

# Thrips in green beans

Thrips can attack green beans from the moment the seedlings emerge from the ground through to flowering, but it is the damage some do during flowering that has the greatest impact.

The most common damage symptom in green beans is found on the pods. Scarring on the pods causes twisting and curling to varying degrees as well as mildly rough patches on the skin. Silvering of the leaf tissue is rarely of economic importance but can indicate the presence of thrips.

Jassid, or leaf hopper, infestations can also cause silvery and deformed pods may also be a result of higher than normal levels of green vegetable bugs or other pod sucking bugs. Inspect your crop carefully to check if thrips, or other insects, are responsible for the symptoms.



*Damage to the top and underside of a leaf*

*Thrips larvae*



*Thrips in a flower*

Thrips insects are very small (less than 2 mm in length) so distinguishing between the 13 species of thrips commonly found on green beans is virtually impossible in the field. However, all thrips species are managed in the same way so you only really need to determine whether or not thrips are causing the damage observed in the crop.

Adult thrips are small, cylindrical or cigar-shaped insects up to 2 mm long and range in colour from pale yellow to black. They have two pairs of narrow wings that are fringed with long hairs and rest along the length of their back. The young larvae are similar in shape to the adults but smaller and wingless, and usually pale yellow to almost white.



To identify the species of thrips present in the field requires diagnostic keys and a high-powered microscope. However, thrips are quite distinct as a group and can easily be distinguished from other insect pests commonly found in green beans.

## Damage

The feeding apparatus of thrips is unique amongst insects. Thrips have only one mandible, which they use to puncture the plant surface before inserting their stylets. Using their stylets thrips suck the sap from the damaged cells, inducing a range of symptoms.

Silvering is the most common symptom. It is readily seen on leaf tissue and occurs as a result of the cell contents being removed. Although of concern, leaf silvery does not cause significant yield reduction. Treat silvery as a sign that thrips could be active in the crop and insecticide applications may be required.

Significant reduction in saleable yield does occur when thrips damage green bean pods. Scarring of the pods causes twisting and curling to varying degrees as well as mild rough patches on the skin. Once this type of damage is observed it is generally too late to apply any chemical treatments.



**Table 1.** List of thrips found on green beans

Scientific name	Common name	Family	Plant part affected
<i>Desmothrips tenuicornis</i>		Aeolothripidae	Leaves/Flowers
<i>Frankliniella occidentalis</i>	Western flower thrips	Thripidae	Leaves/Flowers
<i>Frankliniella schultzei</i>	Tomato thrips	Thripidae	Leaves/Flowers
<i>Haplothrips gowdeyi</i>	Gold tipped tubular thrips	Phlaeothripidae	Flowers
<i>Limothrips cerealium</i>	Grain thrips	Thripidae	Flowers
<i>Megalurothrips usitatus</i>	Bean blossom thrips	Thripidae	Flowers
<i>Pseudanaphothrips achaetus</i>	Hairless flower thrips	Thripidae	Flowers
<i>Thrips imaginis</i>	Southern plague thrips	Thripidae	Leaves/Flowers
<i>Thrips palmi</i>	Melon thrips	Thripidae	Leaves
<i>Thrips parvispinus</i>	Taiwanese thrips	Thripidae	Leaves/Flowers
<i>Thrips safrus</i>	Northern plague thrips	Thripidae	Leaves/Flowers
<i>Thrips tabaci</i>	Onion thrips	Thripidae	Leaves/Flowers
<i>Thrips vulgatissimus</i>	White flower thrips	Thripidae	Flowers

## Identification

If you observe damage in your crop it is important to correctly identify the cause so you can choose the most appropriate course of action.

If you identify thrips as the cause of the damage or actually see thrips activity you can:

- decide if any action is required or not. Not all thrips species found in green bean crops actually cause economic damage to the pods
- select the most appropriate insecticide
- be aware of possible virus transmission. Thrips are known vectors of tospoviruses such as tomato spotted wilt virus (TSWV)
- know when the thrips are most prevalent in your district and plan to minimise their numbers in future years
- identify and treat other causes of the damage you observe if you determine thrips are not the problem.

Research shows that large numbers of western flower thrips in the flowers (up to 4 per flower) cause very little damage to developing pods, while low numbers of bean blossom thrips (1 per flower) can cause severe pod damage. Thirteen species of thrips from seven genera have been identified from leaves and flowers of green beans in Australia. Table 1 shows a list of thrips found on green beans.

## What thrips is that

Below is a collection of the thrips currently identified from green beans. This collection shows that certain thrips are very similar in colour so identification of thrips cannot be carried out using colour alone.

With experience, it is possible to identify certain thrips genera on a particular crop. Microscopic examination is usually necessary to determine species. If you are unsure, ask an expert in thrips identification.

## Collecting thrips for identification

When collecting thrips for identification, place the thrips along with the plant part (e.g. cotyledon, leaves or flowers) they were found on in a specimen jar, and cover with methylated spirits.

