

Scirtothrips dorsalis
(Chilli thrips)

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S. dorsalis

Synonyms: Chilli, Castor, Berry, Assam and Yellow Tea Thrips

Host Plants:

Over 150 host plants including banana, beans, chrysanthemum, citrus, corn, cotton, cocoa, eggplant, ficus, grape, grasses, holly, jasmine, kiwi, litchi, longan, mango, onion, peach, peanut, pepper, rose, soybean, strawberry, tea, tobacco, tomato, viburnum, etc.

ECONOMIC IMPORTANCE

Major pest of:

- **strawberries** in Queensland, Australia
- **tea** in Japan and Taiwan
- **citrus** in Japan and Taiwan (Chiu *et al.* 1991, Tatara and Furuhashi 1992, Tschuchiya *et al.* 1995)
- **cotton** in the Ivory Coast (Bournier 1999)
- **soybeans** in Indonesia (Miyazaki *et al.* 1984)
- **chillies** and **castor bean** in India
- **peanuts** in several states in India (Mound and Palmer 1981).
- Ananthakrishnan (1984) also reports damage to the following hosts: **cashew, tea, chillies, cotton, tomato, mango, castor bean, tamarind, and grape.**
- **Rose** in India

Identification

S. dorsalis

There are currently thought to be 11 distinct species that are lumped into this “species”.

All of them are extremely difficult to separate from the others using traditional taxonomy and a microscope.

Nine of them can only be identified by using DNA and molecular tools.

S. dorsalis

We need YOUR HELP.

Please **SEND US SAMPLES!**

Chilli Thrips-Adult



Chilli Thrips-Adults

Male and Female (larger)



Thrips-Adults



**Western
Flower thrips**

Chilli thrips

Western Flower Thrips Adult



Chilli Thrips-Adult (recently emerged)



