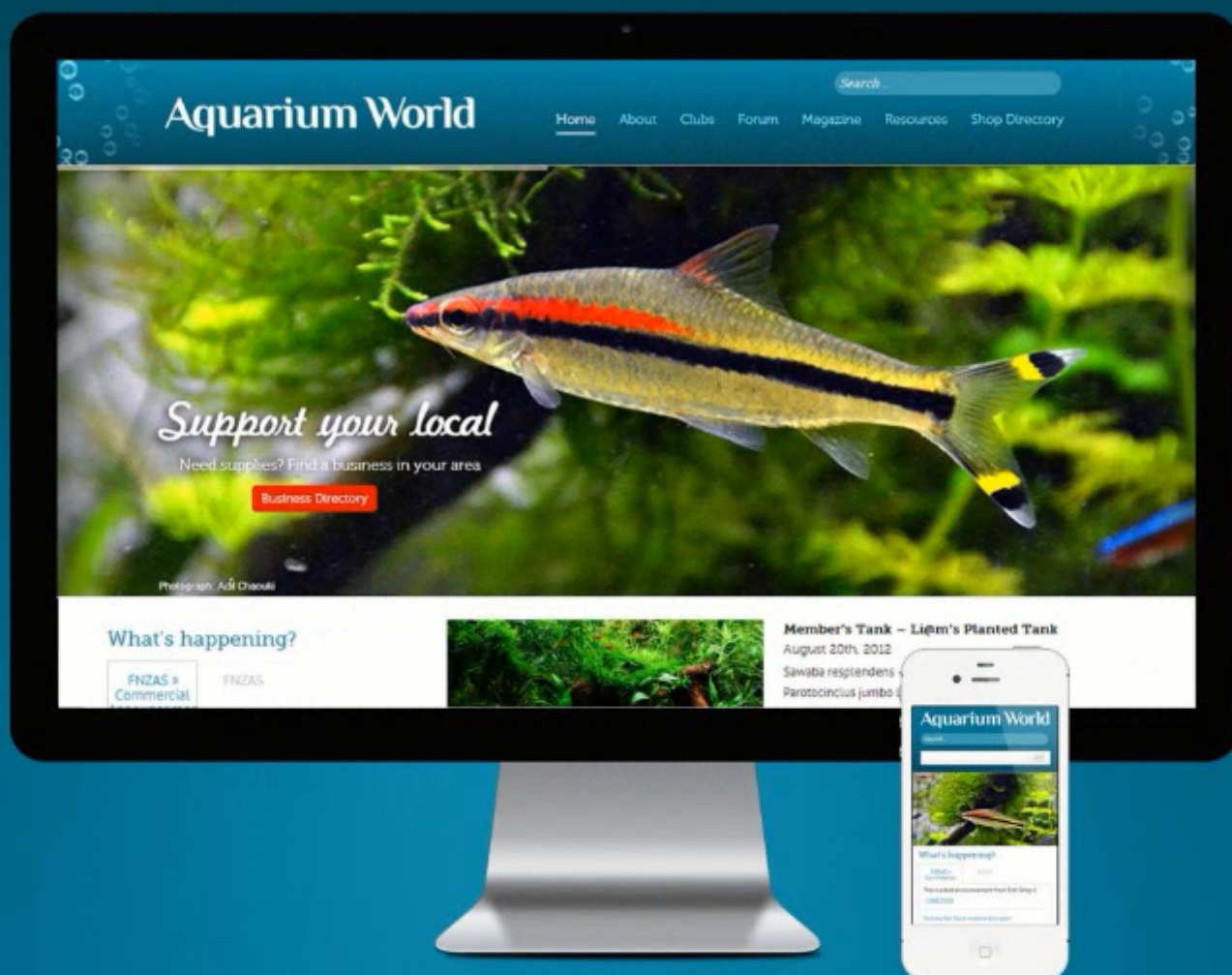


Aquarium World

magazine

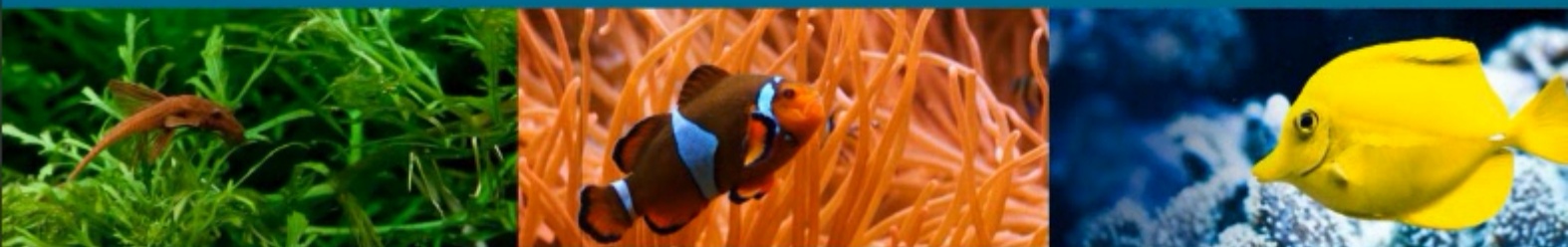
Volume 63 Issue 2 2017





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magazine

Volume 63 Issue 2 2017

EDITOR

Darren Stevens
editor@fnzas.org.nz

ASSISTANT EDITORS

Mark Paterson

COPY EDITOR

Caryl Simpson

ARTISTIC DIRECTOR

Diane Wilkie
diane@scratchmedia.co.nz

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Nothobranchius guentheri

Photo: Robert Beke

BACK COVER

Aphyosemion australe

Photo: Diane Wilkie



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Welcome to another issue of Aquarium World.

In this issue we feature killifish. These fascinating, beautiful, egglayers are relatively easy to keep and breed but they don't seem to be as popular in New Zealand as they used to be. There was once a dedicated killifish club, regular shows, and some very passionate keepers. Fortunately, killies are now increasing in popularity and hopefully this issue will inspire a few more fish keepers to set up a dedicated killifish tank.

I am sure many of us would like to turn our aquarium hobby into a job but very few people get the chance. Rob Yarrall has managed to do just that and has been a fulltime aquarist at the 'The National Aquarium of New Zealand' for 41 years. This year he retires and we celebrate a great career.

Aquatic plants haven't been imported into New Zealand for many years and while we are fortunate to still have a great range of varieties in the hobby, some species have become very rare. One such rarity is the onion plant *Crinum calamistratum* and Cam Scott shares his experiences with keeping what may be the only remaining plant in New Zealand.

And for fans of large cichlids with plenty of personality (and attitude), Kimberley Savage reports on her journey with keeping and breeding red devils.

I hope you all have a safe and relaxing Christmas break.

Darren

Darren Stevens
FNZAS Editor



Nothobranchius palmqvisti
Photo: Diane Wilkie

Barrie McKoy

Barrie began fishkeeping in the early 80s after being attracted to the bright colours and variety of shapes and habitats of killifish. He was intrigued that a fish could lay eggs that would be left dry for several months and later hatch when the rains replenished their pools. Barrie was a member of the NZ Killifish Association (now in recess) and has kept killifish on and off over the last 30 years, and is now working towards helping rebuild stocks and interest in these fish in NZ.

Cam Scott

Cam is a 30 something year old aquarium store owner from Nelson, having been a hobbyist that mainly kept African cichlids, plecos, and aquarium plants. He is FNZAS Vice-President and Tasman Aquarium Club President, believing that part of the joys of fish keeping are the conversations, interactions and learnings with other people, not just reading a screen. He is working hard to strengthen the numbers of fish keepers within Nelson & the FNZAS.

Diane Wilkie

Diane has an interest in small biotope and aquascape aquariums, aquatic and carnivorous plants. She has held various offices in the NZKA, HBAS and FNZAS over the years and is currently the artistic director of the Aquarium World magazine. Her house is run by three cats of various ages and demeanours and contains three small species only planted tanks.

Mark Paterson

Mark began fish keeping when he was a child, keeping live bearers and siamese fighters. He has worked for circus and zoo parks in NZ and overseas. For the last 28 years he has kept many species of aquatic life but NZ local marine is his keenest interest. Mark loves to share this passion & knowledge with fellow hobbyists and is currently running the marine systems at a local university & is also FNZAS President.

Kimberley Savage

Kimberley's fish addiction started about 5 years ago when she was given an axolotl and it went wild from there. These days her focus and passion is on central American cichlids and she T-Bar and red devil cichlids. Her knowledge of these cichlids as well as other central American species is always growing and she is always learning from her own experiences and welcomes hearing about others. She would love to see more central American species in NZ.

Caryl Simpson

Caryl has held various offices in the Marlborough Aquarium Club over 24 years. She was involved with the FNZAS as editor for 16 years, and archivist for 8, and is a founding member and global moderator in the FNZAS Fishroom forum. She currently has one tropical community 4ft tank and a pond.

Darren Stevens

Darren is a marine biologist who has worked for NIWA for about 20 years. He regularly participates in research surveys and has been around much of New Zealand as well as Oman, U.A.E., and the Ross Sea, Antarctica. In his spare time he enjoys fishing, and is a particularly passionate pleco keeper. Darren is an active participant in his local clubs and FNZAS Editor.

