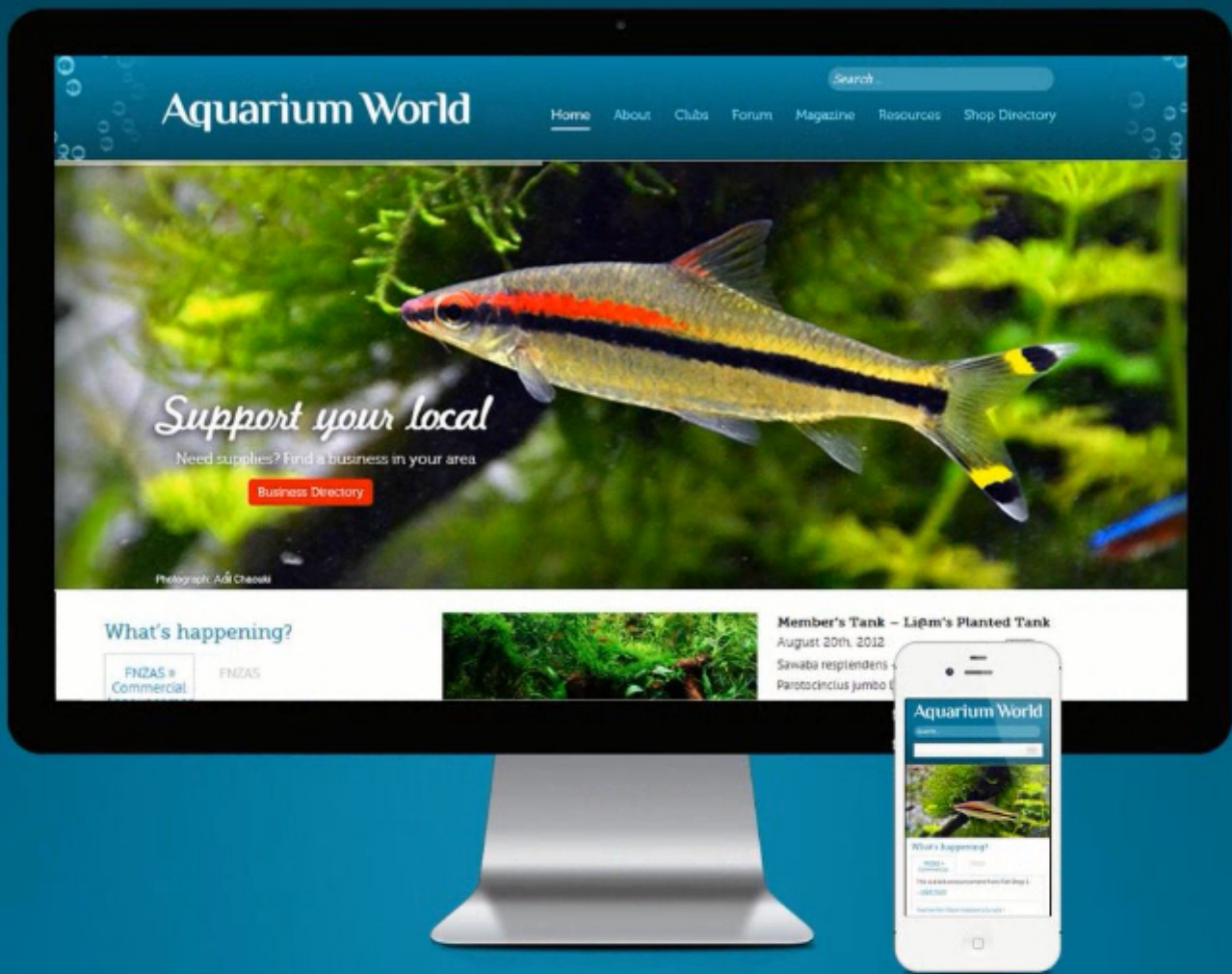


Aquarium World

magazine

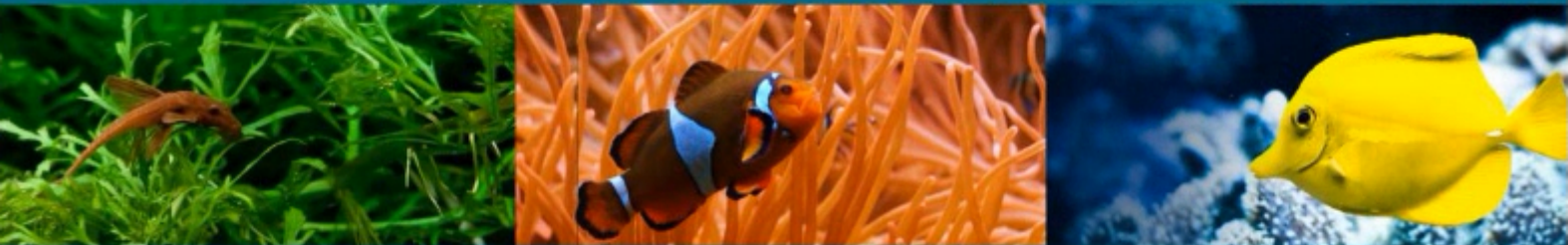
Volume 63 Issue 1 2017





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Volume 63 Issue 1 2017

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Photo: Cam Scott



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Welcome to another issue of Aquarium World.

In this issue we share a couple of reader's experiences.

I have often wondered what it would be like to set up a fish room in your house. While I am unlikely to ever gain approval for such a plan it is nice to know that other fish keepers have taken the plunge with spectacular results. In this issue, Cam Scott visits one such house.

Having kept tropical freshwater tanks for a number of years, I have often thought it would be great to set up a small marine tank. It would be nothing fancy just a couple of corals, an anemone, and a pair of clownfish, but I have been put off by my lack of knowledge and the perceived cost. In this issue, Adrienne Dodge shares her experience with going marine. We also have some great marine articles: from keeping a native carpet shark or a striking schooling bannerfish, to some great pointers on how to frag corals, and we visit New Zealand's only specialist tropical marine store.

And for something a little different from our normal fare we introduce a few special amphibians. New Zealand has about 100 reptile species (the tuatara - a living fossil, about 100 lizards, and the occasional marine turtle or sea snake visitor), but our only native amphibians are 4 very special primitive frogs. These native gems are totally protected by law and can't be kept in captivity (except by a handful of specialists) but we do have 3 introduced Australian frogs and 2 exotic fire-bellied newts, all of which make great pets. In the first of a two part story we introduce New Zealand's frogs and we also look at how to care for fire-bellied newts.

