



Predatory Mites

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MANAGEMENT OF PEST MITES BY USE OF PREDATORY MITES

The use of predatory mites is an economical biological control for two-spotted spider mites, a complex of harmful spider mite species, which feed on the undersides of plant leaves. Predatory mites are more effective than chemical control because the pest mites do not build up resistance to predatory mites and growers can reduce or eliminate the use of chemical pesticides. Spider mites are often a 'secondary' pest outbreak after spraying – break the cycle by using predatory mites! Crop yield and quality also improves when growers stop using broad spectrum chemical sprays. Predatory mites do not bother plants, people or animals.

Because predatory mites do not give immediate control, they need to be released at the first signs of a pest mite problem. If there are no pest mites for food, predatory mites will not survive and reproduce. Some species (*N. californicus* and *A. fallacis*) persist at low pest densities. In these conditions, it is advantageous to use the 'bean leaf' product that carries a food source for the mites while they establish in the crop. A ratio of 1 predator per 10 prey mites is often adequate to suppress a pest population. It helps to tolerate a small population of two-spotted spider mites in hot spots to maintain the predators as long as possible during the season and be ready to recolonize each year. High density hot spots can be knocked down with "selective" miticides before and after the release of predators. Other insects are also important predators, including six-spotted thrips, *Stethorus punctillum*, the cecidomyid *Feltiella acarisuga*, and general predators, such as minute pirate bugs, big-eyed bugs and lacewings.

PREDATOR MITE SELECTION CHART

Beneficial	Host	Host Plants	Temp range	Humidity	Notes
<i>P. persimilis</i>	Two-spotted spider mite (TSSM) only	Strawberries, greenhouse plants	59-86°F	at least 60%RH, 70%RH ideal	consumes 5-20 pest per day, reproduces faster than TSSM below 82°F
<i>A. fallacis</i>	TSSM, European red mite, spruce mite, Pacific mite, bamboo mite, others	Strawberries, peppers, raspberries, mint, greenhouse plants	48-85°F	at least 50%RH	can survive at low pest densities
<i>G. occidentalis</i>	Spider mites, eriophyid mites, not Red mite eggs	Fruit trees, grapes, corn, cotton	60-120°F	tolerates low humidity, not below 30%RH	will diapause in cool weather and day length <1 hrs
<i>N. californicus</i>	Spider mites, Persea mite, Avocado brown mite, Tumid mite, broad mite, cyclamen, Willamete mite, others	Roses, vegetables, strawberries, avocados, corn	55-105°F	prefers humid, but tolerates low to 40%RH	versatile and fast, persists at low pest densities, but will eat other beneficial mite eggs
<i>M. longipes</i>	Spider mites on greenhouse plants	Greenhouse plants	70-100°F	at least 40%RH at 70°F	great in greenhouses, hotter temps than <i>Persimilis</i> , not as successful outdoors
<i>G. helveolus</i>	Persea mite	Avocado trees	55-90°F	best over 40%	Release 100 per avocado tree (5k/acre) when Persea mites on >25% of leaves

DESCRIPTION OF PREDATORY MITES SPECIES

Predatory mites are shipped in the adult stage in plastic bottles with a natural medium, such as corn grit or vermiculite, or in plastic trays with bean leaves. They are shipped at cool temperatures and should be released on infested plants immediately on arrival. The predatory mites have pear-shaped bodies and the front legs are longer than those of pest mites. They are distinguished from the two-spotted spider mite by the lack of spots on either side. They tend to move more quickly when disturbed or exposed to bright light.

METHODS OF APPLICATION

Predatory mites will have the best chance of success if not more than 10 percent of leaves have pest mites on them. If there is more than an average of one pest mite per leaf, it is best to reduce the population with an insecticide soap or selective miticide. Broad-spectrum pesticides must be avoided for two to three weeks before the introduction. Distribute predatory mites when cool and avoid irrigation or hosing down foliage immediately afterward if the mites are in a natural medium. Water or sugar water sources and higher humidity improve their performance. Under good conditions pest mite control is possible in four to six weeks.

Recommended quantities depend on many factors, including level of infestation carried over from the previous season, ant control and whether selective miticides will be used to treat hot spots. When leafhoppers are also a problem, a combined program with green lacewings will aid mite control.

INTERIOR PLANTINGS

Recommended quantities for early releases in greenhouses and interiorscapes range from 1 predator per square yard for potted plants to 5 predators per square yard for tomatoes and peppers to 13 predators per square yard for cucumbers. Control in heavily infested and very leafy plants and trees may require as many as 500 to 2,000 predators per tree or planter, in weekly or biweekly releases.

STRAWBERRIES AND LOW-GROWING FIELD CROPS

Predators are best applied at or before the two percent level of infestation at 10 - 20,000/acre per week to a total of 30 - 60,000/acre per week over a three week period. Growers usually start with *P. persimilis* and introduce *G. occidentalis* gradually, so that the more heat tolerant species is already reproducing in the field when temperatures reach 85° F or higher.

GRAPES

Applications in grapes generally start in April or early May until the end of June. A minimum of 1,000 per acre is applied in each of five or six weekly or biweekly applications for a total of 5 - 6,000 predatory mites per acre for the season. Heavy infestations could require applications of up to 5,000 predators per acre. It is possible to start with *N. californicus* when the weather is cooler and introduce *G. occidentalis* gradually in combination, so that when temperatures reach 85 F or more, *G. occidentalis* is already reproducing in the field and can continue to offer control at the higher temperatures. It is most effective to release predatory mites in the chronic hot spots which are often associated with ant infestations and other beneficial insect interference factors, such as, pesticide drift, excessive road dust and conditions associated with the edge of the field.

ALMONDS AND WALNUTS

There is some success with predatory mites wintering over, but applications should resume when the predator/pest ratio is less than 1:10. Several weekly or biweekly applications are made using a minimum of 1000 per acre. Both lacewing eggs and predatory mites can be blown into each tree from the top of a truck using a leaf blower adapted with a PVC pipe applicator and mites in a corn grit medium.

HELPFUL HINTS

- Introduce predatory mites early in hot spots. Follow with whole field applications.
- Be proactive, not reactive.
- Pest mites can be tolerated below the 2% level.
- Selective miticides can be used on hot spots of heavy pest mite infestation.
- Distribute the predators when temperatures are cool.
- Humidity favors the predator.
- Monitor to maintain at least 1 predator to 10 pests.
- Release mites on bean leaves by onto plant, staple or paper clip to another leaf if necessary.

Strategy for releasing mites on trees:

The predators are shipped in vials of 1,000, packed in a medium of ground-up corn cob. The vials should be gently turned over for about a minute to be sure that the predators are evenly distributed throughout the medium. The mixture is then poured into the bags.) The bags are then fitted around the ends of the branches or clusters of leaves and stapled in place so that the predatory mites can easily climb onto the tree and get to work.

