Thrips Management in Production Nurseries

Greenhouse thrips infestation including all nymphal stages and a single adult circled. Also note black frass/excrement. Photo by David Cappaert, Bugwood.org

*Thrips are a persistent pest in Australian production nurseries across the horticultural landscape, causing damage to many plants, including many ornamental nursery crops, vegetable seedlings and potted colour. Apart from feeding damage, certain species such as Western flower thrips (*Frankliniella occidentalis*) are vectors of plant viruses like Tomato spotted wilt virus (TSWV), posing a serious threat to production nurseries. Effective management relies on an Integrated Pest Management (IPM) approach combining cultural, biological, and chemical strategies.*

INTRODUCTION

Thrips are tiny, slender, cigar-shaped insects with fringed wings (order Thysanoptera; pronounced Thigh-SAN-op-terra). Most thrips of production nurseries are cream to pale brown, dark brown or black. Thrips rupture the outer layer of plant cells while feeding on cell contents, causing scarring, stippling, flecking, russeting or silvering of the leaf surface, scaring of developing fruit, discolouration and scaring of flowers or distortion of new growth, depending upon where feeding occurs. Feeding often leaves black flecks of frass/excrement. Not all thrips are plant feeders, some species feed on fungi or pollen and are often non-damaging. Certain thrips are predators that feed on other insects (including thrips) and mites. Importantly, some thrips can vector serious plant viruses potentially affecting many plant species.

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Australia has over 35 species of thrips recognised as pests affecting horticultural, ornamental and forestry crops. Certain species are more serious pests to the production nursery industry (Table 1), tending to cause greater damage and feeding on many plant species. Some species are prone to pesticide resistance, particularly western flower thrips, onion thrips and tomato thrips.

From an entomological perspective, thrips is both singular and plural. There is no 'thrip'!

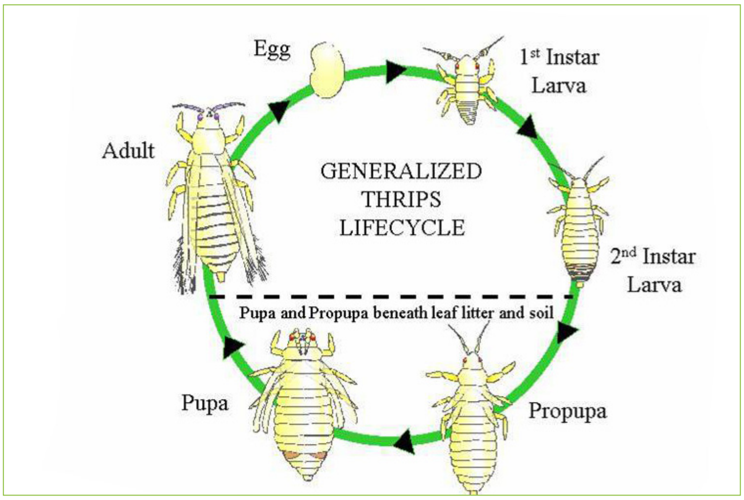
THRIPS BIOLOGY

Thrips are small, generally ranging in size from 0.5–2mm long, occasionally longer. Adults of most species have wings that are slender, with long marginal hair-like fringes. They are weak flyers but can be spread long distances on wind currents. Adults of some species have short wings or are wingless.

The lifecycle of thrips includes an egg, two immature nymphal stages (often referred to as larvae) that actively feed, followed by two or three "pupal" stages (see lifecycle diagram). The "pupal" stage is not a true pupa like those of beetles or moths, but is a non-feeding immature stage. Immature stages tend to be cream to pale brown in colour, however some groups can be orange, yellow or even red. Eggs are often laid into plant tissue (stems, leaves, flowers or fruit), but some species lay eggs on the plant surface. Immature thrips are similar in appearance to adults, are generally paler in colour and always wingless. Many species pupate in soil or leaf litter layers and/or may pupate on the plant itself, particularly in flowers and other protected areas; this has management implications (see below). Adults tend to be cream to pale or dark brown, or black. Some groups of thrips are relatively large (up to about 15mm), but these are rarely pests.

