



GAINING CONTROL OVER SPIDER MITES

The Two Spotted Spider Mite

The spider mite, *Tetranychus urticae*, is a tiny, eight-legged pest related to the spider and tick. Spider mites are members of the arachnid class. The term "spider mite" comes from their behavior of spinning fine silk webs on infested leaves and new growth. Adults are normally green or yellow but turn red when day lengths shorten in the autumn. Adults have an oval body, with two red eyespots near the head end of the body. Females usually have a large dark blotch on each side and numerous bristles covering the legs and body. They look sort of like bristly black dots. Their eggs are visible too – they are very tiny, white and are laid closely grouped together.

Spider Mites attack plants by stabbing the underside of the leaves and sucking out the sap, causing the cells to collapse and die. As their numbers increase, the number of white speckles on the leaf increases and the leaf eventually dies. Once the spider mites begin reproduction, a distinctive 'webbing' forms, usually under the leaf and then at the growing tip of the plant. The mites disperse from a plant of declining food quality on threads of webbing and drift or are blown on to other plants.

What makes this pest truly difficult to control is its rate of reproduction. Each female will lay up to 12 eggs per day. Mating is not required for egg production. At 70° F, these eggs will hatch in as few as three days and will develop into adults in only 14 days. Adult females also have the ability to go dormant for a time after the photoperiod (daily hours of light) shortens, then re-emerge to lay more eggs a few weeks after the photoperiod lengthens again. That's one reason Spider Mites keep reappearing crop after crop on indoor plants.

Life Cycle and environment

In a given colony of two-spotted spider mites, both adult males and females are present, however females usually outnumber males three to one. This factor accounts for their high reproduction rate as a single female can lay on average over 100 eggs in her life time. Females normally lay eggs on the underside of leaves. The rate at which a two spotted spider mite develops from an egg to an adult is greatly dependent on environment. Their life cycle is accelerated at higher temperatures. This is one of the reasons that these mites are such large greenhouse pests. In the artificial environment of a warm lighted greenhouse or indoor grow space, the mites are able to reproduce quickly and to be active throughout most or all of the year.

Integrated Pest Management:

We prefer a more holistic / organic method of controlling spider mites (or any pests for that matter). Predators, Neem Oil, Azatrol, and organic sprays used in conjunction with each other is just as effective and less caustic to the environment and to your prized plants. Lower temperatures will also help. The ideal temperature for Spider Mites to thrive is 80 deg. F., so you will want to stay below this range if an infestation is found. It is also very important to keep the growing area clear of dead plant material. Dead leaves should be removed from growing areas as soon as possible, as they often contain mite colonies and clusters of eggs. Leaves showing large amounts of mite damage should also be removed as there are often large populations in these areas. Below we list a variety of management methods. Please feel free to ask us questions about any of these or any other methods / products that you have heard of and we will help you find the best solution to the problem. If all else fails we have also listed a harsher miticide to kill these little buggers DEAD.

Preferred Methods of Treatment and Control:

- Azatrol
- **Neem Oil** (*Cold Pressed*)
- Predators
- Pest Out
- Pyrethrin Bombs or Sprays
- Forbid (*or Avid + Hexagon or Floramite!*)

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Azatrol

Azatrol is OMRI listed and Organic. You can feel safe applying this onto your plants all the way through their lifecycle. It will not affect taste, aroma, or color. It works on bugs such as mites, aphids, root aphids, thrips, fungus gnats, caterpillars, etc.

Apply Azatrol as Follows:

In the beginning Spray once and then again 4-5 days later. After control is established continue to spray every other week. Make sure full coverage is achieved when spraying. Both the tops and bottoms of the leaves need to be thoroughly sprayed.

If you are spraying plants that are in the fruiting stage and indoors, you need to worry about mold. Outside, mold is less of a problem for plants because the plants dry out quicker. (When spraying indoors it is recommended to use a wetting agent, such as **Coco-Wet**. We also recommend turning the lights off for a 3 hour period during your plants day time photoperiod, and turning on all fans to facilitate them drying out.) You can spray up to the first 4 weeks into the fruiting/flowering stage, after which you must take extreme precautions to avoid mold.

Quart size foliar application: In a quart, mix 3 tsp. of Azatrol and a few drops of wetting agent with distilled or RO water. Shake and apply. Wait 5 days and reapply by increasing dose to 4.5 tsp of Azatrol with wetting agent and water. If spraying indoors, we recommend raising the lights or spraying while the lights are off (for at least a 3 hour period.) Outdoors spray either early in the morning or at dusk. For best results use within 24 hours.

Gallon size foliar application: In a gallon, mix 2 oz of Azatrol + a wetting agent with RO water. Shake and apply. Wait 4-5 days and then re-apply with 3 oz per Gallon + a wetting agent with RO water. If spraying indoors we recommend raising the lights or spraying while the lights are off (For at least a 3 hour period.) Outdoors, spray either early in the morning or at dusk. For best results use within 24 hours.

Please see separate **Info Sheet** on "**Azatrol**" for more instructions and information on this amazing Pesticide.

Neem Oil

Neem oil contains steroids (campesterol, beta-sitosterol, stigmasterol) and a plethora of triterpenoids of which *Azadirachtin* is the most well known and studied. Neem Oil is another all-organic way to deal with Mites and almost any other bug infestation out there. It is best used as a preventative, meaning that you should apply it before the problem begins as opposed to after it is already there. Make sure to purchase "cold-pressed" Neem products such as **Einstein Oil**. Cold Pressed Neem Oils contain a much higher concentration of the active compounds which repel and retard pests in your garden.) Mix neem oil with a wetting agent (such as **Coco-Wet**) to thin out the spray and cause it to adhere to the leaves better. Spray every three days, starting with the lowest concentration listed on the bottle and increasing the concentration every 3 days until the highest concentration is reached; at which point continue to spray at the highest concentration - every 3 days. Soon you will see a dark leaf sheen or waxy coating develop on the leaves. This is a good thing. Neem will not hurt plants, it will only hurt the bugs.

