# Tomato Spotted Wilt Virus and Thrips Management

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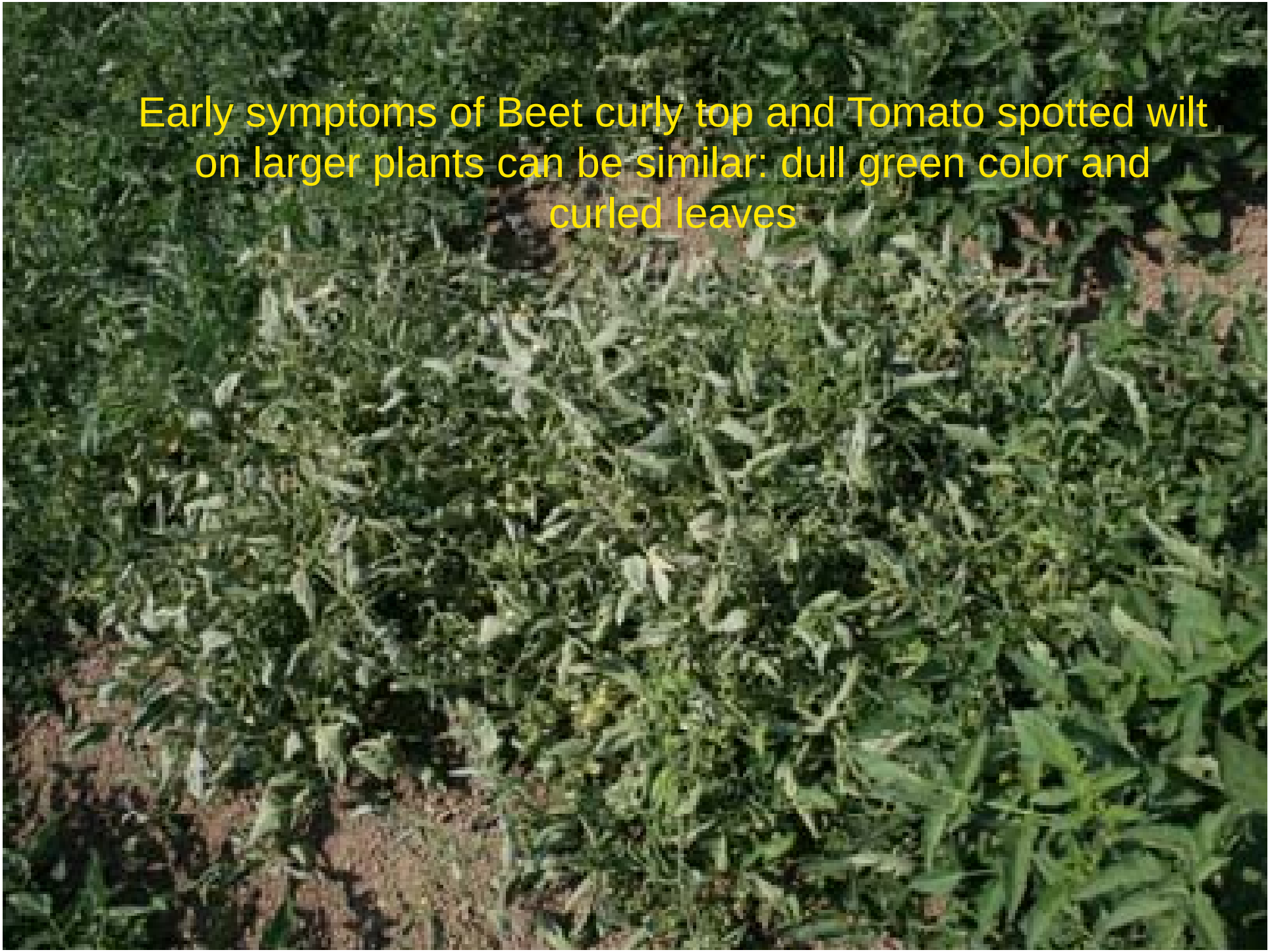
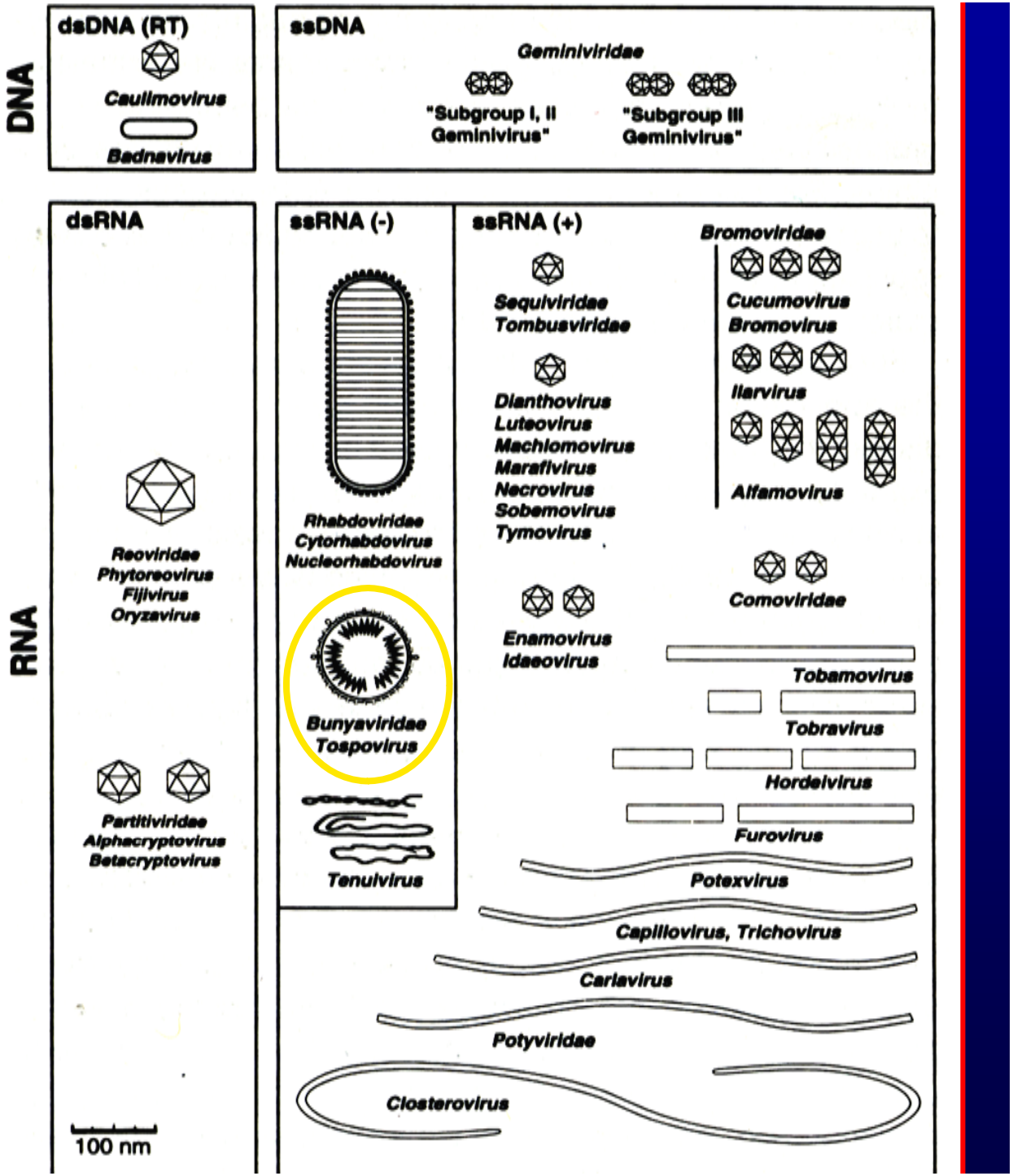
**Fresno County**


Early symptoms of Beet curly top and Tomato spotted wilt on larger plants can be similar: dull green color and curled leaves


Cut here
ACC 00936
SEB1, Sample extract pouch
Contains SEB1. Store at +4° C.
Contents: 3 ml
Lot No: 00039
agdia
FOR TESTING USE ONLY
TSWV 00018
TSWV 0001