ADVERTISING Advertising for the Aquarium World magazine and the Aquarium World website is managed by the FNZAS and can be arranged by emailing: advertising@fnzas.org.nz

Sales: Mark Paterson and Cam Scott

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Killifish for Beginners

Caryl Simpson





Aplocheilichthys lineatus
Photo: Barrie McKoy



The killifish is classified as an egg laying tooth carp and belongs to the family *Cyprinodontidae*. They can be found in every continent except Australia, with the majority living in the tropics. Killifish are usually small fish with a large mouth and large dorsal and anal fins and boy, can most of them jump! A tight fitting lid is needed with most.

These fish can be divided into three basic groups - Non-annuals; live with a continuous water supply so have uninterrupted development.

| *Aphyosemion australe* gold male
Photo: Ryan de Raat

Annuals; live with a dry season where the eggs stay dormant in the ground for a long time until the next rainy season.

Semi-annuals; live where the water dries up to a lesser degree for only a short time.

A lot of the killies we have in NZ are from Africa.

| *Nothobranchius guentheri* gold female
Photo: Diane Wilkie





Their genera are –

Aphyosemion (*Aphyo* – small fry *semion* – mark)

Aplocheilichthys (*aplo* – single, simple *chiel* – margin edge *ichthys* – fish)

Epiplatys (*epiplatys* – broad at the top)

Nothobranchius (*notho* – spurious *branchius* – fins, gills)

Pachypanchax (*pachy* – large, stout *panchax* – a kind of fish)

Epiplatys dageti male

Photo: Diane Wilkie

From Asia we get the *Aplocheilus* (*aplo* – simple *cheilus* – lip). North America has *Fundulus* (*fundulus* – the bottom), while *Jordanella* (named in honour of David Starr Jordan, an American ichthyologist, educator, eugenicist, peace activist and founding president of Stanford

Nothobranchius guentheri gold male

Photo: Mark Owen





University) is found in Florida. In South America we find *Rivulus* (*rivulus* – small stream) and *Cynolebias* (*cyno* – a dog *lebias* – a kind of fish). Killifish cope in community tanks but are better kept on their own in a species tank. Killie keepers often like to keep several different species but it is important that different species, and even different strains, be kept separate. Closely related species can breed and produce hybrids, which are not good for these particular fish. Furthermore, hybrids may be infertile. Cross breeding killifish is very much frowned upon.

Many killifish can be kept in small aquariums of around 10 litres, indeed many prefer them for breeding, but some of the larger species need 18 – 40 litres. Water hardness and pH requirements vary between species but all need a temperature of around 22 – 24°C. Filtration and aeration are important in small aquaria. Box filters, with filter

| *Aplocheilichthys normani* female

| Photo: Diane Wilkie

wool, or sponge filters are both good for killifish. The sponges are especially good in fry tanks as the fry do not get stuck in them. A lot of breeders raise fry in small containers, like plastic filing drawers, in a heated fish room.

A planted tank with substrate looks nice but if you plan to breed your killies, a bare tank with no plants makes egg collecting much easier with breeders providing a small container of peat for the bottom spawners. It would pay to have a planted tank for show and rearing fry but use separate bare tanks for spawning. As killies prefer low light, choose your plants with this in mind. Java fern and moss are both suitable, as are *Cryptocorynes* and *Anubias*.

| *Fundlopanchax garneri* blue male

| Photo: Barrie McKoy



Subdued lighting is preferred as many killifish come from forest areas protected from direct sunlight. If you prefer a well lit aquarium, bushy and/or floating plants can provide the required shade. Try lighting above and to the front of the tank to show your killies at their best.

Make sure you have a good live food supply because killies prefer these and need plenty of them. Some refuse to eat dried foods but whatever you choose, a varied diet is essential. Good live foods for adult killies are daphnia, brine shrimp, mosquito larvae, white worms, Tubifex and fruit flies. They can also be offered beef heart, paste foods and a variety of good quality dry foods. Fry require newly hatched brine shrimp, microworms, grindal worms or infusoria.

Killies breed in three different ways. Either burying their eggs in the mud on the bottom,

laying them on top of the mud, or laying them on the roots of top plants. The egg buriers live in areas where their pools totally dry up during the dry season. These fish bury their eggs in the mud where they are protected when the water evaporates. They can survive like this for months. When the rains come, the eggs hatch. Killies living in less dry conditions will lay their eggs on the roots hanging down from floating plants. Those who live in areas between these two extremes are the ones who lay their eggs on top of the mud bottom. There are many articles to be found on the internet detailing how to spawn killifish utilising each of these different methods.

Caryl Simpson

Epiplatys dageti juveniles waiting for baby brine shrimp to emerge from a continuous feed hatchery
Photo: Diane Wilkie





Keeping and Breeding the Clown killifish

Mark Paterson

Clown killifish (*Epiplatys annulatus*) are a small peaceful freshwater fish that are found in swamps, river basins and coastal areas in West Africa. They are named for their colourful appearance (males are more colourful than females), can reach a size of 4 cm, and live for 3 years.

Clown killifish should be kept in groups of 5 or more in a tank with a pH of 6.0–7.2 and a temperature of 23–25°C. Owing to their small size a 40 litre tank

Epiplatys annulatus male
Photo: Diane Wilkie

will house a small group or they can be housed in a well planted community tank with similar sized peaceful fish. Remember to have lids in place on your tank as they are very good jumpers. Clown killifish are omnivores and should be fed a varied diet such as live blood worms, brine shrimp, microworms, daphnia, and flake food.

Breeding clown killifishes is fairly easy and there are a few ways of doing it. If your fish are mature and well-conditioned with lots of live food, they should spawn on a daily basis. They will spawn on floating plants or you can use spawning mops and then remove the mops with the eggs attached. Because they are daily spawners they don't lay many eggs with each spawn.

One way of hatching many fry at the same time is to separate the sexes and condition them with lots

Epiplatys annulatus fry
Photo: Diane Wilkie



of live food for several days before putting them together again. They will begin spawning soon afterwards and after a few days the adults can then be removed and daphnia added to the tank for the emerging fry to eat. Daphnia will not harm the eggs or newly hatched fry.

The eggs are very tough and can then be placed in a shallow tray on a layer of damp peat moss. The tray can then be covered and the eggs left to mature for two weeks. Once the time is up the tray can be placed in a heated tank and the eggs will hatch in

an hour or two. Then add brine shrimp nauplii or daphnia for the fry to feed on.

An alternative method is to set up a tank with lots of floating plants and live food and just leave them to it. After a couple of weeks you will notice fry which can be moved to another tank or left with the adults as some fry will survive.

Mark Paterson

Epiplatys annulatus male top, female bottom
Photo: Diane Wilkie



Hatching *Aphyosemion* *bitaeniatum* eggs



Barrie McKoy

As *A. bitaeniatum* are one of the most stunning killies available in New Zealand, I wanted to strengthen their future by increasing their numbers in the country. Although they would tick over okay I felt I needed to give them a boost. I have found *A. bitaeniatum* eggs hard to hatch for quite some time as I get a heap of eggs but to get them not developing fungus and then to start eyeing up is at times almost impossible. At a rough guess, I would get one fry from every 30 eggs!

To try and improve my hatching success I decided to experiment with hatching the eggs in slightly damp peat (without being wet), and in water with a bit of Methylene blue to stop fungus occurring.

I collected about 30 eggs over the best part of a week and placed them on boiled peat in

Aphyosemion bitaeniatum
Photo: Kate McDonald

plastic containers. The containers were then floated in their parents' tanks (so as not to mix them up with other species). I left them for two weeks, then wet the eggs and again floated the containers in the parents' tanks, though this time I made sure I labeled the plastic containers as they sometimes got moved around while doing water changes.

I used 1 litre containers with tight fitting lids from the local supermarket. This is important as I slowly lie each container on its side so all the peat sinks to one end and the water to the other making any fry easy to see.

I remove the fry as soon as I see them and place them in another 1 litre container to grow on. I also add a snail to each container to act



Above: *A. bitaeniatum* eggs on damp peat
Photo: Barrie McKoy

Below: *A. bitaeniatum* eggs in hatching container
Photo: Barrie McKoy





as a cleaner. There were 17 fry from the first attempt, and this was a lot better than using the water incubation method with which I hatched 5 fry from the first lot of peat and 6 from the next.



Above: *A. bitaeniatum* fry in grow out container
Below: *A. bitaeniatum* eggs in methylene blue
Photos: Barrie McKoy

Interestingly, while waiting for the fry to grow a bit more I collected more eggs and placed them in water with a bit of Methylene blue, which prohibits fungus. This resulted in 17 fry hatching. The third lot of peat that I soaked this weekend produced no fry to date.

My conclusion was that either method is good and works to varying degrees and can make a fool of you quite often.

Barrie McKoy



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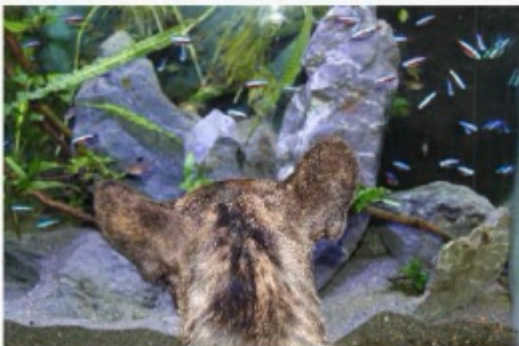
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HABITAT

**B****C****D**

Remarkable Killifish

The name killifish is used for about 5 families of mainly small egg-laying cyrinodontiform fish. There are about 1270 species and they are related to the livebearers (Poeciliidae) which include the familiar guppies, platies, and swordtails.