If you don't have methylated spirits the next best option is to place the thrips and associated plant parts in a sealable plastic bag and deliver them immediately to the address at the end of this fact sheet.

Because thrips are of concern, mainly during flowering, the earlier you find thrips in flowers and have them identified, the better your chance of managing them with appropriate insecticides.

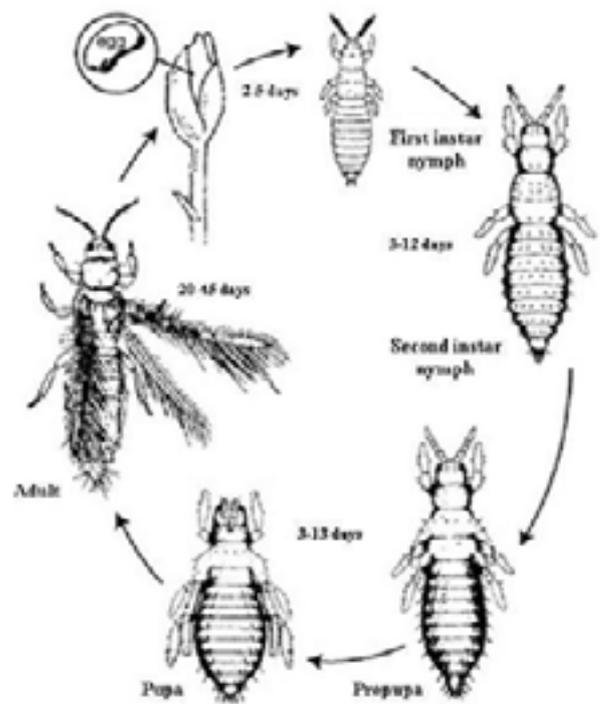
## Life cycle

The life cycle of thrips includes an egg, two larval stages that actively feed, followed by two non-feeding stages, a pre-pupal and pupal stage, which generally takes place in the soil or leaf litter. The diagram on the right illustrates the thrips' life cycle.

The emerging adults are generally winged, but depending on the sex and species, some have short wings and others are wingless. Most thrips insert their eggs into plant tissue.

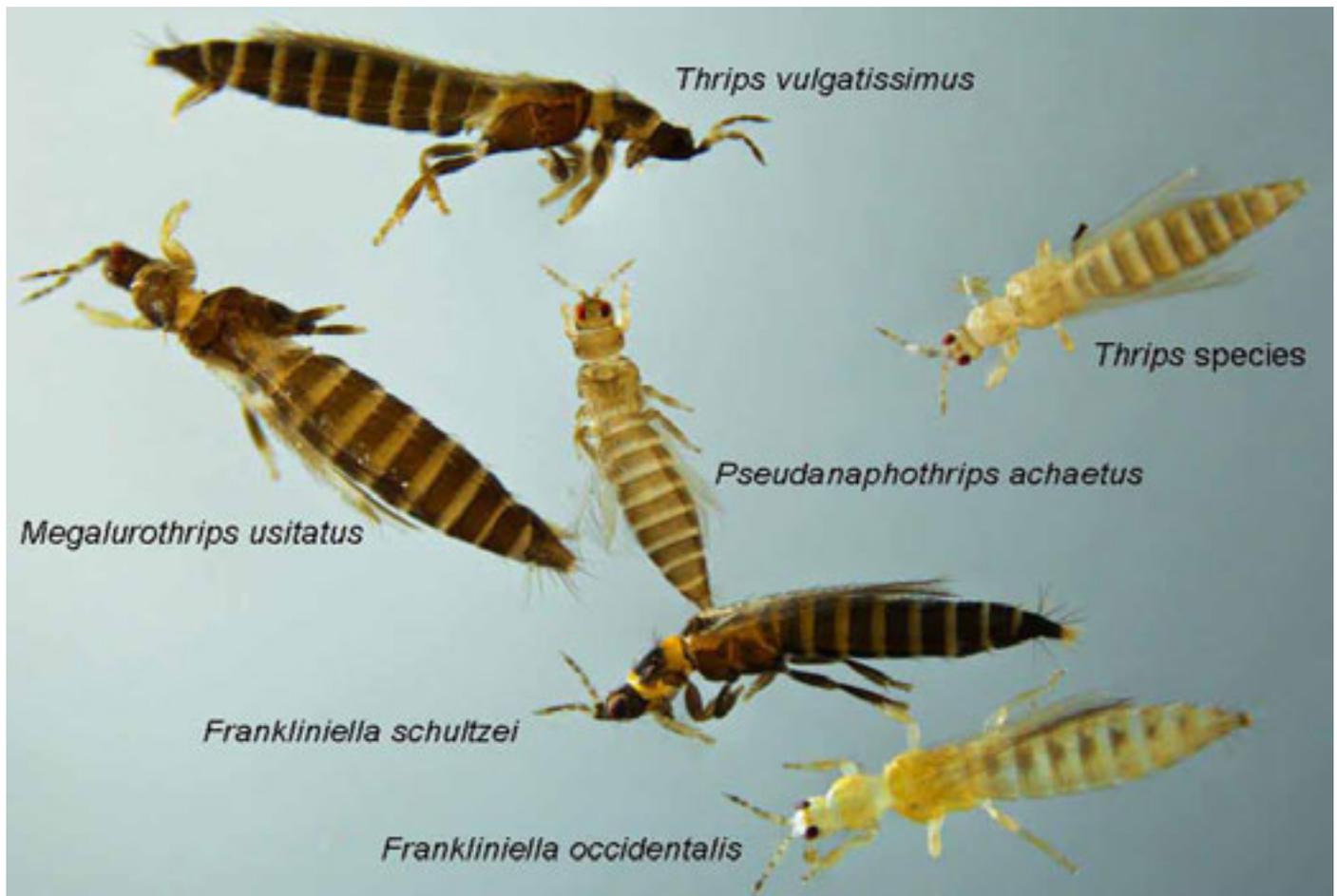
The length of the life cycle depends on the temperature and the quality of the food source. In warm conditions, around 30°C, the life cycle can be completed in as little as 10–12 days. At 20°C the life cycle takes around 19 days (Persley, Sharman et al. 2007).