Chilli Thrips-Adult



Chilli Thrips-Adults



Egg Blister



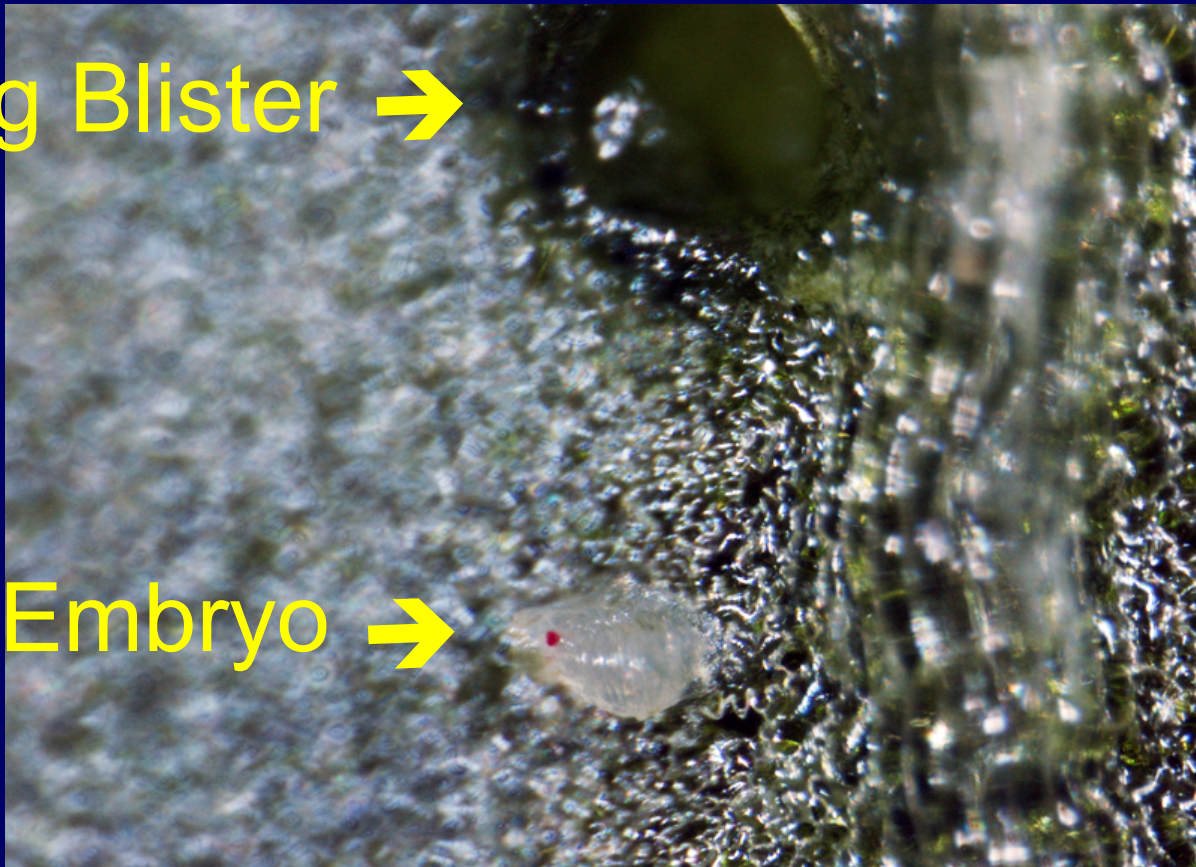
Chilli Thrips-Adults



Embryo Removed from Egg Blister

Egg Blister →

Embryo →



1st Instar Larva



Chilli Thrips

1st Instar Larva



Egg to 2 nd Instar	
F°	Days
60.8	17.2
68	12.0
77	7.6
86	5.8

Chilli Thrips

2nd Instar Larva



F°	Days
60.8	12.4
68	8.1
77	6.4
86	4.4

Chilli Thrips

Pre-Pupa & Pupa



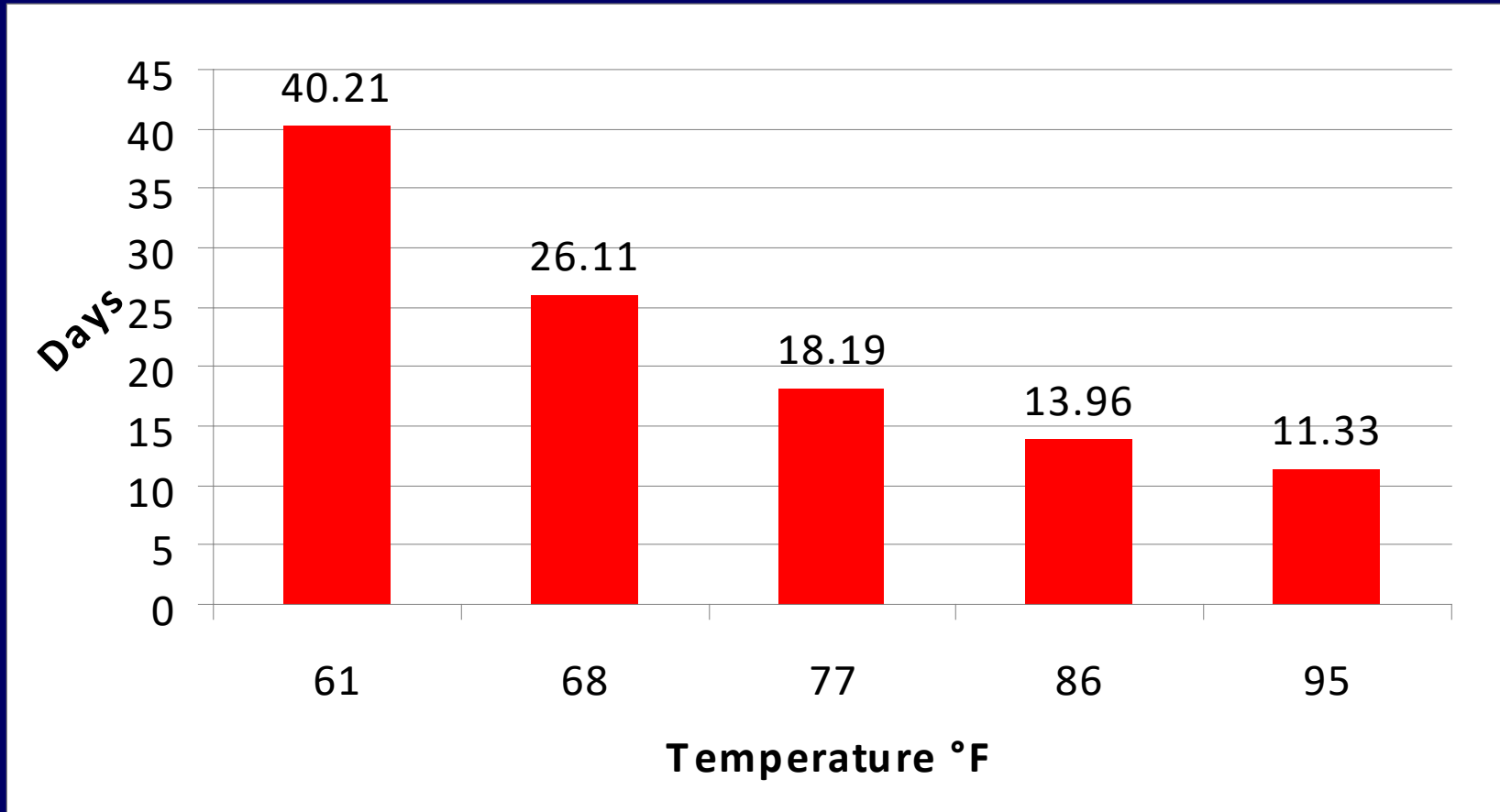
Pre-pupa

F°	Days
60.8	9.9
68	6.5
77	4.4
86	3.7



Pupa