# Plant viruses

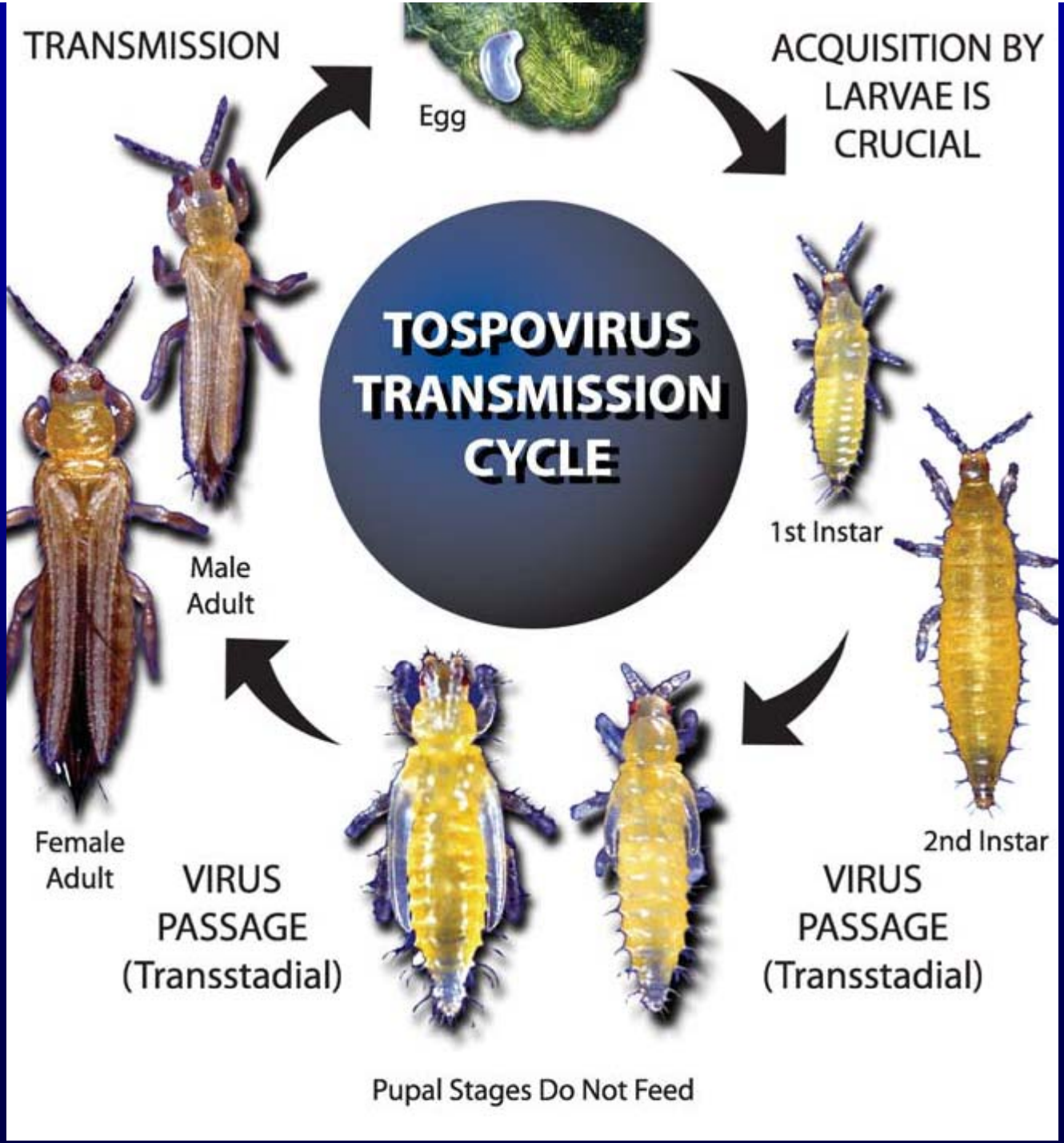


# Thrips reported to transmit TSWV

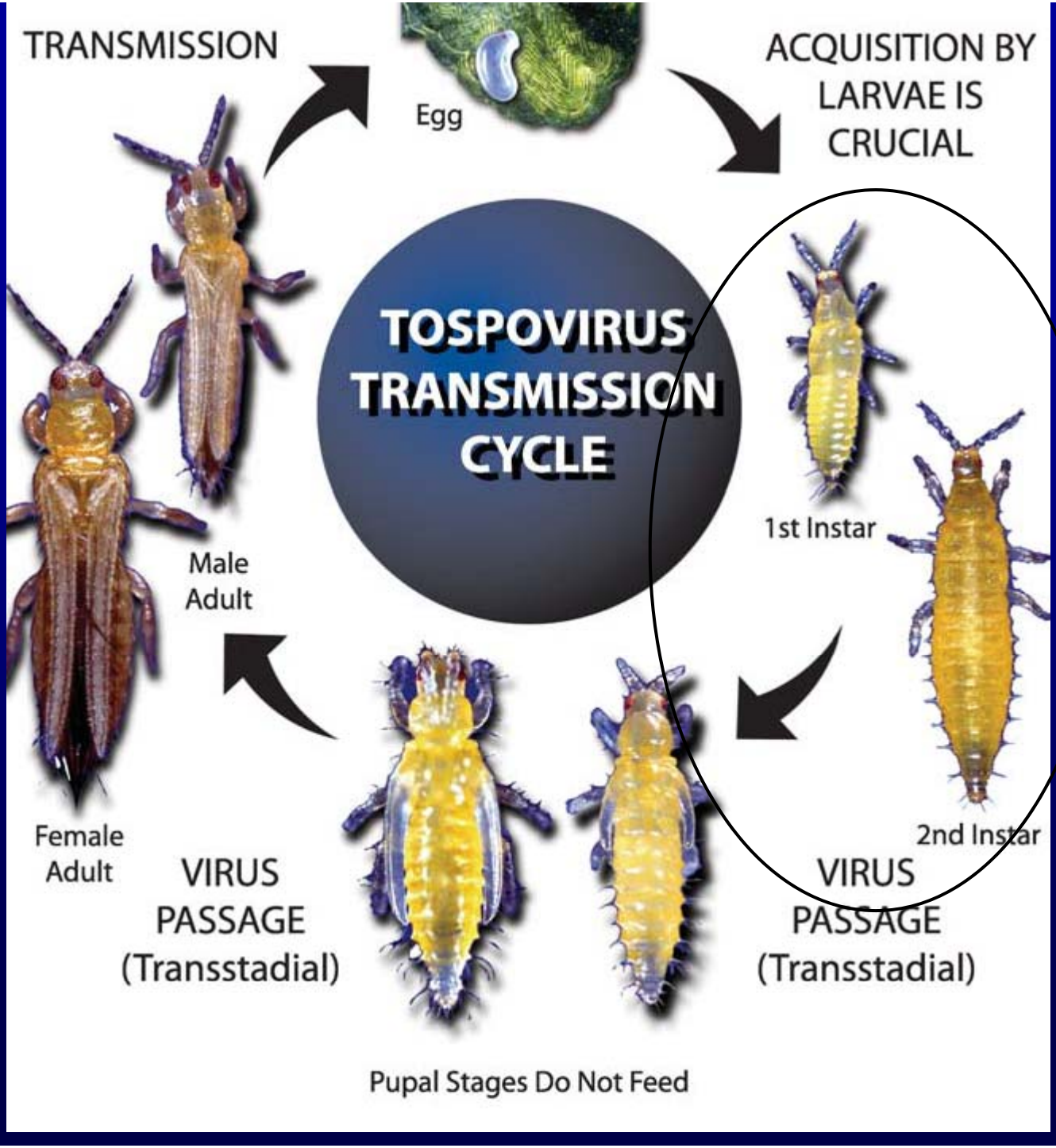
- *Frankliniella occidentalis*
- *F. schultzei*
- *F. intonsa*
- *F. fusca*
- *F. bispinosa*
- *Thrips tabaci*
- *T. setosus*
- *F. gemina*
- *T. palmi*

