Pest Guide
Hemp Russet Mite
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Hemp Russet Mite: How to Recognize Damage and Strategies for Prevention and Control

Hemp Russet Mite (*Aculops cannabicola)* is a type of microscopic arthropod that feeds on leaves, new growth, flower buds, and on glandular trichomes of cannabis (Petanovic, 2007). Hemp Russet Mite belongs to the Eriophyidae family of mites which are economically significant crop pests in citrus, apples, grapes, hazelnuts, coconuts, and tomatoes. Symptoms of Hemp Russet Mite damage can be confused with nutrient deficiencies, viruses, and physiological disorders (Van Leeuen, 2010). Hemp Russet Mite has the potential to be a major pest issue for medical and adult-use cannabis production. Hemp Russet Mite infestations have been reported in both indoor and outdoor legalized cannabis production in California, Oregon, Colorado, and Washington.

Hemp Russet Mites are closely related and belong to the same genus as the Tomato Russet Mite. Studies of the Tomato Russet Mite show that russet mite populations are suppressed under very cold temperatures or under high temperatures above 86 degrees F (Gerson, 2012). In areas with very cold winters, pest populations decline dramatically. However, most cannabis growers clone plants from mother plants that are held indoors or in greenhouses where temperatures rarely drop below freezing. Russet mites on mother plants can be passed along to clones. As legalized cannabis production expands, many cannabis producers are acquiring cloned plants from other farms or nurseries and may be inadvertently introducing hemp russet mite onto their farms. If growers don't understand how to spot Hemp Russet Mite damage and deal with it using natural and organic approved control strategies, they risk severe reduction in crop yield and quality. This article will explain how to recognize the symptoms of Hemp Russet Mite damage and will discuss several options for controlling the Hemp Russet Mite using practices and pest control materials that are approved in organic farming systems.

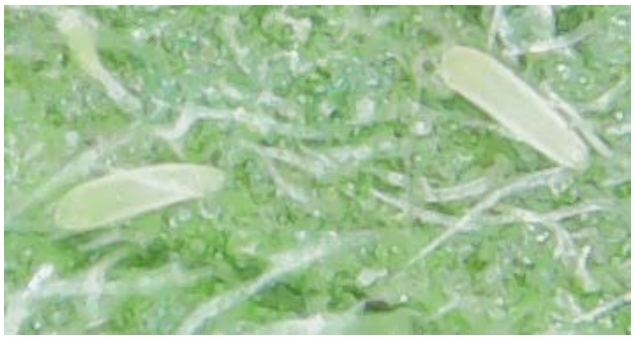
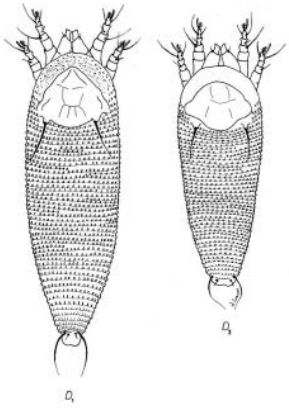


Photo: Hemp Russet Mite on underside of cannabis leaf; handheld microscope.



Dorsal view of Hemp Russet Mite nymph and larva (Petanovic, 2007).

How to Spot Leaf Damage Caused by Hemp Russet Mite

Hemp Russet Mite is a manageable pest if outward signs and symptoms of an infestation are recognized early. The mite is difficult to observe, even with a hand lens. You really need a microscope to see this pest. But growers can teach themselves to recognize characteristic leaf damage and flower damage, and respond with appropriate organic pest control strategies. Good farmers can detect subtle changes in plants because they understand the life cycle of the crop and its pests. They know what normal plant growth looks like and can spot abnormalities quickly. The key to successful pest control is frequent scouting and recognizing pest damage.

Yellowing at leaf edges extending towards the leaf midrib.

