- Chipco 26019 or GT**

- Sclerotinia Blight**

- Pageant Intrinsic**

- Palladium**

- Chipco 26109 or GT**

Alternaria Rotation

- **Daconil Ultrex (M5-chlorothalonil)**
- **Medallion (1 2-fludioxinil) or Palladium (1 2 and 9-cyprodinil)**
- **Heritage, Mural or Pageant Intrinsic (1 1-strobilurins)**
- **Terraguard, Trigo, Banner MAXX (3-triflumizole)**
- **Chipco 26019 or 26GT (2-iprodione)**

Alternaria Rotation - GH vs. Nursery

- **Greenhouse**

- **Mural or Pageant Intrinsic**

- **Palladium**

- **Chipco 26109**

- **Nursery**

- **Daconil**

- **Banner MAXX**

- **mancozeb**

Cercospora Rotation

- **3336, Fungo, OHP6672 (1-thiophanate methyl)**
- **Palladium (1 2 and 9 – fludioxonil and cyprodinil)**
- **Heritage, Mural or Pageant Intrinsic (1 1-strobilurins)**
- **Daconil Ultrex (M5-chlorothalonil)**

Colletotrichum Rotation

- **Phyton 27 (M1-copper)**
- **Dithane, Protect, Pentathlon (M3-mancozeb)**
- **Daconil Ultrex and Spectro (M5-chlorothalonil)**
- **Pageant Intrinsic (1 1-pyraclostrobin and 7-boscalid)**

Myrothecium Rotation

- **Medallion (1 2-fludioxonil) or Palladium (1 2-fludioxonil and 9-cyprodinil)**
- **Heritage and Pageant Intrinsic (1 1-strobilurins)**
- **Daconil Ultrex (M5-chlorothalonil)**

Powdery Mildew Rotation

- **Heritage, Mural or Pageant Intrinsic** (all contain a 11-strobilurins)
- **Terraguard, Strike Plus (=Trigo), Banner MAXX, Eagle, Tourney, Trinity, Torque** (3-sterol inhibitors)
- **Camelot O, Kocide, Phyton 27** (M1-copper)
- **MilStop** (nc-K bicarbonate)
- **Palladium** (1 2 and 9)

Rust Rotation

- **Banner MAXX, Strike Plus (=Trigo), Trinity, Torque, Tourney, Eagle or Terraguard (3-sterol inhibitor)**
- **Heritage, Mural or Pageant Intrinsic (1 1-strobilurins)**
- **Camelot 0 or Phyton 27 (M1-copper)**
- **Dithane, Pentathlon or Protect (M3-mancozeb) (most effective at preventing rust)**

Downy Mildew Rotation

- **Heritage or Pageant Intrinsic (1 1-strobilurins) OR FenStop**
- **Subdue MAXX (4-mefenoxam/tank-mix as directed)**
- **Adorn (43-fluopicolide/tank-mix as directed)**
- **Aliette (33-phosphonate)**
- **Segway O (21-cyazofamid)**
- **Micora (40-mandipropamid), Stature or Orvego (40-dimethomorph and 45-ametoctradin)**
- **Segovis (49-oxathiapiprolin)**

Phytophthora Rotation

- Aliette (33-fosetyl aluminum)
- Adorn (43-fluopicolide) (tank-mix as directed)
- Subdue MAXX (4-mefenoxam)
- Micora (40-mandipropamid) or Stature SC (40-dimethomorph)
- Terrazole or Truban (14-etridiazole)
- FenStop (11-fenamidone)
- Segway (21-cyazofamid)
- Segovis (49-oxathiapiprolin)

Pythium Rotation

- **Empress (1 1-pyraclostrobin)**
- **RootShield Plus (nc-Trichoderma harzianum T-22 and Trichoderma virens G-41)**
- **Segway O (21-cyazofamid)**
- **Subdue MAXX (4-mefenoxam)**
- **Terrazole or Truban (14-etridiazole)**

Rhizoctonia Rotation

- **Medallion** (1 2-fludioxinil - crown and root) or **Palladium** (1 2 and 9- fludioxinil and cyprodinil - foliar)
- **Heritage** (1 1-strobilurin) or **Empress** or **Pageant**
Intrinsic (1 1 and 7-pyraclostrobin and boscalid)
- **3336, Fungo, OHP-6672** (1-tmethyl)
- **RootShield Plus** (nc-Trichoderma harzianum T-22 and T. virens G-41) root rot only and preventative
- **Affirm** (1 9 - polyoxin D)
- **Chipco 26019** or **GT** (2-iprodione)

Thielaviopsis Rotation

- **OHP-6672, 3336 (1-thiophanate methyl)**
- **Affirm (1 9-polyoxin D)**
and to a lesser degree
- **Heritage (1 1- azoxystrobin)**
- **Medallion (1 2-fludioxonil) or Palladium (1 2 and 9 – fludioxonil and cyprodinil)**
- **Terraguard (3-triflumizole)**

Fusarium Rotation

- **Medallion** (1 2-fludioxonil-for crown and root) or **Palladium** (1 2-fludioxonil and 9-cyprodinil-for foliar)
- **Heritage** (1 1-azoxystrobin) or **Mural** (1 1 and 7) or **Empress** (1 1-pyraclostrobin-for roots) or **Pageant Intrinsic** (1 1-pyraclostrobin and 7-boscalid-foliar)
- **Terraguard** (3-triflumizole)

Chase Agricultural Consulting, LLC
937 Tierra Verde Circle
Cottonwood, AZ 86326
(928)649-0400
www.chaseagriculturalconsulting.com