# Western flower thrips

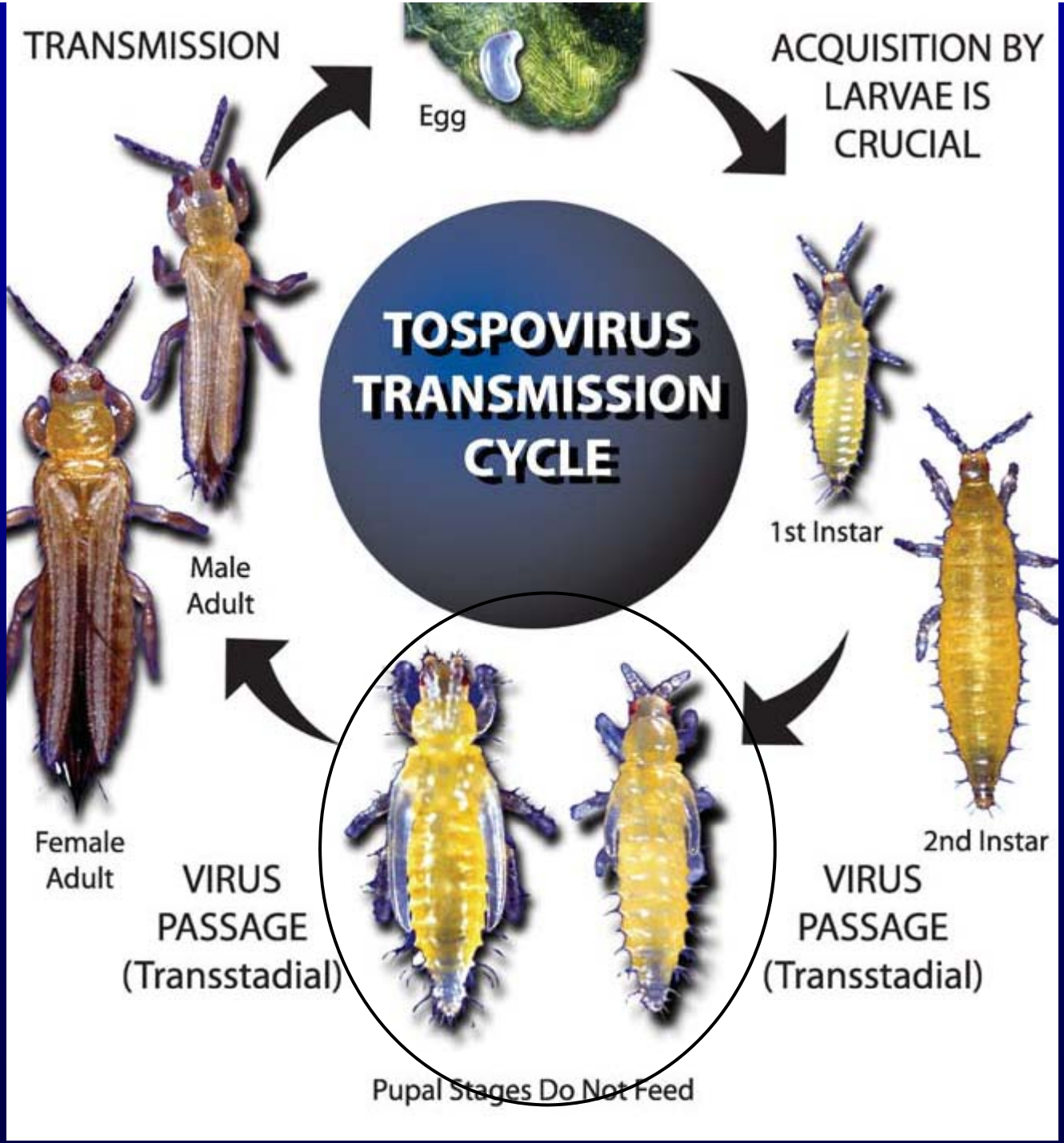
*Frankinella occidentalis*



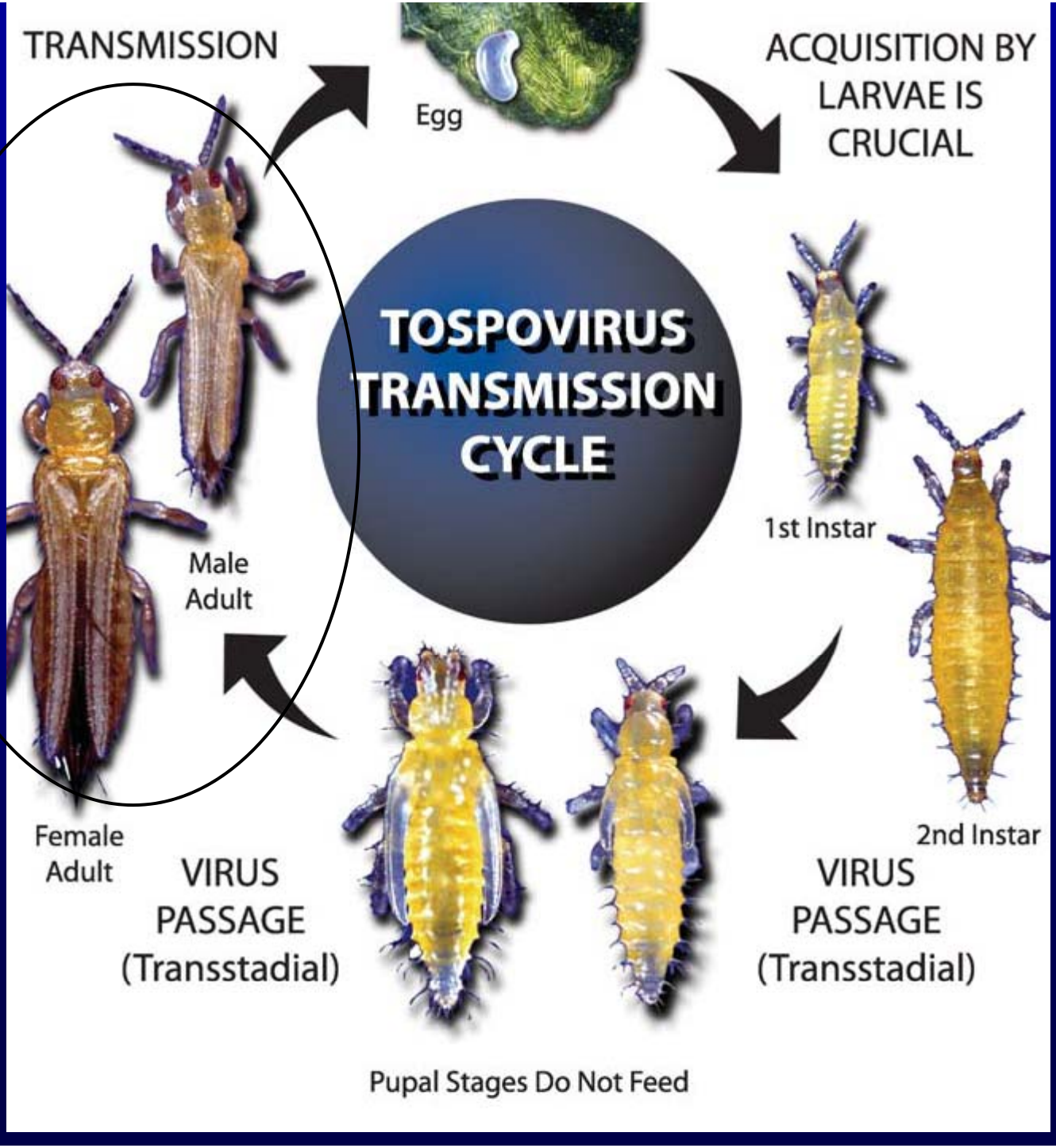

A. E.Whitfield, D. E. Ullman, and T L. German. 2005. **TOSPOVIRUS-THRIPS INTERACTIONS.** Annu. Rev. Phytopathol. 2005. 43:459–89