Predators

Spider Mite Predators not only feed on Spider Mites and their eggs, they also breed twice as fast. Each Spider Mite Predator sucks the juice out of about 5 Spider Mites a day, or 20 of their eggs. Used as directed, predators should noticeably begin to gain control within 4 weeks and then continue until the Spider Mites are nearly or completely wiped out. Predators disappear when the Spider Mites are gone.

SpiderMite Predator Types and Attributes:

Wide Temp Range, Moderate Humidity:

Phytoseiulus persimilis

Temperature Range: 55 - 105+ F. Humidity Range: 55 - 90%

Moderate Temp Range, High Humidity:

Neoseiulus californicus

Temperature Range: 55 - 90 F. Humidity Range: 60 - 90%

Widest Humidity and Temp Range:

Mesoseiulus longipes

Temperature Range: 55 - 105+ F. Humidity Range: 45 - 90%

Spider Mite Predators can be purchased as either a "Triple Threat" which includes all three species listed above, or as individual packages.

Make sure to get enough Predators to kill your infestation. Please consult with us to find out how many Predators that will be!

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Predators (cont.)

Mite Destroyers eat all stages of Spider Mites, and find new infestation sites on their own by flying. But, it takes 4-6 weeks to really get these guys going, so use Predator Mites as well for more immediate control and for cleaning up small "trouble spots". Life cycle takes 18 days at 70 F. 100 Spider Mite Destroyers gets a colony started.

Other Predators include **Lacewings** and **Pirate Bugs** (Pirate Bugs are great at eating up Thrips! too.)

Also Note: If using Predators make sure to stop spraying any pesticide before application begins. (Every pesticide has a specific amount of time before it is rendered ineffective. Make sure to wait that amount of time.) (You can also spray water on the leaves for a few applicaitons before applying predators to "wash" off any residual pesticides.)

Pyrethrin Bombs and Sprays

Our least favorite way to deal with Mites. Pyrethrin bombs are good for getting an infested room between crops to help "sterilize the environment." They can cause burning on plants (especially if too much is applied.) Make sure to turn off the lights when letting off a bomb. it is a good idea to raise them as well so that the next day when the lights come back on you will lessen the chance of burning occuring. Pyrethrin lasts for 24 hours before it degrades to 1/2 of its original amount. It is derived from crysanthanum flowers and generally has a low toxicity for humans. That being said, we still think you should spray with a mask and gloves. Also note: Pyrethrins act only as a miticide and NOT an ovicide (they do not kill the eggs.) You should always follow up one spray or "Bombing" with another 3 days after the first to kill newly hatched mites before they mate again. As far as "bombs" go, **Doktor Doom** is softer on plants and should be used for mid-cycle applications. The **Pyrethrum TR** "Total Release" Fogger is good for sterilizing the space in between crops.

Don't Bug Me

Don't Bug Me® is a fast, effective solution for most common garden pests. Because its active ingredient is Pyrethrum, which is derived from chrysanthemum flowers, it can be applied up to the day of harvest on any fruit or vegetable. Don't Bug Me® kills aphids, whitefly, and other insects on contact by damaging their nervous systems, and even at lower levels it will keep pests away. Best of all, Don't Bug Me® breaks down quickly and does not persist in the environment.

Application of Don't Bug Me

Dilute the RTU formula in the Spray Bottle by 50% with Purified Water. Save the remaining 50% of Don't Bug Me Spray for future use. Used in this way, you will not get any "burning" and you will get 2 bottles worth of RTU Spray.

Forbid (or Avid + Hexagon) (or previously FloraMite)

Forbid is a very serious miticide that should not be treated lightly. If nothing else is working than this will. We prefer the organic methods listed above in an overall integrated pest management program. But, sometimes you have to call in the "BIG GUNS." We will not discuss **Avid + Hexagon** (Avid is the miticide - Hexagon is the Ovicide - together they kill all.) Forbid is the new killer on the block (1/8th - 1/4tsp./Gal). **Forbid** is our preference (newer and better killer), if a spray of this caliber is needed. It is both a miticide as well as an ovicide. (It will kill both the mites and their eggs.) **Forbid** is such a specific killer that it will not kill any other bugs. . .In fact it will not even kill Predator Mites. Furthermore it will go through the leaves from the top of the leaves to the bottom. Forbid has a 20 day residual lasting power. Only spray Forbid in the Vegetative phase. When spraying make sure to follow these rules:

1. Use a pesticide Respirator. 2. Wear fluid proof gloves. 3. Wear long sleeves and pants and take off and wash as soon as application is finished. 4. Wear eye protection.

Application of Forbid:

Into a 1 Gallon container mix 1/8 to 1/4 tsp of Forbid. Shake until homogenous. Next add enough drops of **Indicate** solution (the pink stuff) to make the solution turn pink throughout. Pour solution into sprayer.

Other Methods of Control

Populations can also be reduced by spraying the underside of the leaves with a jet of water to break up the webs and wash the mites off. Soap sprays are also very effective at controlling spider mites. Lower temperatures will help. The ideal temperature for Spider Mites is 80 deg. F. It is also very important to keep the growing area clear of dead plant material. Dead leaves should be removed from growing areas as soon as possible, as they often contain mite colonies and clusters of eggs. Leaves showing large amounts of mite damage should also be removed as there are often large populations in these areas.

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