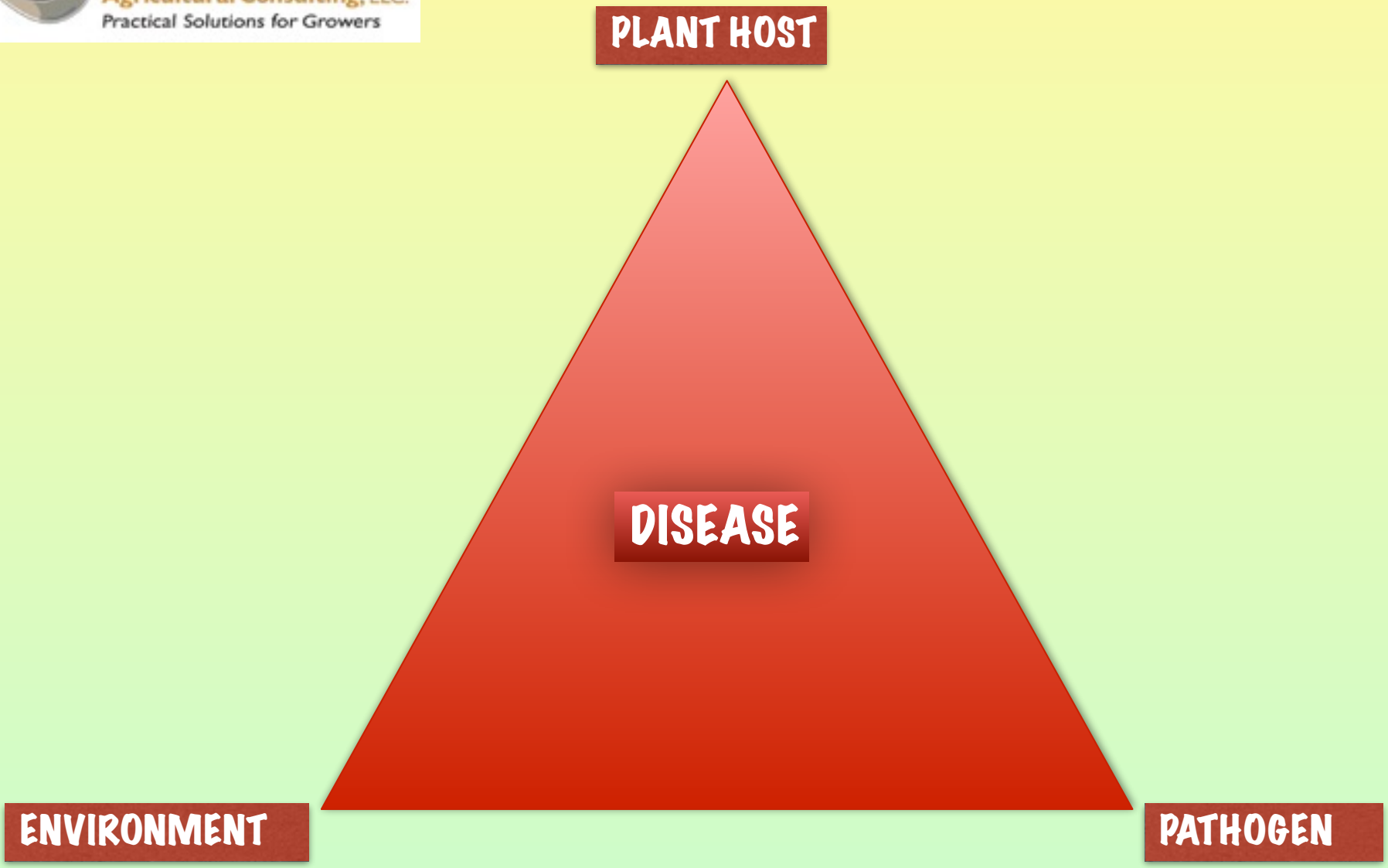
Oomycetes Update 2017

A. R. Chase
Chase Agricultural Consulting, LLC

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers



Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Key Factors in Disease

Disease	Wet leaves	High humidity	Temperature	Wind
Botrytis	+++	++	+	+
Downy mildew		+++	+	+
Powdery mildew	- -	++	+	++
Rust	++	+	+	++
Bacterial leaf spots	+++	++	+	
Fungal leaf spots	+++	+	+	+
Phytophthora aerial blight	+++	+	+	
Rhizoctonia blight	+++	+	++	
Root rot (Pythium)				
Crown rot				

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

What can you do?

shadehouse
greenhouse
raised benches
flood floors
ebb and flood benches
drip tape or drip tubes

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Flooding


Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers
Overhead irrigation best way to create foliar diseases


Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers
Raising pots off ground
pack stop disease spread

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Raising pots off floor and using drip tape to manage water


Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers
Sprinkler irrigation

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Downy mildew woody plants

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Other Downy Mildews

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

When the sun comes up, leaves start to dry and spores are released.

Most spores spread by fans or wind and infect new leaves before noon.

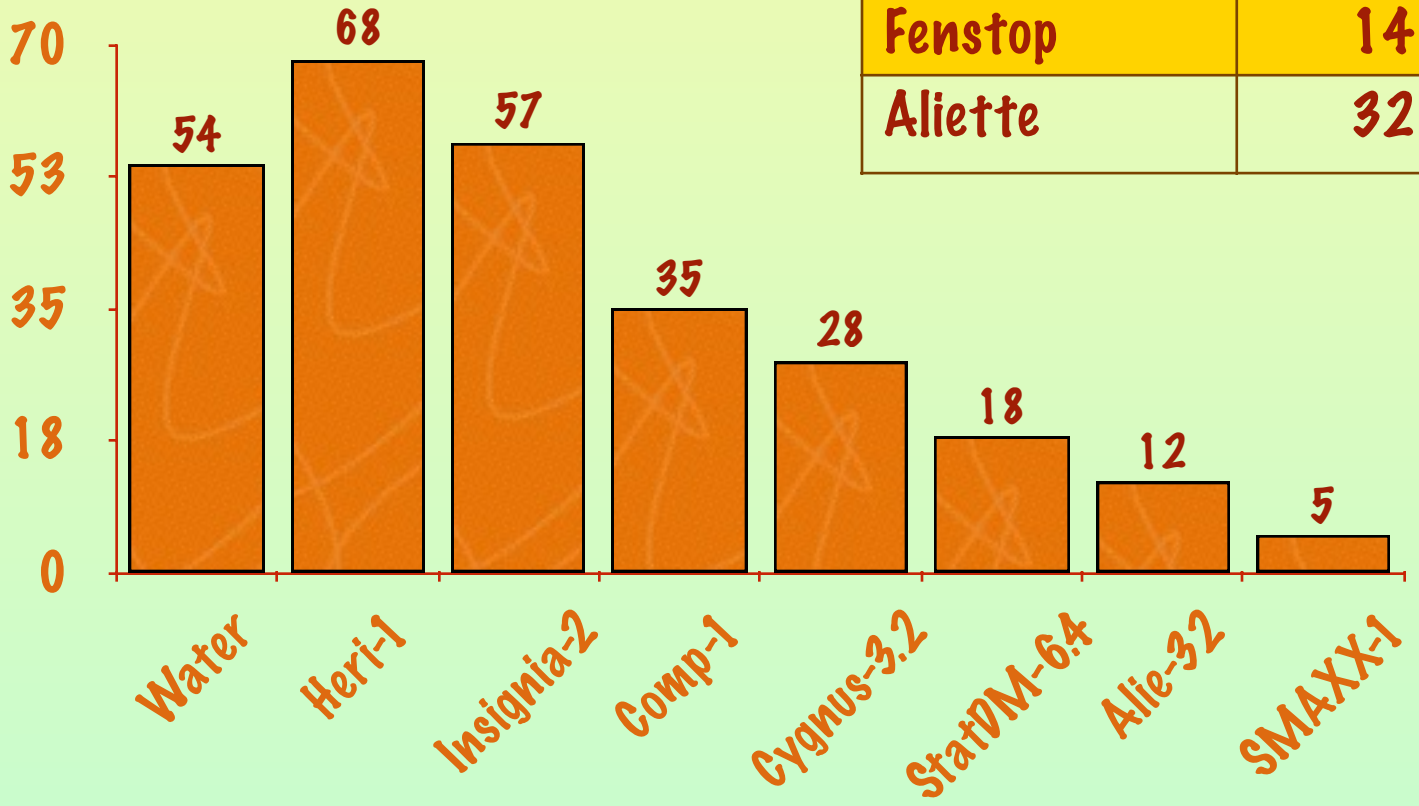
Wet leaves and high humidity make the Downy Mildew pathogens sporulate and infect healthy leaves.


Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers
Six hours of constant leaf wetness = downy mildew
Use fans and venting to reduce humidity and leaf wetness
Water early in the day to ensure dry foliage at night.

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

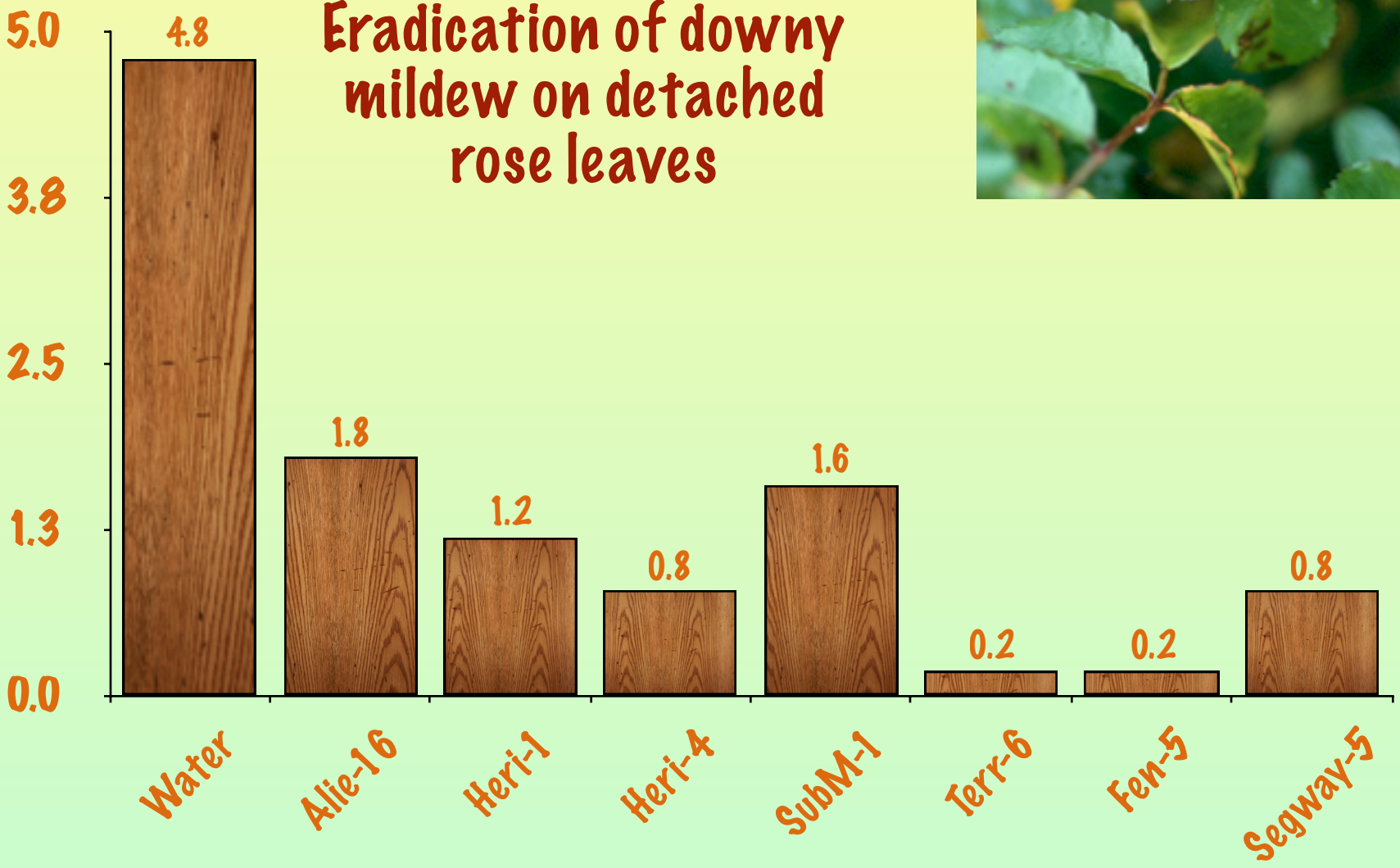
Eradication of downy mildew on potted roses

Product	Rate/ 100 gal	% DM infection
Water	—	40 b
Subdue MAXX	1 oz	7 a
Segway	2.75 oz	37 b
Stature DM	9.6 oz	1 a
Fenstop	14 oz	9 a
Aliette	32 oz	8 a



Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Eradication of downy mildew on detached rose leaves