Killifish are amazing fish with some breaking the normal rules and giving them the ability to live in environments that normal fish, as we know them, couldn't survive in. Some species of killifish go through their entire life cycle within 3 months

(A, B) Ephemeral pools in savannah habitat in Mozambique that contained the annual killifish *Nothobranchius furzeri* (C). (D) Fully developed (Diapause III) *Nothobranchius furzeri* embryos on peat moss.

Photo: Andrew I Furness

each rainy season, some can live in trees and self-fertilise, and others can move on land. This is why many consider killifish to be some of the most adaptable fish in the world.

During the wet season, most killifish inhabit pools but as these pools dry out in summer they spawn and leave their eggs to settle in the soil. The eggs survive the dry season in a dormant state and the next seasons rains cause the eggs to hatch and the cycle begins all over again. During the dormant state, the eggs can start to develop then stop until conditions are right again, delaying

hatching for weeks or months if needed. This life cycle can be so quick that the turquoise killifish (*Nothobranchius furzeri*) from equatorial Africa lives, on average, just 10 weeks.

Most fish breathe in water through their gills, but the mangrove killifish (*Kryptolebias marmoratus*) can survive out of water for up to 60 days. They live in mangrove forests of the west Atlantic where the decaying leaves of the mangroves are broken down by bacteria to create hydrogen sulphide gas and, due to the denseness of the mangroves, the waters have a low oxygen content. To cope with this toxic environment the fish have adapted to be able to climb out of the water and into the mangroves where they enter holes bored in the branches by insects. Once out of the water they can change their gill structure to retain water and nutrients while breathing and expelling waste products through their skin. This species consists mostly of hermaphrodites that can self-fertilise, effectively creating clones

of themselves. There are very few males in the population but this allows for some strengthening of the gene pool over time. This is an unusual trait amongst vertebrates making them indeed a truly remarkable little fish.

Mangrove killifish and a few other species are able to travel on land as pools dry up or become toxic from concentrated minerals. They do this with a waddling motion using their pectoral fins, or they curl their bodies and rapidly uncurl effectively flipping themselves through the air and covering distances quickly.

Mark Paterson

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Furness, Andrew. (2015). *The evolution of an annual life cycle in killifish: Adaptation to ephemeral aquatic environments through embryonic diapause*. Biological Reviews. . 0-0. 10.1111/brv.12194.

Kryptolebias marmoratus
Photo: [D. Scott Taylor](#)



Nothobranchius



Barrie McKoy

Nothobranchius species must be some of the most unusual killifish to keep. Most people are fascinated by the way the eggs need to be stored for up to 6 months (depending on the temperature at which they are stored), whereas most other killifish need to have part of their incubation period spent in a dried state. Some can, in fact, be incubated similarly to the *Aphyosemion* species.

Nothobranchius guentheri unusually showing breeding behaviour in the gravel of a show tank

Photo: Ryan de Raat

We are fortunate in New Zealand to have several varieties available including the following:

Nothobranchius eggersi is an extremely fast growing fish that can often be sexed after just



N. eggersi
Photo: Barrie McKoy



N. korthausae (yellow)
Photo: Diane Wilkie

3 or 4 weeks. They need to be bred as soon as possible as over feeding will shorten their lives considerably. These fish do not enjoy large water changes, especially as fry and peat water should always be used.

Nothobranchius guentheri is another fast growing killie which is stunning to look at. They are prolific egg layers and the males tend to get along well together in a breeding group.

Nothobranchius korthausae (Yellow) is possibly the easiest notho to breed and also has a high number of eggs, and fast growing fry. They are almost indestructible once they have achieved breeding age and they live for a little longer than a lot of other *Nothobranchius*.

I find *Nothobranchius palmqvisti* needs salt in the water, the most of any notho. They don't take to over-feeding although they do grow



N. palmqvisti
Photo: Barrie McKoy



N. rachovii aquarium strain
Photo: Barrie McKoy

quickly when food is plentiful. Good numbers of eggs are produced although I find less than some of the others.

The aquarium strain and the Beria strain of *Nothobranchius rachovii* have been imported into New Zealand in the past. The aquarium strain is slightly bluer and the Beria slightly more orange. *N. rachovii* is possibly the most

colorful of all the nothos and sure to catch the eye of all those that view them. Again, salt needs to be added to the water.

Nothobranchius steinforti is possibly my favorite notho at the moment. It is not the most colorful species but its subtle colours are unmistakable. Its tail is almost pink and the body is a faint aqua colour. It produces



N. rachovii Beria
Photo: Diane Wilkie

good numbers of eggs and matures early. I have found this species to be the hardiest of all the nothos. I have not lost one fry or adult since breeding them. *N. steinforti* is an ideal species for someone who wants to try breeding *Nothobranchius*.

Peat hatch times for these species are listed below:



N. steinforti
Photo: Barrie McKoy

N. eggersi 10–14 weeks
N. guentheri 12–16 weeks
N. korthausae 10–16 weeks
N. palmqvisti 12–16 weeks
N. rachovii 20–28 weeks
N. rachovii "KNP Black" 20–48 weeks
N. steinforti 12–16 weeks

For quite some time killifish keepers have stored their notho eggs in peat in temperatures ranging from 18 - 25 °C. Lately in the United Kingdom, and in Australia, it's been mentioned that the eggs can handle temperatures well into the 30's. In fact, *N. rachovii* seem to need higher temperatures to achieve a good hatch rate. I suppose that if you think about their natural environment, the puddles and wet areas that they survive in during winter are barren dried up dirt through summer with temperatures often in the high 30's and maybe early 40's.

This brings me to another point and that's the dampness of the peat. These same puddles dry up totally, the dirt contains all sorts of

rubbish and is almost totally devoid of any moisture. I like to squeeze out as much water as possible and double bag the peat. In years gone by I used to spread the peat out on newspaper and cover with the same. A book was placed on the paper to remove as much water as possible overnight before being stored for the needed period.



N. guentheri
Photo: Barrie McKoy

As touched on earlier, *N. rachovii* needs greater temperatures in the storage of eggs. This is not to say that you will not get any eggs hatching at a lower temperature but at a temperature of more than 26 °C, their eggs have been known to hatch in as little as 3 - 6 weeks according to an article I read recently in the BKA Killi News (British Killifish Association). It also mentions that at lower temperatures of around 24 °C, 6 months is more normal. Another thing I found of great interest was that the eggs can be water incubated. It takes 3 - 4 weeks at 26 °C plus. Apparently, once the eggs are eyed up, you dilute the incubation water with fresh cool water (16 - 20 °C) and add some freshly boiled peat. Apparently, more belly sliders occur this way.

Peat is easy to post so there is no excuse as to why you shouldn't have a go at raising these fish from a handful of dirt.

Barrie McKoy

1 cm



Tadpole Shrimp

Mark Paterson

The tadpole shrimp or triops (*Lepidurus apus viridis*) is a little known and fairly rare New Zealand crustacean. It has had the same shape since the Triassic period, 200 million years ago, and so is considered a living fossil. *Lepidurus apus* is found over much of the planet while the subspecies *L. a. viridis* is restricted to Australia and New Zealand. They usually live in temporary freshwater pools, i.e., pools that fill in rainy weather then dry up in summer, up to a metre deep. It can become dormant during freezing weather and its egg cysts can last many years in dried mud (28 years has been recorded) until the pond fills with water again.

