PRODUCT INFORMATION SHEET

Spider Mite Tri Pak

Our new and improved tri-pak are tailored for you. All tri paks will contain will *P. persimilis* in vermiculite, A. *fallacis* in vermiculite and *S. punctillum*. Each of the predators will be in separate container to allow you to apply certain predators where you want them.

Product: Phytoseiulus persimilis

Phytoseiulus persimilis adult females are approximately 0.5mm long, pear shaped and red in colour. Immatures and males are smaller and lighter in colour. About 80% are females. At optimum temperatures, P. persimilis can develop from egg to adult in 7 days and live for up to one month. The sex ratio is 4 females / 1 male. Population increase is 44x in generation time of 17 days. (They breed twice as fast as spider mites at 70°F (20°C), therefore can quickly gain control!) A well-fed female will lay about 50 eggs in her life-time. Prey consumption is up to 7 adult spider mites, or 25 eggs or 20 immatures per day.

Target:

Phytoseiulus persimilis feeds voraciously and reproduces only on two-spotted mites (*Tetranychus urticae*) and other web spinning spider mites (red spider) in the family Tetrancyhidae.

Release:

Predators are highly perishable. Release immediately upon arrival! (If not possible, then lay vial on its side in fridge for up to one day at 40°F (4°C). To release from bottle, mix predators into vermiculite by slowly and gently rolling the vial 30 or so times. The mites are fragile - so do not shake! Remove the tape on cap and gently tap onto dry foliage. Each tap will release about 10 mites.

Rate:

Release rates are dependent on crop, level of infestation and desired speed of control. Best results are obtained when pest levels are low. Average rate is 1 predatory mite per ft^2 ($10/m^2$), 2000 per 3000 ft^2 ($289m^2$) of greenhouse area, or 10 per infested leaf. A reduction in spider mites should be obvious in 2-3 weeks, and usually complete control in 4-6 weeks. Monitor the new growth for control as the webs formed from the dead spider mites will remain on the foliage and damage already done will stay the same.

Temperature:

Ideal temperature range is 70 - 85°F (20 -30°C), with relative humidity of 70 - 80%. Minimum temperature for activity is 50°F (10°C). *P. persimilis* is best adapted for greenhouse and shade house uses, as well as moderate outdoor environments. This product is not appropriate for use in hot, dry climates with temperatures greater than 90°F (35°F) and humidity below 40%.

Note:

-Begin releases at first sign of spider mites. Using more predators gives faster control!!
-P. persimilis must have spider mites in order to survive, as they do not feed on pollen nor plants. They are not cannibalistic i.e./ they do not consume each other.
-Do not release immediately before or after pesticide applications. Request pesticide compatibility information for residual effects!

Product: Neoseiulus fallacis

Neoseiulus (=Amblyseius) fallacis is a very small, pear-shaped predatory mite about 0.25-0.5 mm (1/64") in length, that is very active. They are similar in appearance to the two-spotted spider mite but are more flattened and lack spots. Their colour varies from cream to almost white and changes depending on their age and recent food source. The eggs of N. fallacis are nearly transparent white, shiny and football-shaped whereas two-spotted spider mite eggs are round and usually associated with webbing. N. fallacis eggs hatch into a six-legged larval stage that is transparent and difficult to see without a microscope. The following post egg nymphal stages and the adult stage all have eight

legs. At 70°F (21°C) N. fallacis eggs hatch in two days and adults develop in 7 days. At
55°F (13°C) adults develop in 16 days. Females represent 66-75% of the adult population. They can lay up to 100 eggs along the ribs of the undersides of leaves. Higher egg production is achieved with greater prey availability. At 80°F (27°C) adults live 1-81 days (average 41) and at 70°F (21°C) the life span is somewhat longer at 24-80 days (average 62). Four to six generations of N. fallacis are completed in a season in New York state. N. fallacis are also effective indoors on crops that can provide them with pollen and nectar on which to establish themselves.

Target:
N. fallacis preys on many species of mites, especially red, two-spotted (Tetranychus urticae), European, Spruce, and Strawberry mites. N. fallacis uses two different foraging patterns. When prey is plentiful, a random walking pattern is used, allowing them to prey on mites on a leaf most efficiently. When prey is scarce, the predators walk along the leaf edges, increasing the chance of moving to a new leaf. Individual predatory mites assume a stance that allows them to be carried off on a breeze to new hunting territories when prey numbers are pronouncedly low. Research shows that N. fallacis uses chemical signals from prey silk and feces to hunt prey, and furthermore uses its own marking pheromone to mark previously searched areas.

