

Thrips and INSV Management in Desert Lettuce

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Historically, management of western flower thrips in lettuce was targeted at preventing damage by thrips feeding on marketable leaves. Left unchecked, cosmetic scarring could result in downgrading of quality, or even rendering the crop unmarketable. In fall lettuce, PCAs could typically allow thrips to build up on young lettuce plants and later prevent feeding damage on marketable leaves with 1-2 well timed foliar insecticide applications. However, that all changed last spring with the discovery of Impatiens Necrotic Spot Virus (INSV) in late spring crops.

To manage thrips with the intent of suppressing or prevent INSV infection it's important to understand how western flower thrips acquire and transmit the virus. Based on the experiences in Salinas the past 2 seasons, we've learned that INSV infections occur two ways. First, **Primary infection** or spread occurred where INSV infected adults from an outside host source migrate into lettuce, feed, and transmit INSV to otherwise healthy plants. In theory, the more infected thrips moving into the field, the higher the incidence of primary infection. An adult thrips can only transmit the virus; it cannot acquire the virus from an infected plant. **Secondary infection** or spread occurs when thrips larvae acquire INSV by feeding on an infected plant (either lettuce or nearby weeds), complete development and emerge as infected adults, capable of transmitting INSV throughout the field or nearby lettuce fields/weeds. Keep in mind, adults only transmit INSV, whereas only larvae acquire the virus from an infected plant.

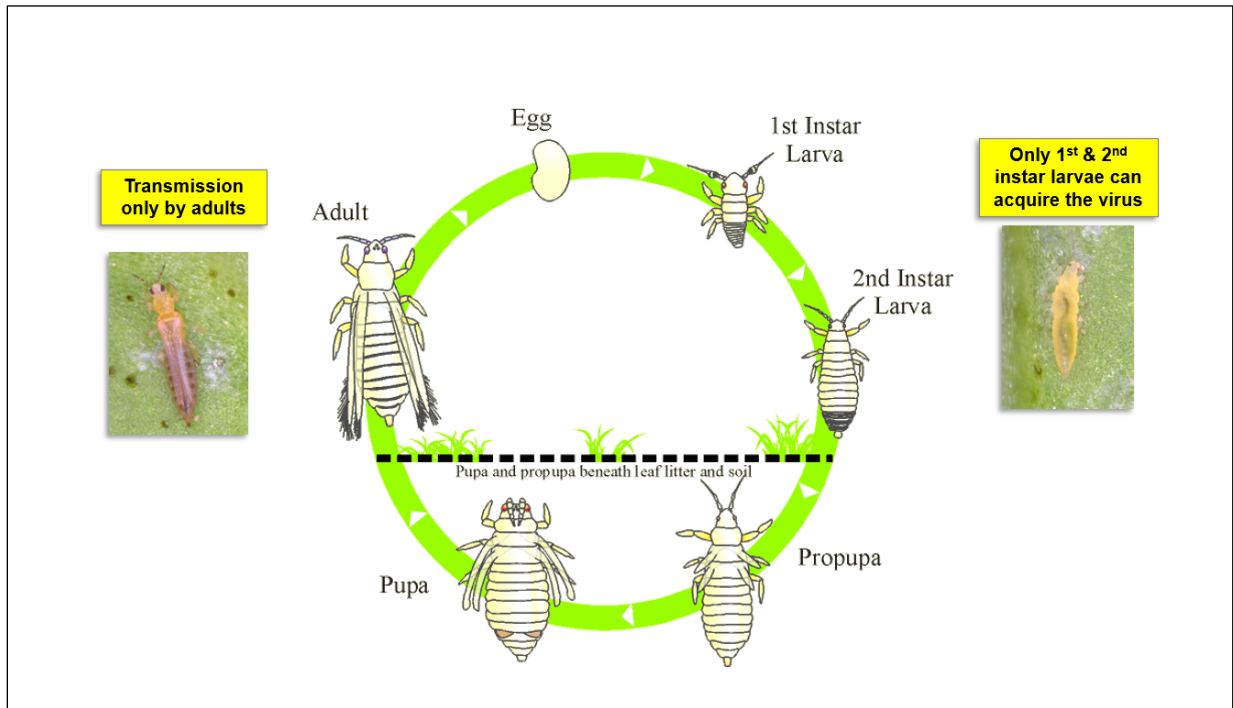
This has led us to many questions about the virus and its epidemiology in desert cropping systems. First, why did it suddenly appear last March 2021 when it had not previously been reported in our cropping system. In over 30 years as a vegetable entomologist in Yuma, I had never seen INSV or TSWV (a related tospovirus) in desert lettuce prior to 2021. We've now demonstrated in 2022 and 2023 that INSV arrived into the desert on infected lettuce transplants or infected adults on transplants originating in Salinas. Given that Salinas has battled INSV each of the last 3 summers and produce a fair amount of lettuce and brassica transplants grown in Yuma, we must assume that INSV will again move into the desert at some point. So, until we have a better understanding of INSV epidemiology on desert lettuce, it is recommended that PCA's and growers adjust their thrips management programs this season, particularly in high-risk areas. Below are several recommendations that PCAs should consider helping reduce the risk of INSV outbreaks in desert lettuce.