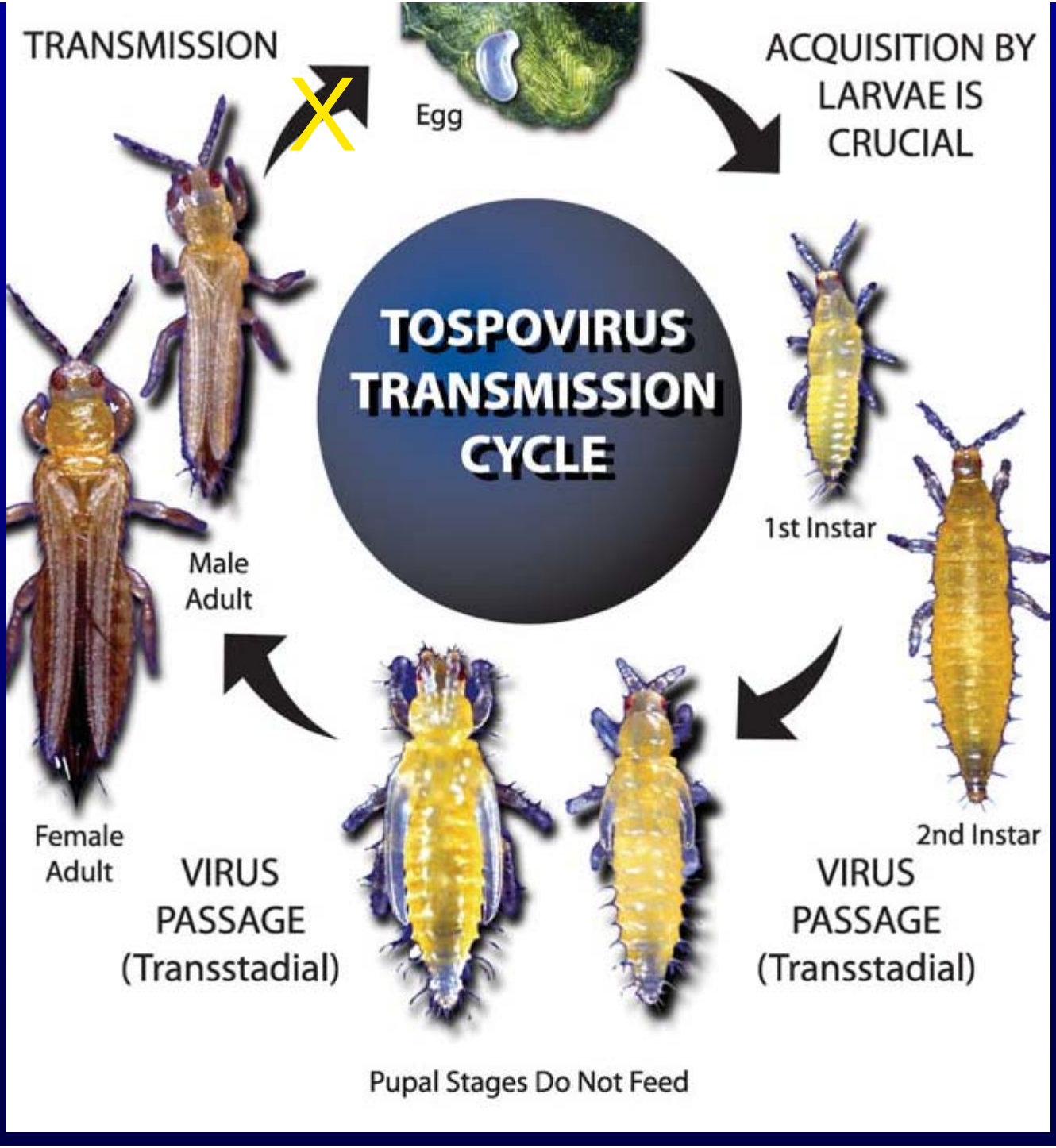

TSWV must be acquired by the larvae to be transmissible.



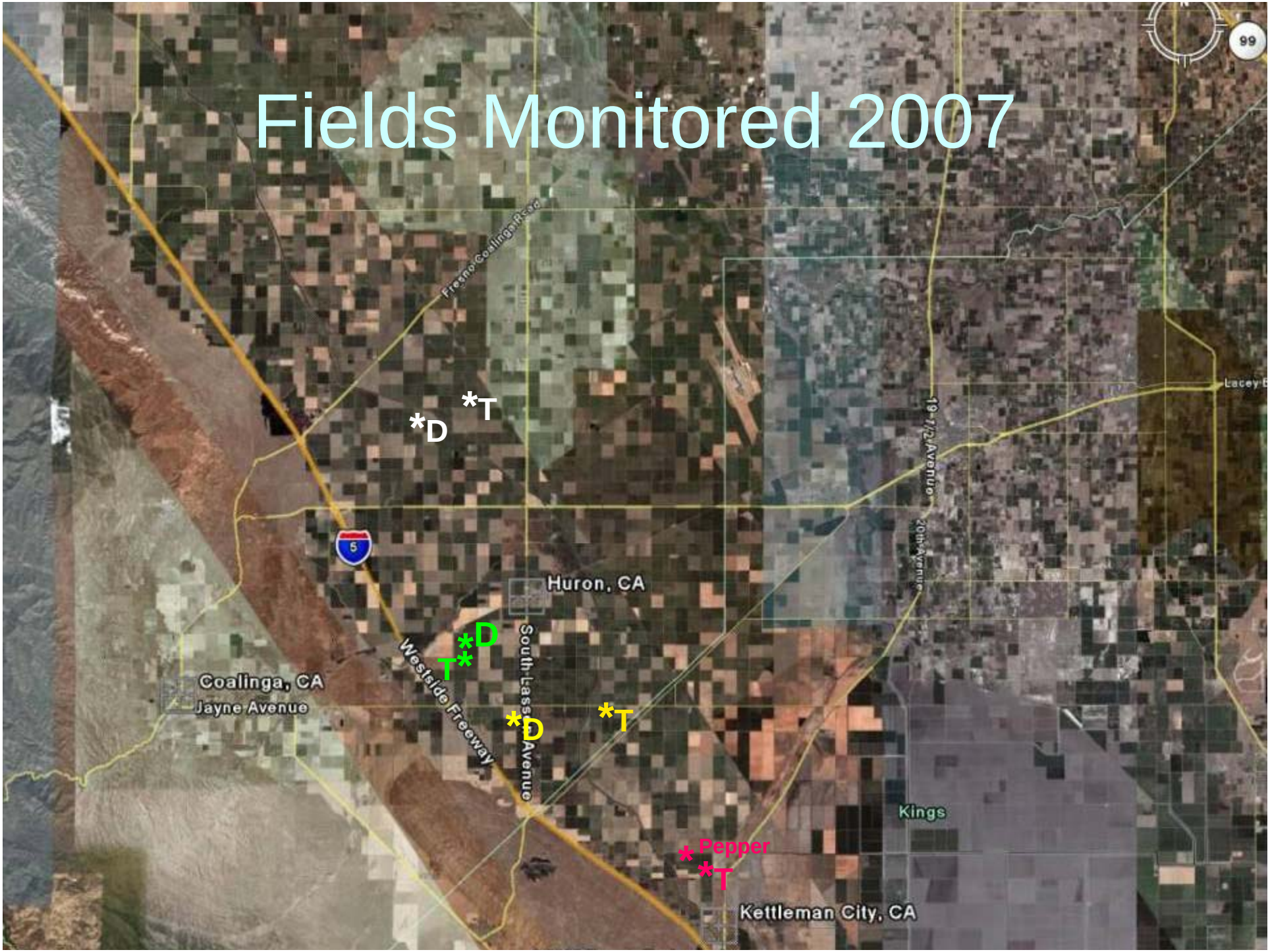

Western flower thrips develop through two quiescent, non-feeding pupal stages in the soil

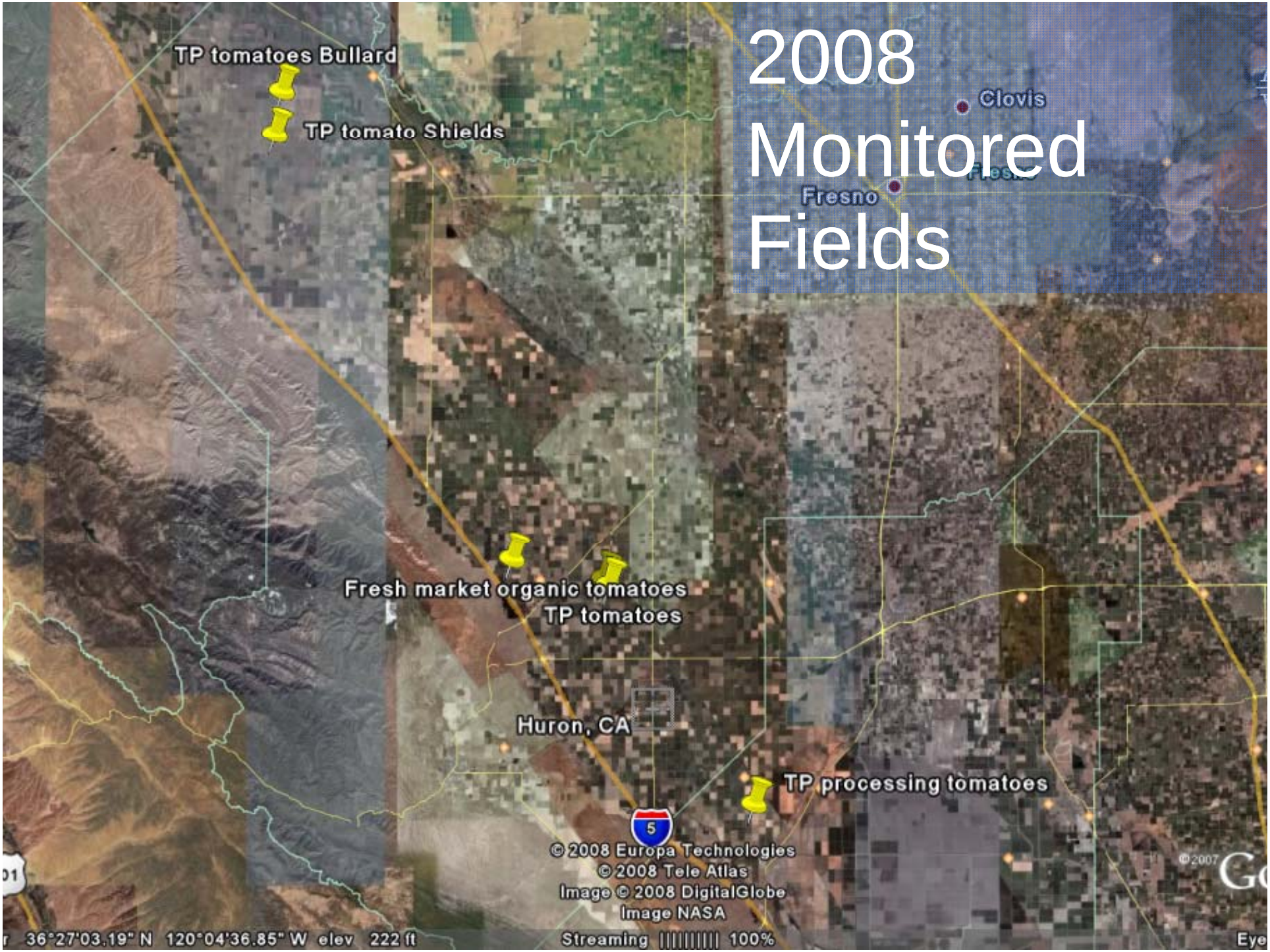



Adults can live 30 to 45 days and transmit the viruses to plants throughout their life.