Tadpole shrimps grow to a maximum length of 60mm and look very much

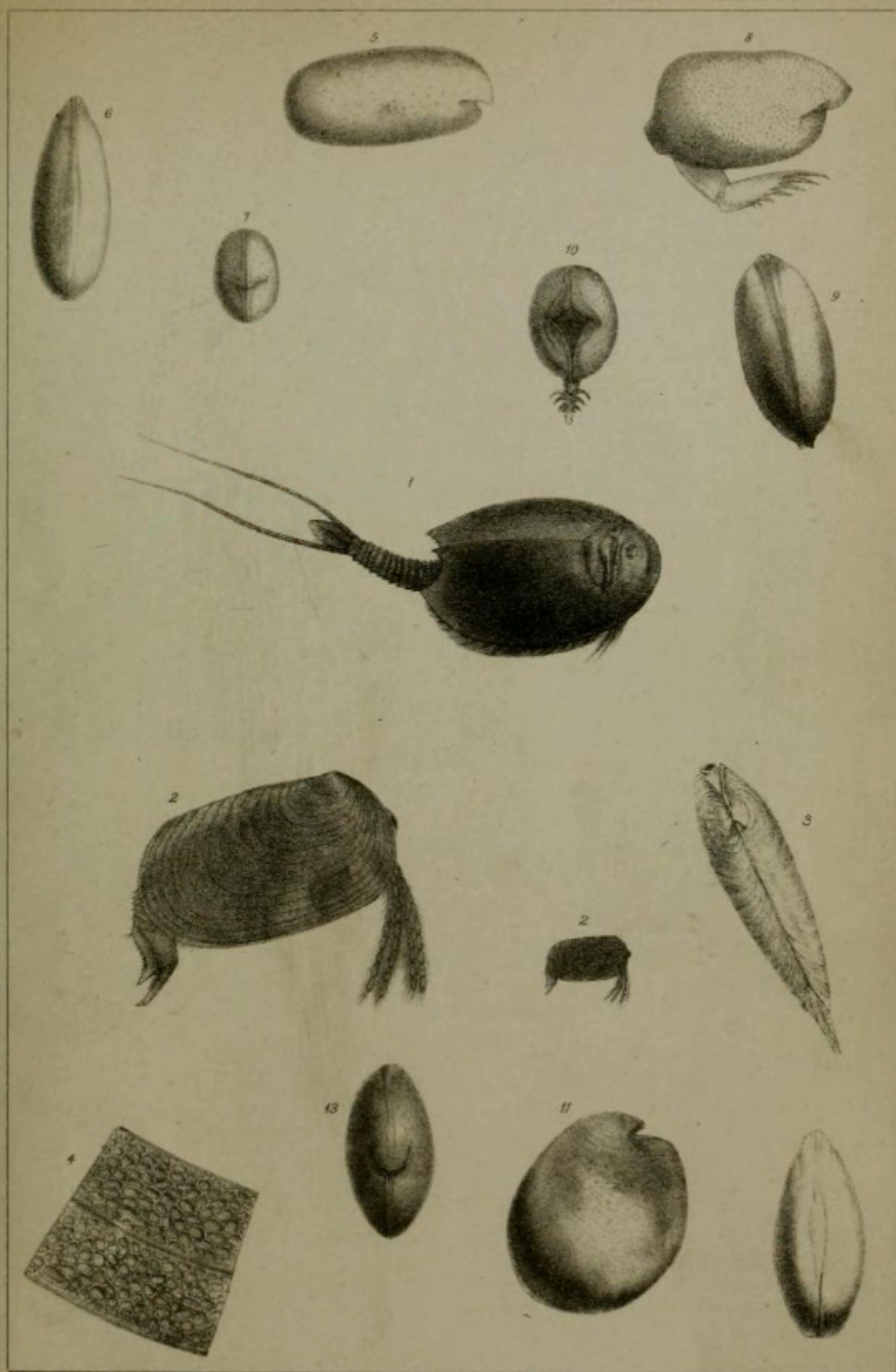
Above - Tadpole shrimp *Lepidurus apus*

Photo: Christian Fischer

Right - fig 1 *Lepidurus viridis*

W.Wing - Proceedings of the Zoological Society of London (vol. 1850, plate Annulosa XVII)

like miniature horseshoe crabs with a broad carapace, a long abdomen and tail, and paddle-like limbs underneath for propulsion. They reproduce by a mixture of sexual reproduction and self-fertilisation of females (parthenogenesis). No males have been found in the local subspecies (so they only reproduce by parthenogenesis) and just one egg cyst needs to survive to create a whole new generation. The ability of tadpole shrimps to self-fertilise and the toughness of cysts has probably led to the global spread.



W. Hing del et lith.

Ford & West, Lithographers, 54, Rotten Garden.

1. *LEPIDURUS VIRIDIS*. 2, 3, 4. *ESTHERIA DAHALACENSIS*.
 5, 6, 7. *CYPRIDINA MARLE*. 8, 9, 10. *CYPRIDINA INTERPUNCTA*.
 11, 12, 13. *CYPRIDINA ZEALANDICA*.

New habitats can be colonised by cysts being transferred on migratory water fowl or blowing on the wind (cysts are about 0.5 mm in diameter).

Light and temperature play a part in cyst hatching with temperatures of 16 to 20 °C producing the best results. Once hatched, under optimal conditions they can reach maturity in 4 weeks.

Tadpole shrimp are omnivores and feed on detritus, plant matter, algae, bacteria, fungi and daphnia. Their main predators are waterfowl, diving beetles and fish.

Tadpole shrimps can be kept in a small aquarium with a minimal lighting (a 6500k or 60-watt bulb is sufficient), an air pump with an airstone or small sponge filter, and a mulm or mud substrate from

the bottom of the pond where they were collected. The pH should be 6–7.8 and some native aquatic plants will make the tank more interesting. Try feeding them on daphnia, baby brine shrimp and finely crumbled flake food.

Mark Paterson

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Collier, Kevin (1992). "Freshwater Macroinvertebrates of potential conservation interest *Lepidurus apus*".

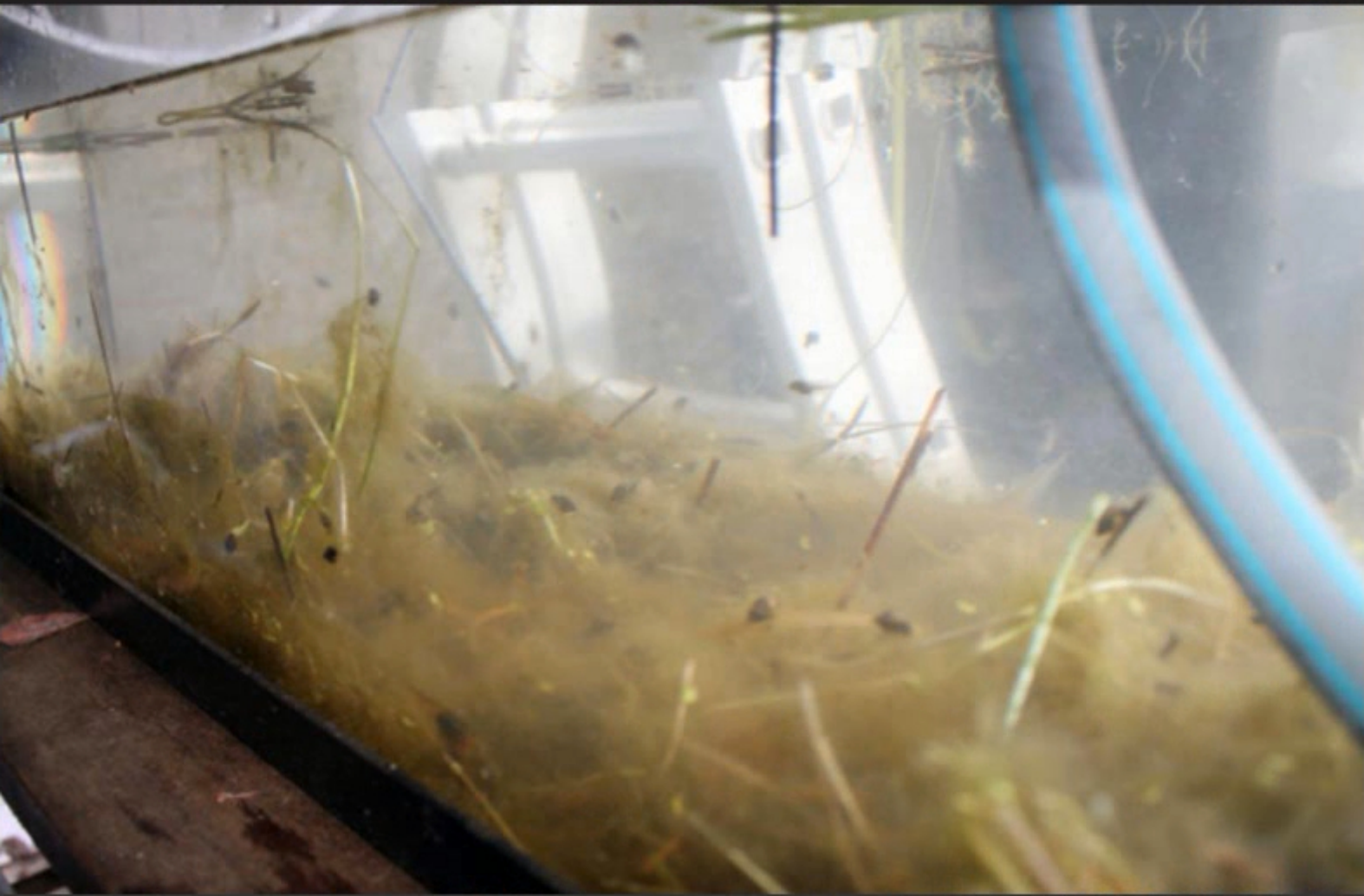
Encyclopedia of Life.

Right - Inverted tadpole shrimp *Lepidurus apus*

Photo: Dino Aquarium World member

Below - Tadpole shrimp biotope

Photo: Dino Aquarium World member





FISH MINI PROFILE

American Flag Fish



The American or Florida flag fish (*Jordanella floridae*) is a lovely little (5–5.5 cm) pupfish and is related to killifish. The males alternating red and creamy green stripes are thought to resemble the American flag and give rise to its common name. They are native to Florida where they are mostly found in shallow weedy waterways. American flag fish are undemanding and can be kept in a pH of 6.0–8.5 and temperature of 18–30 °C. Feed them on a varied diet of small dried, frozen and live foods. They are great at removing filamentous algae and if none is present supplement their diet with an algae-based flake. They are best suited to a well planted species only tank.

Photo USGS

Crinum

Crinum calamistratum

by
Cam Scott

Over the past few weeks we have had a lot of interest in this magnificent specimen of a plant, so I decided to do a small write up about my experience with keeping it.

Let me start with some basic information. Crinums are tolerant of a wide range of conditions, and will accept a pH of 6.0 - 7.8 and a temperature of 20 - 30°C. The leaves can grow to an astonishing 120cm but they are thin and swirl around so they become a majestic centre piece. The plant is a stunning lush green.