Thrips lifecycle durations depend on environmental conditions and food source quality. In warm conditions (30°C) lifecycles of many species take less than 2 weeks, while at 20°C up to 3 weeks. In winter, development time increases and reproduction decreases but breeding may continue in most of Australia, particularly in protected cropping environments. In very cool periods, thrips may overwinter as nymphs or adults in the soil, or as adults on plants, leaf litter or bark. Species overwintering in soil occur at a depth of 20-30cm, although some species may pupate as deep as 100cm depending on soil conditions. For overwintering species, dormancy usually ends when temperatures rise in spring.

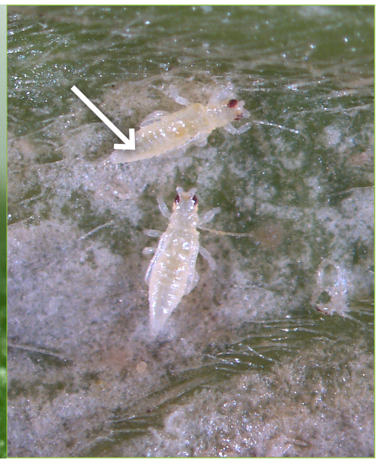
Under good conditions adult thrips may live for 2–6 weeks, with females laying 80–300 eggs. As such, thrips have the capacity to produce large numbers in relatively short time periods.



Generalised thrips lifecycle reproduced with permission, Mark S. Hoddle, UC Davis

Thrips egg laid into green bean; plant tissue removed to show egg.

Hatching thrips larva.



Thrips pupal stages showing wing buds.

IDENTIFICATION AND CRYPTIC SPECIES

There are about 7000 species of thrips worldwide, but only about 10% are considered pests. Due to wide colour variation, accurate identification is impossible based on colour. In-field identification is extremely difficult and species level identification relies on an experienced diagnostician and microscope. Species level identification is recommended when damage consistently occurs, if management actions fail, and occasionally as part of routine monitoring. Sometimes multiple species of thrips occur on the same crop.

Molecular-based identifications are possible and may assist in identifying some species. In fact, some species are morphologically identical, but have different genetic makeup – these species are known as cryptic species, and may have different biologies and/or behaviour.

The common Tomato thrips (*Frankliniella schultzei*) is a cryptic species; genetic studies reveal it is a species complex composed of multiple, morphologically similar but genetically distinct entities. In Australia, it is often associated with "yellow," "brown," and "black" colour forms. Despite overlapping in host use and distribution, these colour forms show genetic divergence, suggesting they are cryptic species. Similarly, a broader global analysis has identified five genetically distinct groups within what is currently referred to as *F. schultzei*. Importantly, these cryptic species may differ in key traits relevant to management, including their ability to transmit plant viruses and potentially their insecticide resistance profiles. However, such differences are not readily apparent from visual inspection alone. For growers, this highlights that accurate identification of thrips species is not always straightforward, and misidentification may lead to ineffective pest management decisions. Where persistent or unusual damage occurs, molecular identification or expert taxonomic support may be needed to clarify species identity and guide control strategies.

Adult thrips; Each individual species:
1 *Thrips vulgatissimus* 2 *Megalurothrips usitatus*
3 *Pseudanaphothrips achaetus* 4 *Thrips* species
5 *Frankliniella schultzei* 6 *Frankliniella occidentalis*.
In this case, all species came from one bean crop.


Corky damage caused by thrips feeding.


Deformed and twisted growth caused by a severe infestation of *Scirtothrips dorsalis* on lisianthus.

DAMAGE

In Australia, a relatively small number of species are considered pests of nursery crops (see Table 1 for selected species). Immature and adult thrips feed on various plant parts with "rasping-sucking" mouthparts that damage plant cells and suck up their contents. While collectively, thrips can feed on growing tips, flowers buds, petals, pollen, new and old leaves and stems, some species feed in specific areas. Some species may exclusively feed within flowers, others may feed on flowers, leaf buds and expanding leaves.

Feeding on older leaves may cause relatively mild damage including the formation of silvery patches that turn brown as the cell tissues dry up beneath the epidermis. This reduces photosynthesis and can induce premature leaf fall. Damage tends to be visible almost immediately after feeding occurs. In contrast, feeding damage on new growth or between plant parts tends to be delayed, i.e. plant growth must occur for the damage to become visible. As the damaged tissue develops it may present as leaf distortion, leaf scarring, petal scarring and or leaf drop and rind blemishes.

Faecal droplets, which turn black as mould grows on them, frequently accompany damage. Nymphs tend to be more damaging than adults as they are often in greater numbers and are less mobile than adults; as such, damage is concentrated. Oviposition can also cause damage to developing fruits, e.g. tomatoes. Damage from thrips can also predispose plants to fungal or bacterial infection.