The virus does NOT pass from female to eggs.


Fields Monitored 2007
Fresno Coalinga Road
*D
*T
Huron, CA
*D
T*
South Lassen Avenue
Westside Freeway
Coalinga, CA
Jayne Avenue
*D
*T
Kings
*Pepper
*T
Kettleman City, CA

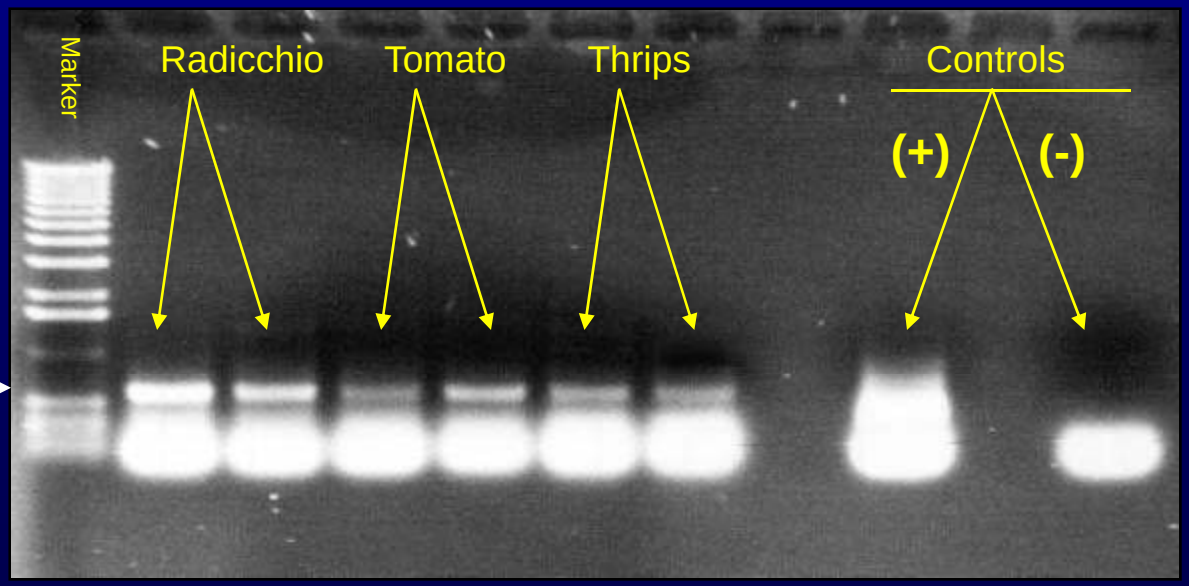

2008
Monitored
Fields
TP tomatoes Bullard
TP tomato Shields
Clovis
Fresno
Fresh market organic tomatoes
TP tomatoes
Huron, CA
TP processing tomatoes
5
© 2008 Europa Technologies
© 2008 Tele Atlas
Image © 2008 DigitalGlobe
Image NASA
Streaming 100%
36°27'03.19" N 120°04'36.85" W elev 222 ft

# Cards were placed in fields weekly

# 10 flowers from 5 sites in each monitored field were collected

# The presence of TSWV can now be detected in thrips by RT-PCR: R. Gilbertson

- Could help determine when virus-carrying thrips are present
- Technically challenging
- Need to be able to tests thrips recovered from sticky cards




Robert Gilbertson: UC Davis

# Results-Thrips populations

- Thrips populations begin to increase in March/April; peaked from May-July; and slowly declined until late fall (October) to winter when populations are lowest
- In 2007, populations were moderate, whereas in 2008 populations were twice to four-fold as high
- Detection of larvae in tomato flowers indicates thrips reproduction on tomato
- All were identified as western flower thrips

# Insecticide for Control of Thrips

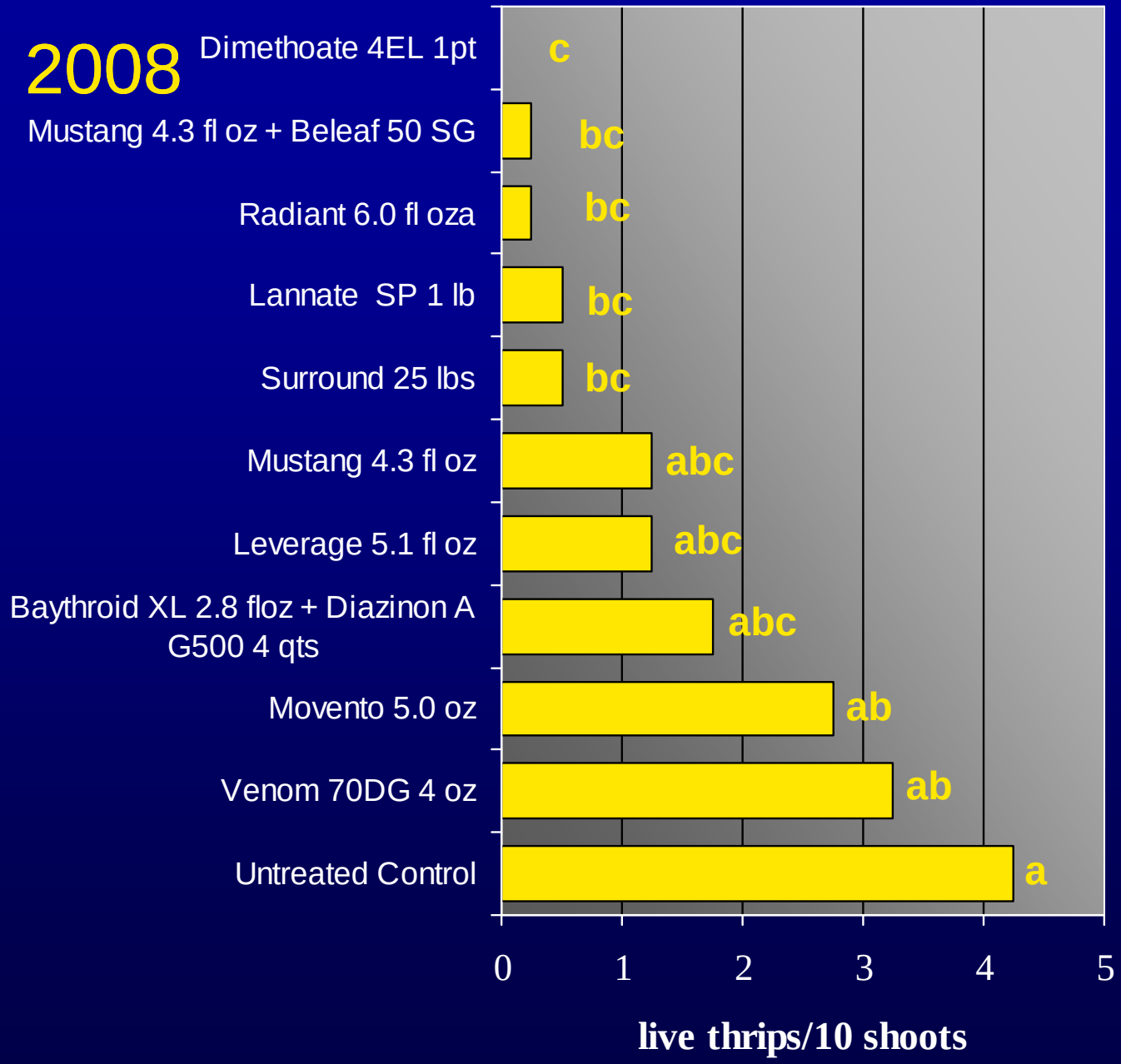
- Thrips adults and immature stages generally prefer areas of the plant where they are sheltered (flower or bud tissues)
- Thrips populations can increase very rapidly, 200-300 eggs/female
- Insecticide resistance is a concern
- If specifically-timed insecticide application in host crops may reduce virus spread
- Carefully read label before making any pesticide recommendation.