Chase Agricultural Consulting, LLC.
Practical Solutions for Growers

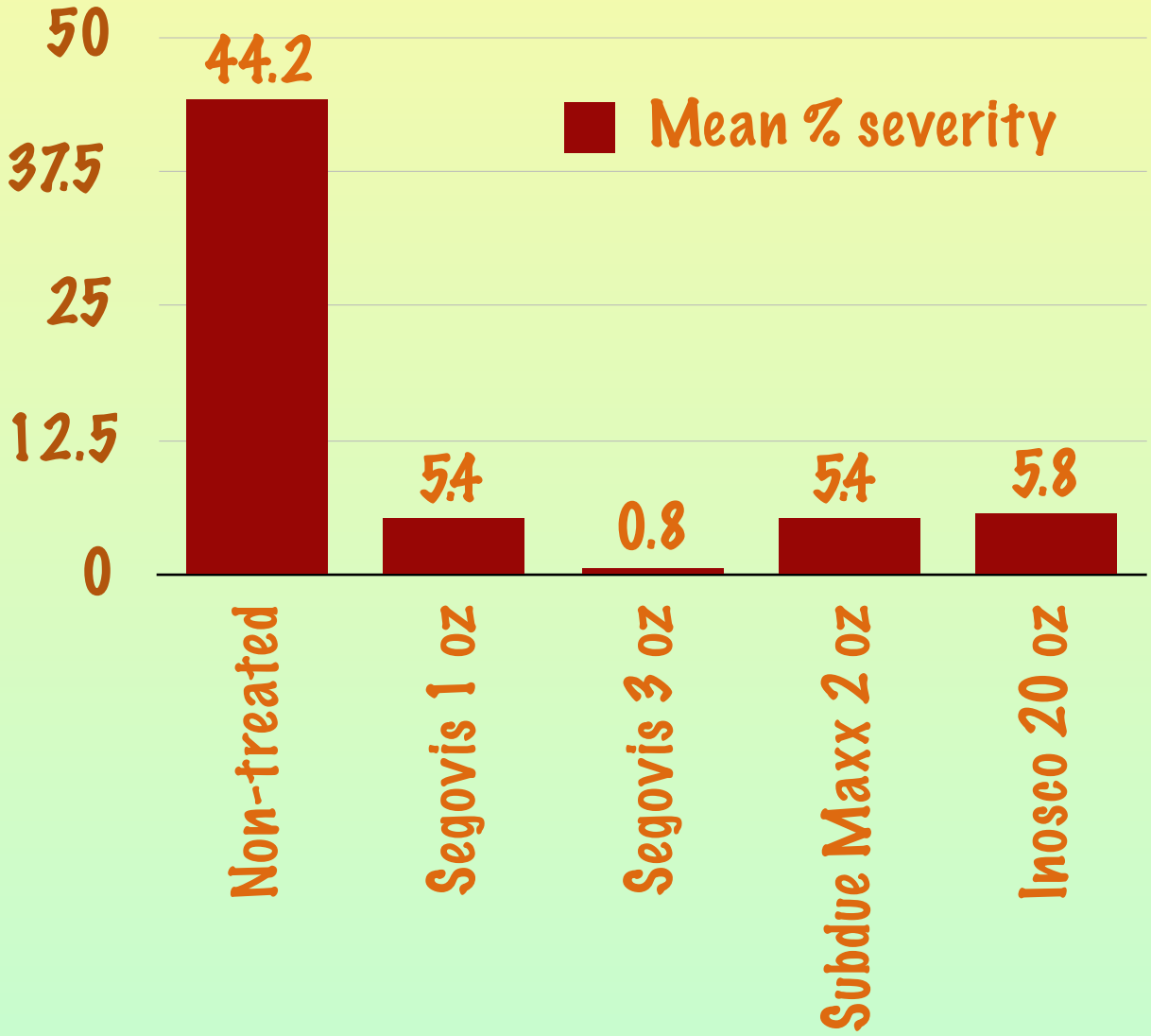
Rose downy trials from the field in NW Florida (Hausbeck, MSU)

products were applied twice on a 10-day interval

Treatment	Rate/ 100 gal.	% Downy Mildew
Water	-----	54 bc
Heritage	1 oz	68 c
Compass O	1 oz	35 ab
Segway/Silwet	2.1 oz/2 oz	31 ab
Segway/Silwet	2.75 oz/2 oz	18 a
Segway/Silwet	3.5 oz/2 oz	10 a
Stature DM	6.4 oz	18 a
Aliette 80WDG	32 oz	12 a
Subdue MAXX	1 oz	5 a
Actinovate/Capsil	6 oz/4 oz	55 bc

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Effect of fungicide drenches on severity of rose downy mildew (Baysal-Gurel, UT)



Pots were drenched with about 20 oz per pot after the first signs of symptoms appeared.

Rates in the graph are per 100 gal).

Downy mildew severity was recorded weekly.

Chase Agricultural Consulting, LLC.
Practical Solutions for Growers

Effect of fungicide timing on severity of rose downy mildew (Baysal-Gurel, UT)

The initial spray was the same - Subdue Maxx (2 oz/100 gal) and Micora (4 oz/100 gal).

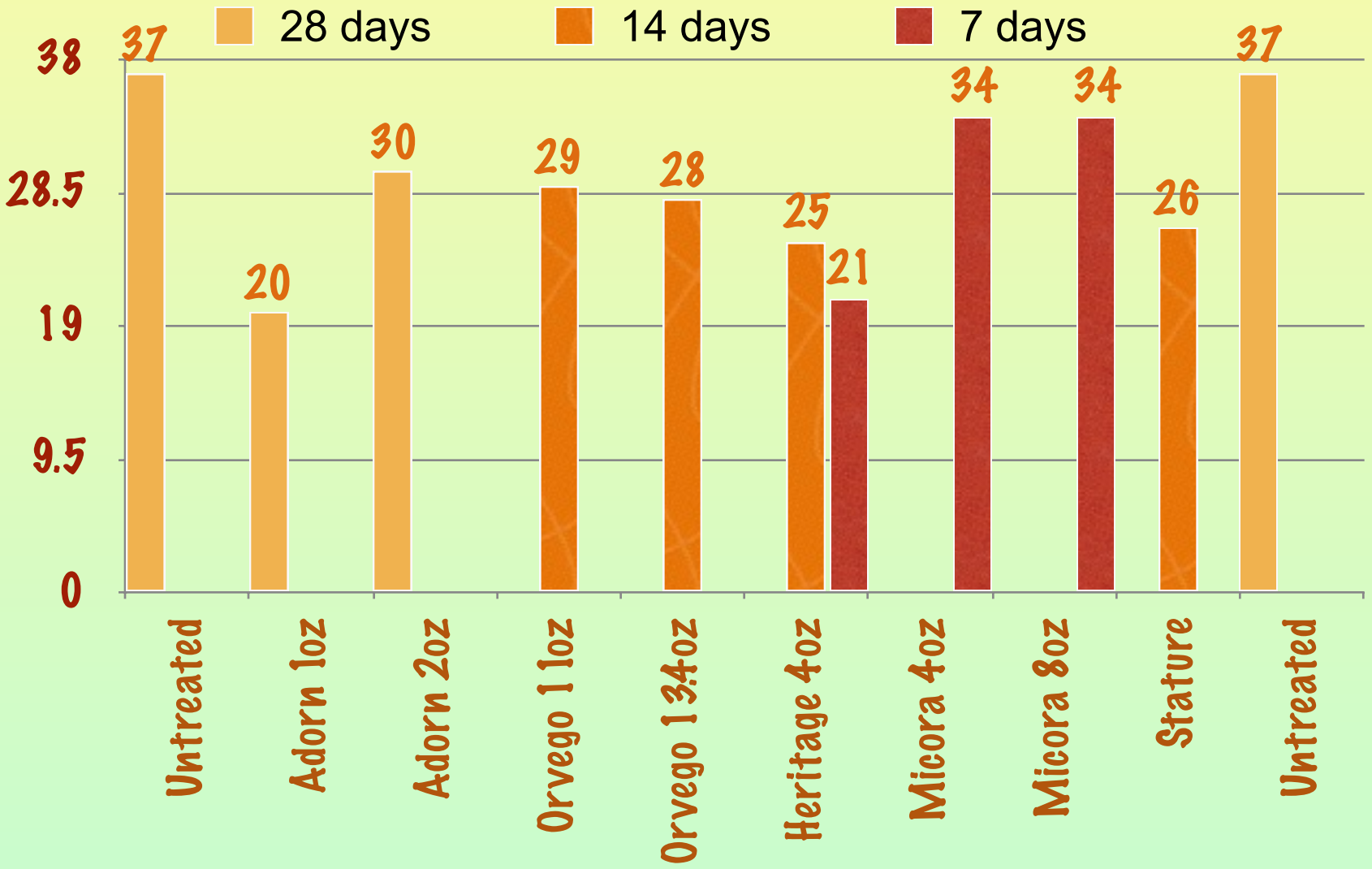
Then plants were split into two treatments and the following alternation was applied either weekly or every other week:

