



BEGINNING WITH KILLIFISH

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Killifish are some of the most beautiful and interesting freshwater fish that are sometimes available to aquarists. They have some of the more interesting habits and some Killifish are suitable for the inexperienced aquarist, while others are a challenge for the most experienced.

But what is a Killifish? A Killifish is one of a large group of fish called CYPRINODONTIDAE or tooth carps. The name "*Killifish*" originated from the word "*kill*" which in old Dutch means "channel". Simply, Killifish are fish which are found in channels of water. The CYPRINODONTIDAE group includes the *Anableps*, the Silversides, the live-bearing tooth carps and the egg-laying tooth carps. They are referred to as egg-laying tooth carps to distinguish them from their closest relatives the live-bearing tooth carps (these being the Platies, Mollys, Guppies etc.). The Sydney Killie Group concerns itself to the former group, the egg-laying tooth carps.

These fish are found throughout the equatorial belts around the world. They differ from continent to continent. In simple terms they are divided into three groups: The *annuals*, the *semi-annuals*, and the *non-annuals*. The annuals live, in the wild, in non-permanent pools that dry up in summer. They lay their eggs in the mud at the bottom of the pool before the pool dries out and the fish die. When the rains come the eggs hatch, the fry grow and mature so that in a period of six weeks they are able to lay eggs again. In a cool aquarium these fish live for much longer and will spawn for 12 months or more. They are often quite easy to breed and are the most interesting fish. Semi-annuals live in pools that sometimes dry out in the dry season. The non-annuals inhabit permanent water masses and may live up to 5 years.

Many people are fascinated by the pictures they see of Killies but are put off by the alleged short life of six months or so, or the difficulty of getting the fish, and the myths about keeping them. With a little care and good basic fish keeping principles, the fish are easy to keep, and by being a member of the Sydney Killie Group the fish are made a little easier to get. It is the Group's policy to ensure that members swap and exchange or sell their fish in the group first and then to other people. Once you have seen real Killies in a well set up tank you too may become 'hooked' by the beautiful and extremely hardy little jewels. The truth is that most species are infinitely easier to keep than a lot of tropical species and if you want to start breeding and raising, Killies provide some species that it is difficult not to be successful with. It's a fact that some species, if maintained in a well set up tank with proper food, will virtually look after themselves and will breed and reproduce at a steady rate for good measure. There is often the question of "will they fit into my community aquarium?". The answer is dependent on what else is in the aquarium. If you have a tank that has a pH of around 7.0 then the answer is probably **yes**. *Aphyosemion gardneri* size Killies cope quite well with Angels and *Australofundulus transilis* is good company for others of the South American *Aequidens* Cichlid genus (Editor's Note: except for *A. rivulatus*, the Green Terror). *Aequidens curviceps*, Keyhole Cichlids, Discus etc. as well as Convicts and Jack Dempseys to 35-50mm. All of the Killies except the diminutive *Epiplatys annulatus* (the Clown Killie) seem to do all right with Tiger Barbs. However it may be that you would like a community tank of just Killies and this can be fine if you follow certain ideas. Try to have a well-planted tank with plenty of bushy or fine leaved plants, as well as some floating plants like Indian Fern. Some golden *australe*, *gardneri* and some *Aplocheilichthys* would give a spread of fish so that there were fish on the bottom of the tank, in the middle and on the top. All would eat the same foods, need the same tank conditions and would not fight.



Temperature

Killies, on average, prefer a much lower temperature range than the normal tropical fish. For many fish a temperature of 20° C is all that is needed with a slight rise for spawning. If you have a centrally heated home it is possible that you will be able to keep Killies for most of the year in un-heated tanks.

Feeding

Killies are a little fussy in some ways as they prefer live foods. In the wild they eat mainly terrestrial insects, aquatic insects, larvae and crustaceans, so they do better when fed live foods. But they do eat alternative foods. They eat any of the small worms: Grindal, White, *Tubifex* and Bloodworms as well as chopped up garden worms. *Daphnia*, *Cyclops*, and wingless Fruit Flies are also welcomed. If these are unavailable very finely minced fat-free beef heart, as well as freeze dried foods can be substituted. The fish can be encouraged to eat a good quality flake. But like any other fish a variety of foods are best. Also remember that if you have a small tank with only a trio of fish in it, then feed very small quantities of food.

