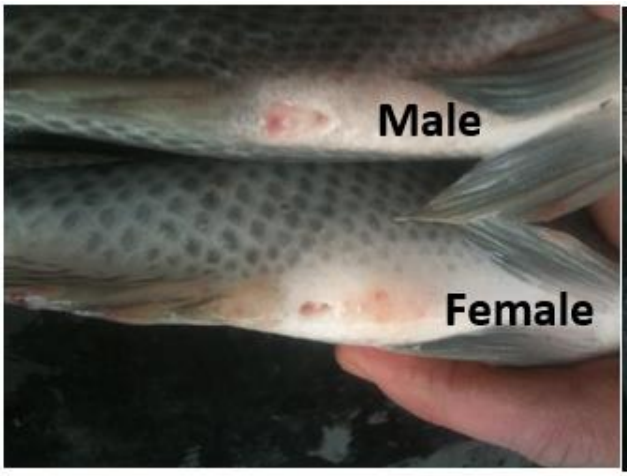
Tilapia Fish Breeding



Female fish mouth brooding

Blue Nile Male Tilapia with Breeding Flush

Tilapia Breeding (If breeding for production, this activities is performed in tanks separately from the aquaponics system so there can be greater controls with water quality and temperature. In addition, you don't want eggs, fry or fingerlings getting through the pipes, pumps or other parts of your aquaponics system (they will anyway), but it is best to minimize as much as possible.

Mixed sex tilapia will breed freely if they are in a tank together when conditions become relatively ideal (water temp above 72°F, 22.2°C).

Nile tilapia become sexually mature based on environmental conditions such as water quality, feed availability and stocking density, commonly around 5 to 6 months and 5 to 7 ounces (150 to 200 grams). Mozambique tilapia can breed as young as 3 months and as small as ½ ounce (15 grams).

In mixes sex tanks, male tilapia can become very aggressive and fight for their territory. It is not uncommon to find large dead males in the tank as the Alpha male has either suffocated the other fish by holding it against the tank and preventing its gills from flaring, or chased it to exhaustion.

For production purposes, all male tilapia are often selected as they have the highest weight gain and if there are no females in the tank, then there won't be any breeding related fatalities.

When breeding specific coloration, size, or male progeny, healthy male and female breeders are selected based on desired characteristics.

The common ratio is 3-4 females and one male in a breeding tank (minimum 50 gallons, preferably larger, with ideal water conditions (0ppm Ammonia, 0ppm Nitrite), pH 8.0 – 9.0, the best water temperature for egg incubation is 80 - 85° F (26.6 – 29.4^{o}C)

Clay pots, 4" PVC pipe or other structures can be added to the tank to allow more females the private space they need to lay eggs and mouth brood.

The female will lay her eggs on a flat surface while the male defends the space against intruders. The male swims over the eggs and fertilizes them, then returns to guarding to prevent other fish from eating the eggs.

The female draws the fertilized eggs back into her mouth and then seeks a private space to wait out the incubation process.

When all the females are brooding in their individual space, remove the male fish as his work is done and he will just be a pest after that.

The female rolls the eggs in her mouth continuously encouraging proper aeration and water flow.

She cannot eat while mouth brooding, unless there is a suitably safe place for her to hide her eggs while she eats. In most aquaponic systems this rarely exists, so she will go without food.

Any stress (netting, human interactions, strong light changes, temperature shifts, sudden water agitation, etc), can cause her to either spit the eggs out (and abandon them), or swallow them.

After about two weeks, any viable eggs experience "swim up" where they hatch and become mobile.

These tiny fry float to the surface of the water with the female close by. If she detects danger, she will suck them back into her mouth for protection.

If possible, it is ideal to net out the fry and place them in a separate nursery tank with similar ideal water characteristics. This will prevent other hungry females from accidently eating the fry.

Once a female is no longer mouth brooding she can be returned to a standard tank and will begin eating again.