Darren

Darren Stevens
FNZAS Editor



Al Mead's 1400 litre African Cichlid display
Photo: Cam Scott

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.

Joel Knight



Joel is a 20 year old reptile & amphibian enthusiast from Wellington. He cannot remember a time when he has not kept frogs due to his intrigue with the process of metamorphosis as a kid. He has raised large numbers of frogs and provided them to keepers all across the country. His passions also include the keeping of native NZ lizards for which he holds Permit Authorisation from DOC.

Lisa Walker



Lisa has been a fish hobbyist since her first year in uni when she inherited a tank containing two comets and a blackmoor. She's had marine tanks since 2011 (she was taking up the hobby just as more sensible folk were being driven out of it by the earthquakes). Fragl started in 2013 when her soft corals started outgrowing her 4 foot tank. Now she has 2 1000litre+ tanks and a 130 litre RSM full of 6 month old clownfish, grows more than 300 varieties of corals.

Tim Kurth



Tim (aka Spoon) was brought up in Motueka and from the age of 8 kept local marine life then progressed to amphibians, local freshwater, then tropical aquariums. Now settled in Christchurch & belonging to local club, CTT, he quickly developed MTS. Tim currently has a reef tank & has bred maroon clownfish. He enjoys the technical side of fishkeeping and DIY projects and passing on the knowledge he has gained from more experienced aquarists in this hobby.

