

How to Create an Organic Aquarium

*The Beginner's Guide to Soil-Based
Freshwater Aquariums*

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WHEN CAN I ADD FISH AND INVERTEBRATES?

An organic aquarium needs time to settle before animals can be safely introduced. Adding fish or invertebrates too early can overwhelm the system before it is ready. But that doesn't mean there's nothing to see in those first few weeks. One of the joys of this approach is observing the system stabilise, a principle known as ecological succession:

Ecological succession is the process by which the mix of species and habitat in an area changes over time. Gradually, these communities replace one another until a 'climax community' – like a mature forest – is reached³¹.

Though your aquarium is a closed system, it's still governed by the same biological principles that shape ponds, wetlands, and other aquatic ecosystems. In the first few months, different groups of organisms take turns establishing themselves, as the system moves towards balance. Understanding this natural sequence helps you know when to add animals, and when to wait. We can understand succession in an organic aquarium as unfolding in three stages:

STAGE 1: PIONEER SPECIES (WEEKS 0–4)

The early phase of any organic setup is dynamic and unpredictable. The soil is adjusting to being submerged, plants are adapting to their new environment, and the first pioneer species (bacteria, microfauna, and algae)

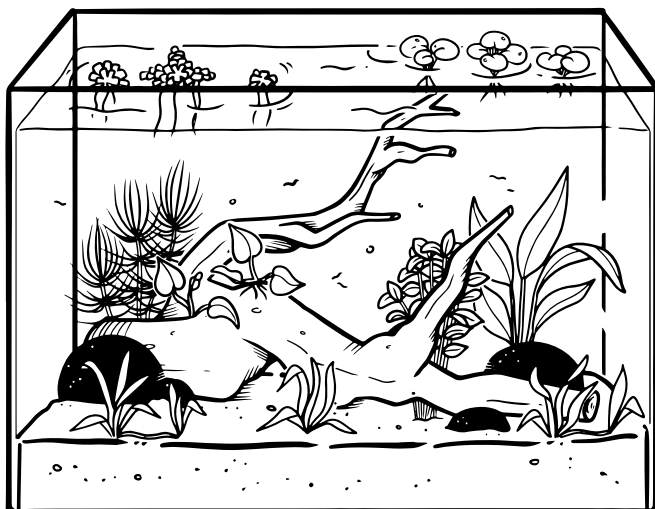
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begin to multiply. During this stage, you'll likely see copepods, ostracods, and detritus worms crawling through the substrate or clinging to the glass. These tiny organisms are part of the detritus food web, and their presence is an excellent sign that your system is beginning to take shape.

This stage is characterised by change. A white, cloudy tank during the first week is common, as bacteria multiply rapidly in response to nutrients leaching from the soil. This is a normal part of the equilibration process. Similarly, brown diatom algae may coat surfaces in the first few weeks. These early colonisers typically disappear on their own as plants establish dominance and nutrient competition increases. A thin, slippery biofilm may also appear on hardscape, glass, or plant leaves. This is not a problem. In later stages, your snails, shrimp, and some fish will graze on it, helping convert it into usable nutrients for the rest of the system.

It's important to be patient here. Even if tests show traces of ammonia or nitrite, it's best to avoid interfering. As plants grow and establish, they will naturally absorb these compounds. Frequent water changes can delay this process by altering the chemical environment that plants are trying to adapt to.

Whilst it is recommended to avoid intervening during this period, there is a situation where it is advised. If you've started with fewer plants and are relying on growth and propagation over time to reach the critical



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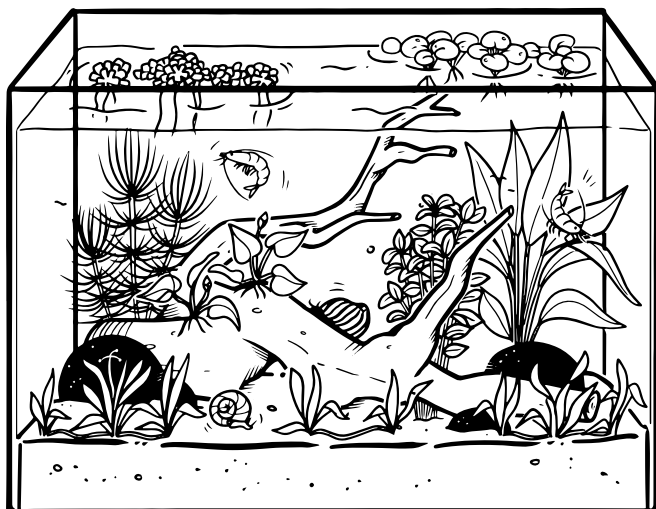
plant mass, algae may begin to outcompete your plants. In this case, gentle interventions can help tip the balance back in favour of plant life. Reduce lighting to 4–6 hours per day (start by trying 3 hours on, 5 hours off, 3 hours on), and perform small water changes (10–25%) twice a week for the first 4 weeks. Scrape algae from the glass and remove hair algae manually. If algae are still outcompeting your plants, consider purchasing additional floating plants and fast-growing water-column feeders to absorb excess nutrients.

