

Ciclo Biológico del Trips y Su Control Integrado

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Photo Cheryle O'Donnell

Order Thysanoptera
Suborder Terebrantia
Family Thripidae



Species *Frankliniella occidentalis* & *F. schultzei*

Common name western flower thrips & common blossom thrips

Species *Thrips palmi* & *T. tabaci*

Common name melon thrips & onion thrips

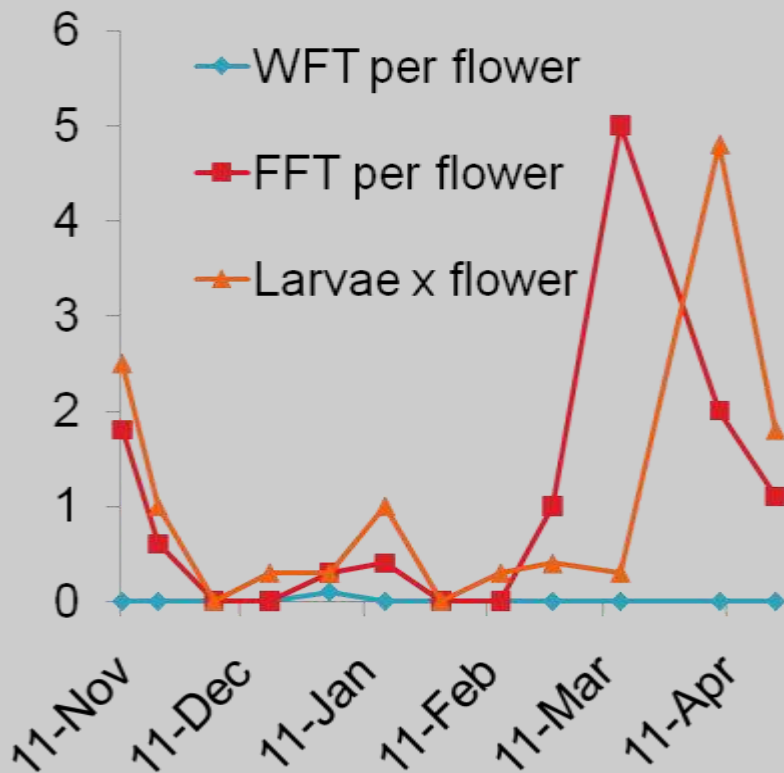
PEST STATUS OF INVASIVE THRIPS

Certain biological characteristics aid successful invasion where it causes extensive crop damage, vectors viral diseases, and permanently destabilizes IPM systems owing to irruptive outbreaks that require remediation with insecticides, leading to the development of insecticide resistance...

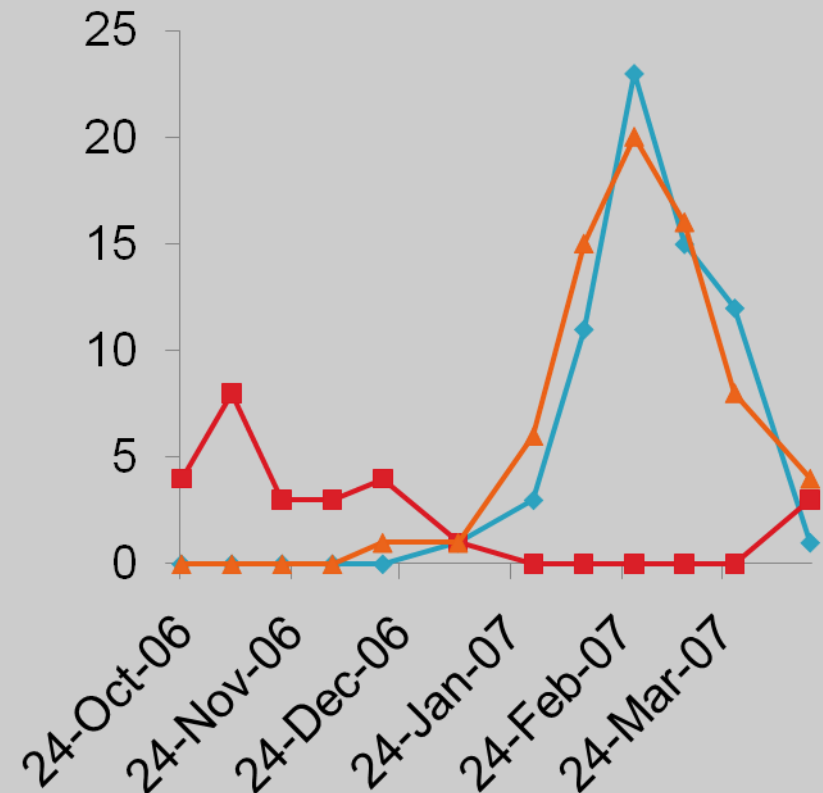
Morse and Hoddle. 2006. Annual Review of Entomology