Crinums are a part of the African onion plant family, and it is easy to see why when you look down at the bulb structure. I have heard of people slicing the bulbs and unravelling the layers, much like a brown onion, and this can be used as a propagation technique. With only one plant I am not keen on doing this.

Most people in the aquarium plant hobby overseas claim these plants as easy care and suitable for low light and low tech set ups and I would have to agree

with them. This does not mean that they do not appreciate extra fertiliser, CO₂, and extra light.

I have owned this plant for nearly 2 years. In that time, I have had it in 3 separate aquariums as I have been trialling growing methods as well as designing its current final display home. Originally, I had it growing in a 90cm long by 50cm high aquarium, with a rich substrate of Seachem Flourite, no water column fertiliser, and T5 lighting for 12 hours a day. The aquarium was lightly stocked with Boeseman's rainbows. In the 8 or so months the Crinum was in there I did not notice any major leaf or bulb growth.

From there I moved it in to a 180x60x60 cm aquarium. I ran a deep substrate bed (about 15 cm) of rich soil capped with some natural sand. Lighting was twin 150w metal halides which I placed directly over the plant. Again, I did not use any water column fertiliser, but I had a few guppies in the tank. The aquarium was very heavily planted with large plants and I decided not to do regular water changes or run any type of air or filtration. All the plants grew really well and became very large. The Crinum increased the size of its leaves, bulb, and roots, but it never reproduced. I did run into issues with hair algae due to the lack of movement, but that is a story for another day. From this point, I had concluded that this plant wanted a thick and rich substrate to grow into and that it enjoyed plenty of light. It

was also a tank buster, so it needed the height to stretch.

On New Year's Day 2017 I transferred the Crinum into its forever home in the display tank at The Fish Room. This aquarium is 210x70x50 cm and has a 10,000 litre per hour return pump as well as a Fluval CP4 wave maker at the same end, so there is plenty of flow in the aquarium. I had always planned to run a dry fertiliser program loosely based around Tom Barr's estimated index program. The lighting is a set of Current Satellite LEDs which I had used on a previous set up. While this lighting is inferior to the metal halides or T5s the Crinum had been used to, 8 months in and it has not wilted or turned its leaves up. In fact, the twirly whirly leaves look stunning! I went with a mix of JBL Manado and Seachem Flourite substrate and JBL root balls for the root fertiliser. So far, I feel that this combination has been positive for the Crinum as it stands proudly in the middle of the display. We added pressurised CO₂ to the water about two weeks ago, and it is already making a difference as it has sent out a new leaf. It is too early to give you a proper report on the addition of CO₂, but I doubt it will have a negative effect on this plant

Aquascaping with Crinum is a simple pleasure. I have used it as a centre piece for my scape, but with the right flow rate, you could easily apply the rule of thirds, and have its leaves flow into the



middle, and slope your scape on the same angle as it is growing. The colour, shape, leaf length and texture make this plant very versatile and the only real application that I can see it being no good for would be in a nano tank or an

Amano style 'nature aquarium' scape, although even then you may be able to use it if you are creative enough.

At this point I am not aware of another *Crinum* specimen in New Zealand, and unfortunately, I have not been able to



propagate this one. However, I am trying to do so, and if I do manage to get it reproduce, I will spread it far and wide so this gorgeous plant does not die off here. If you are aware of anybody else who has one, please ask

them to contact me as I would love to be able to trade tips, tricks, and knowledge between other keepers.

Cam Scott

Reference:
<https://en.aqua-fish.net/plants/crinum-calamistratum>



spectacular stripes



The stunningly striped *Aphyosemion striatum* is a killifish species found in the lower Mitémele river drainage in southern Equatorial Guinea and the Mbei, Komo, Gabon, Abanga and lower Ogowe river drainages in northwestern Gabon, Africa. They can grow to 6cm and occur in swamps, brooks and small streams in the coastal rainforest. They are best kept in a species only tropical tank with a well fitting lid as they are known to jump. Striatum will take some dry foods but prefer live food such as daphnia, mosquito larvae, mico, grindle or white worms and fruit flies. They are mop spawners. and have a lifespan of approximately two years.

Photo Barrie McKoy

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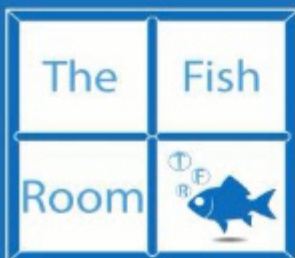
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TRIGGER FISH

by Mark Paterson

There are about 40 species of triggerfish (family Balistidae) in our oceans.

Triggerfish are named from the first 2 spines on their dorsal fin which are fused together to form an erect spike that can be either locked in place by the 3rd spine or folded back into a groove. The spike can be erected to wedge them into a hole in rocks or to prevent them being swallowed by a predator. Triggerfish have an oval-shaped compressed body with a large head that takes up one third of the body and a small strong jawed mouth with teeth fused together as an adaption for crushing shells and crustaceans. The eyes are small, set back from the mouth, and high on the

Trigger fish off Oahu, Hawaii

Photo: [Shera Mercer](#)

head. Their anal and dorsal fins move in an undulating motion from side to side to provide slow movement whilst the tail fin can be used for swifter motion to escape predators. Triggerfish are covered in tough skin with small scales that acts almost like body armour with just a small slit for their gills just before the pectoral fins. They are often brightly coloured and marked by lines or spots.

Triggerfish inhabit tropical and subtropical oceans throughout the world, and most species are found on shallow, coastal habitats such as coral reefs. In the aquarium, they display great

intelligence and learn quickly where food comes from, settling relatively quickly to hand feeding. Their natural diet consists of crustaceans, molluscs, sea urchins and other echinoderms, and in the aquarium they readily feed on meaty foods or pellets. Triggerfish can blow jets of water from their mouth and use this to find invertebrates hiding in the sand. They are often seen spitting sand from their mouths to sift through the material in search of edible invertebrates or other organisms. Several species of them are popular in the marine aquarium trade and I will give a brief outline on those most frequently imported in New Zealand. As a general rule, triggerfish

should not be mixed with conspecifics, as they generally become more aggressive as they age.

Owing to their jaw structure and being territorial, they are not really recommended for a reef set up as they can move rocks and take bites out of corals. Young triggers, when introduced to the aquarium, can be quite shy and need lots of caves and holes to shelter in but once they start to put on size they can become very bold. General keeping requirements are large tanks 200 litre plus, pH: 8.1–8.4, Temperature: 24–28°C, Specific Gravity: 1.021–1.025 and Hardness (dKH): 8–12°

Orange lined trigger (*Balistapus undulates*)

Orange lined triggers can grow up to 30 cm long. Their body is dark green with



Orange lined trigger
Photo: Leonard Low

orange lines, there is a black blotch on the base of the tail, and the caudal fin is orange. Males lose the lines on their snout as they mature. They are found down to 50 metres throughout the western Pacific and Indian Ocean in coral reefs and lagoons. Only one should be kept in a tank as they are solitary, territorial and can be aggressive with other fish – often erecting the first dorsal spine to intimidate opponents and predators.

Red toothed or Niger trigger (*Odonus niger*)

Odonus niger is also known as the red-toothed trigger due to its red teeth. Red toothed triggers can grow up to 50cm. They have a dark, deep blue body with blue/green fins and a lyre shaped caudal fin with a yellow bar between the lobes. Their pectoral fins are quite small and typically they steer mostly with their dorsal and anal fins making them seem like helicopters with their swimming motion. It inhabits the tropical Indo-Pacific in open waters down to about 35 metres where they feed on plankton in the current, though they will feed on a normal diet in the aquarium.

The Niger trigger has a reputation as one of the most peaceful of the triggerfish but it may still have a go at invertebrates. They are a fast-growing fish so shouldn't be kept in small aquariums.



Niger trigger
Photo: Janderk

Clown trigger (*Balistoides conspicillum*)

The clown triggerfish grows up to 50 cm. It takes its name from its colouration which is similar to a gaudy clown costume. It has a black background colour but its lips are circled by a yellow ring while the lower half of the body is covered in big white circles and a leopard type patterning covers its dorsal area. It is considered to be the most aggressive of the triggerfish species.



Clown trigger
Photo: Derek Ramsey

The clown triggerfish is widely distributed throughout the Indian Ocean and can also be found in the Caribbean. It is most commonly found along reefs down to 75 m depth where it has a varied diet of molluscs, echinoderms and crustaceans. Because of its colouration it is one of the most highly prized aquarium fish but it needs a large aquarium and it will eat invertebrates and be aggressive towards other fish, even eating smaller fish. While this fish can become tame enough to be hand-fed you should always remember it has a powerful bite and sharp teeth. It has even been reported to bite through electrical cables in the aquarium.

Picasso trigger (*Rhinecanthus aculeatus*)

The Picasso triggerfish and a few other triggers are known in Hawaii as humuhumunukunukuāpuaa which means "fish with a snout like a pig". It grows to 30cm and is found in lagoons and on reefs throughout the Indo-Pacific region. Its

common name is derived from the abstract pattern of lines and angles in vivid colour that paint its body reminiscent of a Picasso artwork.