Fry Cultivation

Keep fry and fingerlings in a nursery tank for the best viability

Maintain high water quality, dissolved oxygen and temperature around 85o F (29.4C)

Use a fry power fish feed which is high in protein 45%, feeding 5-7 times per day

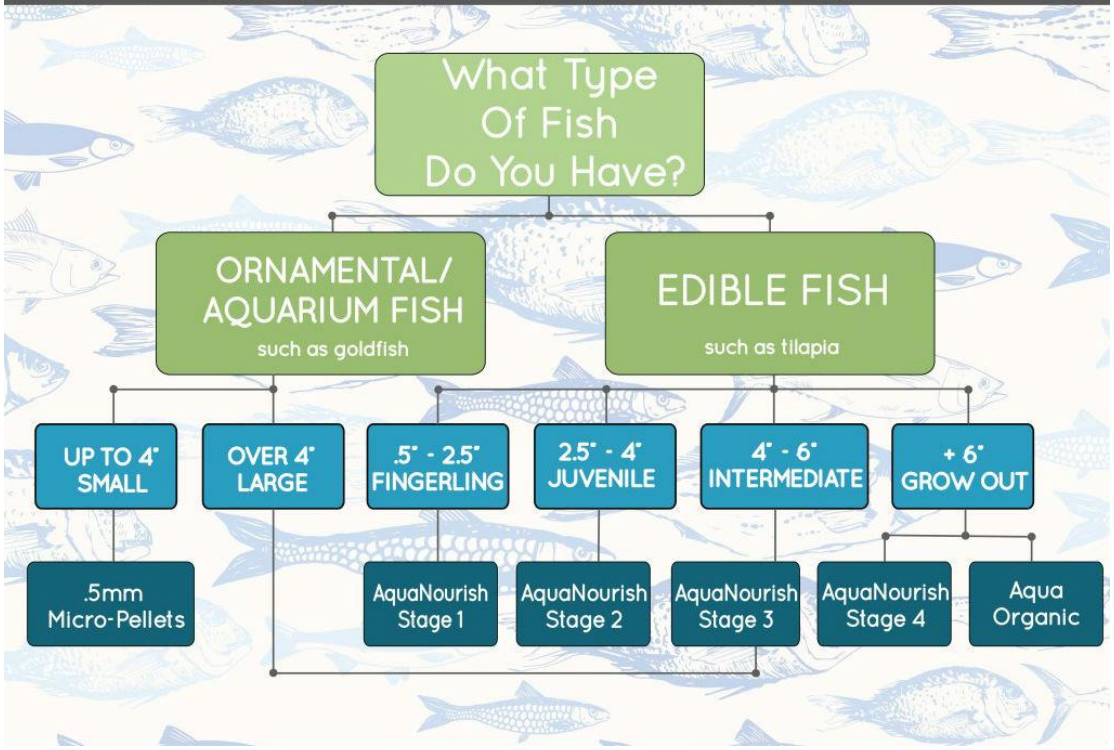
Keep different age cohorts separated for easier stocking and size management

Aquaculture practices cull out the smallest and sickly fish to improve the growout potential

It is possible to determine the sex of a tilapia at fingerling stage if all males are desired.

WHICH FISH FOOD IS BEST FOR YOUR FISH?

Fish need protein. How much depends on their size and metabolism. Younger fish need more protein because they are exerting significant energy in simply growing. Check out our easy to navigate graphic below to discover the right size food for your fish friends.



Stage 1 – .8 mm – 1" – 2.5" fish
Crude Protein .....50.00 %
Crude Fat .....12.0 %
Crude Fiber .....3.0 %
Phosphorous.....1.0%

Stage 2 – 1.7mm – 2.5" – 4" fish
Crude Protein .....40.00 %
Crude Fat .....9.60 %
Crude Fiber .....1.70 %
Ash..... ..... 8.70 %

AquaOrganic –
4mm – 10mm pellets

Crude Protein (min).... 34.000%
Crude Fat (min)..... 3.0%
Crude Fiber (max)..... 10.0%
Lysine (min)..... 1.7%
Calcium (Ca) (min)..... 1.3 %
Calcium (Ca) (max)..... 1.8 %
Phosphorus (P) (min)..... 0.8 %

Non-GMO, No Fish Meal, No Soy

USDA ORGANIC

Stage 3 – 2.5mm – 4" 6" fish
Crude Protein ..... 37.00 %
Crude Fat .....10.00 %
Crude Fiber ..... 2.20 %
Ash..... ..... 11.00 %

Stage 4 – 5mm - Growout 6" fish
Crude Protein ..... 35.00 %
Crude Fat ..... 4.00 %
Crude Fiber ..... 4.90 %
Ash..... ..... 8.00 %

Common Freshwater Fish Diseases

Ammonia Poisoning – Red or inflamed gills. Fish are gasping for air at the surface. Usually found in new tank setup or a tank with too many fish. Ammonia poisoning is easily preventable. Avoid adding expensive and less hardy fish until the aquarium has cycled. *If your tank has not yet completed the nitrogen cycle, you will need to perform frequent water changes to keep the ammonia levels down. Add nitrifying bacteria to improve the cycling process.*

Pseudomonas – Common fish disease that starts as small red marks which eventually turn into deep bleeding ulcers located anywhere on the body. May not be fatal but if they heal koi will have undesirable scaring. Edible fish species should not be consumed.