The female western flower thrips adult can live for 30–45 days and produce 150–300 eggs (Caon and Burfield 2006), whereas the onion thrips female lays around 80 eggs (Shelton and Reueda 1995).



Typical life cycle of a flower thrips.

'From the UC Statewide IPM Program, Calif. Agric. Exp. Sta. Circ. 337'



*Thrips species* currently identified as green beans pests.

## Monitoring your crop

To reduce the risk of large numbers of thrips infesting your crop you should regularly monitor the crop for thrips activity.

**Check your crop at least once a week, or twice if you think there is a problem.**

- Before flowering check for thrips activity on the growing tips of two side-by-side plants in five locations randomly selected throughout your crop, and if you find thrips get them identified.
- During flowering remove 20 flowers randomly collected per paddock and pull them apart to look for adult thrips. Larvae are very difficult to see due to their smaller size and pale colour.
- Send any thrips you want identified to the address at the end of this fact sheet. Information about how to collect thrips is provided below.
- Place at least two yellow sticky traps just above the crop plants to help you detect flights of thrips coming into the crop. Place at least one other trap on the side adjacent to other crops or remnant vegetation.
- Record the information you collect during your crop monitoring, and the action you took. This will make a good reference for the management of thrips in future crops.



## Contacts

For thrips identification contact:

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This project has been funded by HAL using the vegetable industry levy, voluntary contributions from Simplot Australia and McCain Foods (Aust) and matched funds from the Australian Government.

## Management options

Thrips are only of concern during the flowering stage of the crop. Although they can be found on the cotyledons, leaves and in the growing buds, the level of damage they cause to these plant parts rarely requires any action. To manage thrips populations in green bean crops, try to implement these management strategies:

- Destroy alternative hosts such as weeds and other vegetation in and around the crop. Don't allow these other hosts to flower.
- Turn in crop residue immediately after harvest. This will help to destroy any thrips that may be pupating in the soil.
- Collect and dissect green bean flowers to monitor the presence of thrips and to get an indication of their numbers in the crop.
- Identification is very important as a number of thrips look the same with the naked eye but require different management options. They need to be identified by someone with experience in thrips identification.
- Chemical application is still the only reliable means of managing thrips in green bean flowers.
- Good spray coverage is essential as the thrips hide within the flowers making it difficult to get the chemical in contact with the thrips.
- Spray the flowers before they fully open. This will help control those thrips wandering on the plant before they enter the flowers.
- Always use the recommended rate of insecticides and rotate between chemical groups. This will help minimise the chance of resistance developing due to the overuse of any one insecticide.
- Choosing the correct insecticide is important, so seek advice from your local agronomist or entomologist and visit the APVMA web site (<http://services.apvma.gov.au/PubcrisWebClient/welcome.do>) to check which insecticides are currently registered for use in green beans.

## Further reading

Final Report HAL Project VG07017 *Thrips Management in the Green Beans Industry*.

Shelton, AM & Reueda, A 1995, *Onion Thrips*, in: Global Crop Pests, Cornell University.

Caon, G & Burfield, T 2006, *Western flower thrips*, SARDI, Entomology.

Mound, LA & Kibby, G 1998, *Thysanoptera: an identification guide*, CAB International.

Persley, D, Sharman, M et al. 2007, *Thrips and Tospovirus: A Management Guide*, CRC for Tropical Plant Protection, Brisbane, Department of Primary Industries and Fisheries, Queensland.