- I. **Season-long sanitation.** Maintaining a clean cropping system via cultural management is the foundation of an effective thrips/INSV management program and should be helpful in eliminating potential sources of both the virus and the vector. Research over the past year has shown that several deserts weed species are reservoirs for both thrips and INSV. Reduction of thrips/INSV can be achieved with thorough weed control, both in and around produce fields. Additionally, once lettuce harvest is complete, growers should disk crop residue as quickly as possible to reduce prolonged thrips reproduction and spread.
- II. **Scouting for thrips is important.** Research has shown that visual sampling for thrips can underestimate the actual numbers on the plant due to their cryptic nature. If you can see a few adults and larvae on the plant, it means that there are likely several-fold more thrips on the plant (hiding near the base of the plant between midribs).

- III. **Focus on minimizing Secondary spread.** Because adults can be difficult to control, prevent larvae from completing development to the adult stage and moving throughout the field. It's hard to prevent primary infection from the outside but minimizing larvae populations should help suppress the secondary spread of INSV if it is present in the field. In other words, "*Nip the thrips*" populations in the bud.
- IV. **Early and aggressive spray timing in High-risk areas.** It is advisable that PCAs preventatively treat lettuce fields early and aggressively in high-risk areas:
- Lettuce and brassica transplants originating from Salinas should be treated before or shortly after transplanting.
 - Direct-seeded lettuce fields grown adjacent to, or near, lettuce fields where transplants originated from Salinas should be treated early and aggressively.
 - Lettuce grown in areas where significant INSV was found last spring (*i.e., Tacna, Roll, Wellton*) should be watched closely and treated preventatively when thrips first appear.
- V. **Using Insecticides Differently.**
- Consider incorporating Lannate or Torac with chemical thinners/smart sprays.
 - Consider combining Lannate or Torac with armyworm/loopers or whitefly sprays early when thrips pressure is light.
 - Consider rotating Minecto Pro or Exirel with Radiant for Worm and/or whitefly control in fall lettuce, and similarly when aphids appear later, consider rotating Beleaf or Acephate with Movento. All these products have shown to provide control or suppression of western flower thrips larvae.
 - Consider tightening spray intervals (6-7 d) with heavier thrips pressure or the first signs of INSV in the area.
- VI. **Test symptomatic plants immediately.** The earlier you discover INSV in a field the better chance you have of reducing secondary spread within the field and, perhaps as important, to surrounding lettuce in the area. The UA Diagnostic Plant Pathology Diagnostic Lab and Dr. Bindu Poudel-Ward can confidentially confirm the presence of INSV on symptomatic plants. So please don't hesitate to have symptomatic plants tested for INSV infection.



Western flower thrips adult (left) and larva (right) feeding on lettuce.