In the wild Picassos eat everything from sponges to crustaceans and they quickly settle down to eating a varied diet in the aquarium. Once settled they can quickly become tame and live for many years.



Juvenile Picasso trigger
Photo: zsispeo

Rectangular trigger (*Rhinecanthus rectangulus*)

Rectangular triggers are a close relative of the Picasso trigger and live in similar areas and habitats. They carry a different colour pattern but their requirements are the same as the Picasso trigger. Rectangular triggers are fairly aggressive and will generally not tolerate other triggers in their general vicinity and so there should be only one trigger in a tank.

Blue throat trigger (*Xanthichthys auromarginatus*)

The blue throat trigger fish comes from the Indo-Pacific, East Africa and Hawaii regions and can grow to 30 cm in an aquarium. Their bodies are grayish and the males sport a blue throat and yellow fin borders. These are probably the least aggressive triggerfish, very rarely bothering other fish but they will target shrimps as



Male Blue throat
Photo: zsispeo

food. Blue throat triggers are quite hardy and are usually easy to get eating, readily accepting pellets or any meaty food. It is worth noting that this species has been recorded as breeding in captivity.



Female Blue throat
Photo: zsispeo



Pink tail trigger
Photo: zsispeo

Pink tail trigger (*Melichthys vidua*)

The pink tail triggerfish comes from the Indo-Pacific and can grow to 40 centimetres. Its colouration ranges from a very dark green to almost black with a translucent white or pink dorsal and tail fin. Although they get large they are considered one of the least aggressive triggers but will still consider invertebrates a favourite snack. They settle quickly to tank life and the usual diet, but beware as they can shift around loose coral rock quite easily

All in all, triggerfish can make a wonderful addition to the marine aquarium, but their intelligence can mean they get bored and corals and invertebrates are not usually safe around them. As they age they can be more aggressive towards tank mates.

Mark Paterson

References:

<http://www.fishbase.org>

<https://en.wikipedia.org/wiki/Triggerfish>



Big, angry, aggressive, glass bangers. This is the common reputation red devil cichlids *Amphilophus labiatus* tend to hold here in New Zealand and in all reality they can live up to this. Owning one may even be perceived as crazy, but owning a pair "Good luck with that one mate".

My passion for this cichlid, which lead me to breeding them, started with a YouTube video I watched around a year and a half ago of a red devil cichlid playing with its owner. The intelligence of this fish

intrigued me so now here I am, a year and a half later, owning not just one, but a pair of my own.

I am no expert when it comes to breeding these guys and cannot take credit for their latest spawn, as they have done it all on their own, but I can tell you of my experience and what lessons I have learned. I definitely started off the hard way. I obtained these two as adults from separate sources. Introducing them was a nightmare at first and took a bit of time, effort, and patience. Having a large

RED DEVILS

**KIMBERLEY SAVAGE
TALKS ABOUT THE TRIALS
AND TRIBULATIONS OF
OWNING A PAIR OF
RED DEVIL CICHLIDS**



aquarium definitely helped (600 litre) as well as a way to separate them, whether it be by a divider or a separate holding tank nearby, as my female became extremely aggressive towards my male. After a good week of brawling and time out sessions these two finally calmed down and have bonded well.

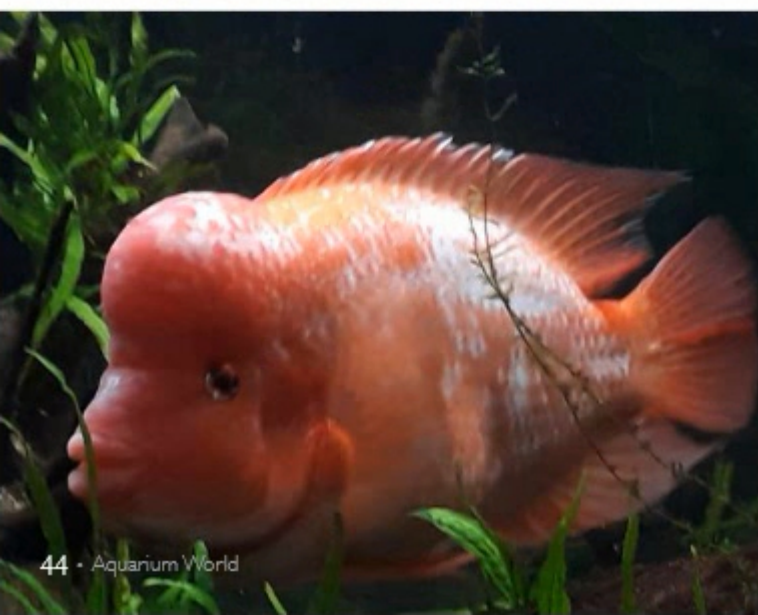
When it comes to fish keeping I am a huge believer in space and to the best of my ability creating a natural environment within the aquarium. This is what I have offered my pair. My aquascaping consists

of driftwood, some with Java fern and Anubias attached, smooth river rocks, slate, and a substrate of sand and fine gravel. I also added a large pot/cave for the pair to spawn in. My temperature is always maintained at 25 degrees and the pH consistently sits at 7.4. I feed them small amounts 2 times a day, offering a variety of different things: pellets, Repashy (a mixture of Grub Pie, Community Plus, and Soilent Green), brine shrimp, peas, bloodworms, and the occasional feast of earthworms.



The female can lay 600–800 eggs in one spawning and mine hatched within 3–4 days. Both parents then started removing the newly hatched fry into pits they had dug outside their spawning pot. After 10 days the fry began free swimming which

Amphilophus labiatus Above - female and fry. Below male
All photos: Kimberley Savage



is a beautiful sight. I will be raising the fry on Repashy and brine shrimp and will leave the fry with their parents to raise for as long as possible. The parents are fierce protectors of their young and placing my hand in the tank is not an option. Despite this, watching the entire process is worth every moment of aches and pains that comes with owning this cichlid. The survival and parenting skills of Central American cichlids is truly amazing no matter what species. It's something every cichlid lover should see and experience for themselves.

Kimberley Savage

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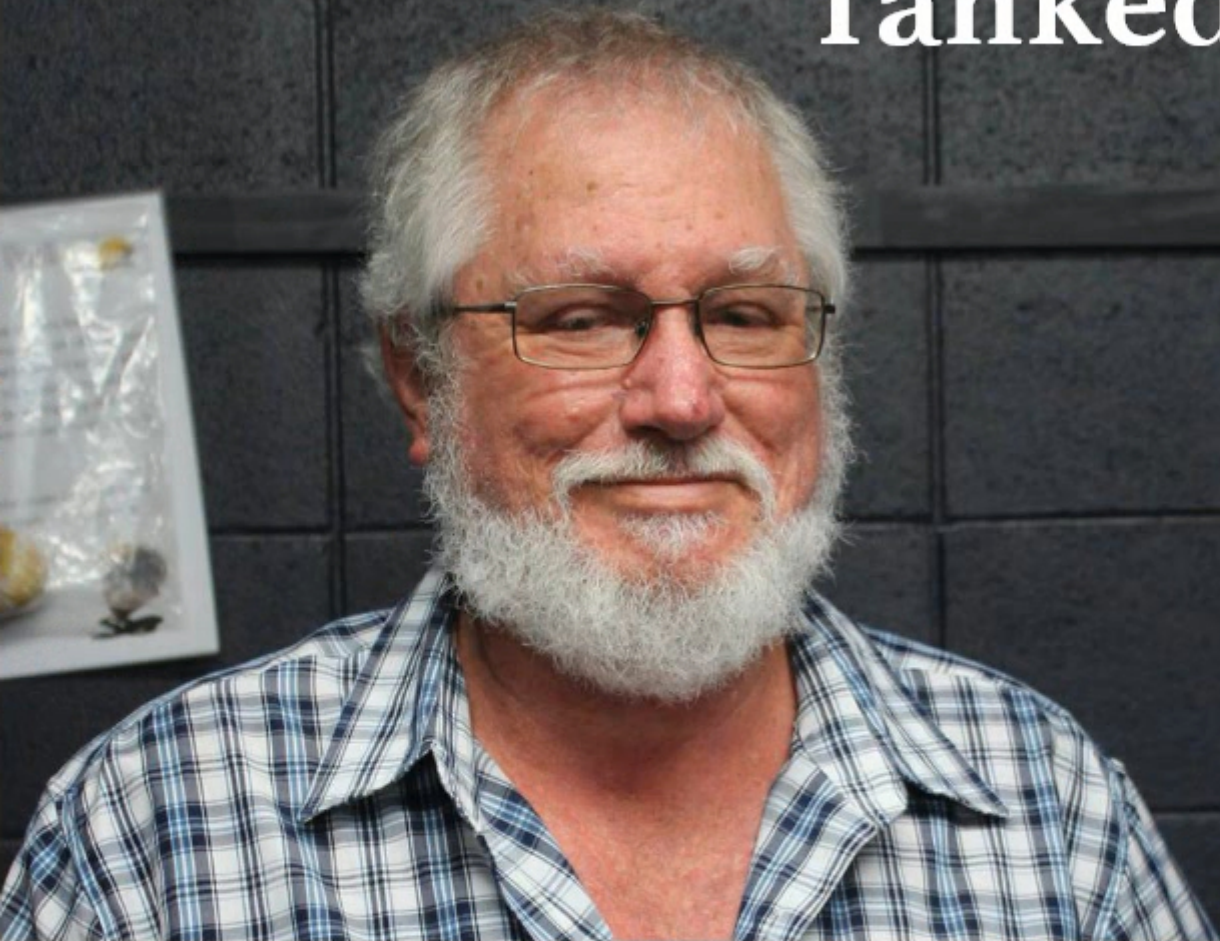