- Mural (7 oz/100 gal)
- Segovis (2 oz/100 gal).

Treatment interval	Average # infected leaves	Mean incidence (%)
Non-treated	13.9 a	15.1 a
7 days	1.1 b	0.9 b
14 days	1.8 b	1.5 b

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Viburnum Downy Mildew Control



Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

General Downy Mildew Approach The Beginning

- Reject and destroy cuttings or plugs with signs of downy mildew.
- Drench all other trays with Subdue MAXX (1 oz/100 gal) ASAP after receipt OR Segovis (0.6 oz/100 gal).
- If there are no signs of downy mildew, then go ahead and use a 10-14 day spray interval on extremely susceptible crops.
- If there are any symptoms then use a 7 day interval - or even if you get a lot of wet, cool weather.

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Downy Mildew Approach - Production

After they have been planted about a week - start a rotation of:

- Micora (spray 4-8 oz/100 gal)
- Adorn (spray 2 oz/100 gal)
- FenStop (spray 14 oz/100 gal)
- Final spray before leaving facility should be Segovis (1-2 oz/100 gal)

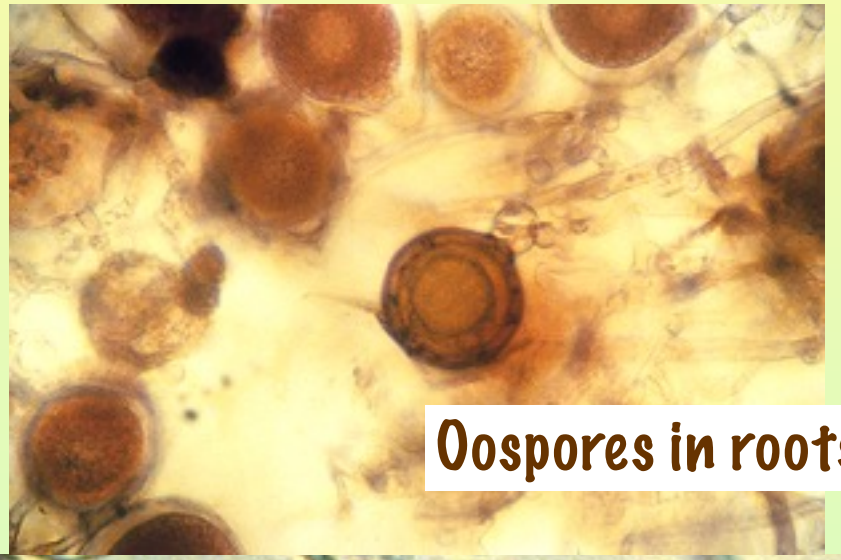
Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

If you have an outbreak:

Segovis (1-2 oz/100 gal)
OR
Micora (spray 8 oz/100 gal) and Subdue MAXX (spray 1 oz/100 gal).
OR
Adorn (spray 2 oz/100 gal) and Subdue MAXX (spray 1 oz/100 gal)

