GROWERTALKS

Features

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Pesky Cannabis Pests

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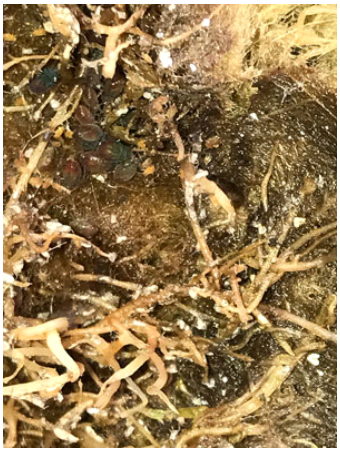
In this excerpt from the new cannabis chapter in the 19th edition of the Ball RedBook written by Dr. Brian Corr, he goes in depth on the bugs that can reduce yield.

Cannabis plants are relatively free of arthropod pests (insects and mites), but can develop infestations that can range from a nuisance to the cause of serious reductions in quality and yield.

Insect control is important for multiple reasons. Insects weaken the plant and therefore can reduce yield. Some spread disease. Also important is the “ick factor.” Much like finding a worm in an apple you’re eating, finding remains of insects in dried cannabis is a serious flaw and can be grounds for rejection of dried flowers.

Root aphids

Although there are aphid species that can affect the leaves and stems of the plant (see below), root aphids are the most problematic. Although species of *Pemphigus* aphids have been reported on cannabis roots, the dominant species of root aphid found on cannabis is the rice root aphid (*Rhopalosiphum rufiabdominale*). This species has a very broad host range. The aphids are dark olive to dark brown (lighter when young), fading to rust-red at the end of the body.



Pictured: Root aphids at work. Even when roots are examined, root aphids can still be missed since they’re often similar in color to the growing medium.

Because root aphids are out of sight on the roots, they often go unnoticed until the population becomes significant. Usually the first sign of problems is unexplained poor growth, with chlorosis occurring when the population is large enough. Even when roots are examined, root aphids can still be missed since they’re often similar in color to the growing medium. Watch for crawlers emerging from the growing medium or out of the drainage holes during irrigation.

When populations become very high, winged forms are produced, allowing the aphids to spread throughout the growing area. These winged adults may be found on sticky cards or stuck in trichomes on the plant. They can be confused with fungus gnats, but have shorter legs and stouter bodies, and often have their wings folded above their body.

Exclusion is important for all pests, but exclusion of root aphids is critical since established root aphids are very difficult to eradicate. Most enter on plants, though winged root aphids can enter through unscreened air intakes. At 73F (23C), root aphid populations can double in under two days, which makes rapid response to an infestation

important.

If allowed by regulations, the entomopathogenic fungi *Beauveria bassiana*, *Metarhizium anisopliae* and *Isaria (Paecilomyces) fumosoroseus* are reported to be effective against root aphids when drenched to saturate the root ball. There are no reports of predator mites or insects being effective against root aphids.

Drenches with pesticides such as azadirachtin, pyrethrum, insecticidal soaps and various mineral or essential oils (e.g., thyme, rosemary) are sometimes recommended for root aphids (when allowed by regulation). Care must be taken when using these active ingredients because the effective rate is often close to the level, which causes phytotoxicity.

Foliar aphids

Although root aphids are more of an issue for cannabis than most other crops grown in controlled environments, most growers are familiar with aphids found on above-ground portions of the plant.

Because aphids can reproduce without mating (parthenogenesis), populations can grow quickly. It's been reported a single aphid can produce as many as 12 generations in a year, resulting in (theoretically) as many as 600 billion offspring.

Aphids feed on plant sap and stress the plant. In sufficient numbers, aphids can cause wilting and yellow, distorted growth. They have the potential of transmitting viruses. There are multiple species of aphids that affect cannabis. The most common are:

Green peach aphid (*Myzus persicae*)—This aphid is a generalist and can affect many species of plants besides cannabis. Despite the name, the color of this aphid can vary from green to yellow to pink and occasionally red. It's often found on the undersides of lower leaves, especially at the mid-vein.

Black bean aphid (*Aphis fabae*)—This is another generalist, feeding on many species of plants. Again, despite the name, this aphid can be a dull green as well as black. This aphid is more often found in the upper portion of the plant on the undersides of leaves.

Cannabis aphid (*Phorodon cannabis*) (also known as the bhang aphid or hemp aphid)—As the name implies, this aphid is specific to cannabis. Like other aphids, color can vary. It can be almost colorless or bright green to dark green. It's often found in the flowers or on the stem under the flowers. Hop aphid (*Phorodon humuli*) is a similar aphid that some entomologists consider to be the same species as the cannabis aphid.

Control of aphids on any crop starts with monitoring to detect infestations before they become significant. Yellow sticky monitoring cards are helpful for detecting winged aphids, but it's important to scout plants carefully since winged aphids may not be present and therefore not found on sticky cards.

Aphids can be hard to detect on the plants since they usually congregate on the undersides of leaves or close to the stem. In severe infestations, the honeydew excreted by the aphids will cause a glossy appearance on leaves until it becomes colonized by fungus and turns black (sooty mold). Control will be more difficult if the infestation has gotten to the point honeydew is present. Early detection by thorough scouting is critical.

Control of aphids on cannabis is complicated by the limited number of pest control products approved for use on cannabis. Approved products vary by location. Some of the most effective treatments are entomopathogenic fungi such as *Beauveria bassiana*, *Metarhizium anisopliae* and *Isaria (Paecilomyces) fumosoroseus.*

Control with predatory insects is approved in most jurisdictions that allow production of cannabis. Parasitic midges (*Aphidoletes aphidimyza*), wasps (*Aphelinus abdominalis*, *Aphidius matricariae*, *Aphidius colemani*), lacewings (*Chrysoperla carnea*) and various species of ladybugs give good control if introduced before populations become

excessive. It's especially important to start biological control early in the crop. Unfortunately, as cannabis flowers mature and the buds and leaves begin to produce trichomes, the sticky resin can trap or otherwise interfere with biological control insects.