POPULATION DYNAMICS OF THRIPS IN COMMERCIAL PEPPER IN SOUTH FLORIDA

PALM BEACH COUNTY 1995/96



PALM BEACH COUNTY 2006/07



Frantz & Mellinger. 2009. Florida Entomologist 92:29-34.

IPM for the practitioner encompasses the simultaneous management of multiple pests, regular monitoring of pests and their natural enemies or antagonists, use of economic thresholds when applying pesticides, and integrated use of multiple suppressive tactics...

Ehler. 2006. Pest Management Science 62: 787-789.

Vertical IPM: integration of multiple, compatible tactics to control one group of pests such as arthropods or pathogens or weeds

Horizontal IPM: integration of multiple, compatible tactics to control more than one group of pests



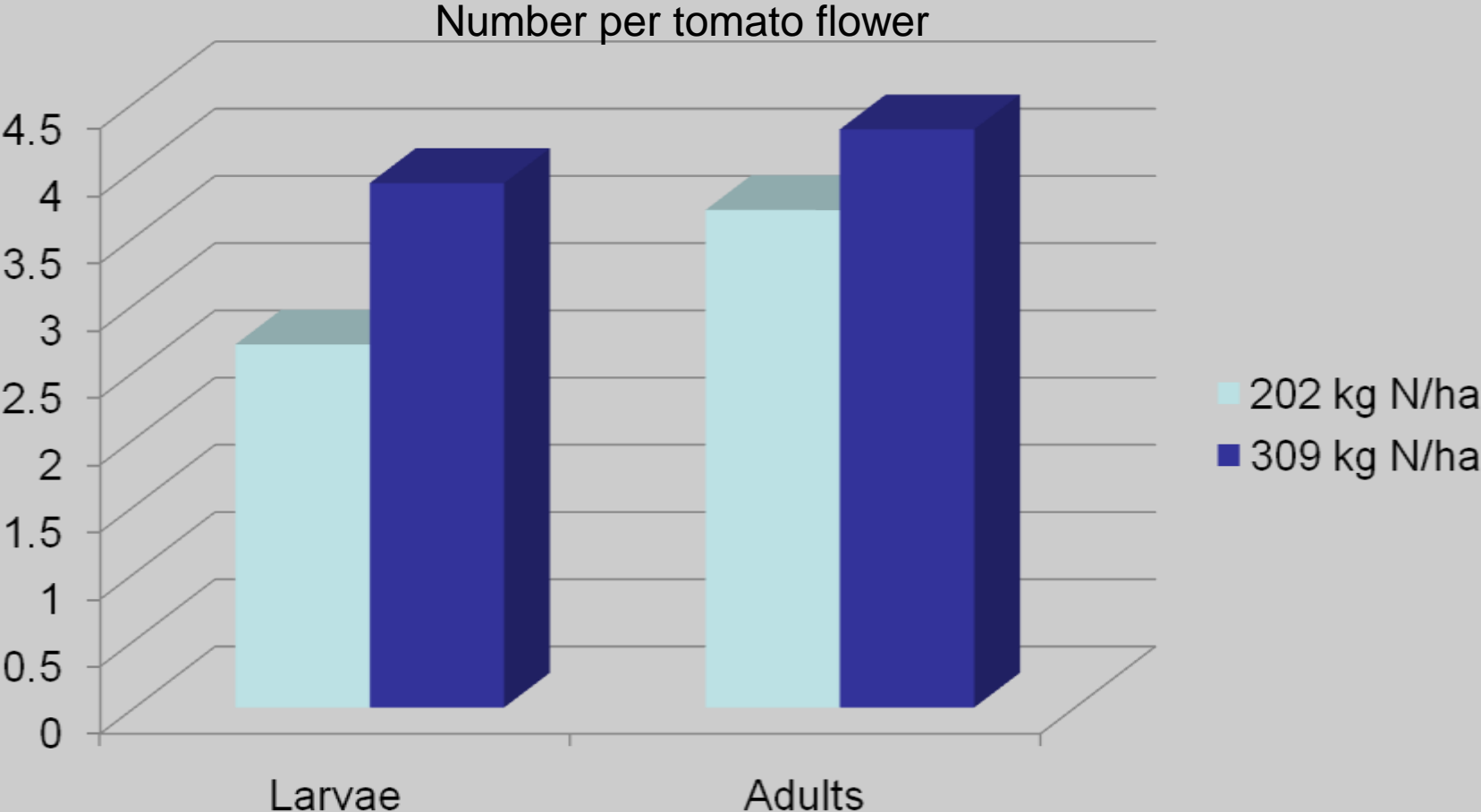
Halo spotting on
tomato due to
oviposition of
*Frankliniella
occidentalis*