Phytophthora and Pythium

Sporangia on roots



Oospores in roots

Zoospores

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

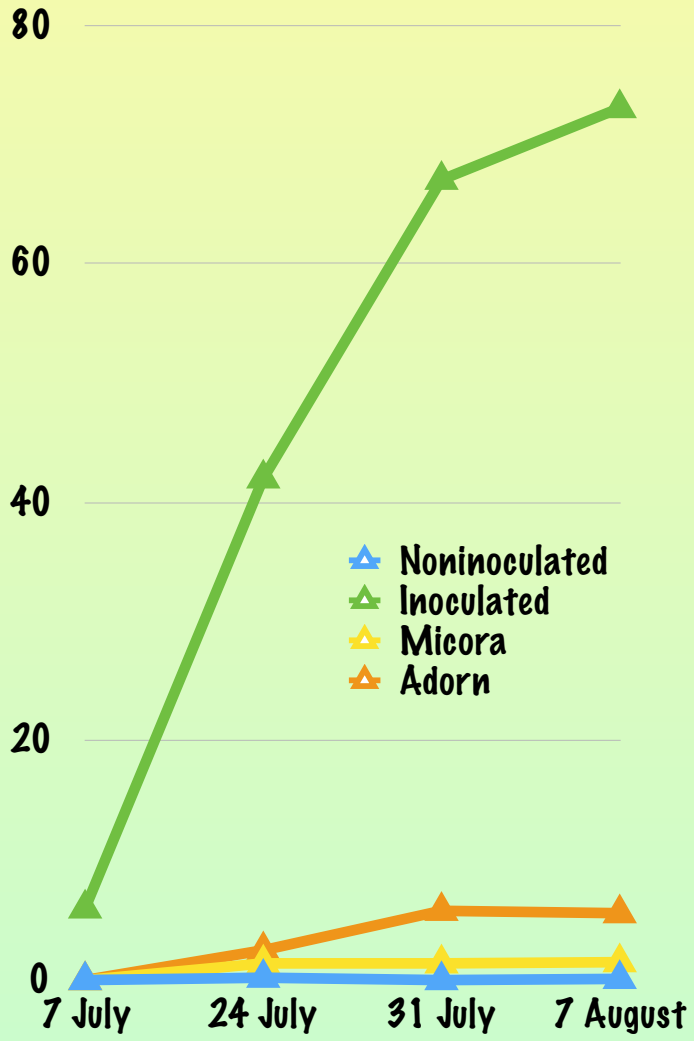
Root and Crown Rot

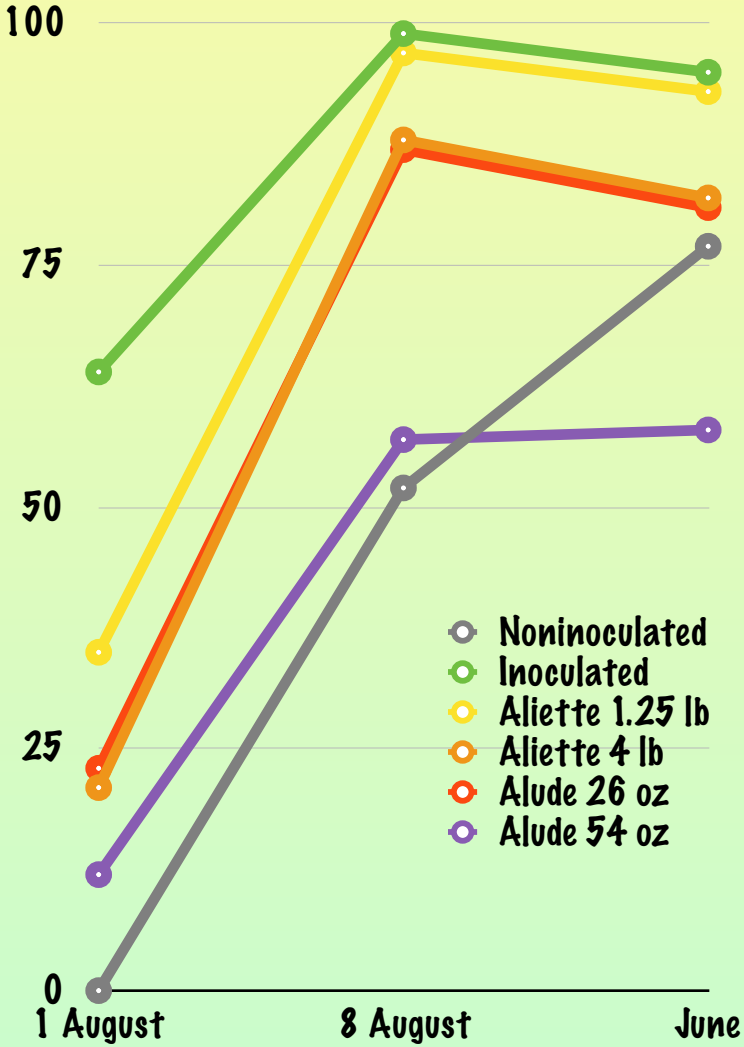
Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Aerial Blight and Leaf Spot

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

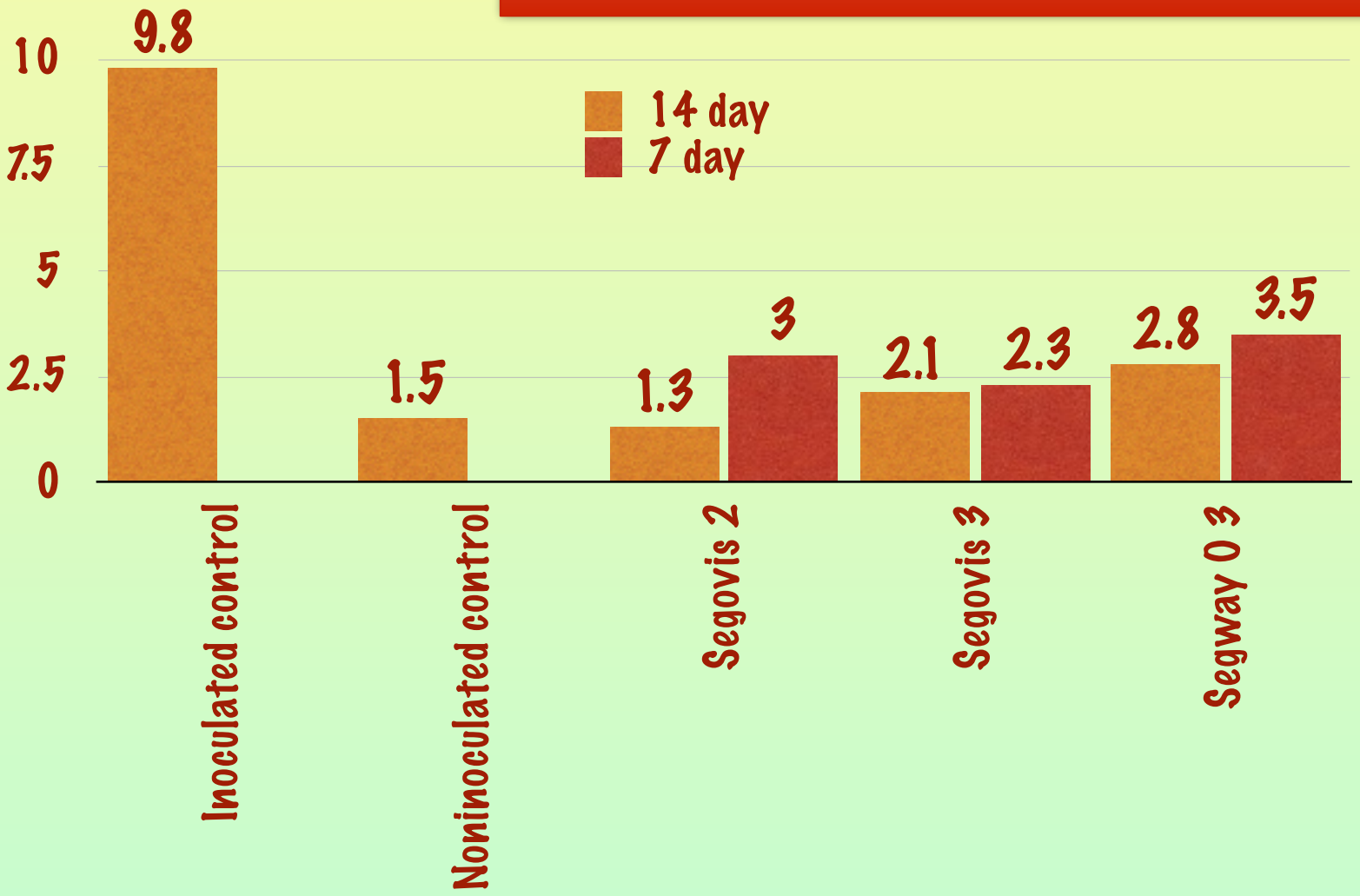
Phytophthora aerial blight on vinca





Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Disease severity for gerber daisy plants treated either 7 or 14 days before inoculation



