

**Troublesome Weeds in San Joaquin Valley Vegetable Crops**  
**Michelle Le Strange, Farm Advisor, University of California Cooperative Extension,**  
**Tulare & Kings Counties**

**What are troublesome weeds? Let's start with the obvious.**

**1) Weeds that cause harm to humans.** Hand weeding and hand harvest is common with many vegetable crops. Weeds that have barbs, thorns, stingers, scratch and itch are troublesome. A few examples are:

Puncture vine	<i>Tribulus terrestris</i>
Burning nettle	<i>Urtica urens</i>
Cocklebur	<i>Xanthium strumarium</i>

**2) Weeds that are aggressive competitors.** Even fairly competitive vegetables like tomatoes have difficulty fending off these weeds. Some are so aggressive that land values can be decreased because of the loss of productive potential.

Perennial weeds:

Field bindweed	<i>Convolvulus arvensis</i>
Bermudagrass	<i>Cynodon dactylon</i>
Johnsongrass	<i>Sorghum halepense</i>
Nutsedges	<i>Cyperus spp.</i>

Parasitic weeds:

Dodder	<i>Cuscuta sp.</i>
--------	--------------------

**3) Weeds that mimic the crop.** Weeds in the same family as the crop can look so similar that they are missed by hand weeding crews or by selective herbicides. For example,

Mustard weeds growing in cole crops (broccoli, cauliflower, cabbage):

London Rocket	<i>Sisymbrium irium</i>
Shepherd's purse	<i>Capsella bursa-pastoris</i>
Wild radish	<i>Raphanus sativus</i>
Wild mustard	<i>Sinapsis arvensis</i>
Black mustard	<i>Brassica nigra</i>

Nightshade weeds growing in Nightshade crops (tomato, pepper, and eggplant)

American Black nightshade	<i>Solanum americanum</i>
Black nightshade	<i>Solanum nigrum</i>
Hairy nightshade	<i>Solanum physalifolium</i>
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>
Lanceleaved groundcherry	<i>Physalis lanceifolia</i>
Wright groundcherry	<i>Physalis acutifolia</i>

Composite weeds growing in lettuce.

Prickly lettuce	<i>Lactuca serriola</i>
Common sowthistle	<i>Sonchus oleracea</i>
Common groundsel	<i>Senecio vulgaris</i>

Marestail/Horseweed	<i>Conyza canadensis</i>
Hairy Fleabane	<i>Conyza bonariensis</i>

**4) Weeds that are unusually “weedy.”** Weeds that are known for high seed production and continuous germination throughout the growing season.

Redroot pigweed	<i>Amaranthus retroflexus</i>
Tumble pigweed	<i>Amaranthus albus</i>
Prostrate pigweed	<i>Amaranthus blitoides</i>
Lambsquarters	<i>Chenopodium album</i>
Common purslane	<i>Portulaca oleracea</i>
Prickly lettuce	<i>Lactuca serriola</i>
Common sowthistle	<i>Sonchus oleracea</i>
Russian thistle	<i>Salsola tragus</i>

**5) Weeds that are resistant to herbicides.**

Marestail/horseweed	<i>Conyza canadensis</i>
Hairy fleabane	<i>Conyza bonariensis</i>

**What are the less obvious troublesome weeds in SJV Vegetable Crops?**

**1) Weeds that provide habitat for insect vectors of viruses.**

Beet leafhopper vector of Curly Top Virus overwinters on Russian thistle *Salsola tragus*

**2) Weeds that are the virus reservoirs.** Weeds can serve as hosts for viruses. Some viruses have few weed hosts and others have multiple weed hosts. Weeds can be the source of virus inoculum for crop damaging viruses. In some instances only a FEW weeds can do A LOT of damage to the crop over time. One example that is a current economic problem for the last several years in tomatoes is Tomato Spotted Wilt disease. Vectored by six species of thrips; Western flower Thrips is the predominant vector in California.

TSWV has a very wide host range. It infects over 900 plants, mostly dicots.

**Crops**

Beans  
Celery  
Cilantro  
Eggplant  
Lettuce  
Peppers  
Radicchio  
Spinach  
Tomatoes

**Ornamentals**

Begonia  
Chrysanthemum  
Geranium  
Impatiens  
Lily  
Marigold  
Petunia  
Snapdragons  
Verbena  
Zinnias

**Weeds**

Chickweeds  
Datura spp.  
Little Mallow  
Lambsquarters  
Morningglory  
Nightshades  
Pigweeds  
Prickly Lettuce  
Purslane  
Russian thistle  
Sowthistle

In areas with recent outbreaks of TSWV in the San Joaquin Valley, weeds and plants other than tomato were collected and tested for the virus (Table 1). Most samples tested negative for TSWV, although lettuce, pepper, spinach, London rocket, cardone, malva, prickly lettuce, common groundsel, black nightshade, groundcherry, field bindweed and sowthistle tested positive. However, the incidence of TSWV infection in all these plants was very low (<0.1%). To date, we have not found evidence of any weed that is extensively infected by TSWV.

Due to 2009 water shortages in Fresno County, some old lettuce fields were left fallow and developed high populations of prickly lettuce and sowthistle, weeds known as TSWV hosts. In two such fields, 100 prickly lettuce and 100 sowthistle plants were examined for tospovirus-like symptoms, and weeds with symptoms was tested for *Impatiens necrotic spot virus* (INSV) and TSWV. On 25 March, 6% of the sowthistle plants were infected with TSWV as determined by immunostrips and one was infected with INSV. Flowers from sowthistle plants were examined, and both larval and adult thrips were present. On April 22, weeds from another fallow field in the Five Points area were evaluated. Here, weeds showed symptoms of infection and 2% of the sowthistle and 7% of the prickly lettuce plants tested positive for TSWV, whereas all plants tested negative for INSV. Tomatoes in fields closest to those fallow fields showed earliest development of TSW symptoms, indicating that these weeds were sources of inoculum. Thus, weeds in fallow fields represent a new potentially important inoculum source where both thrips and TSWV can be amplified and then serve as a source for early colonization/infection of nearby processing tomato fields.

**Table 1.** Weed survey results for TSWV incidence during 2008-09.

Weed	Tested (+)	Weed	Tested (+)
Barnyard grass	27 (0)	Lambs quarters	64 (0)
<b>Black nightshade</b> <sup>ab</sup>	<b>36 (2)</b>	<b>Malva</b> <sup>a</sup>	<b>114 (1)</b>
<b>Bindweed</b> <sup>abc</sup>	<b>37 (3)</b>	Mustard	62 (0)
Bur clover	25 (0)	Nettle	25 (0)
Common sunflower	28 (0)	Pigweed	27 (0)
Dodder	25 (0)	<b>Prickly lettuce</b> <sup>abc</sup>	<b>96 (3)</b>
Fiddle neck	26 (0)	Purslane	25 (0)
<b>Ground cherry</b> <sup>a</sup>	<b>25 (1)</b>	Russian thistle	35 (0)
<b>Groundsel</b> <sup>a</sup>	<b>40 (1)</b>	<b>Sowthistle</b> <sup>abc</sup>	<b>74 (4)</b>
Jimsonweed	25 (0)	Tree tobacco	25 (0)

(+) number of plants tested positive for TSWV by Immunostrips and RT-PCR. <sup>abc</sup>, Merced, Yolo/Colusa, and Fresno/Kings Counties, respectively