TABLE 1. PEST THRIPS IN AUSTRALIA MOST RELEVANT TO PRODUCTION NURSERIES

PEST SPECIES	COMMON	HOST CROP AND DISTRIBUTION
Echinothrips americanus	Poinsettia thrips	Impatiens, *Euphorbia pulcherrima*, Dieffenbachia, Syngonium, Cardamine and Hibiscus. Feeds and breeds on leaves.
Frankliniella occidentalis	Western flower thrips (WFT)	Fruit, vegetable, flower and ornamental crops. It has been recorded on over 250 plant species. Feeds on leaves and flowers. Widespread in mainland Australia.
F. schultzei	Tomato thrips	Feeds on leaves and flowers of a wide range of plant species including many from the families Solanaceae, Fabaceae and Cucurbitaceae. Also feeds, on *Allium* sp. and many ornamental crops. Widespread in Australia.
Heliothrips haemorrhoidalis	Greenhouse thrips	Feeds on a wide range of trees and shrubs. Feeds on older leaves, particularly of plants that are stressed. Widespread throughout Australia.
*Megalurothrips usitatus**	Bean flower / blossom thrips	Various legume crops (Fabaceae), notably feeding on bean flowers and developing pods. Found across northern Australia (WA, Qld and northern NSW).
*Scirtothrips dorsalis**	Strawberry thrips, chilli thrips	Highly polyphagous including many species from Solanaceae, Fabaceae and Cucurbitaceae. Plants from many other plant families also are hosts. Populations may show localised specificity. It is widespread across northern Australia and WA. Refer to the break out box on this species for more information.
*Thrips hawaiiensis**	Banana flower thrips	Feeds and breeds on a large number of flowering plants, but is only sometimes considered to be a pest. It has been recorded from plants in the families Anacardiaceae, Apocynaceae, Arecaceae, Asteraceae, Brassicaceae, Caricaceae, Musaceae (particularly bananas), Lecythidaceae, Fabaceae, Proteaceae, Rosaceae, Rubiaceae, Rutaceae, Verbenaceae and others. It is mainly present in Qld, NT and NSW but has also been reported in SA, WA and Vic.
*T. imaginis**	Plague thrips	Mainly feeds on stone and pome fruit, but may also feed on legumes, tomato *Eucalyptus* spp. and grape. It is widespread in Australia, from Tasmania to as far north as Brisbane.
T. palmi	Melon thrips	Many species, particularly from Cucurbitaceae, Solanaceae, Fabaceae, Asteraceae and other families and orchids. It is only known from around Darwin, north Qld and southeast Qld – quarantine restrictions apply.
T. simplex	Gladiolus thrips	Feeds and damages *Gladiolus* flowers and is found wherever these plants are grown. Also feeds on other Iridaceae species.
T. tabaci	Onion thrips	*Allium* sp. are preferred hosts but it will feed on many other species including brassicas, tomatoes, beans, cucurbits, roses, potatoes and species from Asteraceae, Caryophyllaceae, Crassulaceae, Fabaceae, Euphorbiaceae, Lauraceae, Malvaceae, Mimosaceae, Moraceae, Myrtaceae, Poaceae, Rosaceae, Rutaceae, Solanaceae and many others. Widespread in Australia.

* Native to Australia. Refer to OZ thrips and Thrips of California for more information.

VIRUS TRANSMISSION

Some thrips can vector important plant viruses (tospoviruses). Globally, tospoviruses are amongst the most formidable of plant pathogens causing severe economic losses in a wide range of cultivated crops. The main tospoviruses affecting the nursery industry in Australian crops are tomato spotted wilt virus (TSWV), capsicum chlorosis virus (CaCV) impatiens necrotic spot virus (INSV), and iris yellow spot virus (IYSV). Four species of thrips transmit these pathogens: *F. occidentalis*, *F. schultzei*, *T. palmi* and *T. tabaci*.

Only first or early second instar nymphs feeding on infected plants can acquire and transmit these viruses. Although more mature life stages can acquire the virus, viruses cannot complete their lifecycles within the adult insects, and therefore cannot be transmitted. A nymph can acquire the virus in less than 30 minutes of feeding on an infected plant. Once the nymph acquires the virus, it circulates and multiplies within the insect. When the individual becomes an adult it can then readily move and infect any susceptible plant on which it feeds for the rest of its life. The virus is not passed to offspring through the egg.