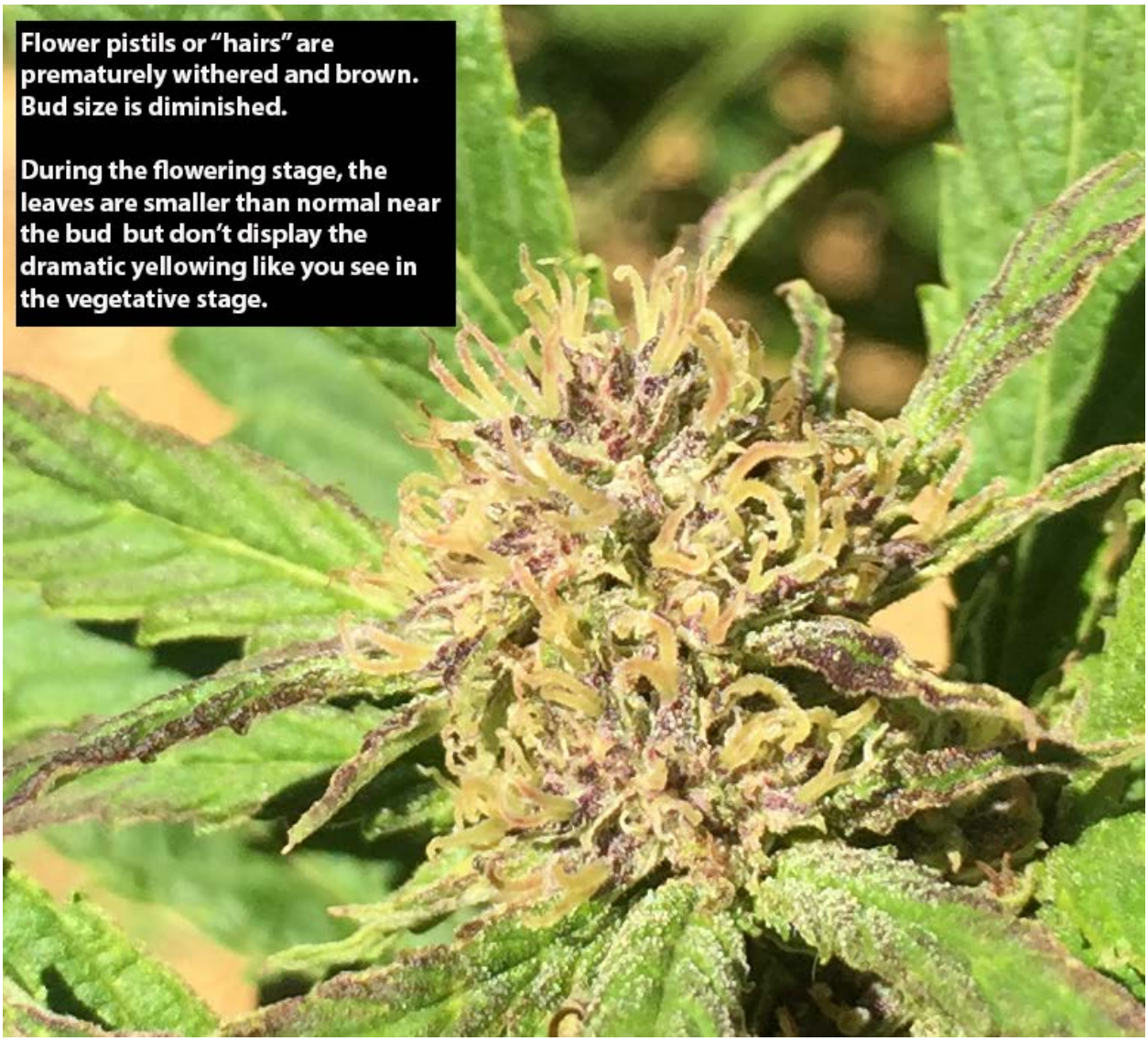
Signs of Hemp Russet Mite damage during the cannabis vegetative stage include **yellowing at leaf edges extending towards the leaf midrib**. The yellowing observed in the photo below is from Hemp Russet Mite damage observed on a cannabis mother plant at a state licensed cannabis operation in Oregon. The yellowing is caused by mites piercing plant cells and feeding off the contents. As the damage progresses, leaf edges may appear burned and necrotic. Leaves may also appear rough, crinkled and stunted. The pattern of yellowing and necrotic leaf edges is often mistaken for nutrient deficiencies, fertilizer burn, or virus.

“Canoeing” or curling of the leaves upwards

The **“canoeing” or curling of the leaves upwards at the petiole where the leaf attaches to the leaf stalk** is another characteristic symptom of Hemp Russet Mite damage. When plant leaves curl, it is often a physiological response to plant pests like mites and aphids. Unnatural leaf curling is a warning sign that the plant is under attack.

Flower Damage

Hemp Russet Mites feeding on developing cannabis flower buds causes the pistils to darken and die prematurely. In this early flower stage the pistils are usually light colored, long and vibrant. Observing **flower buds that are smaller than normal and browning** can often be a sign of Hemp Russet Mite. Symptoms of Russet Mite damage on leaves during the flower stage is less obvious than during the vegetative stage. During the flower stage, leaves with damage from Russet mite may appear rougher and smaller than normal. Leaf edges may appear slightly burned or wilted and have abnormal curls.