DEVELOPMENT (DAYS) EGG TO EGG



Over Wintering of Pupae

Grapes

- 64.4% in liter
- 16.2% in branch zone
- 12.5% in soil
- 6.9% leaf zone

Scouting

Scouting



Scouting



Damage

Damaged Flower Bud and Leaves

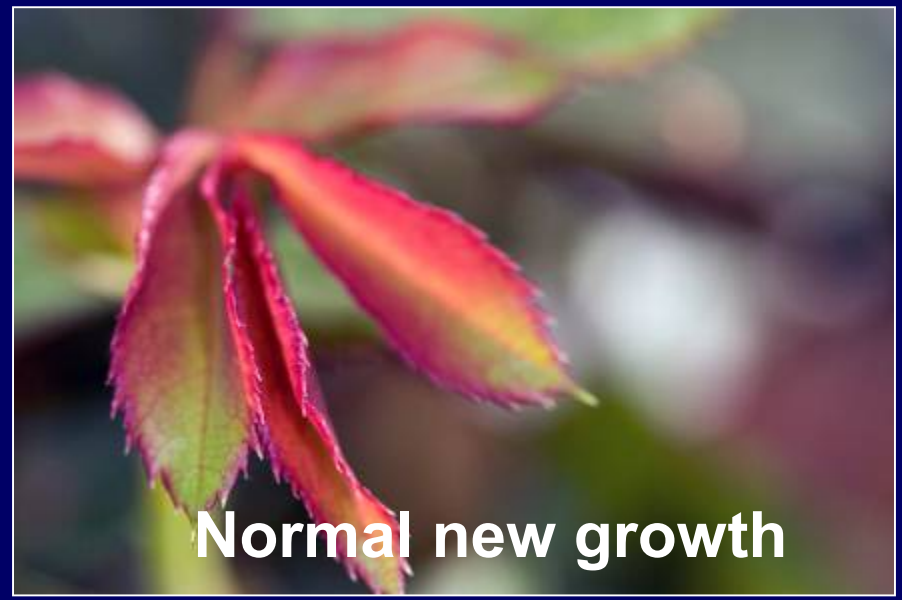




**Comparison of
damaged and
normal leaf**



Damaged new growth



Normal new growth

Chilli Thrips - rose



Chilli Thrips-pepper



Chilli Thrips-pepper



Management

Chemical

**100% Reliance on
Pesticides =**

RESISTANCE

What Can Growers Do?