Flecking on pepper
due to feeding by
*Frankliniella
occidentalis*



26.05.2006 11.21

CROP FERTILITY AND POPULATIONS OF THRIPS



Stavisky, Funderburk, Brodbeck, Olson, & Andersen. 2002. J. Economic Entomology

Capacity of minute pirate bugs, *Orius insidiosus*, to reduce thrips populations



Photo Joe Funderburk

Predator-Prey Ratio Management Guides

1 predator per about 180 thrips =
population suppression

1 predator per 50 thrips = control



Using sunflowers
as refugia
plantings
in pepper for
thrips control

UV-reflective metalized mulch



INSECTICIDES THAT CONSERVE MINUTE PIRATE BUGS

<http://edis.ifas.ufl.edu/IN401>

SPINOSYNS	thrips and other
PYRIDADYL	thrips and other pests
REQUIEM™	thrips, aphids, whiteflies
FLONICAMID	thrips, aphids, plant bugs
SPIROTETRAMAT	thrips, aphids, whiteflies
CYAZYPYR™	thrips, aphids, whiteflies, and other pests
M-PEDE	thrips, aphids, whiteflies, spidermites
METHOXYFENOXIDE	lepidoptera
INDOXACARB	lepidoptera
Bt's	lepidoptera, coleoptera
ECOTROL™	thrips and other pests
AZADIRACHTIN	various taxa
CYROMAZINE	Dipteran leafminers
FENBUTATIN	mites
PYMETRAZINE	whiteflies, aphids

INTERSPECIFIC COMPETITION

Interspecific competition and population dynamics of thrips on crop and uncultivated hosts. *Frankliniella occidentalis*, *Thrips palmi*, and *Thrips tabaci* are out-competed by native species of thrips.

Paini, Funderburk, & Reitz. 2008. *Journal of Animal Ecology* 77: 184-190.

Paini, Funderburk, Jackson, & Reitz. 2007. *Journal of Entomological Science* 42: 610-615.

Northfield, Paini, Funderburk, & Reitz. 2008. *Annals of the Entomological Society of America* 101: 769-778.

INSECTICIDES KNOWN TO
INDUCE *Frankliniella occidentalis* &
Thrips palmi

Synthetic Pyrethroids are strong
inducers

Neonicotinoids sometimes have a slight
inducing effect

Broad-spectrum carbamates and
organophosphates should be avoided
generally

RECOMMENDATIONS FOR PEPPER

1. Distinguish between adult and larval thrips and identify adult thrips
2. Economic thresholds: about 6 *Frankliniella occidentalis* or *Thrips palmi* per flower and about 2 thrips larvae per fruit
3. Native species of thrips are not damaging and they outcompete *Frankliniella occidentalis*
4. When peppers are flowering, use insecticides for thrips and other pests that conserve minute pirate bugs
5. Never use pesticides that induce *Frankliniella occidentalis*
6. Ultraviolet-reflective mulch (do not use foliar pesticides that reduce the UV-reflectivity of the plastic)
7. Sunflower and other refugia provide a source for minute pirate bugs
8. Vertically integrate management of thrips and other pests including pepper weevil and lepidoptera
9. Follow BMP's for fertility and irrigation practices

