

## LESSON 4: PLANT DISEASE & PESTS

One of the big benefits of hydroponics is the rarity of pests and diseases. That's not to say that it can't and won't happen. Under certain conditions Pests and diseases can move in and take over a hydroponic garden. Insects may find their way into your growing space, and depending on what kind of insects move in it can have a major effect on your plants.

If you leave a window or door open (if your garden is inside) insects like aphids can infest and take over the garden in a matter of days. We'll show you several ways to get rid of your uninvited guests and reclaim your garden.

The hands down safest way to get rid of unwanted insects, is identify what it is, then find out what other insects eat them. For example if your garden is being attacked by a horde of aphids, find a garden supply center in your area and pick-up some ladybugs. These cute little spotted insects have a voracious appetite for aphids, and will take care of your problem in no time.

When possible, it is best to use nature to your advantage. It can also be pretty interesting to see how introducing one insect will affect the others. Virtually every insect has a predator in the natural world and by using this fact to our advantage, we can grow pesticide and contaminant free produce.

Using insects to control the population of other insects works best in a confined environment like a green house, because the predator insects have nowhere to go. It can be used in an outdoor system, but obviously not nearly as effectively.

For help in identifying pests and what beneficial insect will kill them, go to hydroponic dictionary's insect sections.

**BENEFICIAL INSECTS**

**HARMFUL PESTS**

## PEST CONTROL

If using nature against nature isn't an option, there are still things to try before resorting to pesticides and other harsh chemicals

**STICKY STRIPS**

These strips are placed around the plants and the bright colours of the strips attract the insects. Once the insect steps onto the sticky strip, they're stuck. Once the strip is full, just remove it and replace with a fresh one. These can also be great for indicating what (if any) insects are in your garden, and are frequently used by commercial growers to see how many insects they have in their gardens.

You could improvise some on the cheap using tape (think duct tape, not masking tape) but these probably won't provide adequate results because the glue may dry out, or may not be sufficiently sticky enough to capture smaller, or lighter insects.



### **Insecticidal Soap**

Insecticidal soap is another environmentally sound method for removing pests from your garden. This soap solution works by clogging the pores on the insects' exoskeleton, smothering them when sprayed directly. It generally won't affect beneficial insects on your plants, but it isn't a good idea to test it out.

The soap leaves no residue on plants and crops that have been sprayed with it can be harvested the same day. You can buy the insecticide as either a spray or as a concentrate to mix with water. If you're going to use the concentrate, mix it with softened or distilled water.

### **Botanical Sprays**

Botanical sprays are made from plants that have insecticidal qualities such as the neem tree. Sprays from the neem tree are a unique pesticide in that they don't directly kill the insect. The neem must be eaten by plant-eating insects, so predators like lady bugs won't get significant quantities of neem.

Once it is ingested by the insect, the neem will alter the life-processing behavior in such a manner that the insect can no longer feed, breed or undergo metamorphosis.

These are a safer alternative to chemicals and while it is natural, it's still an insecticide and caution needs to be exercised when used.

# PLANT DISEASE

Plant disease can come around when you least expect it. The best way that you can prevent diseases is to keep your grow room clean. Get in the habit of regularly cleaning your tools, tubing and containers with isopropyl alcohol. The alcohol will destroy any bacteria, viruses or fungus hiding in your equipment, and prevent them from reaching and harming your plants.

When pruning your plants be sure to collect any trimmings, and any leaves that have fallen off. These are highly susceptible to disease and should be removed frequently. The growing medium you're using should be replaced, or thoroughly cleansed after each use.

Be very careful when handling your plants that you don't cut or scrape them. Open wounds on a plant are very susceptible to disease, even in a clean growing room, with intentional cutting. Follow up each time you cut a plant with some pruning cleanup substance to keep illness out.

## Did you know?

Did you know that some farmers have begun using insect larvae that have died to keep their crops pest free? They take larvae that died due to a virus infection, dry them, then crush them. They take the crushed larvae and distribute them around their crops.

Now any insect that is susceptible to that virus that breeds near the crops will become infected with the virus and die. This is a safer alternative than pesticides for pest removal.

### Be Sure your plants are soil free!

Hydroponics systems get less disease than soil grown plants and one of the major reasons is many plant diseases are found in the soil. Dirt can sometimes find its way into your growing tray and it has no place there!

The whole point of hydroponics is to grow in nutrients, not soil so take extra step to ensure you garden stays soil free by thoroughly rinsing any soil off the roots of a plant to be transplanted into your hydroponic garden. A good idea would be to use a splash of organic fungicide on the roots as well to further reduce the chance of infection.

You should quarantine new plants and seedlings before fully introducing them to your garden. If these plants are store bought look them over carefully in the store to ensure they have no signs of disease. Bring only the healthiest plants home, and leave the sickly looking ones at the store. Quarantining them for a while before introducing them to your system will allow you to further check for disease without risking your established plants.

Keep the bugs out! They aren't just going to eat your plants and destroy them that way, some bugs may be carrying diseases that are deadly to plants. Keep a close eye on the bugs in your garden and take care of any problems quickly. Jump back a few pages for more info on harmful insects.

One factor commonly overlooked in smaller gardens is ventilation. Plants need plenty of moving air around them, this helps control humidity, and in turn helps lower the risk of infection. A simple house fan pointed at a smaller system should suffice. Knowing what to do to prevent diseases is great for the beginner gardener, but sooner or later even the most experienced grower is going to get some sick plants. The diseases are commonly caused by their environment, and experienced growers learn to anticipate problems ahead of time. Here are some signs to look for.

Parasitic diseases are caused by living agents. These are most common in the soil and crop debris. These can be caused by a virus, bacteria, and fungus. These are highly contagious and will spread from plant to plant without much effort. Be sure to remove any plant cuttings and keep your garden soil free.

Non-parasitic diseases are caused by non-living agents like nutrient deficiencies, extreme low temperatures, toxic chemicals, herbicide damage, mechanical damage, and lack of or too much water.

Most diseases in hydroponic setups are fungal or bacterial. This is caused when the organism arrives on the plant. If the conditions are right the disease will penetrate the plant. Once the disease has made its way into the plant, it will show its symptoms in 3 main ways;

1. Development of galls, swelling and leaf curls.
2. Under-development of tissue such as stunting, yellowing, incomplete development of leaves, fruit and roots.
3. Death of tissue such as blight, leaf spots, wilting, rots and tissue breakdown.

The sooner you recognize something is wrong with a plant, the sooner steps can be taken to correct it. If you notice something is wrong with your plants check the growing conditions first, and make sure that the bugs are under control, none of the plants have been damaged, the grow room is clean, there is plenty of airflow, light, and the proper temperature is observed.

Then carefully check the symptoms for nutrient deficiency, and for plant disease. Check for diseases that are common to your plant, and be sure that you aren't misdiagnosing a deficiency.