1. Pay attention to information distributed by SAF, the propagators, media, pesticide companies and/or University and ARS scientists.
2. Implement **I**NSECTICIDE **R**ESISTANCE **M**ANAGEMENT PROGRAMS

IRM

ROTATE

ROTATE

ROTATE

Table based on data from:

Ciomperlik
Ludwig
Osborne
Seal

Effective Products

7 Different Modes of Action

Acephate	Foliar	N, G, L
Acetamiprid	Foliar	N, G, L
Clothianidin	Foliar	N, G, L
Dinotefuran	Foliar	N, G, L
Imidacloprid	Foliar	N, G, L
Thiamethoxam	Foliar	N, G, L
Spinosad	Foliar	N, G, L
Abamectin	Foliar	N, G, L
Flonicamid	Foliar	G
Chlorfenapyr	Foliar	G
Pyridalyl	Foliar	G

N=Nursery
G=Greenhouse
L=Landscape

Compounds in Yellow = the same MOA

Table 1. Recommended chemical^b controls for *Scirtothrips dorsalis* in different plant production systems.

Active ingredient	IRAC class	Registered use site(s)	Knock down	Restricted entry interval (hours)	Efficacy against <i>Scirtothrips dorsalis</i>	Residual impact (days)
Foliar-applied insecticides trade name (common name)						
Aria 50 SG (Flonicamid)	9C	G, I, N	M	12 h	Gr	7-14
Avid 0.15EC (Abamectin)	6	G, N, S	F	12 h	Gr	Contact
Conserve SC, Entrust (Spinosad)	5	G, L, N, S	F	4 h	G - Gr	5
Flagship 25WG (Thiamethoxam)	4A	G, L, N, S	F	12 h	P - E	-
Hachi-Hachi EC (Tolfenpyrad)	21A	G	F	12 h	G	7-14
Kontos (Spirotetramat)	23	G, I, N	S	24 h	P	7-14
NoFly WP (<i>Paecilomyces fumosoroseus</i> strain FE 9901)	-	G	M	4 h	P - E	3-7
Overture 35 WP (Pyridalyl)	UN	G	M	12 h	F	7-14
Pylon (Chlorfenapyr)	13	G	M	12 h	E	7-14
TriStar (Acetamiprid)	4A	G, L, N, S	F	12 h	G - E	-

Registered use sites: G = greenhouse; I = indoors; L = lath house; N = nursery; S = shade house.

Knockdown: Fast (< 1 day), Medium (1–7 days), Slow (>7 days).

Efficacy: P = Poor (< 70% control); F = Fair (70% to 80% control); G = Good (80% to 90%); Gr = Great (90%–95%); E = Excellent (>95% control)

Missing: Mainspring, Rycar, XXpire

PLAN

**Identify All Pesticides Registered for the
Pest and Crop**

Determine Plant Safety

Determine Labeled Frequency

Determine Other Use Restrictions

Organize Treatments (MOA...)

Don't Forget Other Pests!

Management Biological



Why Biological Control?

- To help manage pesticide resistance in populations of thrips.
- Chilli Thrips was attacking basil, mint, and peppers in organic production systems.
- Thrips control impacted implementation of IPM programs in many ornamental crop systems.
- Chemical control in the landscape is

NOT SUSTAINABLE

Rose Banker Plants

[LINK](#)

THRIPS??

BP= Pollen Producing Plants or
Grain

AH= Stored Product Mite or
Pollen

NE= *Amblyseius swirskii*

Banker System

(without a plant)



Amblyseius swirskii





054200 480000 000000
SWIRSKI-MITE PLUS



A sachet contains bran, *Carpoglyphus lactis* (Dried Fruit Mite or Sugar Mite) and the predatory mite *A. swirskii*.



Amblyseius (Typhlodromips) swirskii
Feeding on a Chilli thrips



A. swirskii

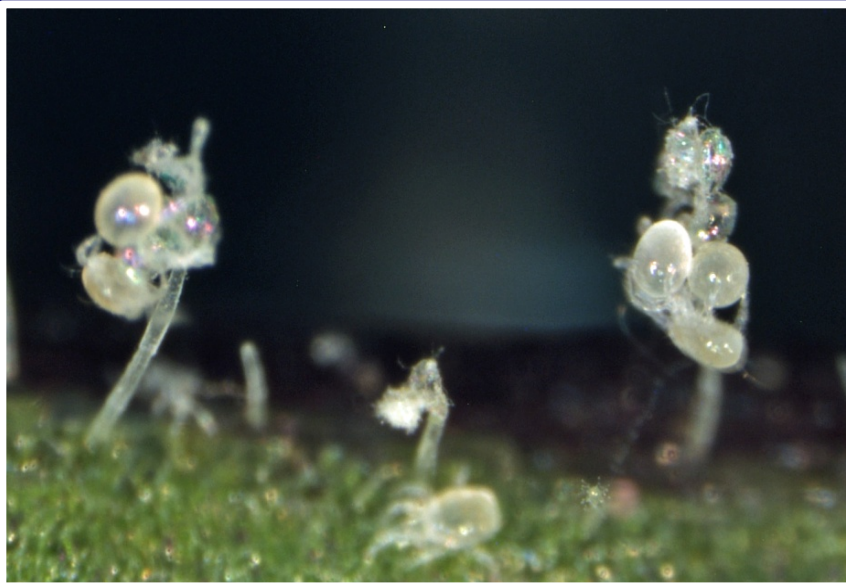


Ornamental Peppers as Banker Plants

- Extremely attractive in the landscape
- Easy to grow and have edible fruit
- Can predatory mites sustain on them?