Whiteflies

Whiteflies cause similar problems as aphids, but are easier to detect because the adult whiteflies fly up when the plants are disturbed. Walking past a cannabis plant with a significant whitefly infestation is like stirring up a small snowstorm. Like aphids, whiteflies suck sap from the plant. This can weaken the plant and potentially transmit diseases. Whiteflies also produce honeydew, which can glaze the leaves and develop black sooty mold.

Whitefly adults are easy to see on the leaves or in the air, but the larvae and pupae are less obvious. As with aphids, scouting under leaves is essential to find whitefly larvae and pupae. These stages are immobile after the first instar and look like small scales on the underside of leaves.

There are at least three species of whiteflies that can affect cannabis:

Greenhouse whitefly (*Trialeurodes vaporariorum*)—This whitefly is familiar to anyone who's grown almost any crop in a greenhouse. Adults are slightly larger than the other whiteflies.

Sweet potato whitefly (*Bemisia tabaci*, also known as the tobacco whitefly)—This whitefly (and its close cousin the silverleaf whitefly) holds its wings in more of tent-like manner above its body in comparison to the greenhouse whitefly and are a bit more yellow.

Silverleaf whitefly (*Bemisia argentifolii*)—This whitefly was first called the poinsettia whitefly because it was found in large numbers on poinsettias. It gets its name because the saliva they introduce into the leaf can induce a disorder in squash where the leaves develop a silver color.

Whiteflies are attracted to the color yellow, so yellow sticky cards are effective monitoring devices for adult whiteflies. Some growers have had success placing large ribbons of yellow sticky material around the production area to trap adults. Entomopathogenic fungi are also effective for whitefly control, with the caveat to discontinue use close to harvest.



Pictured: Adult whiteflies on a cannabis leaf.

The most common biological control is *Encarsia formosa*, a parasitic wasp. It does well under bright light and warm temperatures, conditions also favorable for cannabis.

Another parasitic wasp effective for whitefly control is *Eretmocerus eremicus*. This wasp will tolerate lower humidity than *E. formosa*, so it may be more useful in dry areas.

With all biological control, it's critical to establish the predators/parasitoids before whitefly populations become heavy. Once honeydew is present, the predators must battle the sticky residue to get to the whiteflies. Sticky trichomes also limit the mobility of predators.

Because whiteflies are so mobile, it's especially important to control weeds around the greenhouse and to use insect screening on air inlets.

Mites

As a group, mites may be the most troublesome pest in cannabis production. Even the biggest mites are difficult to see, and the smallest mites are essentially invisible without a strong hand lens or binocular microscope. By the time damage is evident, control is difficult because of the numbers present and because mites are often in leaf axils or in the flowers, making it difficult for pesticides or biological control agents to reach the mites.

Two-spotted spider mites (*Tetranychus urticae*)—Although these mites are visible without magnification, they're often not noticed until the webbing they spin is seen on and between leaves. These mites prefer hot and dry conditions, often found in cannabis production. As the mites feed, they insert their mouthparts into plant cells, resulting in stippling and yellowing. Two-spotted spider mites affect many plant species and therefore are found wherever plants are found.

Broad mites (*Polyphagotarsonemus latus*)—Broad mites are very small, about half the size of two-spotted spider mites. Most people require at least a hand lens to see them. They're usually identified by the damage they cause, not observation of the mite itself. Damage is typically seen on new leaves, which become distorted, twisted or thickened, often curling in from the edges. Flowers can be affected as well. In a severe infestation, new growth is completely killed. In comparison to two-spotted spider mites, broad mites prefer higher humidity and will develop at lower temperatures. Broad mites also affect a wide range of plant species.

Hemp russet mites (*Aculops cannabicola*)—Unlike the other two mites, this mite is specific to cannabis. About the same size as a broad mite, most people cannot see them without magnification. They feed on leaves, flowers, meristems and notably, trichomes, reducing resin production. The damage is almost always seen before the mite—leaf bronzing, leaf curl and, in severe cases, death of the meristem.

Exclusion of mites is critical. Although mites can be carried on the wind, the most common means of introduction is on plants brought from another source or on the clothing of someone entering the production site.

Mites, especially broad and russet mites, work into crevices in the plants, making it difficult for pesticides or biological control agents to reach them. For that reason, plants with a severe infestation should be bagged and destroyed since it's unlikely the pests can be eliminated in a reasonable time.

The predatory mites *Amblyseius andersoni*, *Amblyseius cucumeris* and *Neoseiulus (Amblyseius) californicus* can help control broad and russet mites. *Amblyseius swirskii* is reported to be effective in some reports and not in others. *Amblyseius andersoni* and *Phytoseiulus persimilis* are helpful for control of two-spotted spider mites. Check with your biological control agent supplier for the most up-to-date recommendations.

In many states entomopathogenic fungi such as *Beauveria bassiana*, *Metarhizium anisopliae* and *Isaria (Paecilomyces) fumosoroseus* are approved for use on cannabis. These fungi and predatory mites cannot control a severe infestation and therefore must be used preventatively or at least at the first signs of an infestation.

When allowed by state regulations, azadirachtin, citric acid, oils, pyrethrins, soaps, mineral oil and various essential oils can be sprayed for control of mites. The essential oil derived from rosemary is reported to be especially effective. Thorough coverage is required or control will be limited.

A unique aspect of mite control is that it's important to also control insects to control mites. Some mites can hitch a ride on insects like whiteflies to get from one plant to another. **IG**