Jim Sytema



Jim has been keeping brackish, tropical, and marine fish and reptiles for the last 10 years. He has also worked for local pet shops in Tauranga. He has been an active member of the Bay Fish and Reptile Club for over 10 years and is currently their Vice President and delegate. He is passionate about the FNZAS and their efforts to keep the fish hobby alive in NZ in partnership with Government Agencies.

Adrienne Dodge



Adrienne has been in the hobby for 32 years. She has bred betta splendens and currently has a tropical marine tank. She recently spent seven months working for a specialist fish shop which she says has increased her knowledge and has given her valuable insight into the wholesale/retail industry and the challenges faced. Adrienne is a member of the Marlborough Aquarium Club.

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.

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.

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A FISHROOM LIKE NO OTHER





When I think about a fish room, I often think of unbearable heat, the musty smell of fishy water, the noise of slurping water and bubbles and mismatched glass boxes. This is far from the experience you receive when you visit the fish room of Al Mead and Sharon Bastin out in Brightwater, south of Nelson
Cam Scott



Let me try to paint you a picture. As you walk into their house you can see a glow to your right of a planted aquarium, but you know this is just the starter to your experience. You continue to walk through to your destination, but before you can leave the kitchen area you see another glow coming from a child's bedroom. In that you can see some nice cabinetry, a lovely handmade 3D background and a selection of smaller central and South American cichlids. This is a very beautiful aquarium in its own right and the young lad that owns it is a very keen fish keeper, but this is not why we are here.

You turn into the hallway and there are more glows left and right from children's bedrooms but the reason you have come is directly in front of you. You can see the glowing LED light from the other end of the hall way and the closer you get the more your senses begin to become overwhelmed with excitement. Once you make the door you are greeted by the sight of a magnificent 1400L African cichlid aquarium. Now this aquarium is

not only magnificent, due to its sheer size and presence in the room, but the rimu cabinetry is second to none.

No matter where you look in this room there is an aquarium, totalling 11 in the room with a water volume of approximately 3500L. This fish room is a thing of beauty. Now I know that these numbers are not large in comparison to some people's fish rooms but what sets this room apart is that nearly every single one of these aquariums could be a display tank in any fish keepers' main living area. All of them sit atop amazing hand crafted rimu stands and cabinets, and all of them are well furnished and very well lit with LEDs. There is a range of community, discus, planted, African cichlids, fry grow out tanks, and more.

Let's start with Al's main display aquarium. This monster that Al himself made, is 280cm long and has a total volume of 1400L, and is crammed full with some very exotic and rare African cichlids. There is a good mix of wild caught male peacocks, haps, and mbuna as well as a few *Altolamprologus compressiceps* sprinkled



about for good measure. As soon as AI reaches for his container of New Life Spectrum, off the fish race eagerly to the feeding hole used to feed them. Watching them flap about in anticipation is a sight in itself. Once the food hits the water there is a frenzy of African cichlids eagerly gobbling up as many pellets as they can fit in their mouths. As soon as the pellets hit the substrate it is time for the catfish to come out and play. Almost instantly a troop of *Synodontis multipunctatus* and *Synodontis petricola* come out from the rocks. There is close to 20 synodontis in this aquarium and it really is a treat to see them all come out and hoon around the substrate foraging for food.





This aquarium is effortlessly filtered by a large sump underneath which has been plumbed back into the main display seamlessly behind and above the stunning 3d background that Al, again, made himself (are we picking up the trend here?) The background itself works as a safe haven for many fish and adds to the caves that are in the aquarium aquascaping.

Underneath this stunning set up is a small (in comparison) Tanganyikan aquarium. Within this tank there are more *Altolamprologus*, *Leleupi*, *Julidochromis* and even more *Synodontis* catfish.

To the left of Al's display tank is Sharon's much slower paced discus display. This has half a dozen very nice sized discus in it, a small school of sterbai corydoras,





some stunning long fin calico bristlenose and various other community based fish. The real beauty, I think, within this aquarium is the hardscape, mainly the wood work within it. The woodscape in this aquarium is

amazing, there are plenty of nooks, crannies, twists and turns in the pieces which is perfect for the bristlenose. Underneath this tank AI has placed a fry grow out tank for young cichlids from his breeding tanks.