Streptococcus – A bacteria that infects the fish and can cause neurological issues effecting swimming behavior, swirling, bending, lethargy, disorientation, eye lesions, pop-eye or whiten eyes, body ulcers and abscesses. Gill necrosis, abscess. High mortality rate.

Dropsy or Malawi Bloat – Bloated fish, difficulty diving and will stay on the surface, lethargic and difficulty swimming. Bloat can distend body creating raised scales. This is not really a disease, but a symptom of a bacterial infection, liver issue and possibly malnutrition. Often caused by physical trauma (netting). Body cavity fills with water and the fish cannot either metabolize or excrete.

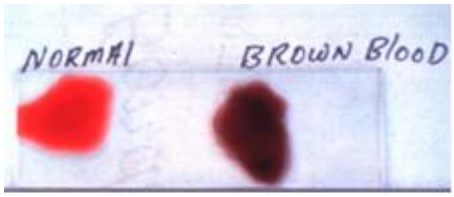
Ich, Ick or White Spot (Ichthyophtirius) Small white spots showing up mainly on the fins but also on the body. It looks like the fish has salt all over it. This is a fairly common fish disease. Ich usually arises due to poor water quality.

Fin Rot, Tail Rot Rotting fins, loss of appetite and laying on the bottom of the tank. This is due to a bacteria that infects the fins of the fish. It is sometimes brought about by bullying from other fish and fin nipping. Most often it is due to poor water quality.

Fish Fungus Cotton like growths on the body that may appear white or gray in color. Be sure to give your fish the best water you can by performing frequent water changes. If your fish gets a disease they may develop secondary fungus infections. *Medications such as Jungle Labs Binox Crystal will treat fungus problems.*

Hole in the Head - HITH, sometimes referred to as Head and Lateral Line Erosion - HLLE Small holes or indentations on the head of fish, advanced cases may show markings along the lateral line of the fish. They may stop eating. There are many theories out there, but no conclusive scientific evidence as to what exactly causes this disease.

Nitrite Poisoning (Brown Blood Disease) – Fish are lethargic or resting just below the water surface and you are getting high Nitrite readings on your test kits. Nitrite poisoning is not a disease but will kill your fish by preventing the blood to carry oxygen. This in turn mixes with iron creating the dark brown blood color.



Oxygen Starvation – Fish gulping at the water surface. Fish found dead with their mouths open. They may be gulping at the surface with their mouths. Check the temperature of the water. Higher water temperatures require higher levels of oxygen. *You will need to increase the aeration in the tank and increase the flow rate with your filters.*

Velvet (Oodinium) Velvet looks a lot like ich but velvet shows up as smaller yellow or gray dusty spots on the fish. Tropical fish with velvet will have rapid gill movement and may be rubbing on surfaces in the tank.

Pop-Eye One or both eyes appear to be, protruding abnormally, "popping" or sticking out. This is usually the result of a bacterial infection, or fluid build up behind the eye due to injury, poor water quality or infection. Swelling may eventually subside, or continue. Not usually deadly unless caused by other bacteria or severally bad water quality.

Swim Bladder Disease Fish have a difficult time staying upright and may hang in the water. Goldfish and koi are especially prone to problems with the swim bladder. Some hobbyists feed their fish peas to treat this infection. Perhaps this works by helping in the digestion process. *Stop feeding the fish for a few days, give the fish optimal water conditions.*

Anchor Worms, Parasites, Leeches – Opportunistic organisms that attach to the fishes body. Some parasites do harm while others ensure that the fish stays alive so that it can continue to have a viable host.

Fingerling cannibalism – Fingerlings needs high protein diet, and if they are too crowded or lacking sufficient feed, they will cannibalize their tank mates. Sometimes a fish will just loose an eyeball but remain alive (the eye won't grow back), other times they get eaten either before or after they die.

Fungal Disease – Various fungal diseases will cause scaling, patching, fuzz, oozing or gelatinous coatings to cover part or all of a fishes body. Those that result in death will continue to decompose the carcass.

Nuchal Hump – Fluid filled sack on the top of the head commonly associated with hormone increase during mating for some fish species. Can happen to both male and female fish and usually subsides after spawning is completed and hormone levels fall.