Predatory mites (*A. swirskii*) eggs (Dogramaci)





Banker Plant Candidates



Black
Pearl



Explosive
Ember

Red
Missile

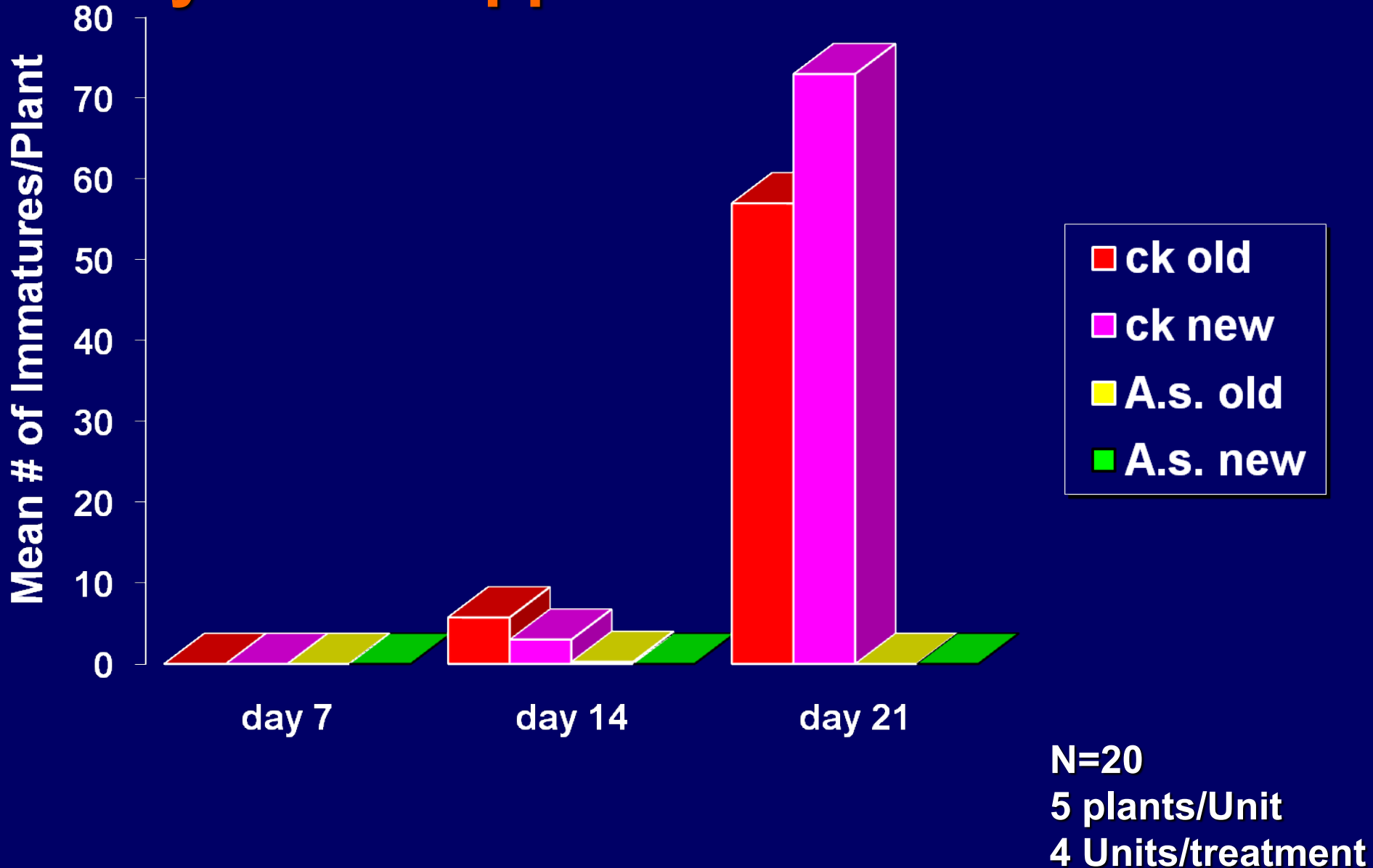


Masquerade



Control of Chilli Thrips

Chilly Chili Pepper



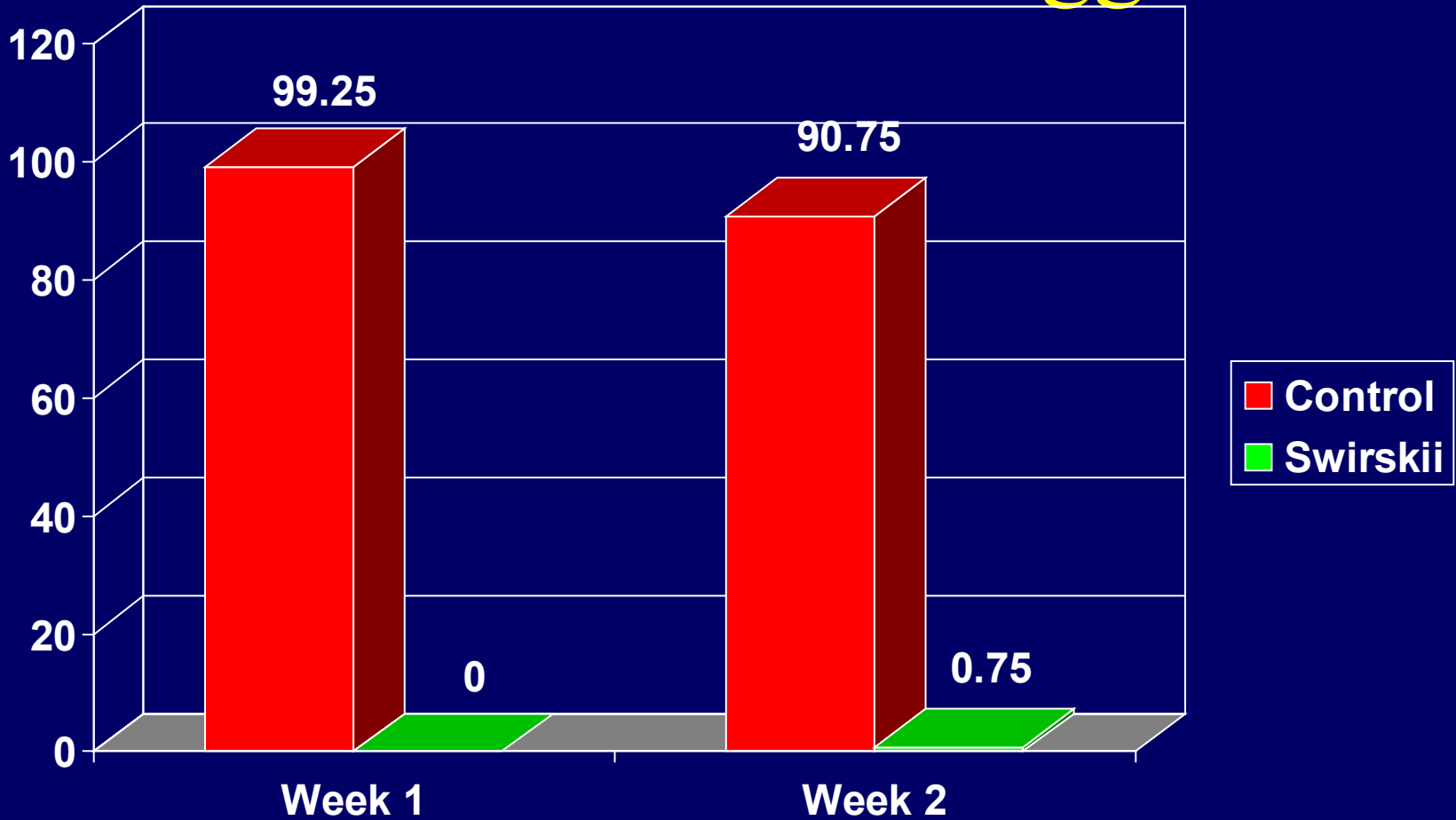


Control

N. cucumeris

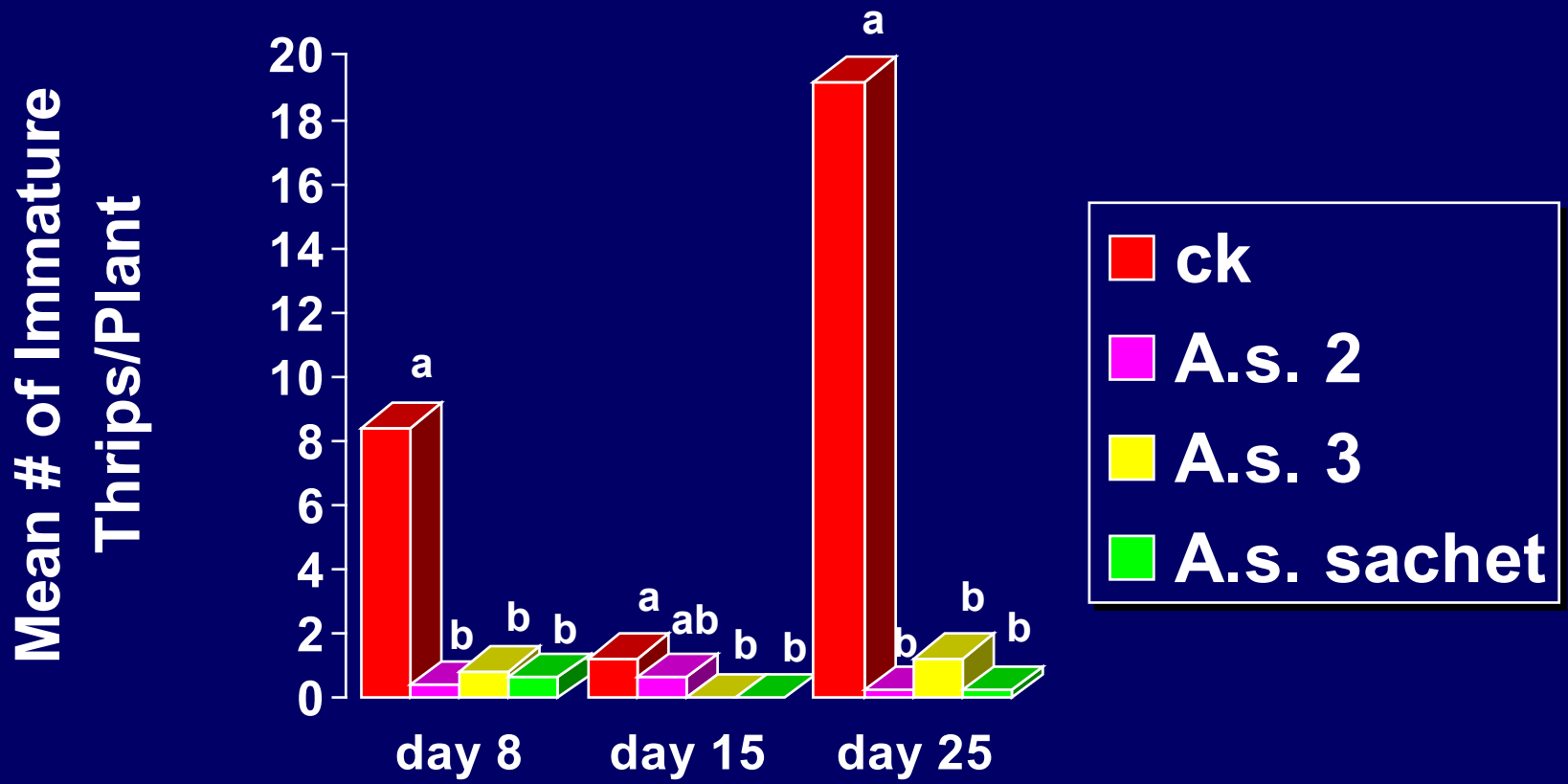
A. swirskii

Mean Number of Eggs



Study 2

Control of Chilli Thrips Chilly Chili Pepper



Summary

- ◆ *A. swirskii* was the more effective predator
- ◆ *A. swirskii* maintained thrips below 1 per terminal leaf, compared with up to 36 for *N. cucumeris* and 70 in the untreated controls.
- ◆ In the landscape, *A. swirskii* continued to reproduce and control thrips up to 63 days post release.

Orius insidiosus – Minute Pirate Bug









Minute pirate bugs (*Orius insidiosus*)

- Adults eat all stages of thrips, larval stage feeds on thrips larvae only.
- Need to feed on pollen to thrive.
Ornamental “Black Pearl” is preferred as a banker plant. Remove fruit once/month.
- Generalist feeder. Ex- aphids, mites, moth eggs.

Minute pirate bugs (*Orius insidiosus*)

- Pepper plants used at a rate of 125 per acre. ~ 1/ 350 sq ft.
- Release rates without banker plants:
 - Preventative: 10-20 per 100 sq ft
 - Curative/hot spots: 50-100 per 100 sq ft

Minute pirate bugs (*Orius insidiosus*)

Challenges:

- Diapause is a problem during short days (less than 12 hrs), or below 59° F.
- Need 2 generations (~60 days) to be fully established on banker plants.
- Sensitive to many pesticide residues.

Bio-control in Action

Pepper plants to establish and support Orius. Plants kept together at first:



Bio-control in Action

Removing the set fruit once a month:



Bio-control in Action

Pepper plants to establish and support Orius (another location):



Bio-control in Action

Plants with Orius also used outside:



Franklinothrips vespiformis
Adult



Franklinothrips vespiformis
Nymph







Management

Cultural

?????

