

Rediscovering an annual Killifish

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Everyone has a fish which, for them, is the pinnacle of fishkeeping. Usually it is something rare or otherwise unobtainable. Discus were it for many people for years and years. For many fishkeepers these days it is an obscure but beautiful Rift Lake or South American cichlid or a Banjo Catfish or maybe the wild form of the Siamese Fighter. For me it has always been killifish.

Anyone who has looked at the colour photos of killis in the books will know about their colours and their sleek form. A little reading will give you the impression of a fairly easy group of fish to breed, but perhaps one with a few inherent problems for the fish keeper. Occasionally killis come up for sale in club auctions and, even more occasionally, in aquarium shops. Only very rarely are these the really interesting species.

I first discovered killis in Brisbane during the early 1970s, while working during the school holidays in Aquarium shops. I got to know a few master killi keepers, many of them Europeans or Americans who brought their love of killis with them to Australia. Europe, America and New Zealand I understand, have specialist killi societies which make up for the lack of commercial and general

hobby interest in the group. I was always impressed not only by my friends' collections of fish, but also by their fine touch and sensitivity to the requirements and culture of these little gems. It seemed to me that the successful culture of killis depended much more on the skill and knowledge of the keeper than on large tanks and fancy equipment.

Amongst the vast array of killis then kept in Australia the prize, to me, were those of the genus *Nothobranchius*. Even amongst experienced killi keepers "Nothos" were regarded with respect. There are more than a dozen different species, all with the same basic form. A young male *Nothobranchius* can take your breath away. The whole body and the unpaired fins are a tapestry, generally with either red, blue or, in a few species, yellow dominant. Overlay this basic body colouration with contrasting pattern and highlights and you have a little fish which can rival most marines for colour. The female is smaller and plain coloured. The new look cover of Tropical Fish Hobbyist magazine uses pictures of two male Nothos in the border design.

Nothos are not the easiest of fish to keep. It's not so much that they're delicate or need special conditions. It's just that there are a couple of things about them that you really have to know. The first is that they are annuals. In the wilds of east Africa, *Nothobranchius* species, like species of the *Cynolebias* and *Pterolebias* genera from South America, live in temporary streams and ponds which can be bone dry for more than six months of the year. Their short life span is an adaptation to their environment. So too is their egg, which has

a tough membrane which can resist drying after being deposited by the parents in or on the substrate.

The egg, or eggs (they lay hundreds), also have a sort of on/off switch. After drying they reach a certain stage of development and then switch off, or "undergo diapause", as the books say. Later in the season, when rains are due, the eggs complete their development so that when the streams and ponds fill with water, hey presto, instant fish. The eggs are quite large at about 1mm in diameter and can be handled with the fingers.

Development can be observed with the naked eye. On hatching, their growth rate is phenomenal. From a newly hatched fish of around 2mm long to a sexually mature young adult of around 3cm takes 8 weeks. The second thing the *Nothobranchius* keeper needs to know is everything about **Oodinium**. The dreaded Velvet disease, a tiny protozoan, is the scourge of most killifish and that goes double for "Nothos". One of the problems is the water itself. The soft, acid conditions advocated for most killis is a wonderful culture medium for Velvet; but it simply isn't necessary for "Nothos". Some people even keep these species in brackish water to keep Velvet at bay. However, the main preventative measures should be to use neutral, medium hard water, maintain attention to tank hygiene and aerate the water moderately. Even then, careful observation for the early signs of Velvet, particularly a high respiration rate, and keeping a few simple cures handy, such as salt, malachite green, acriflavine and Protozoan, is part of the *Nothobranchius* deal.

If you are into killis, you have to be prepared for comments from fish keeping "humourists" who equate the term killifish with Velvet disease and cast cynical aspersions at the would be killi keeper. This joke has been around since Noah and these jokers have simply failed to appreciate the finer things in life. They are to be pitied; or perhaps sent away somewhere where they can give less offence.

Temperature is not important to the fish as they can be quite happy at temperatures from the high 'teens to the low thirties, but Velvet does seem to prefer the lower temperatures and, like whitespot, seems to occur more frequently if the temperature varies. Fish metabolism, and therefore ageing, is increased at the higher temperatures. I find the mid twenties to be ideal.