Classic tospovirus damage includes chlorotic and necrotic ringspots and mosaic symptoms, necrotic spots, stunting and wilting. For more information refer to the fact sheet on virus management in production nurseries.

MANAGEMENT

MONITORING

Plants susceptible to thrips damage should be inspected on a weekly basis for the presence of thrips and data recorded, preferably electronically. Increase the frequency of monitoring during high-risk periods and on susceptible crops, particularly young seedlings. Typically, thrips are problematic in spring and summer, particularly during periods with strong winds. Frequent monitoring will enable infestations to be spotted while they are still light, and thus easier and cheaper to manage. Monitoring options include the following.

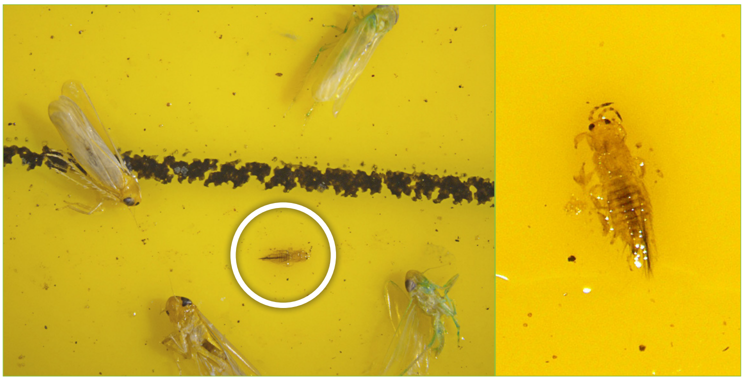
1. **Visual inspection and plant beating**. Examine young leaves and new growth of plants that look stunted, chlorotic or have silvering on both leaf surfaces using a 10x hand lens. Thrips tend to inhabit crevices near leaf veins and growing tips. Plant beating is conducted by gently but firmly hitting foliage against a beating tray (which can be a folder, bucket or plastic plate). The beating tray should be a single colour; white, grey or black is preferable as this will make moving organisms more visible. Beating plants is a relatively efficient way of monitoring for insects and mites that can be knocked from plants, including thrips, herbivorous and predatory mites, aphids, whiteflies, ladybird beetles, small caterpillars and a variety of other insects. However, thrips may fly off the beating tray quickly, so beat a few metres of plants and then examine the tray. Once something is found, a 10x hand lens can be used to inspect the catch.

2. **Blue or yellow sticky traps** are useful for monitoring adult thrips. Adults are most attracted to young foliage and flowers, therefore position traps just above plants. Place additional traps near doors, vents and any susceptible crops or areas. At least one trap per 100 m^2 is recommended for greenhouse crops, more in varieties that are known to be susceptible to thrips. Inspect sticky traps at least weekly and change traps every 2 to 4 weeks, depending on the volume of insects caught. Where thrips have been associated with prevailing winds in spring, traps can be placed at the leading edge of the property (i.e. upwind) and monitored at least weekly during high-risk periods. This may assist in allotting monitoring effort in susceptible crops more efficiently.

Note that small sticky traps with gridlines are monitoring tools whereas mass trapping sticky rolls are a management tool. If you are not willing or unable to count insects on a sticky trap, their benefit is very limited.

Chlorotic ringspots caused by tomato spotted wilt virus on Dahlia.

Small numbers of thrips can sometimes cause severe damage, e.g. *Chaetanaphothrips* on expanding Spathiphyllum leaves.



Thrips adult (circled) and leafhoppers on yellow sticky trap (left), close-up of thrips on sticky trap (right).

For both types of monitoring, record the level of infestation (low, medium, high) and extent of damage. Your records can help to identify areas and varieties that are more susceptible to infestations. It is also important to continue monitoring following application of insecticides or release of biological controls to determine the effectiveness of treatments. These records can assist with making management decisions in the future. Insect monitoring data spreadsheets are available in the BioSecure HACCP protocols available at Greenlife Industry Australia, and are easily created/modified to suit your nursery.

CULTURAL MANAGEMENT

Put in place as many cultural management practices as possible to passively reduce pest pressure and limit thrips populations in crops.