As we continue to pan left through the room we get to one of the two breeding set ups. Again, like the two display tanks, this has some stunning woodwork for a stand. On the top of this stand there is an aquarium divided into four which is used for breeding dwarf cichlids and peacocks. Under that, there is a jungle style planted aquarium with lots of various livebearers and a very nice and very dark red tiger lotus. At the bottom of this set up is another grow out tank for African cichlids. This is the final step before they reach a size big enough to go into Al's main display aquarium.

As we continue round we find another planted aquarium, sitting on top of yet another masterfully crafted stand. This one is an Asian community planted tank which has yet another stunning bit of wood as its centre piece. Fish in it are a couple of good sized kissing gourami, some yo-yo loaches and a great sized shoal of danios.

As we continue on to the last stand we see yet another African cichlid breeding set up. This one has a great selection of Aulonocara species, including some fry growing out, and a few egg tumblers bubbling away furiously with Al's recent stripping.

It is needless to say that Al and Sharon have put some serious time, effort and money into their little slice of aquatic heaven tucked away at the end of their house. There is a phenomenal selection of fish, some absolutely

amazingly crafted full package aquariums and some of the aquascaping is brilliant. Every time I go to this house I never feel like leaving, unfortunately I always have to.

Article and photographs by Cam Scott



MARK PATERSON

My Beautiful Carpets

My Journey with carpet sharks started in early March 2014 when I was handed 7 carpet shark egg cases by Rex Fairweather of the Waikato University Marine Field Station here in Tauranga. Rex was part of a University team conducting research on the Astrolabe reef after the ship Rena ran aground on it. A crayfish pot had been deployed 3 days previously for research and when pulled aboard contained a mature female Carpet Shark and 7 egg cases entwined on the cage sides, the female was released and the egg cases put in a bucket of fresh saltwater, brought back to shore and given to me to

look after. Three of the egg cases were a light brown whereas the others were a yellow colour, I placed them all on some plastic garden trellis by using the tendrils on the egg cases, which are used by the female to attach them onto rocks. The mesh with attached egg cases was then placed into a 120 litre tank that was part of a 1700 litre mature local marine system with the temperature set at 18 degrees centigrade, this allowed me to ensure the water quality would remain stable during the many months of expected incubation.

The egg cases are commonly called Mermaids' purses and can take up to 9 months to hatch



depending on the water temperature. It was interesting to observe the embryos growing and within 4 weeks it was apparent that the three browner coloured egg cases were the only fertile ones with the yellow ones showing no signs of an embryo developing on the yolk sac. The embryo survives by absorbing nutrients from the yolk sac and then hatches as a miniature version of the adult.

Over the next 4 months the embryos grew and could easily be observed wriggling inside the cases until they filled each case with no wriggle room and the yolk sacs disappeared, during this time the exterior of the case got

darker and became harder to the touch.

The first egg hatched 15th of August 2014. Well it didn't actually hatch. I started to panic as the embryo had filled the egg case and it seemed to have stopped moving so I assisted the hatch. The egg case had started to split down one side so I slid my thumbnail into the edge and peeled it open and the shark was tipped into a container of salt water where it lay motionless for a few minutes with its gill flap moving indicating it was breathing. The newly hatched shark was a replica of an adult, it measured 16.5cm and was up and swimming in a tank within 10 minutes of the



birth. As the other two embryos had a little more room in their egg cases I left them for another two days before assisting their hatch also, all juveniles had completely absorbed the yolk sacs. The time period to hatch was just on 6 months and I put that down to possibly the 18°C temperature they were kept at aiding in a slightly faster development of the embryos. It took about 3 days before they accepted the first foods fed to them which were small strips of squid and fish. Since then they have been fed squid, fish, mussel, crayfish and crabs and are now almost 24 months old. There are 2 females and 1 male and they are all housed together in a 1700 litre aquarium.