# Thrips Counts (4 days after treatment)

2007


All materials were applied on 1 Jun with Induce 0.25% v/v

# 2008 Thrips Counts (4 days after treatment)




All materials were applied on with Induce 0.25% v/v

# Influence of Thrips Control Programs on TSWV, 2008

- H 9665 processing tomato direct seeded and sprinkler irrigated on 9 Apr.
- Three replications , 3 Main plot treatments, 4 sub plot treatments;
- 3 beds per main plot treatments
- 75 ft sub plots

# Main plot treatments (pre-plant shank-applied insecticide)

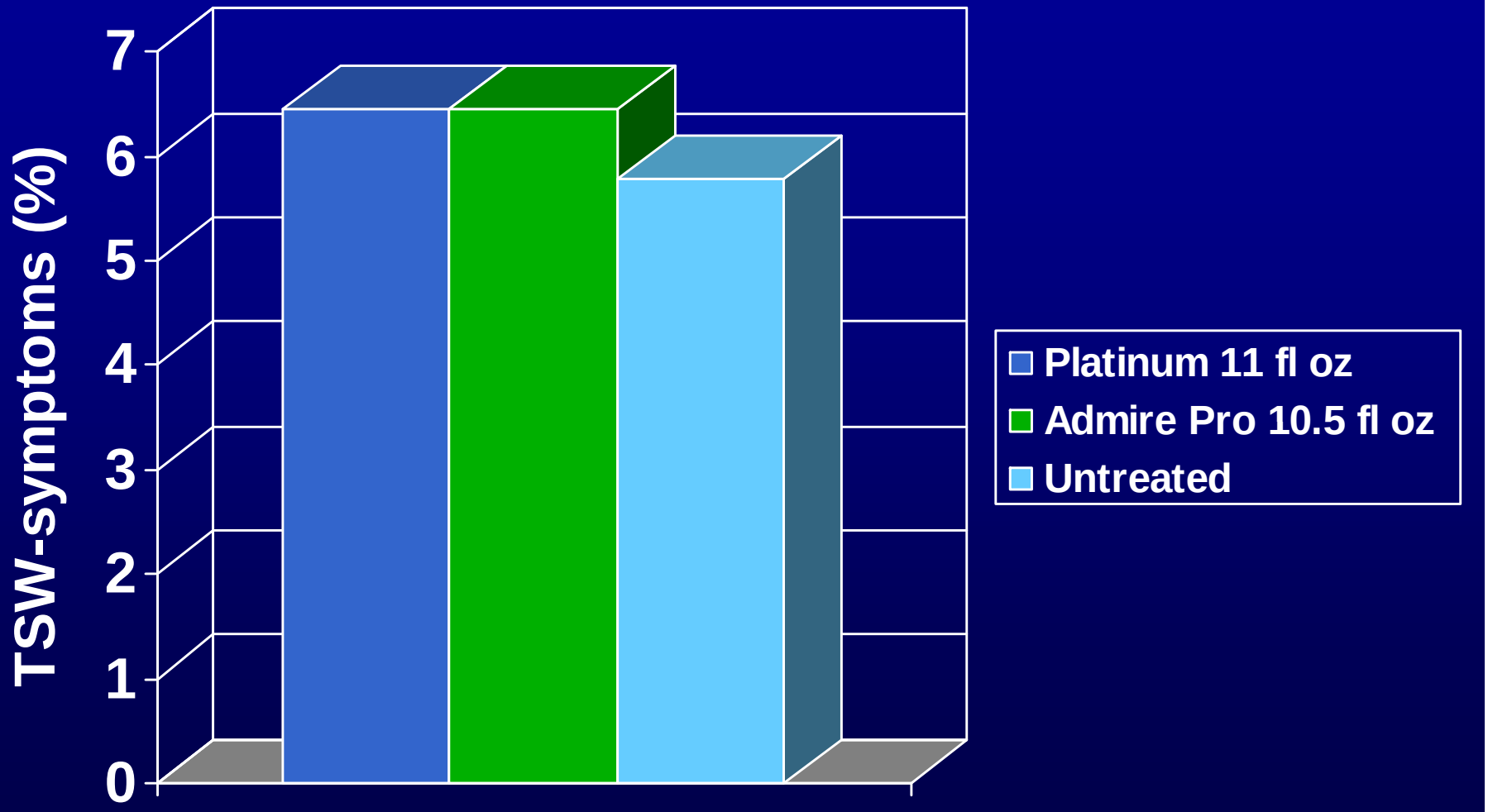
1. Platinum 11 fl oz
2. Admire Pro 10.5 fl oz
3. Untreated

# Sub-Plot Treatments
## (foliar insecticide applications)

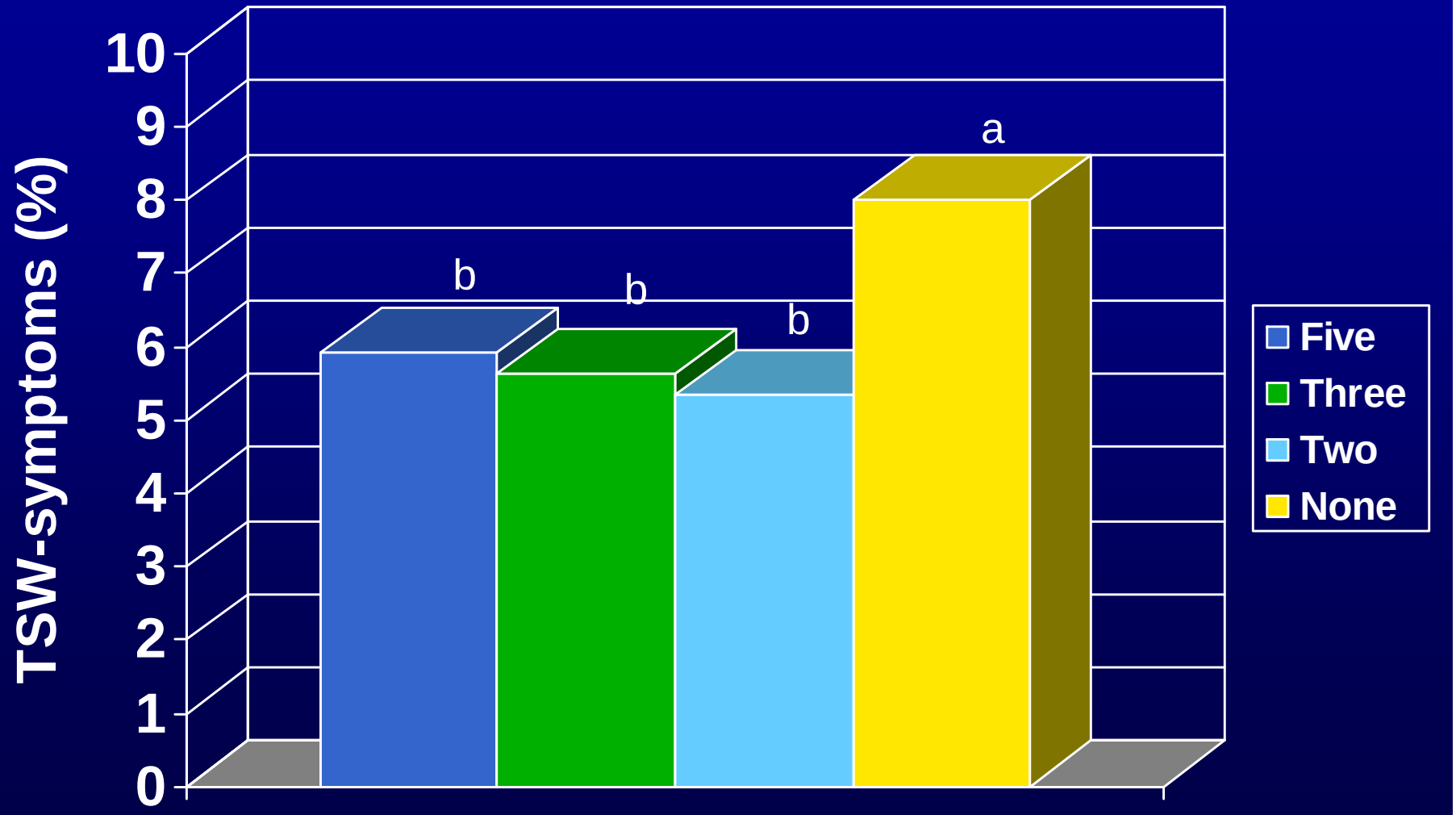
| No. aps | 19 May | 28 May | 5 Jun | 13 Jun | 24 Jun |
|---|---|---|---|---|---|
| 5 | Radiant 6.0 fl oz | Dimethoate 4EL 1pt + Mustang 4.3 fl oz | Lannate WP 1lb | Radiant 6.0 fl oz | Dimethoate |
| 3 | Radiant | Dimethoate + Mustang | Lannate WP | X | X |
| 2 | X | Dimethoate + Mustang | Lannate WP | X | X |
| 0 | Untreated Control | | | | |