- Identify infestations early through regular monitoring (see section above).
- Check incoming stock carefully for thrips and virus symptoms.
- Never propagate from mother stock that is infested with pests. Increase monitoring of mother stock for several weeks prior to taking cuttings managing populations on mother stock proactively.
- Manage weeds proactively as they can be a source thrips and other pest populations and may be asymptomatic virus hosts.
- Prune and thin plants with light to moderate infestations to reduce pest load, increase airflow and access by insecticides.
- Hygienically discard heavily infested or unsaleable stock. Retaining unsaleable stock provides a source of further infestation. Infested material should be transferred to (biodegradable) bags and deep-buried or placed in a black bag in the sun for several hours to kill pest thrips. Leaving unbagged, infested plants or cuttings in bins encourages pests to reinfest the nursery, particularly as the plant material starts to wilt and die.
- Do not discard any plants that are suspected to be infested with pests or disease in a compost heap on-site.
- Screens placed over greenhouse vents and doors can be used to help prevent entry by thrips. However, placement of such screens can increase the humidity in the structure, causing ventilation problems. It is recommended to use a protected cropping consultant/designer before retrofitting or building an insect-proof tunnel or glasshouse.
- If infestations persist for long periods in a particular area or glasshouse, grow plants that are not hosts of thrips for a season to break the lifecycle. Having the thrips identified to species will assist in this process. Contact your local department of agriculture or primary industries or Grow Help Australia.
- Practice good crop hygiene to avoid contamination between greenhouses or production sites. Mark areas that are known to have infestations with visible signs so that workers can avoid moving through that area.
- Avoid broad-spectrum, residual chemicals where possible which cause high mortality of naturalised parasitoids and predators (see section on biological control).
- Discontinue growing crops that regularly receive significant damage. Grow resistant varieties where possible.

Yucca thrips cause superficial damage that can still cause plants to be unsaleable. They are typically present between leaves in the growing tip.

BIOLOGICAL CONTROL

There are numerous natural enemies to manage thrips, including commercially available predators and naturally occurring parasitoid wasps and predators (Table 2). Commercially available predators that feed on thrips on foliage include predatory mites (Montdorensis, Cucumeris and Lailae), the pirate bug (Orius), predatory thrips (Frankie) and a parasitic wasp (Thripobius). Orius and Frankie feed on all stages of thrips found on plants including adults.

There are also soil predators that feed on thrips pupae, including two mites commercially known as Hypoaspis mite and or killer mite, and a rove beetle, Dalotia. Soil predators are probably best suited to crops in propagation that are prone to thrips damage and for which the thrips species in question is known to pupate in the soil; these biological control agents also feed on fungus gnat larvae for which they are important management tools.

Naturally occurring thrips predators and parasitoids will move into production nurseries and become abundant under the right conditions. These include lacewings, certain ladybird beetles, predatory flies, various predatory insects and mites, and parasitoid wasps. Flowering plants will often attract and retain predators and can be used to encourage their presence in production nurseries. Predators can also be encouraged by limiting broad-spectrum pesticides and those with long residual activity. Applications of broad-spectrum pesticides anywhere in the nursery can reduce predator activity and effectiveness over the entire nursery. This occurs because trace amounts of the pesticides are spread wherever recycled water is irrigated on nursery crops.

There are a range of factors that may prevent successful release of beneficial insects. Some predators may not feed on certain thrips species or environmental conditions may prevent their successful release/establishment. This can occur during high summer heat, e.g. above about 35°C, or cold night temperatures below about 10°C. If the area of infested plants is very small (a few m^2) it may not be cost-effective to apply predators. However, some products are available in 'garden packs' specifically for management of relatively small areas. In these cases, cultural management practices and pesticide applications are likely to be the major components of your management plan for thrips.

Refer to the factsheet on managing populations of beneficial insects for more information. It is also recommended to talk to your biological control agent producer when starting a new program to maximise the chance of success. In particular discuss pesticides that have been applied on the property in recent weeks.

TABLE 2. COMMERCIALLY AVAILABLE BIOLOGICAL CONTROL AGENTS FOR THRIPS INHABITING FOLIAGE.