Release:
Release N. fallacis into your crop immediately upon receipt, ideally when temperatures are above 55°F (12°C).
Avoid making releases when temperatures are very high, i.e. 80°F+ (27°C+), and humidity is low since N. fallacis is especially sensitive to dry conditions. N. fallacis come shipped on bean leaves. When placing leaves throughout your crop, make sure they are placed out of direct sunlight and in a position so that the mite predators are able to make contact with the plant foliage (i.e. Bean leaves touching leaves or stem of infested plant).

Rate:
10,000 predator mites per ½ hectare (1 acre). Space release sites evenly throughout the field, especially towards the upwind side and wherever spider mite densities are highest. If possible, scout the field and map spider mite hot spots just before or during predator releases. Apply predators more heavily wherever spider mite densities are high; apply fewer predators where spider mites are less dense. Predators will build up slightly faster wherever spider mite eggs are abundant. Predators will move more quickly wherever spider mites are sparse

Temperature:
40°-100°F (5°-40°C) with 60-90% relative humidity. At temperatures below 50°F (10°C) the predatory mites will feed but won't produce. N. fallacis is known for its affinity for humid environments such as those found in peppermint, strawberry and sweet corn crops where the dense plant canopy sustains a high humidity.

Notes:
- N. fallacis is a slower consumer of mites but once established after 2-3 releases, will provide a continuous control. For a quick knockdown of spider mites, NIC recommends releasing Phytoseiulus persimilis. P. persimilis can be introduced alongside N. fallacis for effective short- and long-term control.
- N. fallacis predatory mites can survive solely on pollen, thus preventing a future mite problem.
- They are adapted to tolerate both pyrethrin's and pyrethroids.
- Will overwinter and establish themselves almost anywhere

Product: Stethorus punctillum
Stethorus punctillum is a small, black ladybird beetle found throughout middle North America, and is commonly known as "Spider Mite Destroyer". It is a highly specialized predator of spider mites. Eggs are laid on leaves up to 15 eggs per day per adult. It takes 18 days to reach adulthood when temperature is 21oC (70oF). Adults live approximately 4 weeks, and eat an average of 40 mites per day.

Target:
Feeds on all stages of spider mites, and is used on a broad range of host plants including fruit and field crops; ornamentals (esp. conifers), and other crops in greenhouses.

For further Information Contact: **NATURAL INSECT CONTROL**, 3737 Netherby Road, Stevensville, Ontario, L0S 1S0
905-382-2904; 905-382-4418 (Fax); info@nicniagara.com
For further Information on all NIC Beneficial Insects go to **www.naturalinsectcontrol.com**

Release:
Hold in a cool place and release beetles in early morning or late evening. Lightly mist area with water to allow for a drink upon release. Open container, shake beetles onto foliage close to spider mite infestations. Place container upright among plants to release remaining adult beetles. If unable to release immediately, hold at 10-15°C (50-59°F).

Rate:
Recommend 1 beetle per $1m^2$ (or $1/10ft^2$). 100 will establish a colony in an average greenhouse.

Temperature:
Optimum temperature is around 21°C (70°F). They have been known to survive outside in temperatures up to 38°C (100°F)

Notes:
-Use Stethorus along with predatory mites (i.e. P. persimilis), as it takes Stethorus longer to become established.
º-Since Stethorus is a fairly new "commercially" used biological control against spider mites, product information is still being collected and will be made available when possible.

500 Square Feet Size				
Insects	2000 P. persimilis	500 N. fallacis	50 S. punctillum	Bonus 10 Release Points
1000 Square Feet				
Insects	2 x 2000 P. persimilis	1000 N. fallacis	100 S. punctillum	Bonus 20 Release Points
2000 Square Feet				
Insects	1 x 10,000 P. persimilis	1000 N. fallacis	100 S punctillum	Bonus 30 Release Points

Phone: 905-382-2904; Email: info@nicniagara.com **Pleaselet NIC know within 24 hours uponreceipt if there are any problems with your live insect order.**

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