Ecology and Management of *Scirtothrips dorsalis*

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POPULATION ATTRIBUTES OF THRIPS

- Vagile (excellent invaders, mobile)
- Broad host range
- Short generation time
- Predisposition to parthenogenesis
- A competitive breeding structure promoting aggregation and exploitation of localized optimal conditions

Mound. 1997. Thrips As Crop Pests (Lewis, ed.) CAB International
Host Range for *Frankliniella occidentalis*

- 50 of 55 plant species in 22 families were food hosts for the adults in a survey in Central Chile.
- 43 of 55 plant species were reproductive hosts.
Plant Hosts for *Frankliniella occidentalis* in the Aconcogue Valley, Chile

Ripa, Rodriguez, Funderburk, & Espinoza, unpublished
Life History of Pest Thrips

- 30 to 40 days for a complete generation
- 6, 5, and 5 days for development of egg, larva, and pupa
- Pollen doubles or triples fecundity
- Strong aggregation tendencies for flowers of Thrips and Frankliniella species
- Scirtothrips aggregate on young foliage and flowers
Reproduction in Thrips

- In most Thysanoptera, reproduction requires copulation.
- Parthenogenesis is common.
- In most species, fertilized eggs have the full diploid number and become female; unfertilized eggs are haploid and become males.
Integrated Pest Management
Natural Enemies of Thrips

- **PREDATORS** Anthocorids, Chrysopids, Nabids, Aeolothrips, Phlaothrips, predatory mites (*Euseius sojanensis*)
- **PARASITES** *Thripinema* (Tylechida: Allantonematidae)
- **PARASITOIDS** Chalcidoidea (*Megaphragma* sp.) *Ceranisus* (Eulophidae)
- **PATHOGENS** Fungal pathogens recently reported as important for *Scirtothrips dorsalis* in India
Important Worldwide Predators of Thrips

ORDER HEMIPTERA

FAMILY ANTHOCORIDAE
commonly, pirate bugs

GENUS Orius

SPECIES insidiosus

COMMON NAME
Insidious flower bug

Photo Stuart Reitz
Intrinsic capacity of *Orius insidiosus* to reduce *Frankliniella occidentalis* populations

**Predator-Prey Ratios**

1 : 217 = population suppression
1 : 51 = rapid local extinction

Orius
Frankliniella occidentalis  thrips larvae  Orius

PEPPER

May & June 1996

Funderburk, Stavisky & Olson 2000 Environ. Entomol. vol. 29 (2): 376-382
RECOMENDATION FOR PEPPER PRODUCERS

CONSERVE ORIUS POPULATIONS BY THE SELECTIVE USE OF TACTICS

Commercial Pepper Field
Thomas Smith Farms, Greensboro, FL

Orius insidiosus

Frankliniella

0
5
10
15
20
25
30

0
0.2
0.4
0.6
0.8

Thrrips per flower

Orius per flower
Aconcague Valley, Chile

1999-2000

Annual cycle of abundance of western flower thrips in alfalfa in the southern hemisphere
Dynamics of *Frankliniella occidentalis* in Alfalfa in Central Chile as Influenced by Pirate Bugs

**Number of thrips per 5 terminal shoots**

- **August**: 17 adults, 0 larvae
- **October**: 0 adults, 291 larvae
- **December**: 140 adults, 13 larvae
- **February**: 68 adults, 81 larvae
- **April**: 18 adults, 16 larvae
- **June**: 64 adults, 16 larvae

Number of total thrips per *Orius insidiosus* unpublished
Species of *Thripinema*, Nematode Parasites of Thrips

- *T. nicklewoodi* (North America)
- *T. khrustalevi* (Asia, South America)
- *T. fuscum* (North America)
- *T. aptini* (Europe)
- *T. reniroai* (Asia)
- Undescribed species (New Zealand)

Photo Chris Tipping
EFFECTS OF *Thripinema* PARASITISM ON EGG PRODUCTION OF THRIPS HOST

![Graph showing the effects of *Thripinema* parasitism on egg production of thrips host.](image)

- Not parasitized, healthy host
- Infected when Larvae II
- Infected when 1-day-old adult
- Infected when 3-day-old adult
- Infected when Larvae I
- Infected when Larvae II

Fecundity of *Frankliniella fusca* (eggs per day)

Age of Adult Female Thrips (days)

Parasitism nearly prevents mid & late season cycles of TSW.

Parasitism suppresses thrips mid and late season.

Recommendations for Peanut Producers

- Cultivars partially resistant to *Tomato spotted wilt virus*
- Biological control
- Planting date
- Insecticides that conserve key natural enemies

Photo Joe Funderburk

ACTIGARD (Syngenta)

- Acibenzolar-S-methyl
- Substitutes for the natural systemic-acquired-resistance molecule salicylic acid that is essential for activation of systemic acquired resistance
- Six applications on tomatoes at two-week intervals beginning at transplanting
Recommendations for tomato producers

- UV mulch effective in reducing thrips invasion and primary spread of TSWV
- Actigard recommended when using UV mulch to reduce sprays of copper and other pesticides that reduce the UV reflectance of the mulch
- Insecticides useful in suppressing thrips larvae and secondary spread of TSWV

Regulation of vector populations with insecticides is not sustainable producing undesirable environmental and economic consequences.

Integrated pest management is effective, environmentally friendly, and sustainable.

Management programs developed from knowledge of vector population dynamics and disease epidemiology.
Chilli Thrips Natural Enemies

- Egg Parisitoid
  - *Megaphragma* sp. (Chalcidoidea)
  - 53.2% parasitism on grapes in Japan

- Predatory Mite
  - *Euseius sojaensis*
  - 1.4 larvae/hr
  - 5.4 larvae/day
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<thead>
<tr>
<th>Ornamental Plant Hosts of Concern</th>
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<tr>
<td>Banana</td>
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<tr>
<td>Camellia</td>
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<tr>
<td>Castor Bean</td>
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<td>Chrysanthemum</td>
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<td>Dahlia</td>
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<td>Euonymous</td>
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<td>Firethron</td>
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<td>Holly</td>
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For the latest information on chilli thrips and ornamental plants, visit [http://mrec.ifas.ufl.edu/lso/thripslinks.htm](http://mrec.ifas.ufl.edu/lso/thripslinks.htm)
Ornamentals

- abamectin (Avid)
- acephate (such as Orthene or Orthonex)
- acetamiprid (TriStar)
- azadirachtin (such as Azatin, Neem oil) (not labeled for thrips)
- cyfluthrin (Decathlon, Discus, Bayer Advanced products such as Tree and Shrub Insect Control or Rose and Flower Insect Killer)
- disulfoton (such as Di-Syston Systemic Insecticide Granules)
- imidacloprid (Marathon, Merit, Discus and the Bayer products listed above)
- novaluron (Pedestal)
- spinosad (such as Conserve)

Materials in yellow would be suitable for use by homeowners if used according to the labeled instructions.
**Overall Conclusions**

- Management of *S. dorsalis* in the landscape requires an integrated approach that includes a detailed understanding of pest biology, natural enemy complexes, and host resistance.

- Chemical control options are also available and may be necessary in some cases.

- Chemical control options or destruction of plant material is the only option for retail nurseries as long as *S. dorsalis* remains a regulated pest.
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