

Typhlodromus

Predatory mite

Biocontrol organism

☞ *Typhlodromus occidentalis*

The predatory mite typhlodromus attacks spider mites, including the twospotted mite. Typhlodromus is well adapted to hot and dry conditions, and is resistant to or tolerant of many organophosphate insecticides.

Adults are similar in size to adult twospotted mites. Typhlodromus is pear-shaped, with no spots or markings, and usually off-white; but its colour may vary with the type of prey. Immature stages are mostly pale and translucent.

Typhlodromus eggs are larger than spider mite eggs, and oval in shape whereas spider mite eggs are spherical. An adult typhlodromus consumes 5–15 spider mites or eggs per day, and lays approximately 50 eggs at the rate of 2–3 per day.

Typhlodromus can complete a generation in 7–8 days under optimum conditions, whereas spider mites will take 14–17 days. Optimum

temperatures for development are 27–32°C, but typhlodromus tolerates temperatures over 40°C. It also tolerates very low temperatures, but becomes less active and may enter diapause (hibernate). This stage sometimes allows typhlodromus mites to remain established in the release area for many years.

Target pests

☞ **Twospotted mite** *Tetranychus urticae*

☞ **Web-spinning spider mites** *Tetranychus* spp.

Twospotted mite, also known as red spider mite, attacks over 200 species of plants. Its extensive host range, short generation time, continuous reproduction and resistance to many miticides often make long-term control by the use of conventional spraying a frustrating experience.

Adult mites are very small, and yellowish green in colour with two dark spots on the back. Males are slightly smaller and slimmer



Plate 34: Typhlodromus juvenile (left) and adult (right) feeding on twospotted mite. Note dehydrated condition of mites.