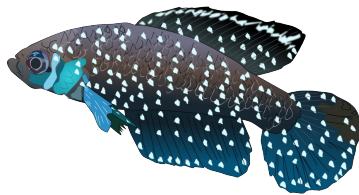
Breeding

Killies are one of the most interesting of all fish to breed. Some species are a perfect introduction to fish breeding, others are very difficult and a challenge for the highly experienced aquarist.

Non-annual species, which include many *Aphyosemion* and *Epiplatys* species, can be dealt with in two ways. Firstly a well-planted tank is used to hold a trio of fish. They are well fed and left alone. Provided there is plenty of cover, the fish should lay eggs which hatch and most of the fry will find shelter and grow on. The second way is quite different. Spawning mops are placed in a usually bare tank and the eggs are harvested from the mops and incubated in small containers such as two litre ice-cream tubs. Most eggs, water incubated in this way, hatch in from 10 to 30 days if the temperature is maintained in the correct range. Once the eggs have hatched it is better to place the fry into another container so that the remaining eggs may hatch normally. The fry may be fed some liquid fry food and then given Microworms and newly hatched Brine Shrimp. Be careful not to overfeed. If the container is too large then the fry will find it difficult to get enough food, and may starve. The growth rates vary with the species but it is generally slower than the annuals. As the fry increase in size move them to bigger quarters. Once the males start to show their colours it is time to put them into a tank of their own so that they don't fight.

With the semi-annuals one of the best ways is to collect the eggs and place them on moist peat in a container and store them for the required time. If you wish you can watch them develop with a hand-held magnifying glass. To get the eggs to hatch all that is required is some more water to cover the peat to a depth of 3cm. Often the eggs will start to hatch in 4 or so hours. Feeding the fry is the same as the non-annuals but they need more as they grow much quicker.

The eggs of most annual species need to be 'dried', or stored in damp peat for periods from 6 weeks to 9 months depending on the species. Most people try to store the eggs in peat the consistency of moist tobacco, whatever that is! One way is to collect the peat that the eggs are in and drain it in a net, before giving it a good squeeze to get the rest of the water out. The peat is then put into a plastic bag, sealed, labelled and the expected hatching date is added before the bag is put away until the eggs are ready to hatch. An airing cupboard is often used to keep the eggs warm enough.



To hatch these eggs is simple. Take a clear glass container and place some water in it. Add about 1 gram per litre of coarse salt or butcher's salt and leave it in the fish room until it has reached the correct temperature of about 21° C. The peat is then taken out of the plastic bag and gently crumbled so that there are no large lumps. It is then added to the water. Soon the eggs should hatch and the fry appear. It is best if the water level is only a little above the peat for a start. As the fry grow at a tremendous rate, feed frequently and move the fry to larger quarters as well as watching the larger fry. They are often cannibalistic. Cynolebias whitei can be ready to spawn after only 6 weeks in ideal conditions, and may be spawning for up to a year. If the eggs fail to hatch the way they are expected to, it is worth redrying and storing the peat for another month. Even if there is a good hatch it is still worth re-storing the peat and rewetting it up to six times as each time more fish will emerge.

Aquarium requirements for breeding

In the wild many species are very territorial and the males defend their own area against all other males. They are quite promiscuous and mate with any females that can be tempted into the territory they 'own'. On the other hand some species shoal and may be kept in aquariums to reproduce the conditions that they enjoy in their natural habitats. This means that many species are able to be kept in trios in relatively small tanks compared with other fish of similar size. A 300mm x 200mm x 200mm tank will house a trio of most Killies. Many of the smaller ones will breed and may be initially raised in a tank of this size.