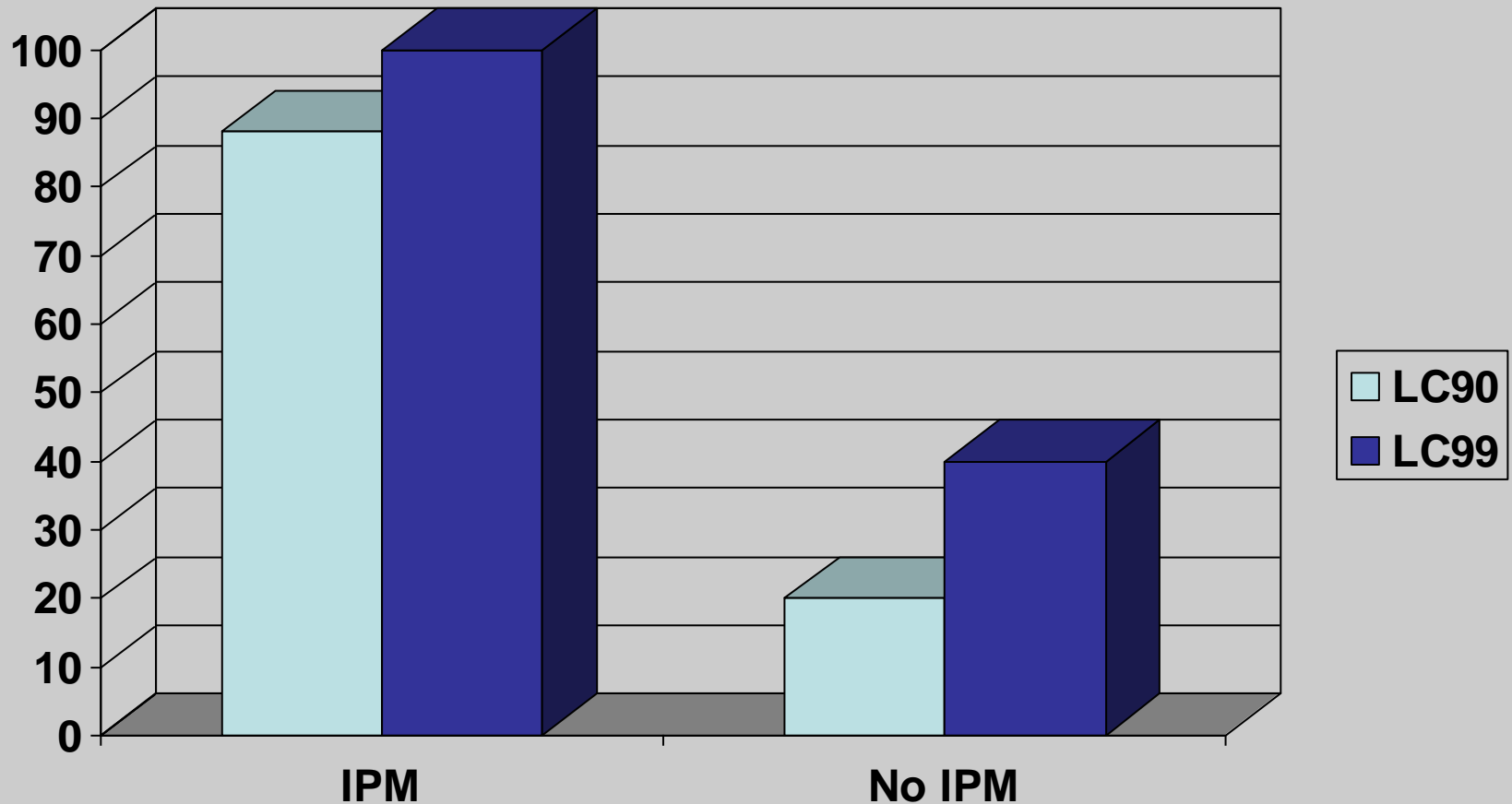
Recommendations for western flower thrips in field tomato

- Distinguish between adult and larval thrips and identify adult thrips
- Economic thresholds: about 1 western flower thrips per flower and about 2 larvae per fruit
- Alternate between efficacious insecticides
- Avoid using insecticides that induce western flower thrips populations
- Ultraviolet-reflective mulch
- Vertically integrate management program for thrips with management of other pests including whiteflies