Chase Agricultural Consulting, LLC.
Practical Solutions for Growers

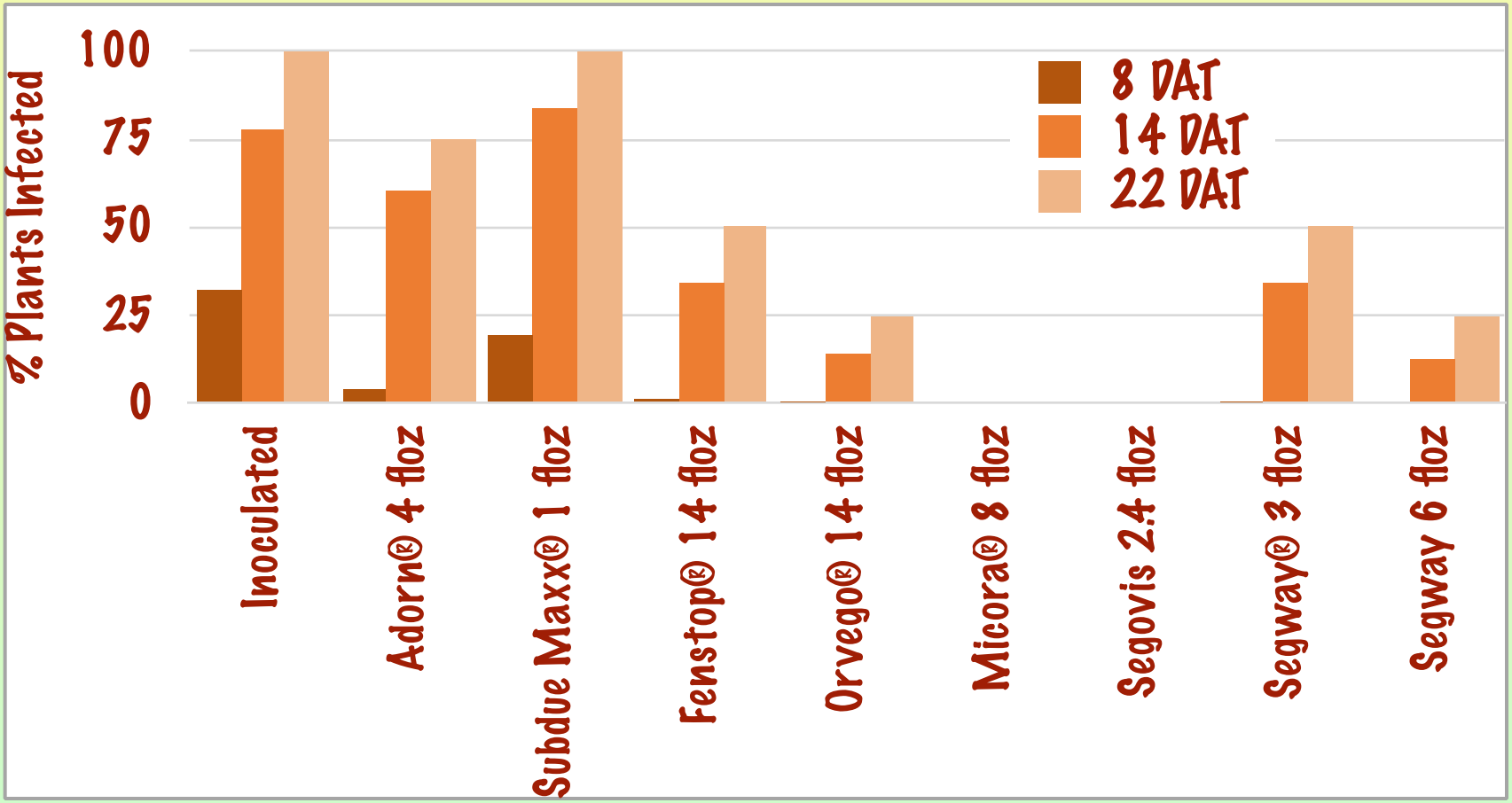
Phytophthora aerial blight on pothos

Treatment	Rate	% Disease Severity [y]	Plant Quality [z]
Noninoculated control	---	2 c [x]	8 a
Inoculated control	---	24 a	5 b
Segovis	1 fl oz/100 gal	1c	8 a
Segovis	2 fl oz/100 gal	0.3 c	9 a
Segovis	3 fl oz/100 gal	0 c	9 a
Adorn	1 fl oz/100 gal	2 c	8 a
Mural	3 oz/100 gal	10 b	6 b

[z] Plant quality rating scale where 9 is a perfect plant, 6 is commercially acceptable and 1 is dead.
[y] Percent canopy area affected as an average across all rating dates.
[x] Column means followed by the same letter are not statistically different (P=0.05) based on Tukey's HSD.

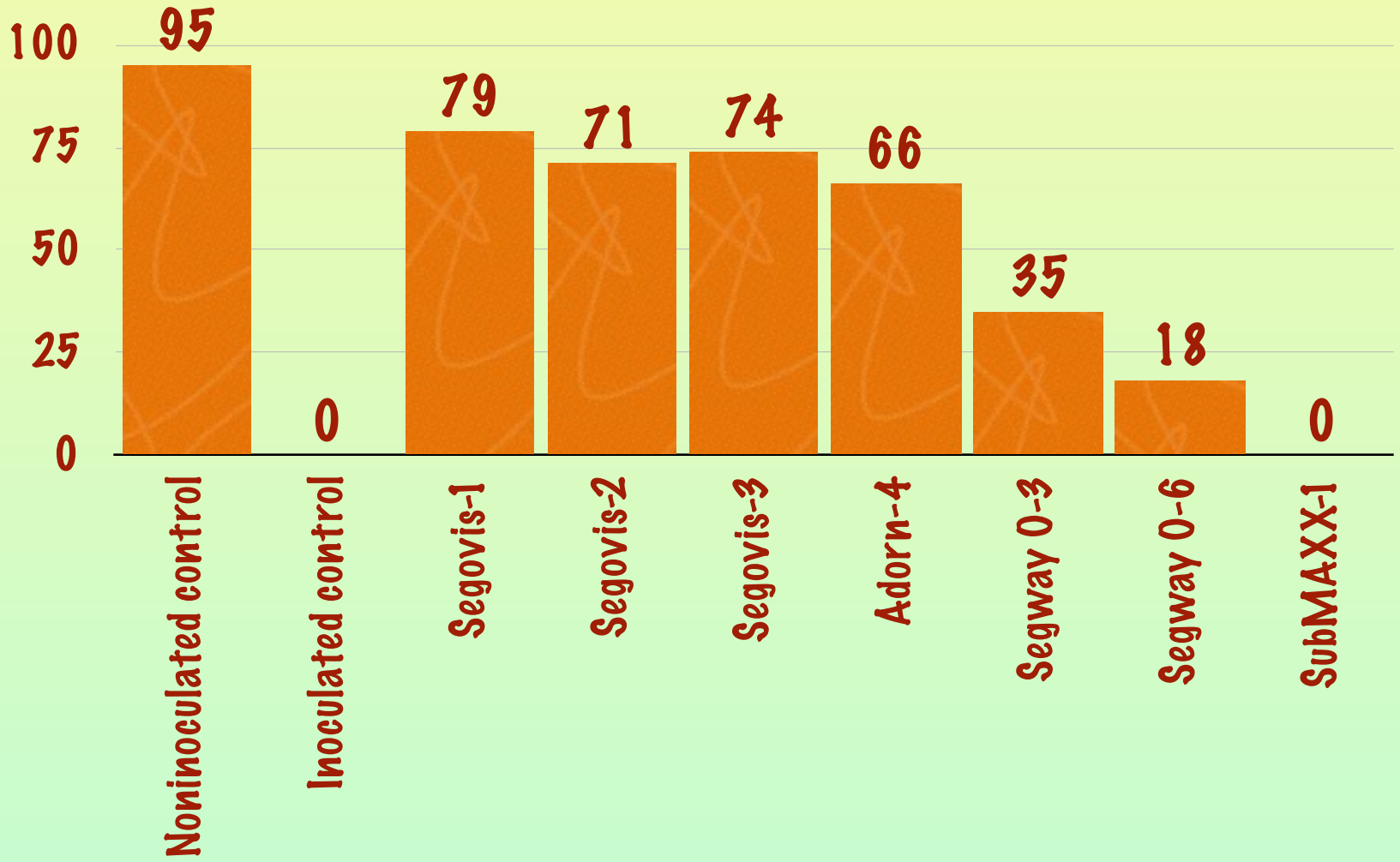
Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Control of Aerial Phytophthora on Vinca (Aggressive, Mefenoxam-resistant Florida Strain)



Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Petunia healthy roots (mefenoxam-resistant strain)



Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Preventative Rotation - low disease pressure

Week 1-at planting
Segovis (drench at 0.6-1oz/100 gal)
Week 3
Aliette (spray at 1-2 lb/100 gal)
Week 6
Micora (spray at 4 oz plus Capsil 4 oz/100 gal)
Week 8
repeat series

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

"Curative" Rotation - high disease pressure

Week 1

Segovis (spray/drench at 1-2 oz/100 gal)

Week 3

Micora (spray at 8 oz plus Capsil 4 oz/100 gal)

Week 4

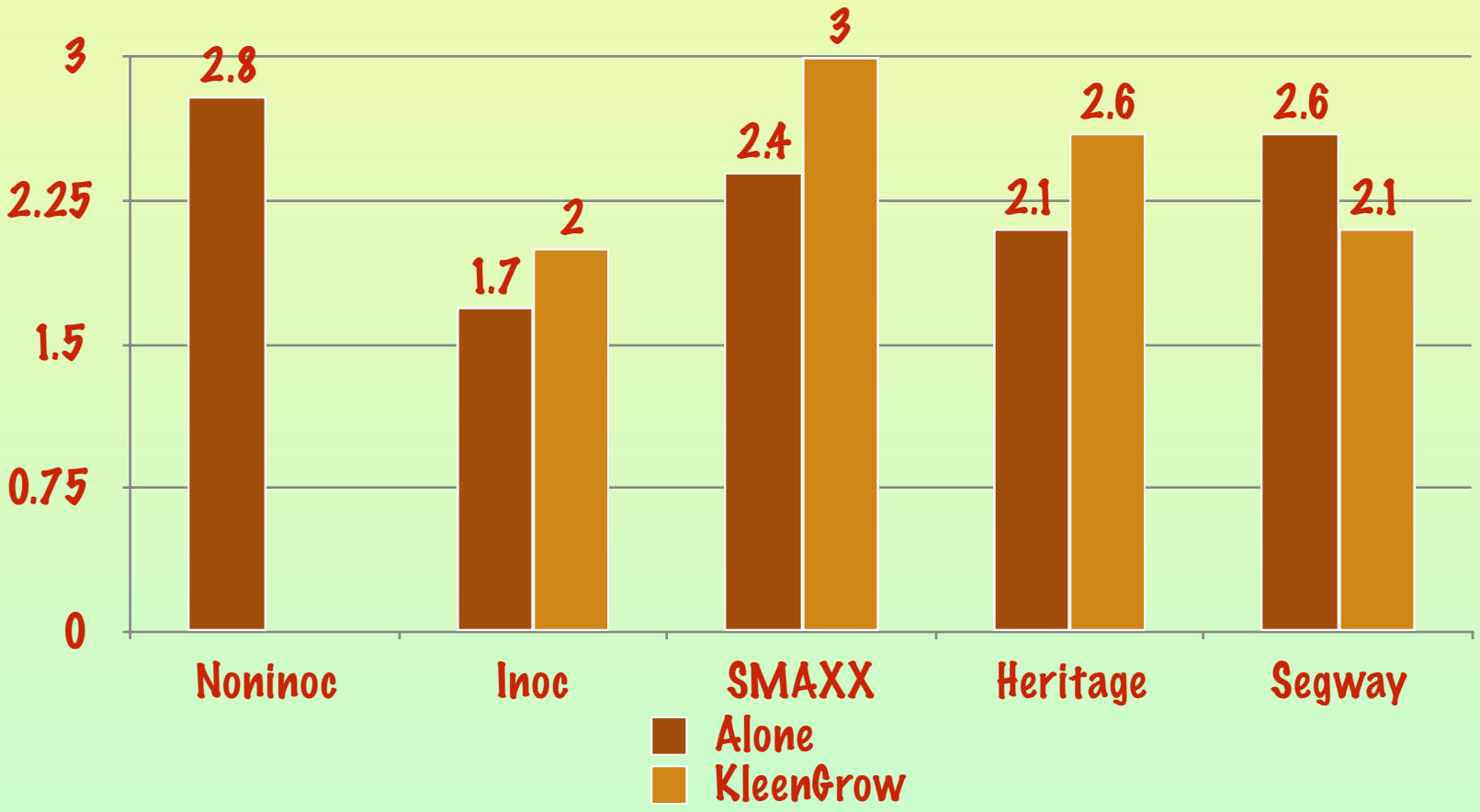
Aliette (spray at 2 lb/100 gal)