Do not use algaecides. These chemical shortcuts disrupt the delicate biological processes that your system is working to establish. With time, most algae blooms fade on their own as plant mass increases and the nutrient balance shifts. There will always be some algae in your aquarium; it is a natural and even beneficial part of your freshwater ecosystem – provided it doesn't take over.

Fish and invertebrates should not be added during this stage. Let the plants and microbes lead the way.

STAGE 2: INTERMEDIATE SPECIES (WEEKS 4–8)

Once your plants are growing steadily and your water tests show a stable pH and zero ammonia and nitrite, you can add your first animals: the



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clean-up crew. Snails and shrimp are excellent early inhabitants. They're hardy, and they play a valuable role in grazing algae and breaking down detritus.

These invertebrates also serve as indicators. If they remain healthy and active, it's a good sign that your system is ready to support more complex life. And in many cases, this stage can be a satisfying endpoint. A planted aquarium with an active shrimp colony can be incredibly beautiful, lively, and easy to maintain.

There is no need to rush beyond this stage. Let the ecosystem continue to mature at its own pace.

STAGE 3: CLIMAX COMMUNITY (WEEK 8 ONWARDS)

It takes approximately 8 weeks for the chemistry of the submerged soil to stabilise³². If ammonia and nitrite remain at zero, your pH is steady, and plants are thriving, then the system may be ready to support fish. However, if you're still seeing ammonia or nitrite spikes, or experiencing regular pH swings, wait. The system is not ready. It's far better to wait a few more weeks than to spend every day worrying about your new fish as they struggle in a toxic environment. Fish should only be added once the tank shows consistent, stable water parameters and clear signs of balance.



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Once your system is stable you can add fish. Begin slowly. Start with small, hardy species, and observe them closely. Test your water daily for 2 weeks after adding fish, watching for ammonia or nitrite spikes and monitoring fish behaviour. If everything remains stable (e.g. no toxins, no algae blooms, no signs of stress) you can gradually add more fish in small groups over time.

This staggered approach allows your plants and microbes to adjust to the increased bioload. Give the system time to respond to each new addition before introducing more.

FISH-IN VS. FISHLESS CYCLE

Some aquarists add fish to soil-based aquariums on day one. Soil bacteria act as a starter culture – like using an established aquarium’s filter media – making traditional cycling unnecessary. However, an organic aquarium relies on many factors working together. As you learn about and build aquariums, mistakes are to be expected. For this reason, it’s safer – and more humane – to wait before adding animals. Waiting gives your plants a head start, and lets you observe and adjust the ecosystem while lowering risks to your fish and invertebrates.

There’s wisdom in the saying: ‘good things happen slowly; bad things happen fast.’ Embrace the gradual process, and you’ll be rewarded with a stable, mature ecosystem that can keep itself in balance.

WHICH SPECIES CAN I KEEP?

An organic aquarium must be stocked with animals that match the natural rhythms and limits of the system. Focus on species that inherently suit the features of this approach. If they originate from low-flow, shaded, densely planted habitats they will likely thrive.

It is important to choose species that have a low bioload: the total amount of waste an organism contributes to the system. A low bioload ensures that the natural waste processing systems of your organic aquarium are not overloaded. If you have too high a bioload, you risk overwhelming your system, disrupting the balance you’ve achieved. For this reason, small species (often called nano fish) are ideal.

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Species such as ember tetras, chili rasboras, celestial pearl danios, or white cloud mountain minnows stay under 4 cm, are peaceful, and thrive in groups. A school of 6–10 fish adds movement to the mid-water without generating excessive waste. They feel secure among plants and often display their best colours in a well-planted tank. As mentioned earlier, avoid fish known to jump (like hatchetfish or certain danios) if your aquarium is open topped.

Alternatively, you can choose a solitary ‘centrepiece’ fish; a honey gourami or a plakat betta (short-finned betta) are great options. Keep only one of these centrepiece fish per tank to avoid territorial aggression. These fish are relatively sedate and will often hover near plants or at the surface. They are visually striking and interesting to observe, especially when the males construct their floating bubble nests. Both species possess a labyrinth organ that allows them to breathe atmospheric air, so ensure they have access to the water’s surface. Just note that these species will likely prey on baby shrimp.

And of course, an organic aquarium would be incomplete without its clean-up crew. Cherry shrimp (neocaridina) are excellent grazers, picking at biofilm and soft algae while helping to keep surfaces clean. Amano shrimp are larger and renowned for their appetite for algae, making them ideal tank helpers. Snails also play a vital role: nerite snails eat stubborn green algae (and cannot reproduce in freshwater, preventing population booms), while ramshorn snails consume decaying organics. Malaysian trumpet snails are especially useful in soil-based tanks; they burrow amongst the cap, mixing and aerating the accumulated detritus as they search for food. Avoid pond snails as these will eat healthy plant tissue; stick to species that only consume decaying organics. If your snail population begins to grow too quickly, reduce feeding slightly and numbers will stabilise with time. A well-chosen mix of shrimp and snails will support the detritus food web and reduce the need for intervention.

Finally, the clean-up crew isn’t limited to invertebrates. *Otocinclus* catfish are a gentle, algae-grazing fish that are a perfect match for organic systems. A small group of *otocinclus* will tirelessly rasp biofilm and soft algae from plant leaves and glass, all the while contributing very little waste. Their peaceful nature and hard-working habits make them one of

the few algae-eating fish truly suited to low-tech planted tanks.

At the end of this book, you will find a field guide with an overview of common fish and invertebrates in the aquarium hobby. The curated selection is by no means exhaustive, but it does introduce species with proven success in organic setups.

HOW MANY SHOULD I ADD?

Stocking an organic aquarium, like everything else in an organic aquarium, is all about balance. Your tank has a natural limit, determined by how many nutrients your plants can absorb and how efficiently your detrital food web can process waste. As we are not outsourcing waste management to a powerful filter, you'll keep fewer animals than in a conventional setup.

Here's a rough guide to how many animals your tank can support, depending on its size:

- Under 7 gallons: snails and shrimp only. The limited water volume and plant mass make it difficult to support fish.
- 7–10 gallons: choose either a school of 6 nano fish or a single centrepiece fish, along with your clean-up crew of snails and shrimp.
- 10–20 gallons: offers more flexibility. You might keep a larger school of nano fish, or one peaceful centrepiece fish with a smaller school, alongside your clean-up crew.
- 20 gallons and larger: you can typically start with 8–12 fish, supported by your clean-up crew. If, after a few weeks, your plants are growing well, algae are minimal, and water tests consistently show zero ammonia, you can consider adding more stock gradually. Always watch your tank closely. Persistent cloudiness, rising nitrates, algae blooms, or signs of fish stress are all indicators that you've exceeded your system's capacity. **When in doubt, under-stock.** You can always add more fish later, but recovering from an overloaded tank is far more difficult.

There is no magic formula here. Start light, observe your tank, and let it guide you.

HOW DO I INTRODUCE MICROFAUNA?

As your new system stabilises, a variety of microfauna will begin to appear – seemingly from thin air. These pioneers are hitchhikers; inadvertently, though beneficially, introduced through your soil and plants. They are welcome residents, and their presence is a sign of a healthy ecosystem.

In addition to these hitchhikers, you may wish to actively introduce some larger members to your detrital crew. There are three ways to add microfauna: you can purchase them from a specialist supplier; you can source them from a fellow hobbyist; or you can culture your own wild specimens.

The easiest and most reliable option is to source microfauna from a specialist. There are a handful of shops that specialise in botanicals and microfauna cultures, and you can be confident that they are suitable to your aquarium. However, this is still an emerging area of the hobby so it may not be available in your region.

If you are unable to source from a supplier, you can appeal to local hobbyists through online groups or at your local aquarium shop. Whilst this request may garner some strange looks, it is a great way of introducing new species from a controlled environment. If you would prefer to culture your own wild microfauna, there are instructions in the How-to section of this book.

Whilst this method is rewarding, it is experimental by nature and does add some risk as you may inadvertently introduce parasitic microfauna or otherwise dangerous contaminants to your aquarium. It is also, sadly, unreasonable to assume that everyone has access to clean waterways. For those reasons, it is recommended to source from either a specialist or a local hobbyist.

PROTECTING MICROFAUNA WITH BOTANICALS

When you introduce fish, your microfauna population will decline as your new fish dine out on this natural buffet. It is not enough to just establish your microfauna; you should actively protect their population too. Dense planting and botanicals provide hiding spots to protect your microfauna from predators.

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A full account of aquarium botanicals is beyond the scope of this book, but it is worth knowing the basics. Botanicals are natural organics (e.g. leaves, twigs, and seedpods) that an aquarist introduces to their aquarium. This is typically done to achieve a natural 'blackwater' aesthetic – a rich tannin-stained water colour. For an organic aquarium – much like a botanical method aquarium – botanicals are more than just aesthetics. In these ecosystems, they are used to provide a nutrient-rich food source and an ideal habitat for our detrital crew. It is a method, not a style.

Commonly sold botanicals include dried almond and oak leaf, but there is a wide range of suitable options you can gather yourself. Research plant species local to you and find out what is suitable for aquarium use. Once you have a list of species, go foraging in an unpolluted area. There is a guide on preparing botanicals for your aquarium in the How-to section. If you do not have access to clean areas to source botanicals from, then it is recommended to get them online from a botanical aquarium specialist such as Betta Botanicals®.

Whilst the idea of adding sticks and leaf litter to your aquarium can be daunting, the biodiversity it nurtures is worth the effort.

HOW DO I ADD ANIMALS SAFELY?

Proper acclimation is very important when adding new animals to your aquarium. Even small differences in temperature, pH, or hardness can be stressful, or even deadly, if the transition is too sudden. Take it slow to give your fish or invertebrates the best chance of settling in.

Here's a step-by-step acclimation guide:

1. **Float the bag.** Turn off your aquarium light to reduce stress, then float the sealed transport bag in your tank for 20–30 minutes to match temperatures. If space is limited (e.g. in nano tanks), transfer the animal and its transport water into a smaller, clean container and float that securely in the aquarium.
2. **Add tank water slowly.** Open the bag or container and

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gradually add small amounts of your tank water; about 50–100 ml every 10 minutes. You may need to remove some of the transport water before adding your own. Continue for about an hour until most of the water in the container is from your aquarium.

3. **Transfer with a net.** Gently net the fish or invertebrate and place it into your tank. Do not pour the transport water into your aquarium, as it may contain contaminants.

After introducing new animals, wait 12–24 hours before feeding or turning the light back on. Keep a close eye on them for the next few days and watch for any signs of stress. A careful start makes all the difference.

WHAT SHOULD I FEED THEM?

FEEDING THE FISH AND FERTILISING THE PLANTS

Feed once or twice a day, offering only as much as your fish can finish in a few minutes. Too much uneaten food can accumulate and rot, overloading the system. Start with modest feeds, then a couple of times a week, sprinkle in a little extra to help support plant growth. Whether it's eaten and excreted or left uneaten, the waste becomes a vital source of nutrients for your ecosystem. Just be sure your tank is handling it well.

Use high-quality, easily digestible foods as your staple. Flake food suited to your fish is ideal as it is nutritious and easily crushed into smaller pieces. Avoid cheap, filler-heavy foods that offer poor nutrition and create more mess. Good food creates good waste: rich in nutrients, low in pollution.

Variety is important too. A mix of food types provides a broader range of nutrients for your plants and enrichment for your fish. Occasional treats like live brine shrimp encourage natural foraging behaviour. As your tank matures, fish and shrimp will graze on natural food sources like algae, biofilm, and microfauna. This is one of the strengths of an organic system: a living food web that supplements your feeding.

Once again, feeding is another element of an organic aquarium which

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is governed by balance: enough to nourish your animals and fertilise your plants, but never so much that the system can't keep up.

FEEDING THE CLEANERS

Snails and shrimp spend their days grazing on detritus, biofilm, and algae, but they benefit from occasional supplements to stay healthy and active. Blanched vegetables like courgette, spinach, or carrot are favourites. These provide excellent nutrition (rich in minerals like calcium) and introduce additional organic matter into the system in a controlled way. There is a step-by-step guide on preparing spinach for your aquarium in the How-to section.

Botanicals, as mentioned earlier, are another natural food source. As they decay, they release tannins and grow biofilm, providing natural grazing for shrimp and snails. This mimics a natural stream where leaves fall in and the detrital food web benefits.

Lastly, if you have algae-eating fish in your aquarium, such as otocinclus, it is worth supplementing their diet with algae wafers. These can be added 1–2 times a week and provide an extra boost of nutrition for these helpful cleaners.

DISCLAIMER: Research each species' specific habitat, water parameters, space requirements, and social needs before acquisition – never choose animals based solely on appearance if your system cannot meet their needs. Provide appropriate tank size, compatible tankmates, proper nutrition, and environmental enrichment for each species' wellbeing. Understand the long-term commitment, including adult size, lifespan, and care requirements. Plan responsibly for rehoming if circumstances change and never release non-native species into local waterways. Your ethical choices ensure the health and happiness of the animals in your care while supporting responsible aquarium practices.