GOALS OF IPM

EFFECTIVE
ECONOMICAL
SUSTAINABLE

Spinetoram Bioassays of Western Flower Thrips from Palm Beach County, March 2008





**Infected
Weed Host**

Primary Spread



**Acquisition
by larvae (10-15 min)**



Incubation

7-14 days



**Vinuliferous adults
(mobile)**

Transmission

5 min

Transmission

Secondary Spread



Acquisition
by larvae



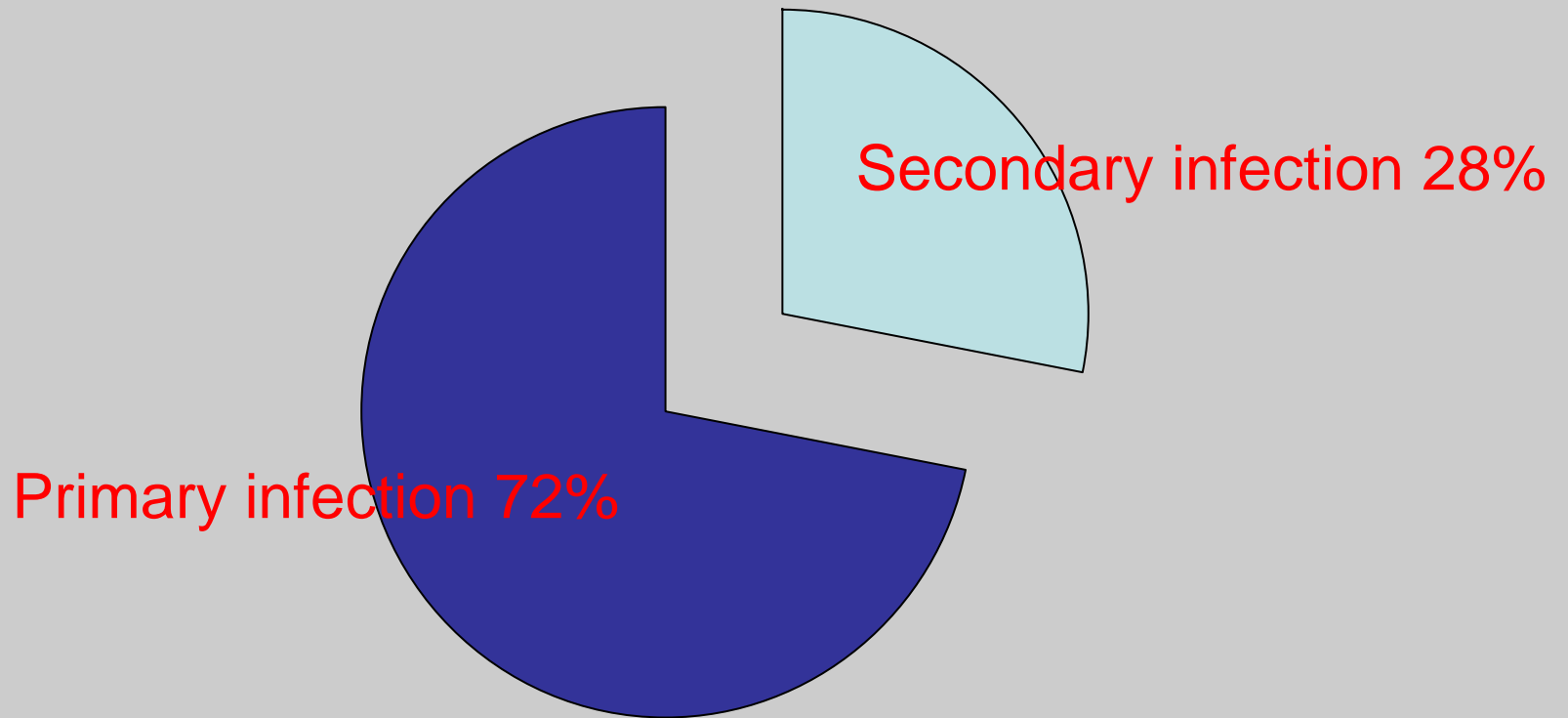
Viruliferous adults

Incubation



Multiple
Transmission

SPREAD OF TOSPOVIRUSES IN FRUITING VEGETABLES



Momol , Olson, Funderburk, & Marois. 2004. Plant Disease 88:882-890

TACTICS FOR CONTROL OF TOSPOVIRUSES

Primary spread: resistant cultivars,
ultraviolet-reflective technologies,
refugia plants, proper fertility,
acibenzolar-S-methyl

Secondary spread: resistant cultivars,
ultraviolet-reflective technologies,
proper fertility, insecticides for larval
control, acibenzolar-S-methyl,
predation of larvae