Mites



Eriophyoidea

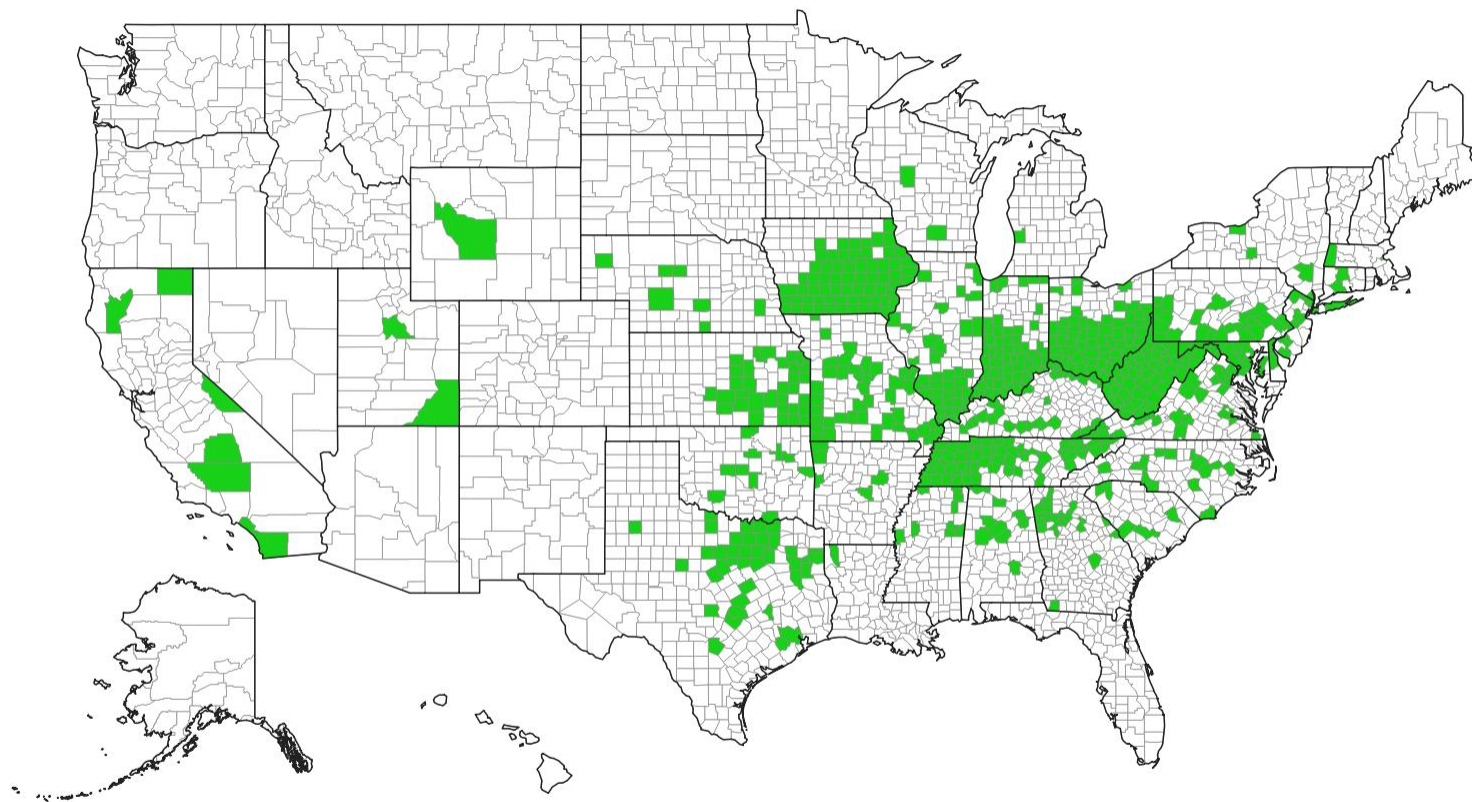
New Pest



<https://roserosette.org>

rose rosette disease (RRD) (*Emaravirus* RRD)