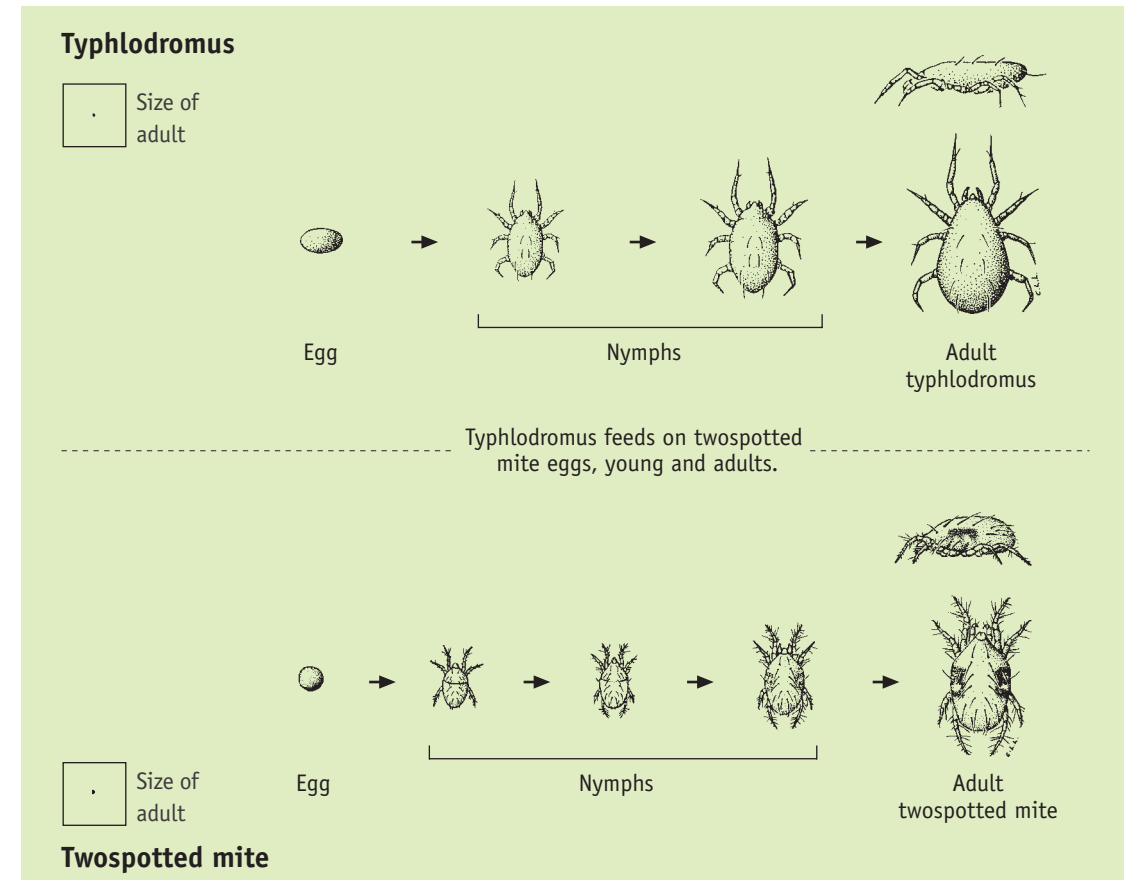


Figure 8: Life cycles of the predatory mite typhlodromus and twospotted mite

than females. Twospotted mites reproduce by laying whitish, spherical eggs among webbing on the leaf. The young mites, called nymphs, resemble the adults and pass through three growth stages before reaching adulthood.

In autumn, with decreasing day length and lower temperatures, adult females normally change to a light red colour and hibernate in cracks and crevices. In indoor situations where it is warmer, mites may remain active all year round.

Twospotted mites are found on all accessible plant parts, but mainly on mature leaves. In severe infestations, twospotted mites congregate on the growing tips. Usually mites prefer to feed and breed on the lower leaf surface.

Pest mites damage plants by puncturing the cells of the leaves with their sucking mouthparts. They then suck up plant fluids, causing white speckling on the leaves. In severe cases the leaves are fully blanched, or turn brown and dry out, and the leaves become covered in fine spider-like webbing.

Suitable crops/environments

Typhlodromus has been shown to be effective on apples and stone fruit. It is well suited to tree crops in hot dry climates, and has the additional advantage of being resistant to azinphos-methyl,

which is commonly used against codling moth and oriental fruit moth.

Outdoor vegetable crops are also suitable, as are indoor or greenhouse crops, if temperatures are high and humidity is low. The predatory persimilis mite (*Phytoseiulus persimilis*) is generally better for indoor situations and for vegetable or strawberry crops in moderate temperatures and higher humidity.

Before release

The first introduction of typhlodromus should be made at the first sign of spider mite activity. If the levels of spider mite are already high and no predators are present, a selective miticide may be required to reduce the population before introducing typhlodromus. The miticide to use will depend on the type of crop.

Do not use residual pesticides 2 weeks before or after releasing typhlodromus.

At release

Immediate release of predators is extremely important. Typhlodromus is delivered on bean leaves. There will be approximately 100 predators in active and egg stages on each trifoliolate leaf (three leaves joined together), together with some pest mites as a food source. Bean leaves should be placed near mite-affected areas. In trees, this should usually be in the crotch area, or stapled to mite-affected leaves in the lower part of the tree to avoid bean leaves being dislodged.

Outdoors, releases of typhlodromus can be made between November and March, depending on the presence of spider mites. In indoor situations, with supplementary heating, typhlodromus will stay active all year and can be released at any time.

An initial release is recommended early in the season, especially in areas where there has been a

history of spider mite activity. The aim is to establish a population of predators as soon as possible.

Typhlodromus establishes more readily when there is a good supply of pest mites as a food source. A second release is recommended approximately 4 weeks after the first to ensure good establishment. Predatory mites are fairly mobile and will move on once they have 'cleaned up' the area in which they have been placed.

Where predators establish readily and pest mite infestation is not heavy, good control can be achieved within 6–8 weeks. In some situations multiple releases may be necessary over two or more seasons to achieve good long-term control. Where toxic chemicals are used to control other pests early in the season, annual releases may be necessary.

Recommended release rates

The following rates should be used as a guide.

Pome/stone fruit: 25 000 predators per hectare. This can be divided into two releases.

1 (a) 12 500 per hectare at first sign of pest mites, or released into previous hot spots during November–December.

