

easy! **DIY**

Aquaponics

Home Food Production for Everyone



*Create your own
Backyard Eco-system*

Grow 10x More in 1/2 the Time!

easy! **DIY** Aquaponics™

TROUBLESHOOTING GUIDE

members.easydiyaquaponics.com

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Startup and Maintenance

The first 6 weeks of running your system are the most critical. Most of the problems you will encounter with your aquaponics system will occur within this timeframe because this is when new factors are introduced to your environment.

Ecosystems are naturally resistant to change which is good because once you have your aquaponics system where you want it, maintenance is easy.

Prepare for system failure by installing backup pumps for water and air in case of equipment failure. If you can it's also a good idea to have battery backups as well such as an Uninterruptible Power Supply or UPS in the case of a power outage. An 8 hour power outage will provide severe consequences for systems not ready for emergencies.

The Nitrogen Cycle



The key to getting a good start and keeping your plants and fish healthy is making sure your system “cycles” properly. This is referring to the nitrogen cycle where fish waste is dissolved into nitrites and then nitrates via bacteria. If you introduce fish into your system and it isn’t cycling properly your water will become toxic and could kill your fish.

When you introduce fish or ammonia into your system you will see a spike in ammonia levels. If you have bacteria growing in your system, you should see the ammonia level off to barely detectable levels and

your nitrite levels will spike. Nitrites are toxic to your fish so it's important that your bacteria is able to change that into nitrates quickly or you will lose fish.

When your Nitrate levels come up your system has completed a cycle. This is good for your plants and not toxic for your fish unless your plants are not using the nitrates effectively.

If you are having issues with any part of your system it's a good idea to check and make sure your system is cycling by testing each of the important chemicals which are Ammonia, Nitrites, Nitrates and pH.

Dissolved oxygen or DO can also be an issue if you don't have an air pump. Sometimes water circulation may not be enough and you can't really "overdose" oxygen so it's a good idea to have an air pump rated for the amount of water in circulating in your system.

Many of the problems you may encounter can be prevented through proper maintenance and care for your aquaponics system. Follow the schedule we've provided for you on the download site and keep track of all your chemical levels. This will make it much easier to troubleshoot any issues that may come up in the future.

Starting the Nitrogen Cycle

There are several different ways to start up the nitrogen cycle.

1. Add plants first and gradually add ammonia and bacteria to your system until it cycles and then add fish. Using this method will require you to supplement your plants with hydroponic plant food until your fish are introduced to the system. When you add ammonia, it will attract bacteria and will be changed to nitrites and nitrates but this may take a few months to get cycling regularly. You can boost this time by adding bacteria. You should be able to pick some up at any hydroponics store or aquarium supply store.

You may also get bacteria naturally by getting it at a nearby lake or river with fish in it. Just grab a few large "slimy" rocks and some pond water to get your system started. You must be aware however that you could be introducing parasites or disease to your system by doing this so tread carefully.

2. Add fish first, then add bacteria until your system cycles and then add plants. This is basically setting up your plant food supply first. When using this method you run the risk of ammonia toxicity. Anything above 1 ppm for ammonia is harmful. Be ready for emergency water changes with dechlorinated water.

3. Add plants and then small fish to gradually get the cycle started.

This works if you add fingerlings to your tank which should introduce small amounts of ammonia to help get the cycle going. There is less risk to your fish but be ready for water changes anyway just in case. Again add bacteria if your system has trouble cycling on its own naturally.

There's no method better than the other, just choose one that you think would be best suited to how you want to run your system.

Just remember that nitrites and ammonia are toxic to fish. Low pH can also affect fish health as well as fast changes in pH, water temperature, and other chemicals.

Plants are affected by lack of minerals or nutrients and high pH levels. Anything above 7.5 will adversely affect the way your plants absorb nutrients.

Troubleshooting Plant Problems

Most issues with pests and diseases can be avoided by running your system with plenty of nutrients that keep your plants healthy. Just like soil based plants, healthy plants will repel pests and diseases. If you do encounter problems with your plants, you cannot use pesticides because they affect the health of the fish. Always use the “natural” approach when it comes to correcting plant issues.

Problem: dying plants

Solution: Either lack of nutrients but more likely chemical imbalance. Check all chemical levels and adjust as necessary.

Problem: immature plant growth

Solution: If your system is new, this is just one of the symptoms of having a young ecosystem. If it's caused by a lack of nutrients, add more fish or plant supplements such as Maxicrop.

Problem: wilting leaves

Solution: This is usually caused by an imbalanced ecosystem. Your plants may not be getting enough nutrients. Make sure you are supplementing your water with plant food as necessary.

Problem: discolored or unhealthy leaves

Solution: This is usually caused by mineral deficiencies. Add chelated iron to your water for yellowing leaves to supplement. Add Maxicrop as needed.

Problem: aphids eating plants

Solution: Ladybugs are a natural predator and will eat the aphids. You can pick them up at your local garden store or attract them by planting fennel, dill, cilantro or even dandelions. More info can be found here:

www.gardeninsects.com/ladybugs.asp

You can also try planting ginger or spray the plants with a ginger solution once a week.

Problem: caterpillars

Solution: Use a garlic spray or “harvest” the caterpillars and use them for fish food.

