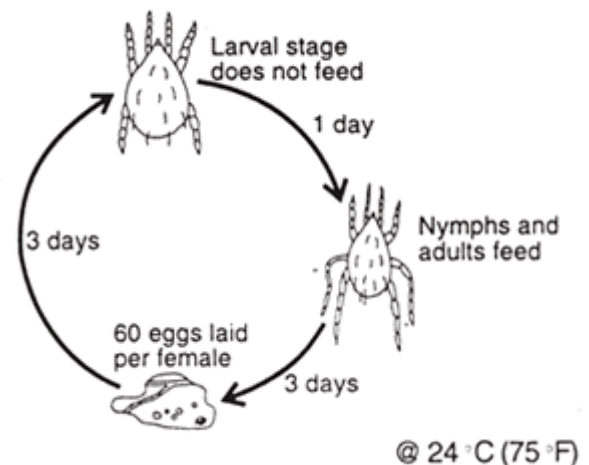


***Amblyseius (Neoseiulus)* *fallacis* Spider Mite Predator**

Target pests

Two-spotted spider mite
(*Tetranychus urticae*)
European red mite
(*Panonychus ulmi*)
spruce spider mite
(*Oligonychus ununguis*)
southern red mite
(*Oligonychus ilicis*)
bamboo mite
(*Schizotetranychus celarius*)



Description

'Fallacis' is a native predatory mite that feeds on spider mites, rust mites and small insects. It is one of the most important biological control agents in North American berry and orchard crops.

- Adults have pear-shaped bodies, 0.5 mm long; they are tan to light orange in colour, shiny, with long legs.
- Immature predators are cream coloured and semi-transparent.
- Eggs are oval and 0.3 mm long.

Use in Biological Control

- Fallacis is used to control two-spotted spider mites and other mites on greenhouse peppers, field strawberries, raspberries, currants and mint. In British Columbia, Washington and Oregon, IPM programs for field berry crops are based on using Fallacis as the primary control for spider mites.

Fallacis is also used on container and field-grown nursery stock. Research in Oregon found that Fallacis can control the spider mites *O. ilicis*, *O. ununguis*, and *T. urticae* on woody ornamentals (*Thuja*, *Skimmia*, *Weigela*, *Potentilla*, *Euonymus*, and *Buddleia*) and bamboo mite (*Schizotetranychus celarius*).

- Fallacis feeds on apple rust mite (*Aculus schlectendali*), cyclamen mite (*Steneotarsonemus pallidus*) and tomato russet mite (*Aculops lycopersici*), however, whether or not it controls these species is not known.
- Fallacis is more resistant to pesticides than most biological controls and a strain highly resistant to pesticides is available commercially (see text box, below).
- Unlike other predatory mites, such as the Persimilis predatory mite, Fallacis can remain in areas with low levels of spider mites; they survive in the absence of mite prey by feeding on other small arthropods and pollen.
- Fallacis feeds and reproduces over a wide range of temperatures [9-32°C (48-85°F)]. They do best where there is a dense plant canopy and when relative humidity is over 50%.
- Fallacis can reproduce at lower temperatures than other predatory mites (*Phytoseiulus persimilis*, *Neoseiulus californicus*) and displaces them in the cooler growing areas in Canada and northern USA.

Monitoring tips

- Use a headband magnifier or 10-15X hand lens. The predators are usually easy to tell from their prey, which are slow-moving.
- Adult mites often hide under leaf hairs and along the edge of leaf veins. They are most easily seen on parts of the leaf where spider mite numbers are low or around the edges of the main spider mite infestation.
- Eggs are usually found singly or in pairs in crevices along, or partly under, the leaf midrib or where prey is abundant.

Life Cycle

Development from egg to adult takes from 7-9 days at 21°C (70°F) to 3 days at 32°C (85°F). At 26°C (78°F) a fourfold increase in numbers can occur within 4 days; in the field, under optimum conditions, populations can increase from 10 predators/100 leaves to 200-500 predators/100 leaves, in just 2 weeks.

- Adult females lay 1-5 eggs per day, for a total of 26-60 eggs over their 14-62 day life time. The eggs hatch in 2-3 days. Eggs are oval and twice the size of two-spotted mite eggs.
- Newly hatched predators do not eat, but later stages and adults feed on all stages of prey. Female Fallacis eat 2-16 spider mites per day.
- Adult females enter diapause in response to the short days (daylight of 14 hours or less in Canada) in fall. They stop reproducing and move into sheltered areas, such as under bark or ground cover. They do not enter diapause in greenhouses or interior plantscapes if the temperature is 18°C (64°F) or above.

Product Information

Fallacis is available commercially either on bean leaves or in a granular carrier (usually vermiculite, sawdust or corn grits). These formulations should be applied as soon as possible. Fallacis packages can be held at 10-15°C (50-60°F), out of direct sunlight, for 1-2 days--but storage for longer periods may reduce quality (reduced egg production).

Using the **bean leaf product**

- Place leaf pieces from the container onto infested leaves of crop plants. The bean leaves eventually dry out and become inconspicuous.
- Check the product by examining the underside of some of the leaves using a 10-15X hand lens or magnifier. Active predators should be visible.
- Advantages of this product are that all life stages are present, which introduces all ages of predators into a crop. It also provides ideal humidity and a food supply for the predators in transit.

Note that although the bean leaves may contain a few two-spotted mites, this does not add to the pest problem because the predators quickly eliminate them. The presence of this food enables Fallacis to become established and start reproducing immediately, which improves biological control.