(b) 12 500 per hectare 4 weeks after the first release.

Place two trifoliolate bean leaves approximately every 7 m in every second row. If



Plate 35: Typhlodromus adult and egg. The egg is oval, and twice as large as the nearby twospotted mite egg.

treating hot spots, place two trifoliates into every tree in that area.

Use the same spacing for the second release as for the first, but place leaves in the rows not covered previously.

2 25 000–50 000 per hectare in one release if mite levels are moderate to high throughout the release area.

At least two trifoliolate bean leaves should be placed about every 7 m in every row.

Outdoor vegetables: 50 000 predators per hectare spread evenly throughout the crop and a few extra in infested areas. Spacing will depend on row widths.

Ornamentals/greenhouse crops: 10 per m² released evenly throughout the crop, plus an additional 20–30 predators per infested plant. In most indoor situations, persimilis is the preferred predatory mite. However, if conditions are hot and dry, or organophosphate chemicals are used, typhlodromus may be more suitable.

After release

Do not use pesticides toxic to the predators for at least 2 weeks after the release date. Try to reduce dust in the area as much as possible. Outbreaks of spider mite are common along exposed dusty tracks and boundaries. Spot treatments with compatible miticides may be necessary in these areas, but do not spray the entire area if this is not required.

Monitor mite levels at least once a week, taking sample leaves from the middle of the plant. A ratio of one predator mite to every twenty pest mites is recommended early in the season, and one predator per ten pest mites mid-season. This will depend on plant susceptibility and environmental factors, but can be used as a guide.

If predators are present but the ratio is out of balance, use IPM rates of selective miticides to



Plate 36: Adult twospotted mite and eggs

reduce pest mites and preserve your predators. If no predators are present and mites occur in large numbers, use miticides at full label rates and introduce predators afterwards.

Monitoring in apples and stone fruit

To monitor pest infestation of apple trees, select ten trees per hectare and sample five leaves from the inside centre of each tree. Record the presence or absence of mites.

1 If less than 50% of leaves have pest mites present, no treatment is needed. If no predators are noted when pest mites first start to become active, a typhlodromus release will be required.

2 If more than 60% of leaves have pest mites present, and less than 50% of these infested leaves have typhlodromus, then a compatible selective miticide will be required. Predatory mites tend to be found on the underside of leaves close to the midrib and adjacent leaf veins. Predators should be re-released 7–10 days after miticide application if no predators are found in this sampling.



Plate 37: Peach leaf damaged by twospotted mite

3 If more than 60% of leaves have pest mites present, and more than 50% of leaves infested with pest mites have active typhlodromus, a miticide will not be required and control of pest mites will occur within 1–3 weeks.

Do not spray pest mites at the first sign of pest mite activity. Some damage in the centre of trees should be tolerated and will not affect present or future crops.

Note that this information applies to apples and stone fruit only. Pears and nashi fruit have much lower threshold levels, and miticide treatment may be required at the first sign of pest mites if no predators are present.

Chemical use

Typhlodromus tolerates many organophosphate chemicals and is resistant to azinphos-methyl. Miticides such as Apollo, Omite, Unimite,

Torque and Pyranica are relatively safe to use, especially at IPM rates.

Most fungicides and nutrient sprays are safe, but Benlate reduces egg production in typhlodromus.

Carbaryl and some other carbamate insecticides are toxic. Pyrethroid chemicals, such as Mavrik or Klartan, are extremely toxic to typhlodromus. Re-release will definitely be required if these chemicals are used during flowering and fruit set, but wait at least 4 weeks after application to allow residues to break down.

Additional information

Predators are supplied on bean leaves. When they arrive, the leaves will often be clumped together. Provided you receive your consignment within 3 days of the postage mark, the predators will still be in good condition. Try to separate the leaves as well as possible and distribute them evenly. All leaves will contain both predators and predator eggs, so make sure they are all released, even if they appear in poor condition.

Typhlodromus should be released immediately they are received. Contact your supplier to discuss your results and any queries you may have.

Other natural enemies of spider mites

Predatory mite *Phytoseiulus persimilis*

Ladybirds *Stethorus* spp.