Problem: disease or fungal infection

Solution: This is usually caused by lack of air circulation around the roots of your plants. Remove any infected plants from the system.

Troubleshooting Fish Problems

The best way to prevent issues with your fish is to research the species you are raising and consult with your supplier on the best way to care for them. If you encounter dead fish, remove them immediately to prevent decay and spikes of ammonia. If your fish is close to death without hope of recovery, remove it and dispatch it humanely.

Problem: fish abnormally hovering near surface

Solution: Possible lack of DO (Dissolved Oxygen). Use an air pump with air stones or a bubbler to add oxygen to the water.

Problem: fish jumping out of tank

Solution: Could be caused by poor water quality, feeding on insects or high water levels in tank. Reduce water and make sure you have a lid or cover with slits or cover tank with netting.

Problem: parasites

Solution: Usually found in fish outside

Problem: fungal infections (white fluff on body and fins)

Solution: Usually happens to physically damaged or weakened fish.

Could be symptom caused by other diseases or stress.

Quarantine fish and treat with fungicide if you wish to keep it. Do not pump any chemicals in your system. Any plants or fish exposed to any chemicals are no longer fit for human consumption.

Problem: bacterial infections

Solution: Usually caused by stress or environmental changes. Give your system plenty of time to equalize after making changes to it. Better to avoid infections rather than try to treat them after. Make sure your fish are getting enough shade. They prefer dark hiding places and it can help them reduce stress.

Problem: ick disease

Solution: White spots on fish. Treat with sea salt (non-iodized) with 1 tablespoon per gallon. You can also try raising the water temperature in addition to help the process but make sure it's within limits for your type of fish.

Troubleshooting Water Problems

Problem: pH levels outside limits (less than 6.8 or over 8)

Solution: Fluctuations in your pH levels will likely occur in the first 6 weeks but will level off once your ecosystem has been established. If you're pH readings fail to settle within limits by then, a system component such as your grow-bed media is likely to blame. Some types of gravel will naturally affect the pH of the water depending on the mineral composition.

Problem: Ammonia Spikes between 2 and 5 ppm.

Solution: Usually caused by a new system that hasn't had a chance to balance out with bacteria. Change out the water 1/3 at a time per day until the problem clears.

Problem: green water

Solution: Algae is growing in your system. If your tank is made of clear plastic, paint the outside to keep the light out. Place a wooden cover over your tank to give it shade. Make sure your peak water level is at least 1 inch below the bed media.

Problem: cloudy or dirty water

Solution: Usually caused by overfeeding or your system could be out of balance.

Problem: foaming water

Solution: Caused by outside chemicals or detergents. Fixing this problem can be difficult because you need to get rid of the contaminant but you also need to avoid shocking the fish. Change up to half the water out of the system daily until it clears. Try to avoid cleaning or disturbing the grow bed media as much as possible to maintain bacteria levels.

Troubleshooting Siphon Problems

It is important that great care is taken when constructing your bell siphon to ensure it is properly sealed for care-free operation. If your bell siphon is made properly then the common problems with siphoning are simply a matter of adjusting the water flow.

The two most common problems associated with bell siphons involve the starting and stopping of the siphon process.

Problem: The bell siphon will not start, the water level in your grow bed remains constant and the water will not drain at its peak.

Solutions:

1. Adjust the flow of the water coming out of the drain into the fish tank. This can easily be accomplished by installing an adjustable elbow on the end of the drain pipe which angles the water upward. If your problem is just a matter of adjustment, this may be enough to initiate the siphon.
2. Adjust the flow rate of the water entering the grow bed. Too little flow will prevent the siphon from starting.
3. Check all the seals around the bell and make sure there are no air leaks. The cap must be completely sealed on top and the tube entering the cap must be airtight. The siphon depends on this area of the bell to create a vacuum that will initiate the process.

4. Make sure the bell and gravel guard are firmly in place and free from debris. If any gravel, dirt or other obstruction changes the level of the bell or increases the space between the bell and floor of the grow bed, this could prevent the siphon from starting.

Problem: The siphon will not break and the water level remains low in the grow bed while the drain continues to trickle.

Solutions:

1. Adjust the flow rate of the water entering the grow bed. Too much water flow will prevent the airlock which breaks the siphon.
2. Check the air tube for obstructions or kinks. This tube allows air to enter the bell chamber which breaks the siphon and any material blocking this will keep it from functioning properly.
3. Check the bottom of the air tube and make sure it is above the low level water line. If the air line is too close to the water it will prevent air from entering the tube and bell chamber.
4. Adjust the flow from the grow bed to the fish tank. This usually isn't the solution for a siphon break problem because if the siphon breaks just by adjusting the flow, this problem is most likely caused by another issue. If nothing else works however you may try to adjust it.

Troubleshooting System Problems

Problem: water pump failure

Solution: Make sure you have a backup pump in place to minimize downtime. Systems can crash within 24 hrs. If no backup is available, circulate manually until you can get a replacement.

Problem: power failure

Solution: Battery backup or Uninterruptible Power Supplies can keep your system going until Utilities are turned back on.

Problem: air pump failure

Solution: This is less critical than your water pump going out, but still should be replaced within a few days. Some pumps have replaceable diaphragms that may be a cheaper fix than replacing the whole pump.