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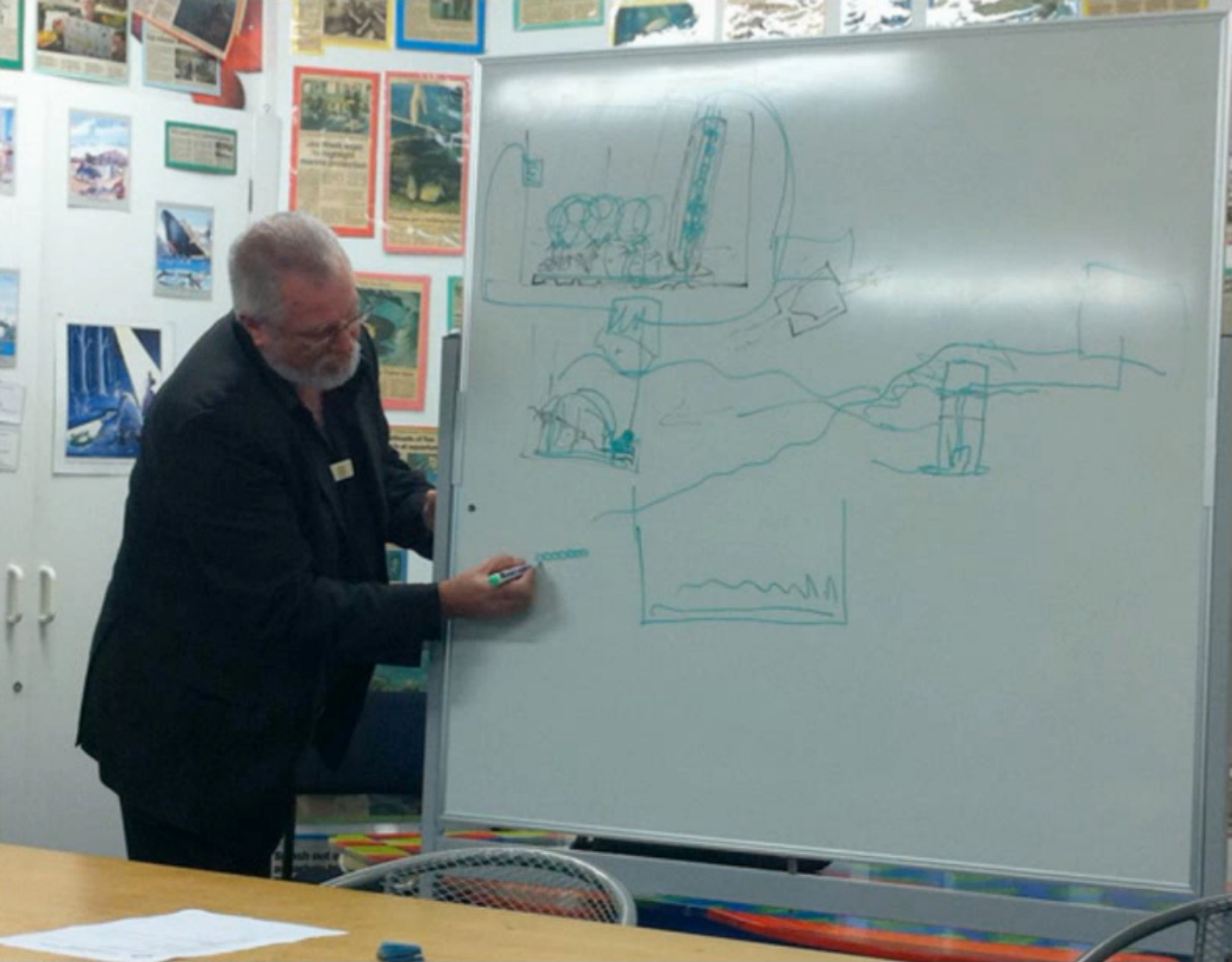
50 Years Tanked Up



One Hawke's Bay Aquarium Society fish keeper, Rob Yarrall, turned his hobby into a living and spent 41 years in the same job, looking after the thousands of live exhibits at the National Aquarium of New Zealand in Napier. Rob's journey began growing up on a farm where his love for animals and the outdoors started. He left school at 15 in 1968 and began working for the Napier City Council. In those early years he got his first fish tank, which was inspired by a friend who had kept tropical fish back in England. This soon developed into full blown MTS (Multiple Tank Syndrome) with a room full of aquariums known locally as Rob's Fish Room.

| Photo: Murray Ardron

While working for the Napier City Council Parks and Reserves in 1974, he started volunteering at the local aquarium on Marine Parade in Napier and not long afterwards was offered the position of full time aquarist. This aquarium was started by the local fish keeping club in the basement of Napier's War Memorial Hall in 1956 and is believed to be the first aquarium in New Zealand. In 1976 the club moved to a purpose-built site on the southern end of Marine Parade and, in 2002 after an \$8 million expansion and redevelopment, it was renamed The National Aquarium of New Zealand.



Rob took over as manager in the 1980's and over the years has done a lot of the design work on exhibits and life support systems. Under Rob's guidance, the aquarium has had some major achievements over the years. They have the oldest living captive born tuatara, they were the first to spawn snapper (*Pagrus auratus*) and groper (*Polyprion oxygeneios*) in NZ, and they have worked alongside Massey University scientists on marine fish research projects. December 2017 will see him retire from 50 years working for Napier City and his position of Curator of Exhibits at the aquarium where he has influenced and shaped a facility that

Rob giving a talk on filtration at an HBAS meeting
Photo: Diane Wilkie

has 150,000 visitors a year and has become a national icon.

Rob has also been a long-time member of the Hawke's Bay Aquarium Society and was made a life member in 2002. "It is so neat that we were able to achieve these milestones right here in Napier. I am lucky enough to work in a job that I love – not many people get to make their hobby into a living."

Mark Paterson

HOW TO

CUT GLASS

WITH BARRIE McKOY

Cutting glass is not as hard as a lot of people think. The tools needed are basic and the essential safety equipment is probably already in your home. The tools are a straight edge that is not too thick, a "Diamantor" cutter and a container of light machine oil. We recommend you use cut and slip resistant gloves and wear safety glasses when attempting to cut glass.

I mentioned a "Diamantor" brand cutter as it's a cheap, but very good, cutter that we use almost exclusively in my company and they are usually available in most hardware stores. There are other brands and most work well but the "Diamantor" is probably the most used cutter in New

Diamantor glass cutter
Photo: Barrie McKoy





Zealand. There are other self-oiling cutters that are very good and last for years if you look after them, but for the price (normally about 5 times the cost) I don't use them as the cutting wheel lasts no longer than a standard wheel unless it is treated properly.

We use a small jar/tin with an old rag on the bottom and tip enough oil into the container to dampen the rag. Always keep your glass cutter in this tin as that keeps the cutting wheel in good condition and ready for use.

To cut a piece of glass, lay it flat on a table or similar that has been covered with a thin blanket of cloth. This cushions the glass without allowing the glass to sag into it. With a marker pen, measure and mark the first cut on both ends of the

Cut in glass starting away from the edge to avoid chipping the glass or damaging the cutting wheel
Photo: Barrie McKoy

glass, making sure that you are measuring from a good clean edge with no chips on the sides. Place your straight edge on the glass and line it up with the marker pen marks but allow for half the thickness of the cutter. Then gently place the cutter against the straight edge to make sure that you have allowed enough room on the marks.

Ask someone to help hold the straight edge at one end and with your free hand, hold the "beginning" end of your straight edge. Place your cutter 1 mm in from the starting edge as starting over the edge can sometimes break the glass and damage and shorten the life of your



cutter. Glass has greater impact strength than steel so the square edge on the edge of the glass will put a small dent in the cutting wheel causing a “miss” in the cut and possible breakage. If your cutter develops a miss, don’t try to use it but instead throw it out as it will cause the glass to break, or at best give a less than perfect edge. Now use your cutter, which should be holding a small amount of oil from the tin, to make a firm steady cut from one end to the other. Make one solid cut and do not go over the cut again. If the cut has small misses in it, join them up.

Cut in glass placed over the handle of the glass cutter
Photo: Barrie McKoy

After you have made the cut, its time to break open the glass. To do this you can either place the end of the cutter under the cut and press down evenly on both sides of the glass or place a straight edge under the glass and again press down evenly on both sides of the cut. You need to snap the glass as soon as possible after making the cut as if it goes cold uneven breakage will often occur.

Repeat the process if you need to make more cuts. After the glass has been cut it



pays to sand the edges to avoid cutting yourself and to help protect the glass from chipping. Do this by using a sanding block with 180 grit “wet and dry” sand paper or greater, and run the sandpaper over the edge of the glass at about a 45 degree angle. This should create a nice “arris” which will look nicer and be safer than a sharp edge.

Straight edge used to break glass open after cutting
Photo: Barrie McKoy

Make sure when you have finished to vacuum both the blanket and surrounding areas as small shards of glass will be almost impossible to see.