* Induce 0.25%

# TSW-Symptom Incidence
# Soil-Applied Insecticide



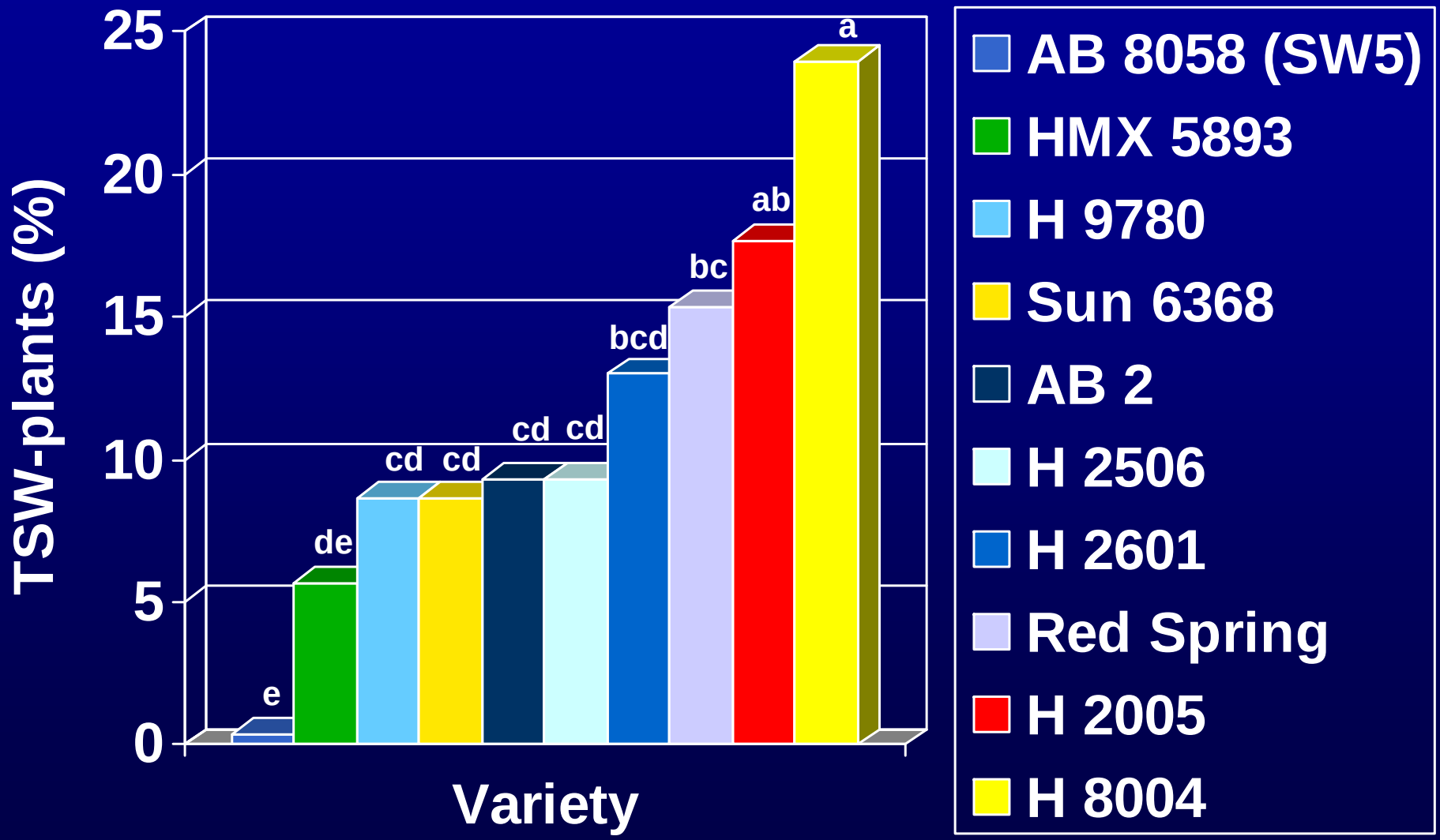
# TSW-Symptom Incidence
# Foliar-Applied Insecticide Programs



# Variety Response to TSWV

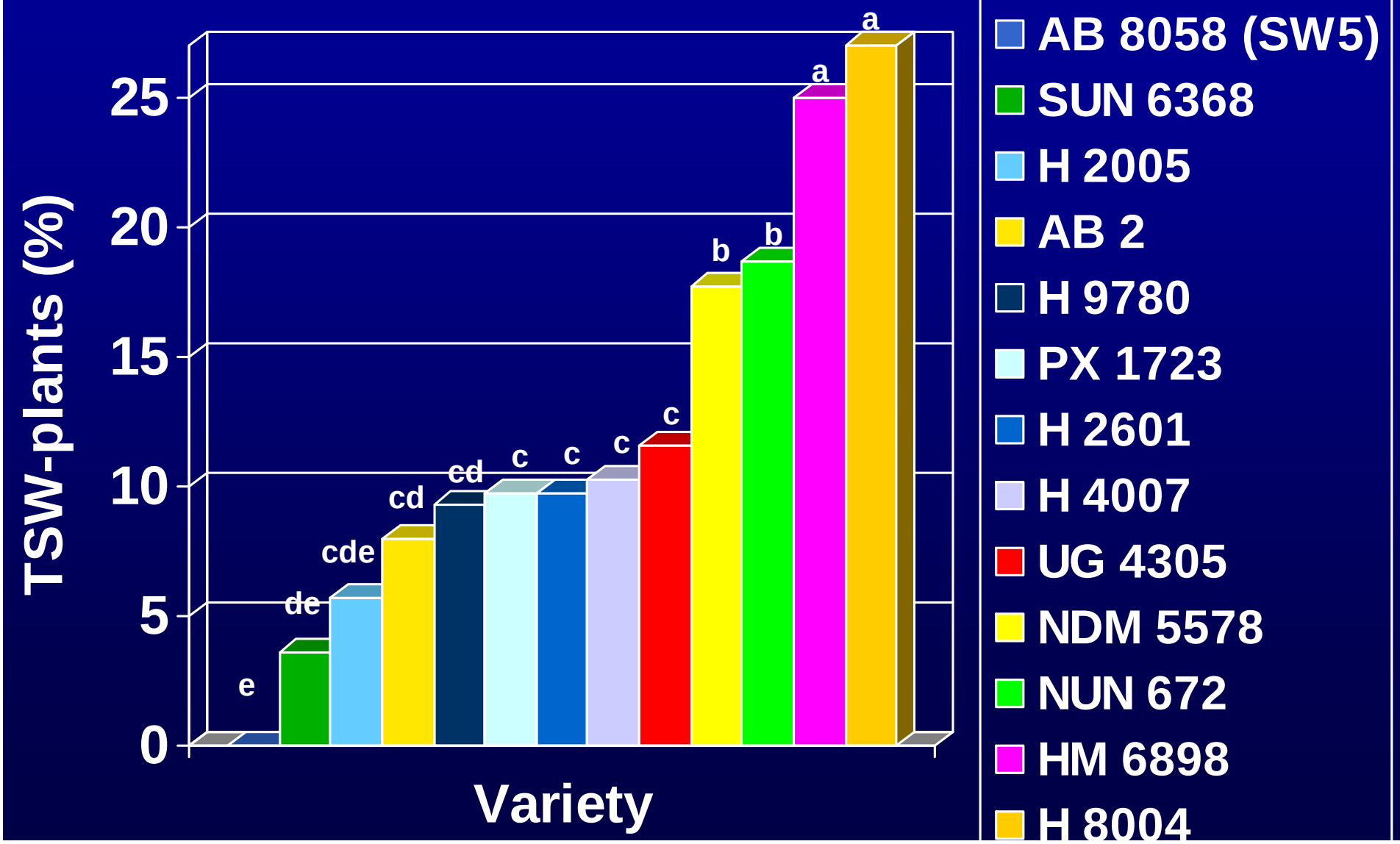
- Resistant Varieties: single dominant resistance gene – *Sw-5* are available in both fresh market and processing tomatoes (*Tsw in peppers*)
- Relative susceptibility of tomato varieties to TSWV