TRADE NAME	FRANKIE	THRIPOBIUS	ORIUS (MINUTE PIRATE BUGS)	LAILAE	CUCUMERIS	MONTDORENSIS / MONTY
SCIENTIFIC NAME	*Franklinothrips vespiformis*	*Thripobius javae*	*Orius tantillus*	*Typhlodromalus lailae*	*Neoseiulus cucumeris*	*Typhlodromips montdorensis*
DESCRIPTION	Predatory thrips. Adults large & ant/wasp-like (2–3mm long), larvae orange to bright red	Tiny, native parasitoid wasp, black head & thorax, colourless abdomen	Adults dark brown/black head & thorax, forewings partially transparent with dark base, yellow/orange-brown legs	Translucent to pale cream/light tan (unfed), light brown/amber after feeding, oval shape	Buff, light brown to white, teardrop shape	Buff to white teardrop shape
PRIMARY PREY / FOOD CONSUMED	Greenhouse thrips, chili thrips	Greenhouse thrips, prefers 1st & 2nd instars	Thrips (WFT, onion thrips), nymphs & adults, pollen	Thrips, mites, pollen	Nymphs of WFT, onion thrips, pollen	Thrips larvae, whitefly, pollen
OTHER PREY CONSUMED	Other thrips and small arthropods	None	Aphids, mites, moth eggs, whiteflies	Whiteflies	Broad mite, other mites, chilli thrips	Various mites, small arthropods
ENVIRONMENTAL REQUIREMENTS	Warm conditions above 18°C, sheltered crops	Protected cropping	Requires pollen, e.g. banker plants, flowering crops	Egg hatching requires humidity >60%, mild temps	Prefers temps >20°C and humidity >65%	20–30°C optimal. Adults only up to 45°C for short periods
COMMERCIAL SUPPLIERS	Biological Services Other information	Biological Services Other information	Bugs for Bugs Biological Services	Biological Services	Bugs for Bugs BioWorks Biological Services	Biological Services Bugs for Bugs

Montdorensis feeding on a spider mite, next to a whitefly.

CHEMICAL CONTROL

Many thrips species inhabit protected regions of plants, within flowers, growing tips and leaf curl galls. For this reason, contact pesticides are only likely to strongly impact those species that mostly are on the leaf surface, unprotected. For all other thrips, systemic or translaminar products are recommended. Populations of some species of thrips can develop pesticide resistance quite rapidly, most notably Western flower thrips, Onion thrips and Melon thrips. For this reason, it is important to rotate between at least three mode of action groups, preferably more. Cease applications of pesticides that have been ineffective. The presence of some thrips, particularly those feeding on pollen in flowers, cause little or no damage to plants. Therefore, it is important to distinguish between those populations that are incidental, and those that are likely to cause economic loss.

Many pesticides registered against thrips are organophosphates (1B), synthetic pyrethroids (3A) or neonicotinoids (4A) (Table 4). These pesticides will have a high negative impact on natural enemies and application of neonicotinoids may preclude the ability to supply to certain retailers; it is recommended to avoid the use of these pesticides unless there are no other options available. If thrips are likely to cause economic damage, it is important to apply a pesticide on multiple occasions within a short period of time, i.e. weekly for two or three weeks as per the label. See recommendations section below for suggested pesticide rotations. This will assist in breaking the lifecycle for those species that pupate in growing media or are otherwise protected from the pesticide application.

Even relatively low risk pesticides can have significant negative impacts on some predators.

RECOMMENDATIONS

For crops that receive consistent, regular damage, particularly in spring, early action is recommended. This may involve the pre-release of a suitable biological control agent; Orius and Frankie are good choices as they feed on a range of food items including pollen and adult thrips (which are likely to be blown into nurseries on spring winds). Monitor thrips populations in susceptible crops regularly during high-risk periods. Follow-up releases of predatory mites (Cucumeris or Montdorensis) and parasitic wasps (for greenhouse thrips) can be applied regularly to limit build-up of thrips (nymph) populations (probably weekly until natural enemy populations have established). Soil-dwelling predators Dalotia and Hypoaspis

CHILLI THRIPS IN WESTERN AUSTRALIA

Management of chilli thrips, *Scirtothrips dorsalis*, in Western Australia has challenged some growers. It is recommended to monitor high-risk crops regularly and apply pesticides or biological control agents when pest populations are low. If using pesticides, apply multiple sprays of the same product as per the label, e.g. 2–3 sprays 10 days apart. Ensure the pesticide is applied at the correct rate; calibrate your equipment. Monitor thrips numbers after applications to determine reduction in numbers. If you rely on damage of your plant to determine if the application was effective you may be incorrectly assuming that pesticides have not worked when in fact they have, or vice-versa. Rotate to another mode of action group if required.