Controlling Hemp Russet Mite

Scouting is the first line of defense to prevent crop pests. But scouting is only effective if you know the signs and symptoms to look for. Considering legalized cannabis is currently an extremely high value crop, a regular pest scouting regimen is recommended. For Hemp Russet Mite, this means recognizing leaf symptoms and using a microscope to view the underside of cannabis leaves for presence of Hemp Russet Mite. Handheld digital microscopes that allow for capturing photos and video have proved useful for positively identifying Hemp Russet Mite and for assessing population size and degree of infestations. These mites are microscopic and can hitch a ride on clones acquired from other farms or even on clothing of farm workers. Proper quarantining of new plants and consistent sanitation practices are essential to prevent and control Hemp Russet Mite.

Cannabis farmers who propagate cuttings from mother plants to produce clones can take steps to prevent Hemp Russet Mite by ensuring that your nursery is set up to provide the plants with optimal light, heat, and water. Reducing plant stress will help to increase plant vigor and natural defense mechanisms.

Biological Controls

A non-toxic approach to dealing with many mite and insect pests is to introduce their predators into areas with known infestations. Commercially available beneficial predatory mites that have been shown to prey on Russet Mite include *Neoseiulus californicus*, *Ambylseius andersoni*, and *Amblyseius swirskii*. The soil dwelling generalist mite, *Stratiolaelaps scimitus* feeds on fungus gnat larvae, pupating thrip, pathogenic nematodes, and larval stages of root aphid. This predator mite may help to create a barrier at the soil surface and prevent hemp russet mite and broad mite from crawling up plant stalks to the leaves. Fighting pest mites with predator mites can be especially effective in indoor settings where temperature and humidity can be manipulated to help the released predator mite survive. For example, the beneficial predatory mite Amblyseius swirskii has been shown to be effective against white flies, spider mites, thrips, broad mites and the Tomato Russet Mite, and works best at temperatures between 72-84 degrees F and 70% humidity. *Amblyseius andersoni* is active and effective at low humidity and high temperatures and is known to feed on Hemp Russet Mite. Both indoor and greenhouse cannabis growers can re-use their soils, and mulch with straw to provide habitat for predator mites. One of the fundamental activities of any organic farmer is to work with natural cycles to build soil. By enhancing habitat for a diverse array of soil organisms, including predatory mites, cannabis growers can grow vigorous, pest free plants. Outdoor farmers can help establish populations of beneficial insects and arthropods by mulching and planting cover crops and insectary crops.

Pesticides allowed in Certified Kind cannabis production to combat Hemp Russet Mite

Biopesticides include pest control materials that are derived from natural ingredients and include plant derived pest products like neem oil and garlic oil as well as pest control materials derived from bacteria or fungus like *Bacillus thuringiensis* or *Isaria fumosorosea*, respectively. Cannabis farmers have had success combating Hemp Russet Mite using a combination of biopesticides including

products that have active ingredients of Chromobacterium subtsugae, neem seed oil, *Isaria fumosorosea,* and citric acid. Growers have also reported success using plant oils and horticultural oils that work by smothering the mite. Mites in the Eriophyidae family are also known to be sensitive to sulfur. Elemental sulfur sprays have been used to control the Eriophyid mites in citrus groves in Florida since at least the 1930's (Yothers, 1930). Elemental sulfur is an allowed pesticide in organic farming and is used extensively in modern day organic grape and tomato production to control mites and fungal pathogens. Sulfur is effective against Hemp Russet Mite infestations in cannabis (Certified Kind, LLC, 2016). Certified Kind growers should consider using an allowed sulfur spray only after exhausting other allowed strategies. As with any pesticide, sulfur should be used with care, and applications should follow label instructions including the use of personal protective equipment and re-entry intervals. Although the EPA has established that sulfur pesticides are exempt from the establishment of a residue tolerance on food crops, no research has been conducted about sulfur pesticides used on cannabis intended be smoked or concentrated into an extract. Common sense suggests that farmers should avoid applying sulfur to cannabis during the flower stage. Growers should also not use horticultural oil and sulfur together since that combination will damage plant leaves. Ideally, cannabis farmers will detect Hemp Russet Mite early and choose natural methods for control. Growers must develop robust, overlapping strategies for prevention of pests like Hemp Russet Mite. Building confidence in dealing with difficult pests like Hemp Russet Mite using natural and organic methods takes dedication, time, and practice yet is an essential and extremely valuable part of the Kung Fu of organic cannabis farming.

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