If you want good quality and good sized fish then you could use a general rule: fish under 50mm in length are able to be housed in a tank about 300mm x 200mm x 200mm, fish from 60 - 95mm need a tank about 500mm x 250mm x 250mm, and fish over 100mm need a tank of 600mm x 300mm x 300mm for a trio. In the wild most Killies live in shallow water, so the water level in tanks need not be over 100mm. Killies are excellent jumpers so ensure that you have a **close fitting** lid on the tank and if there is plenty of light have a good layer of surface plants. Most of the Killies available in Australia take to the local water fairly readily but should be acclimatised to it gradually. In the wild they prefer water that is soft and very slightly acid but can be conditioned to almost any water conditions provided extremes are avoided. Also, the addition of one gram of non-iodised salt (cooking salt) per litre of water would be beneficial. This helps the water chemistry remain stable and prevents disease.

It may be that you like a well-planted tank. This is fine and the fish will be happy there and will leave the plants alone. Many Killie keepers like to have their tanks bare for breeding purposes, with only a mop (made from nylon or bri-nylon wool) in to collect the eggs or give the females a place to hide in. Java Moss will do just as well and may be tied to a cork for top spawners or weighted down for fish that spawn on the bottom.

Aphyosemion gardneri or Aphyosemion australe would be fine in this type of tank.

When dealing with annuals or semi-annuals there are some differences in their requirements. It is better to either keep all of the males and females together in separate tanks or else to keep a male and several females together. The males tend to be rather aggressive towards each other. If trios are kept together make sure that there is plenty of cover for the females as the males tend to be very hard 'drivers'. If you decide to spawn the fish the spawning medium is very easy to provide. Boiled peat is placed in a 500gm margarine container, a 30-50mm hole is cut in the top and the top is fitted on. Some inert materials are placed in the container to make it sink. Add about 35-40mm of peat, and from then on the fish if conditioned properly will spawn in the peat. Fish that breed like this are the Nothobranchius and Cynolebias species. We have some of both in Australia at the moment.

Conclusion

Killifish are rather exciting fish that need only the ordinary care of any type of fish that you may want to keep and breed. They have no myths or mysteries attached to them although many people do them a disservice by telling all sorts of stories about them that simply do not stand up to scrutiny. Oddly enough the Sydney Killie Group is the only specialist fish keepers association that has been formed in Australia that has survived (Editor's Note: I think that ANGFA would politely beg to differ here). It has its roots as far as 1969.

The only difficulty with Killifish will probably be in getting some fish to start with. This is difficult as many dealers will not handle them even if they are available. Some enlightened dealers do. On the other hand, members of the Sydney Killie Group often have spare fish or eggs for sale and the eggs are easily sent by mail anywhere in Australia. The fish are easy to airfreight there is a commercial air link. The Sydney Killie Group tries to help keep the prices realistic also. At the moment there are about

35 species that are being bred and maintained here, as well as colour morphs that should be kept carefully apart. Below are some of the fish that are available at the moment. As there is a bit of a cross over some fish populations they are only given as a guide as to groups.

ANNUALS: Nothobranchius foerschi + N. patrizii,
Cynolebias whitei + Cy. constanciae
Aphyosemion sjoestedti

SEMI-ANNUALS: Aphyosemion marmoratum + A. gardneri (some) + A. amieti

NON-ANNUALS: Aphyosemion gardneri + A. australe + A. striatum + A. bivittatum
Aplocheilichthys panchax + lineatus
Rivulus holmiae

There are others that will appeal to members once they have a little more experience.

Editor's Note: As at the time of printing the Sydney Killie Group is going through a few changes and a point of contact is not available. This information will be provided as soon as it becomes known. There are, however, some Killies available around the place, from both the annual and non-annual groups. Ask Ian McGuinness, Peter Thomas or myself (Andrew Boyd) for details.

Addendum: Peter Thomas has an adaptation of the margarine container spawning chamber (for substrate-burrowing Killies) mentioned above. He cuts two pieces of glass per container, both approximately 60mm square. One he uses as the inert weighting material to hold the container down. The other is used as a cover over the hole in the top of the margarine container lid to stop peat moss from filling the tank if it is lowered in. The lid' glass is then removed. This method seems to work well.