Using the **vermiculite product**

- Lay the container on its side at room temperature, out of direct sunlight, for 1/2 hour.
- Check the product by looking through the bottle or by sprinkling some of the vermiculite onto a sheet of black paper and using a 10-15X hand lens or magnifier. Active mites should be visible.
- Gently rotate the bottle to mix the mites with the carrier and distribute the contents over the infested plants.

Introduction Rates

Fallacis is most effective when applied at the first sign of a mite infestation. Fallacis will usually become established in the crop after one introduction, where they remain if mites or pollen are available for food. When prey become scarce, Fallacis moves to the top of the plant and usually disperses throughout the crop on air currents or the wind.

When predators are found on each infested leaf it usually means that the biological control program will be successful. It may take another 2-6 weeks for new plant growth to show improvement, depending on growth rates.

General Introduction Rates

- 1-5 Fallacis/m² (10 ft²)

For greenhouse crops, apply predators to all infested plants. Use the lower rate for preventative introductions onto mite susceptible plants; use the higher rates if there are established mite populations.

Greenhouse peppers:

- As soon as flowers have pollen, or spider mites are present, apply 1 predator/5 plants. Also, apply Persimilis to all outbreak areas when using Fallacis because spider mite can reach high densities on this crop during hot weather (For information on biological controls in peppers, see Sheet 401). Research in BC has shown that better control of spider mite can be achieved when both Fallacis and Persimilis are used together on greenhouse pepper.

Woody ornamentals, container plants:

- Apply 1-5 predators/m² (10 ft²) to all spider mite susceptible plants early in the season, or as soon as spider mites are detected. Use higher rates for established spider mite populations.
- Use a compatible miticide, such as Vendex, to treat "hot spots" until the Fallacis populations build up.

Field crops:

Before introducing Fallacis, monitoring counts should be done to determine numbers of spider mites and existing predators. Spread Fallacis evenly throughout the field using 150-200 release points/ha (60-80/acre); concentrate extra predators where there are higher mite counts.

- Strawberries and Mint: For new plantings release 25,000 predators/ha (10,000/acre) as soon as possible after planting or 10 days after applying insecticides to control aphids. On producing fields, release 17,000/ha (7000/acre), if needed, in spring or early summer so predator numbers have enough time to build up and provide control before September. **Before planning a strawberry biocontrol program, refer to the Oregon State University web site, which includes a Fallacis release rate calculator (<http://www.orst.edu/Dept/entomology/ipm/mcalc.html>).**
- Raspberries and currants: Release 17,000-25,000 predators/ha (7,000-10,000/acre). Inoculate only those fields with spider mite populations of 0.3 mites/leaf and higher. Release predators early in the spring to achieve control the same season; release them during the summer for control the next season.

For Best Results

- In field crops, placing higher numbers of predators on the prevailing upwind side of the crop will increase their dispersal throughout the crop by wind.
- In greenhouses, Persimilis should be always be applied along with Fallacis. If spider mite numbers are high (there is visible webbing and clusters of mites stringing down from leaves), use an integrated pesticide, such as fenbutatin oxide (Vendex[®]) or

insecticidal soap, to reduce pest numbers before releasing predators and in hot spots after release.

- Fallacis needs relative humidities of over 50% to survive, particularly in the egg stage. In hot, dry conditions, raise the humidity by watering or misting plants.
- For two-spotted mites in greenhouses, where temperature and humidity are consistently high [over 22°C (72°F) and 70% RH], release *Persimilis* as well as Fallacis. *Persimilis* works better in high density spider mite populations under these conditions (for more information on *Persimilis*, see Sheet 200).
- Where over 60% relative humidity can be maintained, both *Persimilis* and the predatory midge *Feltiella acarisuga* (see Sheet 280) can be used with Fallacis.
- The mite eating lady beetle, *Stethorus* (see Sheet 280) is less affected by low humidity and may be used along with Fallacis on greenhouse cucumber, pepper and nursery crops. *Stethorus* is able to fly and can detect and control small colonies of mites before they become well established.

Using Pesticides

For effect of pesticides on Fallacis, see Sheet 180 and text box (below) for resistant strains.

- To reduce mortality of predatory mites from pesticides, release predators 10 days after spraying.
- The pesticide fenbutatin oxide (Vendex[®]) can be used with Fallacis for additional control of spider mites if “hot-spots” develop. It does not harm Fallacis, but avoid over spraying, which reduces the predator’s food supply and their ability to reproduce.
- Spreader-stickers, supreme oils and soaps are harmful to predators contacted by the spray, but have little residual activity.

The Pesticide Resistant Strain of Fallacis

A special strain of Fallacis, selected by H. Thistlewood (Agriculture and Agri-Foods Canada, Vineland Research Station) for resistance to commonly used pesticides is mass-produced under license by Applied Bio-Nomics Ltd. in Canada. When the following pesticides are used at low rates they are of low to moderate toxicity to this strain on Fallacis. **Breeding populations of Fallacis should survive in the crop when the pesticides listed below are used at low label rates. Check with supplier before using other chemicals.**

abamectin (Avermectin)
azinphos-methyl (Apm/Guthion)
Bacillus thuringiensis (Dipel)
captan (Captan)
clofentazine (Apollo)
diazinon (Diazinon)
dichlone (Phygon)
diflubenzuron (Dimilin)
endosulfan (Thiodan)
fenarimol (Rubigan)
fenbutatin oxide (Vendex/Torque)
fenoxycarb (Sustain/Insegar)
hexythiazox (Savey)

iprodison (Rovral)
malathion (Malathion)
methoxychlor (Methoxychlor)
myclobutanil (Nova)
mineral oil (dormant oil)
phosmet (Imidan)
pirimicarb (Pirliss)
propargite (Omite)
sulphur (Sulphur)
triadimefon (Bayleton)
triforine (Funginex)
vinclozolin (Ronilin)