The only other things you really should know about Nothos is that they need live food in their diet and that they are definitely not community fish. Nothos are big eaters for their size and like to hunt for their food. I find mosquito larvae to be ideal but they also like white worm, tubifex, daphnia, ant pupae, aphids (occasionally) and adult brine shrimp. Some breeders say that fruit flies, preferably the cultured flightless form, are the ideal "Notho" food. Frozen or freeze dried food, especially bloodworms, are a good standby. Any food which reaches the bottom of the tank risks being ignored and is therefore a potential source of decay.

Although a predator and one that can display a high level of aggression towards its own species, Nothos just cannot mix it with other fish. The traditional setup is a small tank (10 litres is fine)

containing a single male and two or three females. You could experiment with larger tanks containing a few trios or other killis, but don't mix species of *Nothobranchius* as the females are nearly impossible to tell apart. Always keep the female to male ratio high, to cut down fighting between the males, and don't provide too much in the way of artificial lighting. Room lights or a single low wattage incandescent lamp are fine. Obviously, plants, apart from Java fern or Java moss, don't do well in such tanks. I prefer bare tanks anyway for ease of cleaning, but some fine sand, or even boiled peat, is OK. Remember that small tanks need careful management to maintain water quality. Filtration and aeration are optional but are a good idea since Velvet (that word again) is less at home in water which is well oxygenated and low in ammonia.

We rarely see *Nothobranchius* in Australia these days. For whatever reason, they were left off our permitted import list so those around are either locally bred or have slipped in undetected. When a young trio of Nothos turned up as display specimens in a local pet shop last winter, I was truly surprised and delighted. Luckily for me, and for the fish, I'd had at least a little experience with annual killis in the "good old days" when such things were at least available if you really wanted them. This trio was just the right age for breeding. Thanks to the shop owner's generosity, I eventually took the little trio home to a small tank containing a plastic container of well sifted and boiled peat.

Peat is the preferred substrate for spawning, but a weighted mop of nylon yarn would also serve the purpose. After constant feeding

with live foods and a few false starts, I was able to yield around 100 eggs after a one week spawning session. The peat was dried to the "just moist" state and stored away in a plastic bag in a cupboard. I could not immediately identify the species but after some research decided that I had either *N. palmqvistii* or *N. foerschi* both of which require a minimum 3 month dry period for the eggs. But on submersing the peat in old tank water 3 months later I got nothing. Some eggs normally hatch within minutes of emersion, but after 3 hours I didn't have one. Disappointed, I did as the books say and redried the peat and tried again 4 weeks later. Again, I got nothing; not one baby. By this time the parents were dead from old age and I was downright depressed as only a fish keeper would understand. More out of desperation than hope, I dried the peat and tried again a full two months later. Bingo! Within an hour there were more than sixty tiny babies swimming around above the peat.

Perhaps the cold of the Canberra winter, even in my cupboard, had delayed development. The literature is inconsistent when it comes to first food for baby killis but, by my reckoning, they were just a tad small for newly hatched brine shrimp, so a drip feed of infusoria and microworm was installed. This seemed to get most of them through the first two critical days. Killis have no yolk sac on hatching and are free swimming and hungry from the word go. From that time on, growth was extraordinary. You could almost see them growing.

Given the trials of their (or my) ordeal in reaching this stage, I was scrupulous about tank cleaning and water changes. Two months later, I'm well on the way to a viable breeding colony. Velvet willing. As for identification, it was trickier than I thought. Texts were inconsistent on Notho taxonomy but some more recent magazines clearly had my fish labelled as *N. foerschi*—see the article on *N. patrizii* and related Nothos in the August 1991 issue of Freshwater and Marine Aquarium. Photo 8 on page 17 is a good shot of *N. foerschi*. Earlier books said it was definitely *palmqvistii*, but it seems that a taxonomic review in the late 70s reorganised the genus a little and the name *N. palmqvistii* has been returned to its rightful owner, a similar fish from a different part of southern Kenya.

Other similar species include *N. guentheri*, *N. jubbi*, *N. elongatus* and *N. patrizii*. Most Nothos come from Somalia, Kenya, Madagascar, Tanzania or further south. Apparently a few are genuinely brackish water fish for at least part of their short lives. It is a sobering thought that the environment of this part of Africa is under intense pressure from a combination of rampant population growth, war and agricultural intensification, including increasing use of fertilisers and pesticides.