In Perth, bore water is commonly in use that can be very high in iron and may be quite hard. Iron is a positively charged ion and will attract negatively charged pesticides and bind them, drastically reducing pesticide efficacy. Likewise, hard water can also reduce pesticide efficacy. It is not recommended to use such bore water for application of any pesticides. Collect rainwater or purchase and store clean and neutral water in a tank for pesticide applications. Refer to the GIA factsheet on chilli thrips for more information on the biology of this species.

Chilli thrips damage on mango

mites are recommended in nursery and protected propagation areas to control thrips pupae and fungus gnats in growing media. Seek advice from biological control agent producers on optimal releases whenever applying predators/wasps for the first time, or when uncertain of how to proceed.

If moderate numbers of thrips have occurred in the crop and biological control agents are either already present or their release is planned, it may be necessary to apply a low-risk pesticide. The following active ingredients will have limited negative impacts on predator populations, particularly if predators are released three days after pesticide application (Table 3).

- Spirotetramat (group 23)
- Spinetoram (group 5)
- Cyantraniliprole (group 28)
- Abamectin (group 6)
- Flonicamid (group 29)
- Isocycloseram (group 30)
- Insecticidal soaps, azadirachtin and oils (horticultural oils, potassium salts of fatty acids) for suppression – these products can have significant effects on some predator species

Add an oil compound at label rates if feasible, particularly if thrips are present on exposed plant surfaces. Again, if planning on releasing predators/wasps, contact the producers to discuss your plan and optimise success.

Refer to the insecticide table at the end of the document for more detailed information on pesticides registered for thrips in Australia. Where biological control is not practiced and naturally occurring beneficial species are not to be conserved, the addition of the following pesticides can be added to the rotation.

- Group 1B pesticide (preferably a systemic pesticide)
- Fipronil (group 2)
- Group 4A pesticide (particularly in Durivo), noting that some retailers do not accept plants that have had this group of pesticide applied

As mentioned above, each rotation generally involves 2–3 applications of the same mode of action group before moving to the next mode of action group. This reduces the risk of inducing pesticide resistance. Always follow the label or permit directions.

BIOSECURITY

There are several thrips recorded as pests overseas, but not in Australia, that could be of concern for production nurseries if inadvertently introduced. If you suspect that you have observed an exotic pest or disease, including exotic thrips species, contact the exotic plant pest hotline 1800 084 881.

FURTHER READING

- OZ thrips and Thrips of California
- Managing populations of beneficial insects
- Managing weeds
- Virus management in production nurseries
- Nursery minor use permits
- Crop life Australia and Insecticide resistance action committee
- Grow Help Australia

This document was updated in 2025 by Andy Howe, Andrew Manners and John Duff (Queensland Department of Primary Industries - DPI) as part of the Hort Innovation, Levy and Queensland Government funded project 'Resourcing, supporting, and assessing biosecurity in nursery production' (NY20000). All photographs can be attributed to DPI unless otherwise indicated (as in the very first Bugwood image). This factsheet was originally prepared by Andrew Manners in 2015 (NY11001).

TABLE 3 LIST OF ACTIVES, EXAMPLE PESTICIDES AND PERMITS FOR USE AGAINST THRIPS IN AUSTRALIAN PRODUCTION NURSERIES (MAY 2025). PLEASE NOTE THAT LABELS CAN VARY AND HAVE ADDITIONAL IMPORTANT INFORMATION; REFER TO PESTICIDE LABELS AND MINOR USE PERMITS FOR MORE INFORMATION.