Barrie McKoy

INTERESTING IMPORTS



Electric Blue Ram
Photo: Diane Wilkie

If our killie articles have inspired you to set up a killie tank, Lagos red killies *A. bitaeniatus*, redtail nothos *N. guentheri* (as seen on the cover), gold panchax, and Norman's lampeyes are on the list. It is also worth checking with your local fish store as the importers do bring in other killifish varieties.

Killifish are related to the livebearers (*Poeciliidae*) which include the ever-popular guppies, mollies, platys, and swordtails and there are several varieties on the importers' lists. A great range of

male guppies are available including blue tuxedo, green cobra, koi, platinum yellow, red leopard, sakura, snow flower and sunset and, if you are wanting a breeding project, pairs are available in blue tuxedo, golden red flamingo, and rummynose. If platys are more your style why not try a blue coral calico, bumble bee, hifin gold moon, red tuxedo, or a snow coral; or if you are after a swordtail maybe a black Berlin, gold wag, green, pineapple, or a red hifin lyretail. If you are after a livebearer with a bit more personality



Norman's Lampeye *propranchax normani*
Photo: Diane Wilkie



Apistogramma agassizi
Photo: Jennifer Hamlin

mollies are a great option and are available as black lyretails, bumblebees, Dalmatians, gold sailfins, and marble orangetails, just to name a few.

If you like cichlids but don't have the tank space or patience for a boisterous red devil, there are several good dwarf options for a well planted peaceful tank. Kribensis are attractive, relatively hardy, and easy to breed and are available in standard and albino varieties. Rams (*Mikrogeophagus ramirezi*), Bolivian rams (*M. altispinosus*), and Apistogrammas are

also good options but they need soft acidic water. Rams are on the importers' lists in electric blue, gold head electric blue, and Holland blue varieties. If you after something different they are also available as long-finned veiltails. Three species of *Apistogramma* are on the importers' lists: *Agassizi* (*A. agassizi*) available in double red and super red, cockatoo (*A. cacatuoides*) in orange and super red, and borelli (*A. borellii*) in opal and yellow blue.

The editorial team



Kribensis
Photo: Aakash Sarin



Happy Animalz

242 Gloucester Street
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06 651 0932

Hours: 9am – 5:30pm Monday to Friday
9am – 5pm Saturday
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1 display tank

Happy Animalz was established two years ago by Nicholas Calder and Romanna Helg and is

is located at the northern end of the Taradale shopping precinct just before the 4 Square Superette. With the only other pet shop in Taradale closing more than ten years ago Happy Animalz has become a bit of a magnet for local children who drag their parents in to look at the kittens, rabbits, mice and good variety of birds and fish that are frequently for sale.

The shop caters for a variety of pets and their supplies with an emphasis on animal health and nutrition and it carries a large range of high quality raw and dried food for cats and dogs. Aquatics are another area of expertise with a quarter of the modest sized shop dedicated to tanks and drygoods. This area is Nic's domain, having spent 14 years in the aquatic industry in both Australia and Wellington and six years





locally in retail, he is a wealth of fishkeeping information. His specialty are cichlids and the shop display tank beside the front counter is dedicated to these fish. Rams (*Mikrogeophagus ramirezi*) of several colour morphs can also be seen

in some of the 11 tropical sale tanks where Nic has increased the tannins and adjusted the lighting to bring out their colours. These freshwater tanks contain a good selection of smaller varieties of fish and plants that are well labeled with prices and



Cichlid sale tank



pictures of the respective fish they contain. Nic is more than happy to order in fish if he does not stock a particular fish you are after. The tank that really caught my eye contained a small school of young Harlequin rasbora, Neon tetra, blue and

xanthic gold Rams. The black background that all the sale tanks have along with the tannin laden water and use of red and white led lighting in this tank made the colours of these fish really pop and grab your attention.



Electric blue ram



The five coldwater tanks are clean and well populated with lively White Cloud Mountain Minnows and goldfish including shubunkins, fantails and blackmoors plus the odd apple and blue mystery snail. The turtle tank is currently

inhabited by two male Dwarf gourami recovering from a fight until some non-Red Eared Slider turtles can be found to stock the tank. The shop also sells tadpoles and frogs when in season and occasionally axolotls.



Apple snails





Due to the limited amount of space in the shop there is a good selection of smaller tanks, filters, lights and replacement parts along with a variety of bagged substrates and tank ornaments. They stock mainly Omega One and Hikari fish foods a



selection of live, plastic and silk plants plus a few reptile and terrarium supplies.

Over the summer Nic hopes to install a pond in the shop as a display for some larger goldfish and pond plants.

I have always found the staff at Happy Animalz to be friendly, knowledgeable and helpful. When I was taking the photos for this shop tour I overheard one customer say to another that she enjoyed coming to this pet shop because it was always clean and did not smell like some of the others do. I would encourage you to pop in pay them a visit if you are in the Hawke's Bay.

Diane Wilkie

Interesting species

Rams (blue, electric blue and gold) \$28 - \$38

Frontosa \$35

Cherry Red Haplochromis \$30

Electric Blue Fryeri \$35

Apple snails \$10

Rank	
Tropical fish	★ ★ ★ ★
Catfish	★ ★ ★
Cichlids	★ ★ ★ ★ ★
Oddballs	★ ★
Coldwater fish	★ ★ ★ ★ ★
Marine fish	NA
Marine inverts	NA
Marine corals	NA
Display tanks	★ ★ ★ ★
Pond plants	★ ★
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There are currently 12 affiliated aquarium clubs around New Zealand:

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Contact: Chris Drake cdrake@paradise.net.nz

KAPI-MANA AQUARIUM CLUB

Contact: Vincent Curtis kmacnz@yahoo.co.nz

MARLBOROUGH AQUARIUM CLUB

Contact: Caryl Simpson caryl@simtronics.co.nz

SOUTH AUCKLAND AQUARIUM & WATERGARDEN SOCIETY

Contact: Paul Munckhof monkie@orcon.net.nz

TARANAKI AQUARIUM & POND SOCIETY - IN RECESS

Contact: Mitch Minchington & Debbie McKenzie, 21 Maire St. Inglewood 4330

TASMAN AQUARIUM CLUB

Contact: Glen George hellcazy@hotmail.com

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Contact: Maxine Lynch uhaquariumsociety@gmail.com

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10/2 Tawa Drive, Albany Ph 09 415 4157
www.hollywoodfishfarm.co.nz

The Bird Barn - 10% discount on fish and accessories

158 Lincoln Rd. Henderson. Ph 09 838 8748.

New Pupuke Aquarium Centre - 10% Discount

1 Lydia Ave, Birkenhead Ph 09 480 6846

CHRISTCHURCH

GISBORNE

Eastland Aquariums - 10% discount as well as great in-store specials.

Grey St, Gisborne Ph/Fax 06 868 6760

HAMILTON

Pet World - 10% discount on fish products

Cnr Anglesea & Liverpool Sts. Hamilton. Ph 07 834 3426

Goldfish Bowl Aquariums - 10% discount on everything.

966 Heaphy Tce. Hamilton. Ph: 07 855 2176

World of Water

7 Kaimiro St, Te Rapa, Hamilton Ph 07 849 1117 email: info@worldofwater.co.nz

HAWERA

Wholesale & Industrial Supplies - trade price, equating between 15 - 40% off retail prices

49 Glover Rd, Hawera Ph 06 278 7525

NAPIER

Carevets N Pets - 10% discount on fish & fish related products

120 Taradale Rd, Onekawa, Napier Phone 06 842 2033

NELSON

The Fishroom

611A Main Road Stoke, Nelson Ph 03 547 0441 or 027 226 2625 Email: cam-scott@outlook.com

ROTORUA

Wonderworld Aquarium and Pet Centre - 10% discount

82 - 84 Clayton Road, Rotorua Ph: 07 348 0328 Email: info@wonderworldpetcentre.co.nz

TAURANGA

KiwiPetz - 10% discount

Shop T30, Fraser Cove Shopping Centre, Tauranga Ph 07 578 8623
email kiwipetz@xtra.co.nz

Carine Garden Centre & Water World - 10% discount on fish, fish related products & aquatic plants

Cnr SH2 & Te Karaka Drive, Te Puna Ph. 07 552 4949 www.carine.co.nz

WELLINGTON (and Greater Wellington area)

CareVets@Johnsonville Pet Centre - 10% discount

31 Johnsonville Rd. Johnsonville Ph 04 478 3709

CareVets 'N' Pets - 10% discount

Porirua Mega Centre, 2 - 10 Sempole St. Porirua Ph 04 237 9600

Paws and Claws - 10% discount on all fish & fish keeping items

Logan Plaza, 207 Main St. Upper Hutt. (opp. McDonalds) Ph 04 528 5548

The Pet Centre - 10% discount on all fish and aquatic products

Lower Hutt - 28 Rutherford Street, Lower Hutt 5010, 04 569 8861

Upper Hutt - 82 Queen Street, Upper Hutt 5018, 04 9745473

Lyall Bay - 117 Tirangi Road, Rongotai 6022, 04 282 1242

Thorndon Quay - 56 Thordon Quay, Pipitea 6011, 282 0199

Online @ www.thepetcentre.co.nz - Free shipping with orders over \$30 + fish club discount still applies

The Pet House - 10% discount

Coastlands Mall, Paraparaumu Ph 04 296 1131