# TSWV-Incidence in Mid-Season Processing Tomato Varieties at WSREC, 2007



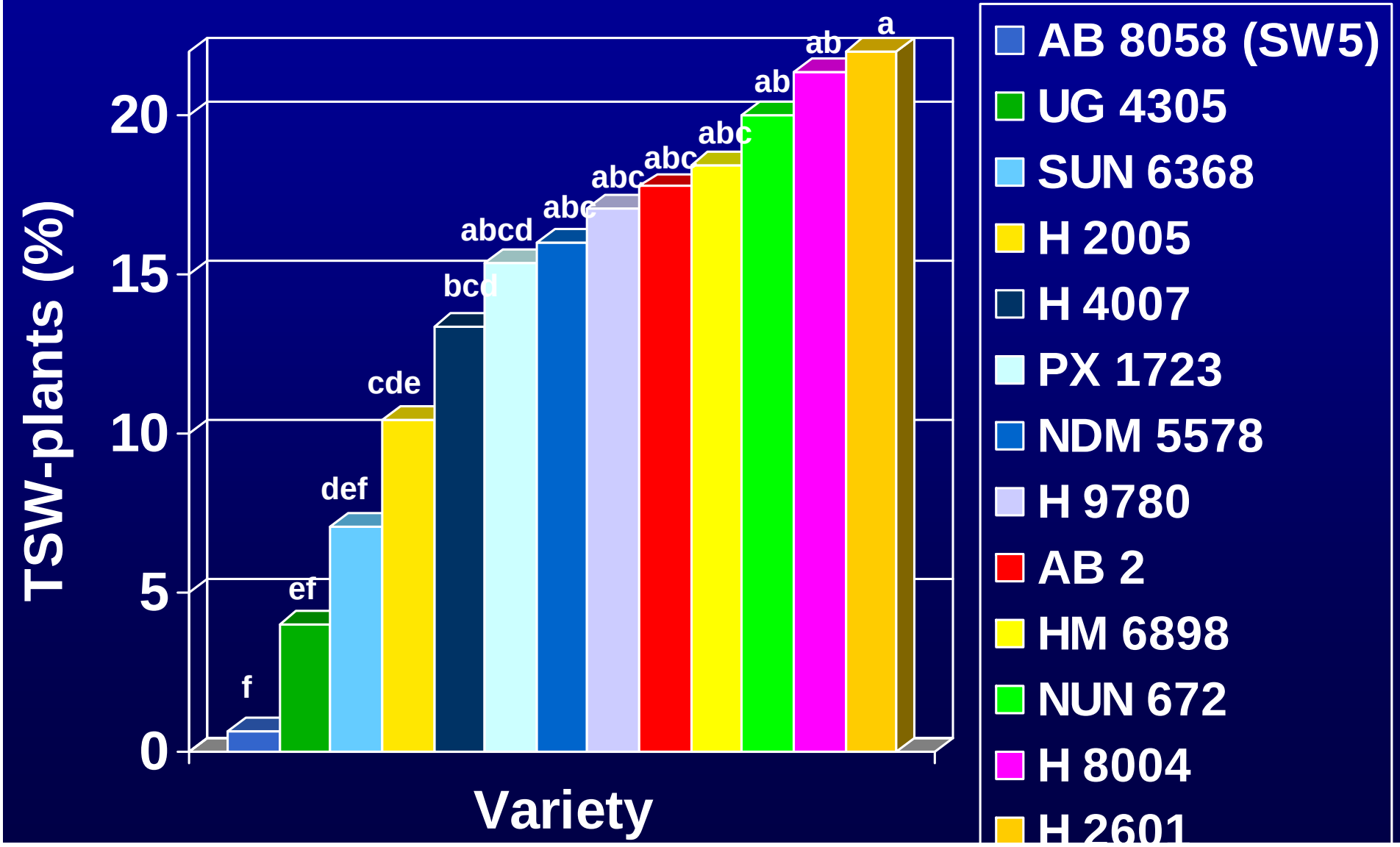
# TSWV-Incidence in Mid-Season Processing Tomato Varieties at WSREC, 2008

Transplanted 16 Apr



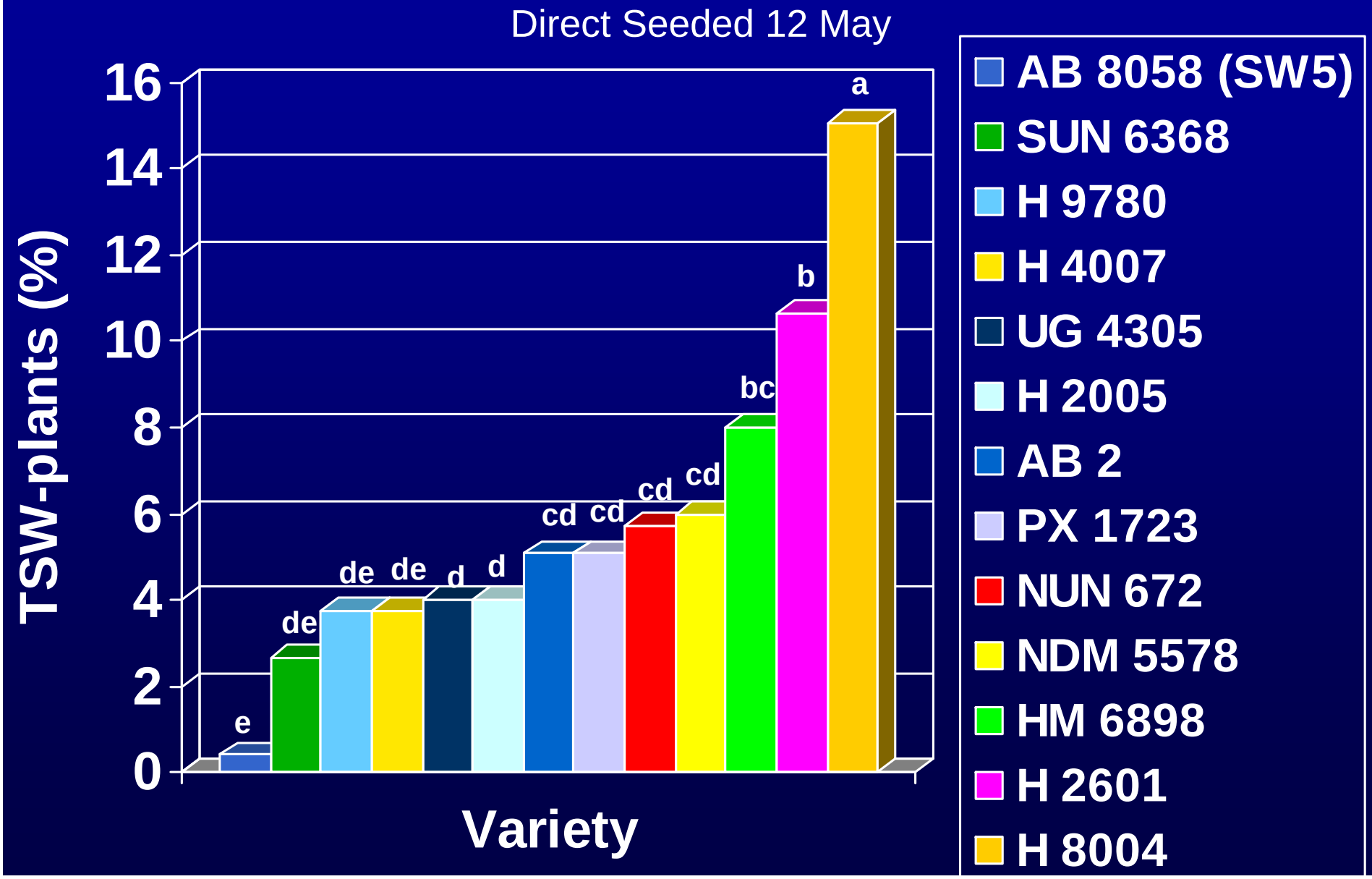
# TSWV-Incidence in Mid-Season Processing Tomato Varieties at WSREC, 2008

Transplanted 15 May



# TSWV-Incidence in Mid-Season Processing Tomato Varieties at WSREC, 2008

Direct Seeded 12 May



# IPM for TSWV

- Strategic planning of crops – avoid planting tomatoes near potential sources of TSWV
- Use TSWV resistant varieties in high risk areas
- Sanitation – immediately plow under crop residue following harvest, weed control
- Thrips/TSW-symptom monitoring - insecticide application at first indication of the virus

# ***Acknowledgements***


- CTRI
- Robert Gilbertson : Plant Path UC Davis
- Diane Ullman : Entomology UC Davis
- Michelle Le Strange : UCCE Tulare
- CTRI
- Growers and PCAs in Fresno and Kings Co.