EDDMapS
Earth Distribution & Distribution Mapping System



Legend

□ No Data

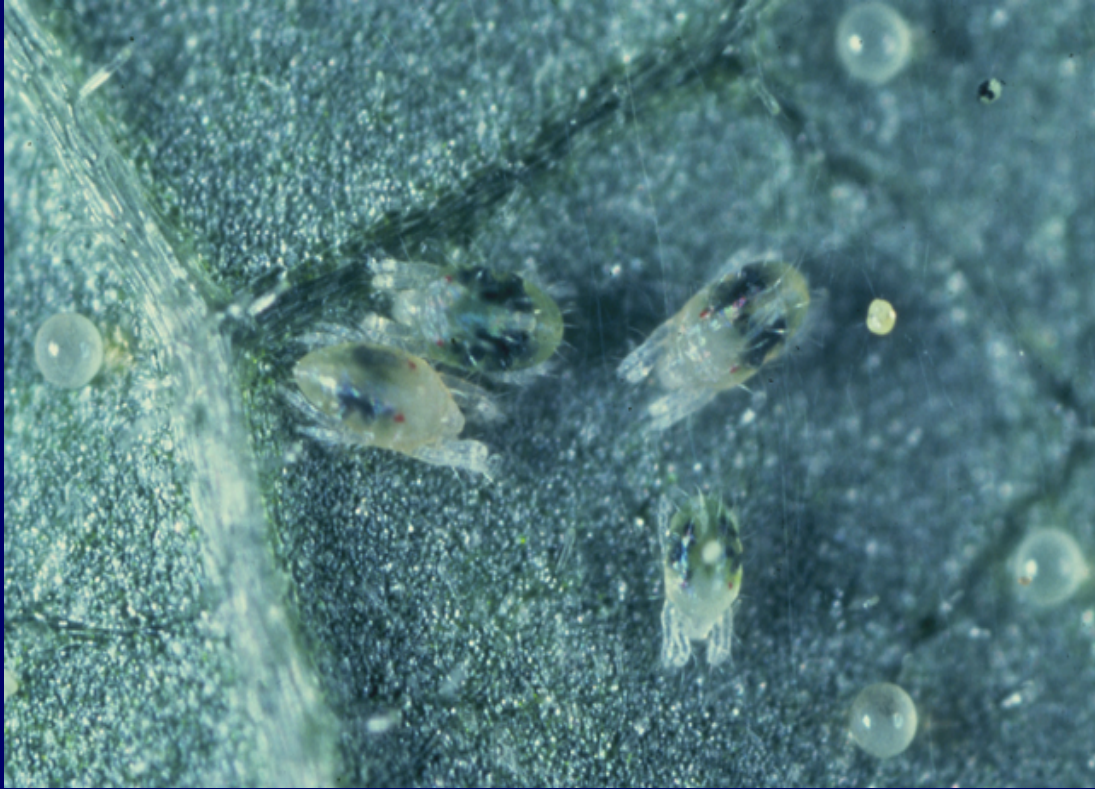
■ Species Reported

Tetranychidae



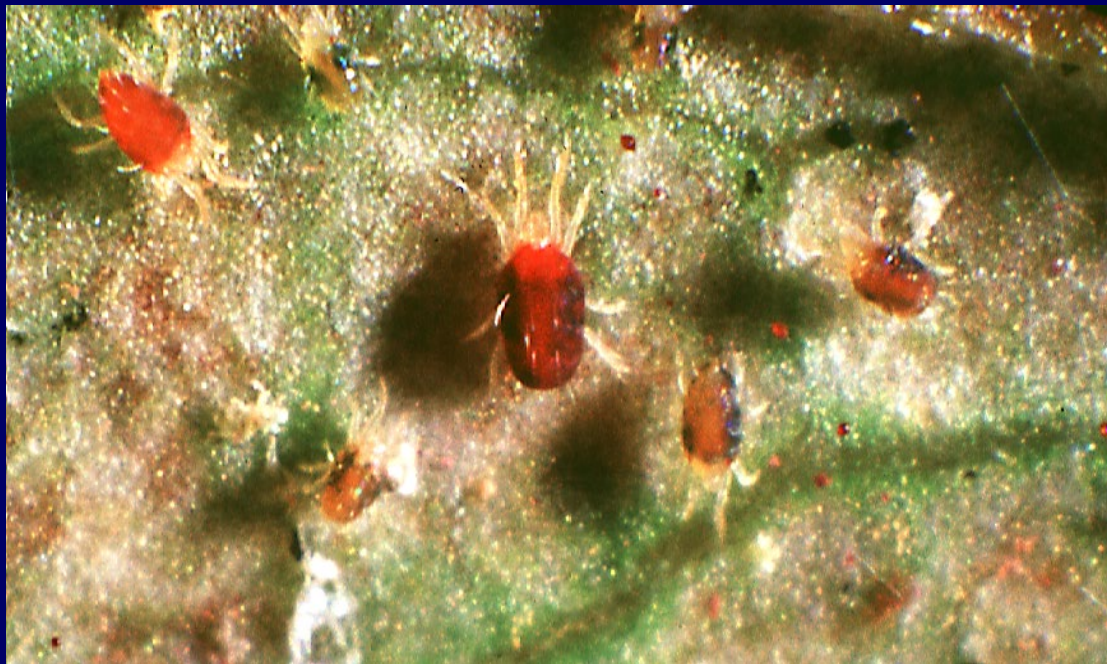








TUMID MITE



CHEMICAL CONTROL

Selected Miticides for Use on Ornamental Plants¹

Robert H. Stamps and Lance S. Osborne²

Mites are among the most difficult arthropod pests to control on ornamental plants. Adult mites have eight legs and piercing/sucking mouthparts that are used to suck fluids from the cells of host plants (Denmark, 1969). The first immature stage of a mite, referred to as the larva, has only six legs, like insects. The exceptions are the Eriophyid mites, which have four legs in all stages. Mites are not insects, but are more closely related to spiders and ticks. Thousands of species of mites feed on plants.

Spider mites, members of the Tetranychidae family, are perhaps the most important mite pests of ornamental plants. The name, spider mites, is due to the many members of this family that produce silk webbing. Spider mites are medium-sized mites that feed on a wide variety of host plants from many different plant families. Some spider mites are bamboo, Lewis, southern red, spruce, tumid and twospotted mites (Figure 1).

Members of the **false spider mites** family, Tenuipalpidae, do not produce silk webbing, but a number of these species feed on ornamental plants. False spider mites are generally smaller than spider mites. Examples of false spider mites are flat and red palm mites.

Some **Tarsonemid mites** (family Tarsonemidae) are smaller than even false spider mites. This family includes broad and cyclamen mites.

Eriophyid mites (*Eriophyidae* family) are too small to be seen with the naked eye (Figure 2) and include bud, gall, purple tea and rust mites, among others. As their names

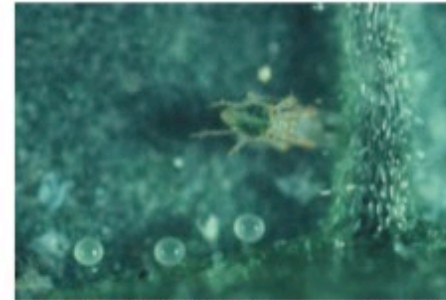


Figure 1. A male twospotted spider mite (*Tetranychus urticae*) and eggs on underside of a leaf
Credits: L. Osborne

suggest, these mites can cause galls, rusts and other abnormal plant growth.

There are other families of mites that have crop-damaging members, but the mites named above are the main mite pests of ornamental plants.

Mites of a given species can develop very rapidly when temperatures, relative humidities, host plants and other factors are optimal. In fact, for many, the time to develop from an egg to an adult can be less than a week. Generally, development occurs more rapidly at higher temperatures, up to a point. Due to mites' rapid development, scouting should be performed frequently (at least once per week), and miticide applications may need to be made on weekly

1. This document is ENH1118, one of a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date February 2009; Revised January 2013. Visit the EDIS Web site at <http://edis.ifas.ufl.edu>.

2. Robert H. Stamps, professor, Environmental Horticulture Department, and Lance S. Osborne, professor, Entomology and Nematology Department, and associate director, Mid-Florida Research and Education Center—Apopka, FL, Institute of Food and Agricultural Sciences, University of Florida.

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BIOLOGICAL CONTROL

Feltiella acarisuga

Phytoseiulus persimilis

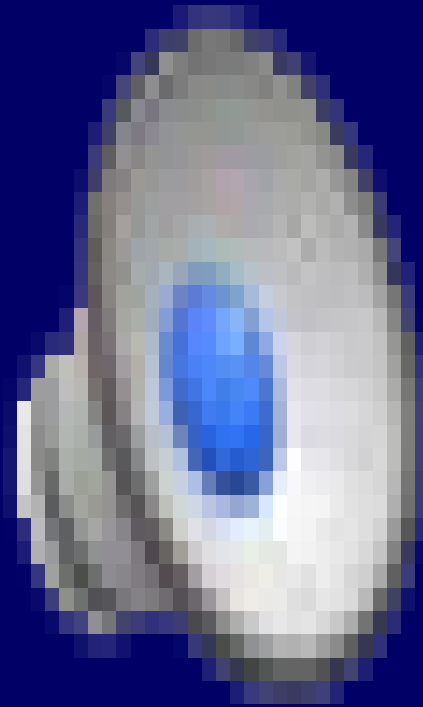
Phytoseiulus macropilus

Neoseiulus californicus

Phytoseiulus persimilis



P. persimilis





N. californicus





Feltiella acariscuda











**"Mr. Osborne, may I be excused?
My brain is full."**



Thank you!

Questions?

RESEARCH SUPPORTED BY:

