

The Aquaponics Ecosystem

In this section, we take a look at how the integration of fish and plants forms an eco-system that enhances the productivity and resilience of both sets of organisms.

From time to time, I get asked whether it's possible to grow fish - without the plants.

The short answer is YES.....but there's a good reason why (in a backyard food production context) you should have at least one recirculating hydroponic growing system connected to your fish tank.

Recirculating aquaculture systems (RAS) differ from Aquaponics in that they are designed to produce fish only. To optimise production, RAS operators will attempt to eliminate all organisms save the fish and the bacteria required for nitrification.

An aquaponics system is designed to produce fish and plants so, in practical terms, an aquaponics unit is simply a recirculating aquaculture system coupled to a hydroponic plant growing system. While, for practical purposes, the difference is simple, the effect (in micro-biological terms) is profound.

You see, an aquaponics unit is an ecosystem.

An ecosystem is a natural system consisting of biotic elements (plants, animals, fish and micro-organisms) living in the midst of abiotic factors (soil, water, rocks, chemicals and temperature).

The organisms that comprise the biotic aspect of the ecosystem are interdependent and occupy their own niche in interconnected food chains. Using the metaphor of a jigsaw puzzle, ecosystem niches are like pieces of the puzzle. When all of the pieces of the puzzle are in place, the ecosystem is healthy, and in balance.

While the visible organisms in an aquaponics system are the fish and plants, it's the micro-organisms that drive the whole thing. They include bacteria, fungi and microscopic plants and animals like green algae and zooplankton.

Unlike conventional recirculating aquaculture, aquaponics systems are not sterile environments. Over time, an aquaponics system will experience the growth of the micro-organisms that will assist it to achieve a state of natural stability.

In a stable ecosystem, none of the species of organisms are in direct competition with each other. Where two or more species occupy niches that are at odds with each other, all of the micro-organisms will adjust their niche arrangements so that there is no need to compete.

The boffins refer to this harmonious adjustment as resource partitioning – something that we humans have obviously never come close to achieving.

To summarise.....aquaponics is an ecosystem and recirculating aquaculture is not.

Not only does an aquaponics system not need to be sterile, the establishment of beneficial micro-

organisms will be actively encouraged. An aquaponics system which has achieved a state of balance will demonstrate greater productivity and less disease - and (if you'll excuse one more non-scientific observation) happier fish and plants.

That's why you should consider at least one recirculating aquaponics system in a microponics unit. In practice, this can be as simple as hooking a duckweed tank up to your basic recirculating aquaculture system.

Of course, once you've got your little aquaponic ecosystem going, you can use some of that nutrient-rich water to nourish your open loop gardens, too.

By gradually integrating other organisms – plants, animals and insects - into your food production unit, you extend the bio-diversity making it even more productive and providing it with even greater resilience.....and that translates into even more clean, fresh food for you and your family.

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