Ten years ago, a member of the Canberra and District Aquarium Society, Zainudeen Ibrahim, was publishing booklets and articles warning of the threat to killifish generally of the unrestrained use of chemicals in Africa. The conservation of small freshwater fishes, and the ephemeral ponds and streams they need to complete their life cycles, is rarely a priority for Third World governments, or for the international agencies which are set up to assist them.

Several killis from both North and South America are already officially listed as "endangered" or "believed extinct" as a result of loss of habitat. Having "rediscovered" *Nothobranchius foerschi*, and along with it, my interest in killifish, I'm now curious to know whether others, either in Canberra or interstate, have had similar success either discovering or maintaining other killis. The eggs of annual killis can be traded or swapped through the post in small parcels of peat. Even the non annual types, such as most of the genus *Aphyosemion*, as well as genera like *Rollofia* and *Epiplatys*, can be sent in small vials of water treated with an antifungal agent such as Acriflavine. Their incubation time of two weeks is long enough for them to survive any but the Christmas mail. If anyone has any of the less common killis they would like to swap in this way, please contact me through the Canberra and District Aquarium Society, PO Box 129, Lyneham ACT 2602, and we shall see what we, and Australia Post, can do about keeping killis alive and well in Australia.

Further reading

There are a number of good books on killis in the shops and society libraries. Hobby magazines from the US and UK often feature killifish. Some particularly useful references are:

Scheel, J.J., 1975: Rivulins of the Old World. TFH Publications Inc. is a magnificent, large and expensive book about African killis. It is a "serious" book, containing lots of technical information on killi ecology, genetics and taxonomy. It also has lots of pretty pictures. Unfortunately, it is now a little out of date as far as taxonomy is concerned, but is still the bible for this group of fish.

Ostrow M. I., 1981: Breeding Killifish. TFH Publications Inc. a good reference on basic care and breeding and contains many useful tips, such as how to get a batch eggs of non annuals to hatch simultaneously.

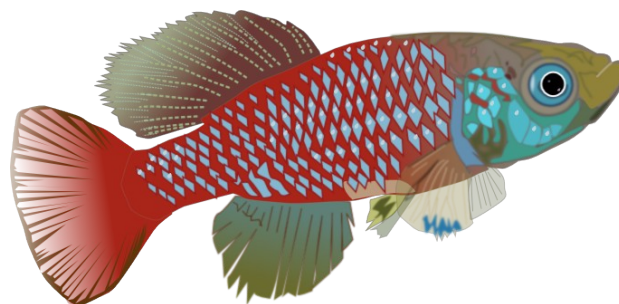
Axelrod H. R., 1976: Breeding Problem Fishes, Book 4 has a chapter on "*Nothobranchius palmqvisti*" (the fish illustrated is probably *N. foerschi*).

Turner B. J. & Pafenyk J. W.: Enjoy your Killifish. The Pet Library Ltd. is a good basic little book covering general maintenance of killis, foods and feeding, diseases (no prizes for guessing which popular protozoan gets 90% of the space in this section) and breeding strategies.

I should not forget Ib's booklets; Zainudeen M. Ibrahim: Killifish the magnificent egg-laying tooth carp. (Volumes I and II), private printing, are now out of print, but if you can find them they provide a useful pictorial reference to the genus

Aphyosemion with commentary on killi ecology, breeding strategies and developmental biology.

Magazine articles on killis by authors such as Jaroslav Kadlec, Ruda Zukal, Hans Jurgen Rosler and Roger Gladwell are always informative and usually well illustrated to boot.



Nothobranchius foerschi (male)

Postscript by the author (2014) – It is a little weird coming across this article 22 years after it was written. I did keep *N. foerschi* going for about four generations (mainly in tanks in my kids' bedrooms!) but eventually lost my collection to a mix of Velvet, old age (theirs) and renovating the house. At the time it was a real effort to find or generate interest in these amazing fish. I was out of fishkeeping for about 15 years after that. I have never seen the species again in Australia. However, just recently I learned that a few other *Nothobranchius* species have survived here (or just miraculously appeared in collectors' tanks!). That's good news. It was also heartening to see that Ib's booklets are still in the CDAS library. Paul.