Western flower thrips life cycle / INSV acquisition and transmission

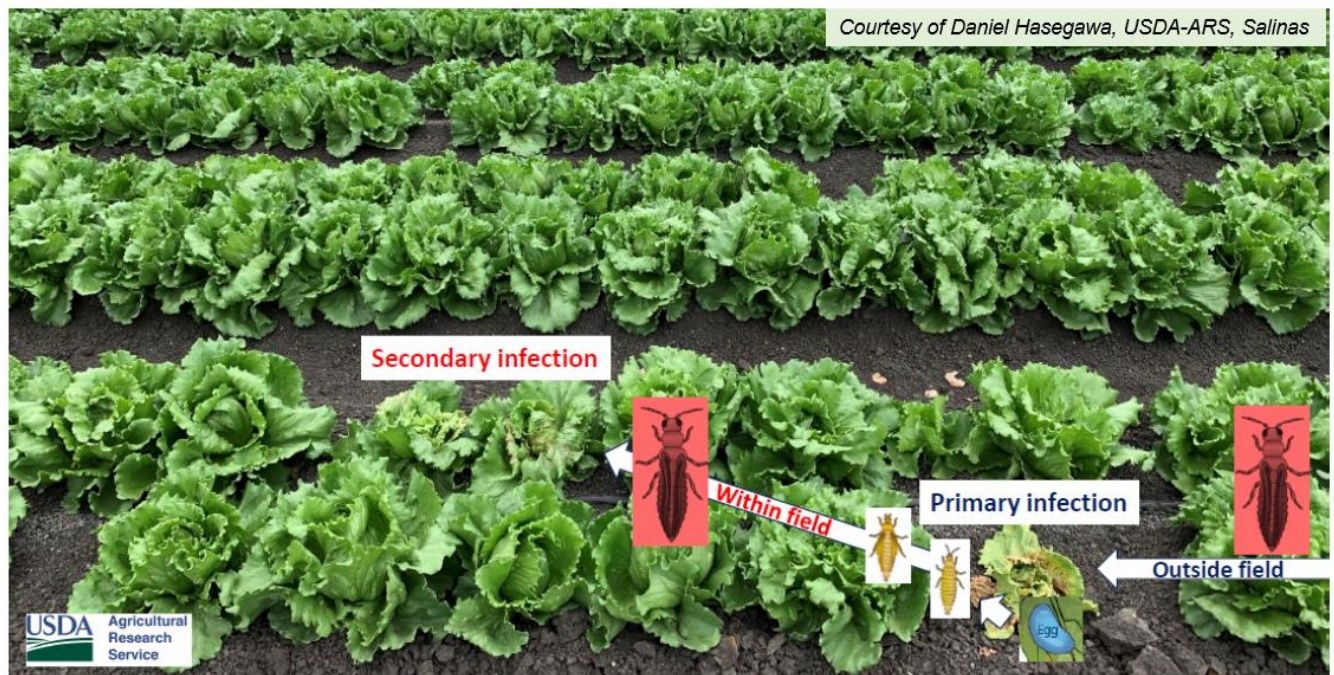
Tacna, AZ Mar 13, 2021



Symptoms of Impatiens Necrotic Spot Virus (*INSV*) on romaine lettuce.



Primary infection or spread of *INSV* into lettuce fields.



Secondary infection or spread of *INSV* within lettuce fields.

Relative Efficacy of Insecticides Against Western Flower Thrips in Lettuce - 2024

Product	Rate/ac	IRAC MOA	Efficacy Against WFT *	
			Adult	Larvae
<u>Lannate SP</u>	0.8 lb	1A		
<u>Acephate 90</u>	1.0 lb	1B		
<u>Radiant SC</u>	7.0 oz	5		
<u>Torac</u>	21 oz	21A		
<u>Dimethoate 267</u>	0.75 pt	1B		
<u>Pyrethroids</u>	-	3		
<u>Assail 30SG</u>	4.0	4A		
<u>Sequoia</u>	5.75	4C		
<u>Movento</u>	5 oz	23		
<u>Exirel</u>	20 oz	28		
<u>Minecto Pro</u>	10 oz	28+6		
<u>Harvanta</u>	16.5 oz	28		
<u>Beleaf</u>	2.85 oz	29		

Control
 Suppression
 No control

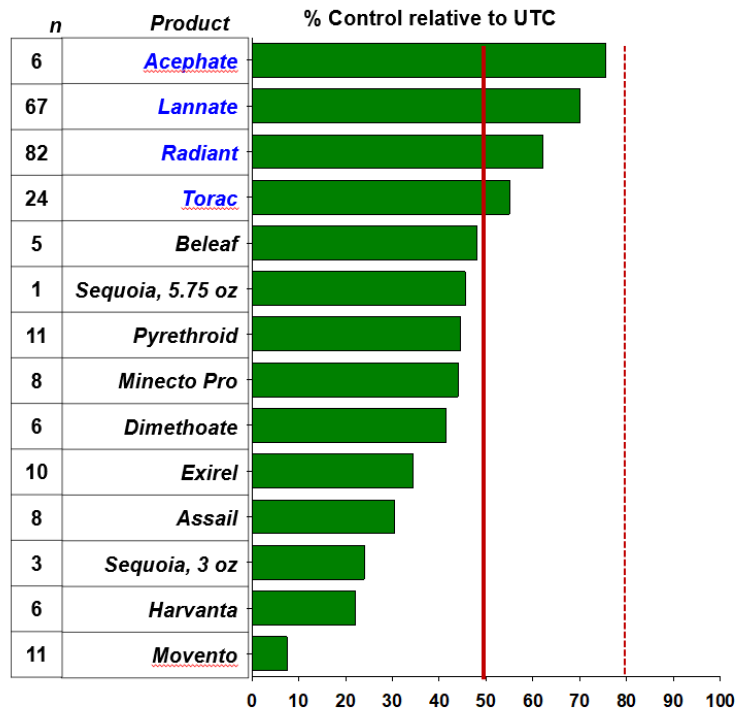
* Based on local field research

Insecticide Efficacy Summary - Adults

Relative Insecticide Efficacy



- 132 trials, 2003-2021
- Romaine and Head lettuce
- 2-3 sprays / trial
- Avg thrips counts at 3 & 7 DAA
- Trials differed with
 - wet date
 - spray dates (fall-spring)
 - spray volume (20-50 gpa)
 - spray timing
 - plant size
 - thrips pressure



Insecticide Efficacy Summary - Larvae

Relative Insecticide Efficacy



- 132 trials, 208-2021
- Romaine and Head lettuce
- 2-3 spray applications/trial
- Thrips counts 3 and 7 DAA
- Trials differed with
 - wet date
 - spray dates (fall-spring)
 - spray volume (20-50 gpa)
 - spray timing
 - plant size
 - thrips pressure