Week 5

repeat series

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

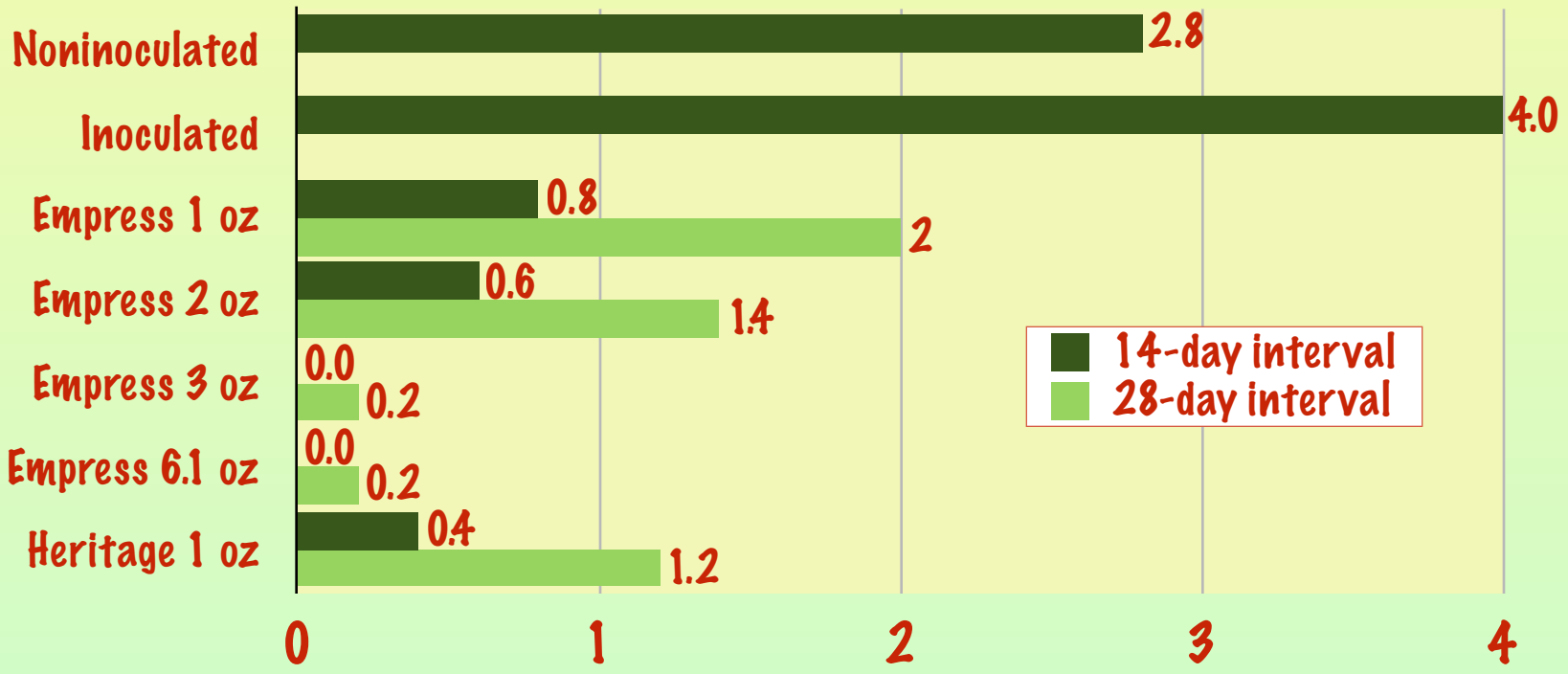
Effect of fungicide treatment with and without KleenGrow on Pythium root rot of New Guinea Impatiens (Daughtrey-Cornell)



Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Efficacy of Empress 250 FS on Pythium Root Rot on Poinsettia

A J Palmateer, Univ. FL



Poinsettia root rot severity in 6 inch pots. Root rot ratings were taken using the following scale: 0= no symptoms, 1= <10%, 2= 10-30%, 3= 30-50%, 4= 50-75% and 5= >75%.

Chase Agricultural Consulting, LLC.
Practical Solutions for Growers

Effect of Plant and Pythium Species on Disease Severity

(Hausbeck, Michigan State University)

Fungicide treatment	Pythium aphanidermatum	Pythium irregulare	Pythium ultimum
Non-inoculated control	40	40	40
Actinovate	50	54	63
Adorn	108	108	89
Fenstop	98	95	96
Heritage	104	93	72
RootShield	68	102	89
Segway O	129	138	66
Subdue MAXX	67	92	45
Terrazole	108	94	64
Vital	105	100	84
Inoculated control	151	126	66

Fungicide treatment	Pythium aphanidermatum	Pythium irregulare	Pythium ultimum
Non-inoculated control	40	40	40
Actinovate	125	157	83
Adorn	99	156	43
Fenstop	83	111	62
Heritage	145	139	87
RootShield	95	68	90
Segway O	122	136	90
Subdue MAXX	85	126	43
Terrazole	92	168	52
Vital	121	95	110
Inoculated control	98	148	90

Results of trials on geranium (left) and snapdragon (right) for control of Pythium diseases. The numbers are the area under the disease progress curve. Boxes in green were the best in each column.

Chase Agricultural Consulting, LLC.
Practical Solutions for Growers

IR-4 Summary on Pythium - 2013

Product (FRAC group)	# trials	average % control
Adorn (43)	29	63
Aliette (33)	16	57
Alude (33)	6	42
Disarm (1 1)	15	44
Empress (1 1)	5	54
FenStop (1 1)	22	54
Heritage (1 1)	42	49
Kocide 2000 (M1)	5	34
Micora (40)	8	39
Pageant (9, 1 1)	23	37
Phostrol (33)	4	76
Segway (21)	13	56
Subdue MAXX (4)	24	61
Terrazole (14)	9	90

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Keys to a Successful Rescue Operation

Know what the problem is exactly.

Avoid thinking that a biological, green or otherwise soft product will work in a rescue situation.

Fix cultural problems that are promoting the disease.

Use the best products that have been shown to have the most "eradication".

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Diseases without a significant cure

- Viruses - none of them can be rescued - ever
- Phytophthora - if you see symptoms it may be too late - initial symptoms to dead plants can be a few days.
- Bacterial diseases - especially crown gall (Agrobacterium), fasciation (Rhodococcus), wilt (Ralstonia) and soft rot (Erwinia)
- Fusarium (fungicide may actually make a Fusarium disease worse)
- Black root rot (Thielaviopsis)

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

The Best Eradicants

Disease	Best eradicant (s)	Cultural changes
Downy mildew	Subdue MAXX FRAC group 4 Phosphonates FRAC group 33 FRAC 49	• Fans to reduce relative humidity (RH) • Irrigate when leaves will dry quickly • Never water at night
Pythium root rot	Subdue MAXX (won't work if the pathogen is resistant) Etridiazole FRAC group 14	• Change irrigation, light level etc. to improve cultural conditions. • Doing this alone can result in "cure". • Plants can outgrow this disease.
Phytophthora stem rot	Micora, Stature FRAC group 40 OXTP FRAC group 49	• Nothing likely to help once symptoms appear. • Throw away symptomatic plants and treat the rest.

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Fungicide Summary

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Downy Mildew Rotation

Eradication possible with early infections that are NOT systemic

- Compass O, Heritage or Pageant Intrinsic (11-strobilurins) OR FenStop
- Subdue MAXX (4-mefenoxam/tank-mix as directed for sprays)
- Adorn (43-fluopicolide/tank-mix as directed)
- Aliette (33-phosphonate) and many others
- Segway O (21-cyazofamid)
- Micora (40-mandipropamid), Stature or Orvego (40-dimethomorph and 45-ametoctradin)
- Segovis (49-oxathiapiprolin)

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Phytophthora Rotation

Eradication possible on foliar blight if overhead irrigation is stopped. NO eradication likely with crown rot.

- **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)

Chase
Agricultural Consulting, LLC.
Practical Solutions for Growers

Pythium Rotation

Eradication possible with improved environment

- **Empress/Insignia** (11-pyraclostrobin - other FRAC 11 are not as effective)
- **Subdue MAXX** (4-mefenoxam - resistance possible)
- **Segway 0** (21-cyazofamid)
- **Terrazole** or **Truban** (14-etridiazole - can eradicate at high label rates and closest intervals)
- **RootShield Plus** (nc-Trichoderma harzianum T-22 and Trichoderma virens G-41 - not for eradication)

YouTube.com/ChaseAgricultural
Chase Digest
ChaseBase
Chase Archives
Ask Ann
Custom consulting/research

937 Tierra Verde Circle
Cottonwood, AZ 86326
928-649-0400
www.chaseagri.com