MODE OF ACTION	ACTIVE INGREDIENT	EXAMPLE PRODUCT NAME/S	REGISTRATION INFORMATION	ACTION[1]	TOXICITY TO BENEFICIALS
1A	Methomyl	Lannate	PER82428 Thrips (incl. WFT) on ornamentals, nursery seedlings (non-bearing) (expires Jan 2029).	C, I	Residual unclear, H (broad-spectrum)
1B	Diazinon	Diazinon	All thrips on nursery plants; various thrips on specific vegetable and fruit crops.	C, I, V	M-H – about 3 weeks residual
1B	Dimethoate	Dimethoate	All thrips on ornamental plants. Various thrips on certain fruit and vegetable crops.	C, S, I	H – 8-12 weeks residual
1B	Omethoate	Folimat	Thrips on onions, bananas, carnations, chrysanthemums, pelargoniums, roses, callistemons, Eucalyptus spp., Grevillea spp., paperbarks and wattles.	C, S, I	H – 8-12 weeks residual.
1B	Phorate	Zeemet	Granular compound for thrips on onions, certain brassicas, potatoes, tomatoes, carnations, chrysanthemums, dahlias, lily bulbs, azaleas, roses and other woody ornamentals. Some labels with different host plants listed.	S, I	Unknown, probably high toxicity with long residual.
2B	Fipronil	Regent Instar Granular	PER91804 All thrips in soil (expires June 2027).	C, S, I	H – at least 1 week residual
3A	Bifenthrin	Bifenthrin	*Selected thrips* on ornamental plants; Flower thrips on banana.	C, I	High – 8-12 week residual
3A	Piperonyl butoxide, chilli, garlic extract, pyrethrins	Beat-a-bug	Plague thrips on nursery plants.	C, I	
3A	Pyrethrins	Pyganic	PER91929 Greenhouse thrips on nursery stock (expires May 2027).	C, I	No residual, H impact (broad spectrum)
4A	Acetamiprid	Crown	Greenhouse and plague thrips on ornamental plants.	C, I, S	H – 6-7 weeks residual
4A	Dinotefuran	Starkle	PER91805 All thrips on nursery stock and ornamentals (Expires April 2026).	C, S, I	H – 2-3 days residual, toxic for bees
4A + 15	Acetamiprid & novaluron	Cormoran insecticide	PER91805 All thrips on nursery stock and ornamentals (Expires April 2026).	C, S, I	Residues several days, M-H, toxic to beneficials, not compatible in IPM programs utilising beneficials.
5	Spinetoram	Success Neo Jemvelva Active	PER91929 Thrips (incl. Melon and Plague thrips) on nursery stock (non-food) and ornamentals (expires May 2027).	C, I	Up to 7 days residual; M toxic.
23	Spirotetramat	Movento	PER91929 Thrips on nursery stock (non-food) and ornamentals. Not to be used on vegetable/herb seedlings in production nurseries (expires March 2027).	S, I, T	>4 weeks residual, L.
28	Cyantraniliprole	Benevia	PER92766 Selected thrips species (incl. WFT) on non-food nursery stock (expires May 2027)	C, I, S	L-M - 2-3 weeks residual as a foliar spray
28	Cyclaniliprole	Teppan	PER91929 Thrips (incl. WFT) on nursery stock (non-food) and ornamentals (expires May 2027).	C, I, S	L- H toxic to beneficials depending on species; not compatible in IPM programs utilising beneficials.
28 & 4A	Chlorantraniliprole & Thiamethoxam	Durivo	PER91805 All thrips on nursery stock and ornamentals (Expires April 2026).	C, I, S	M-H, broad spectrum, systemic; probably moderate to long residual activity. Highly toxic to bees.

MODE OF ACTION	ACTIVE INGREDIENT	EXAMPLE PRODUCT NAME/S	REGISTRATION INFORMATION	ACTION[1]	TOXICITY TO BENEFICIALS
28 & 12A	Cyantraniliprole + diafenthiuron	Minecto Forte	PER92919 Nursery stock, cut flowers and non-food ornamentals for selected thrips (incl. WFT)s (expires Oct 2026).	C, I	Uncertain residual, M-H, toxic to beneficials, not compatible in IPM programs utilising beneficials.
29	Flonicamid	Mainman	PER91929 All thrips (incl. WFT) on nursery stock (non-food) and ornamentals (expires May 2027).	S, I	1-2 weeks residual, L
30	Isocycloseram	Simodis Plinazolin Technology	PER94004 Selected thrips species (incl. WFT) on (non-food) nursery stock (expires Feb 2026).	C, T, I	1-3 weeks residual, M; not compatible in IPM programs utilising beneficials.
NA	Natrasoap	Potassium salts of fatty acids	Thrips on ornamental plants.	C	M-H – no residual.
NA	Paraffinic/ Petroleum oils	Sacoa BioPest	Labels vary. Thrips on selected vegetable and ornamental plants. PER91929 All thrips on nursery stock (expires May 2027).	C	M – low residual

[1] Action. C = contact, I = ingestion, T = translaminar, S = systemic.
[2] Toxicity to beneficials. L = low, M = medium, H = high toxicity. Where more than one letter, e.g. L-M, is present it indicates that the pesticide may have low or medium toxicity dependent on the beneficial insect.