Over the last month the male's claspers have developed and gotten larger and there has been some territorial behaviour observed so hopefully in the future we may have some breeding occurring and eggs laid, fingers crossed.

Carpet Shark

Cephaloscyllium isabellum

The Carpet Shark is so named as many of them have blotchy patterns on the upper side reminiscent of a carpet. They are endemic to New Zealand coastal waters and are found at depths of 1 to 400 metres. It is a bottom dweller that is mainly nocturnal. During the day it is usually found hiding under ledges or inside caves on rocky reefs. At night it emerges to forage for food over sandy areas where it feeds on a wide variety of fish, molluscs, crustaceans and other invertebrates. Though it can grow to 1.2 metres in length most individuals are around the 1 metre mark with females growing larger than males. The only external difference between the sexes is that the males have modified pelvic fins called claspers, which are used during reproduction. These sharks are oviparous (an egg layer) and females usually lay two egg cases at a time. The egg cases are a creamy colour and about 12cm long with curly tendrils at the corners that allow them to be fastened to underwater objects. The egg cases take between 6 and 10 months to hatch and newly hatched sharks measure 16 cm. Male carpet sharks mature sexually at 60 cm and females at 80 cm.

Article and photographs by Mark Paterson

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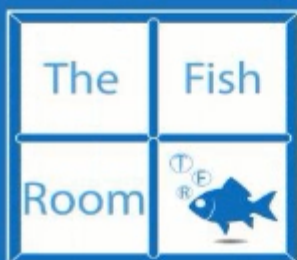
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FROG KEEPING IN NEW ZEALAND



BY JOEL KNIGHT

New Zealand has a number of native Leiopelmatidae frog species, which are among the most primitive amphibians in the world. There are very strict regulations for activities involving any native wildlife. This means that native NZ frogs cannot be kept by a public individual, unless they have obtained a high class category permit that authorises them to do so. These authorisations are typically granted for research and conservation programmes, such as Auckland Zoo's recovery programme. This means that if you would like to keep frogs as pets in NZ you will need to keep introduced species, of which there are three. These frogs are native to Australia but are now widespread across

Ranoidea aurea, golden bell frog
Photo: Joel Knight

NZ. They include two species of bell frogs and a tree frog. Each of these species occur in different habitats, although there is overlap between species, where it is thought that hybridisation may occur. A number of other species were introduced to NZ, but have failed to establish in the cold temperate climate of NZ. The unsuccessful introductions included the common frog, the edible frog, the common toad and the White's tree frog. Two more tree frog species were spotted to arrive on rigging by ship, but have not been seen since. Bell frogs however were successful and can be found across the country. They are



semi aquatic, typically found pond side or close to areas of water, year round. Grass paddocks and drainage ditches being very typical habitat, where breeding will occur when rain follows a hot summer's day.

The largest of the species in New Zealand is the southern bell frog (SBF) – *Ranoidea raniformis*. As their name suggests these frogs favour the southern areas of NZ and are more tolerant of the cooler temperatures than the golden bell frog. Although they have been recorded in the far North of NZ, the status of this population is uncertain. Frogs from this area have unique spotted flash markings on their thighs which resembles another Australian bell frog species, the yellow-spotted bell frog,

| *Ranoidea raniformis*, southern bell frog
| Photo: Joel Knight

Ranoidea castanea. The SBF is a very large frog, with females reaching 100mm+ and can be identified by a number of distinguishing features separate from the GBF. These include a warty/bumpy surface to the skin on the back and a very bold pin-stripe of green down the centre of the back. Also similarly with the GBF, flash markings on the thighs can be a vibrant blue. The stomach is a pale cream colour, males will display a darker throat colour when in breeding season.

The golden bell frog (GBF) – *Ranoidea aurea*, is a mid to large size frog, females



are 90mm+. This species is found more specifically in the Northern areas where temperatures are warmer, from Taupo north. Arguably the most vibrant and beautiful of the introduced species with variations including striped, spotted, pattern-less all green or all gold frogs. As the name suggests, the GBF has rich metallic gold markings, particularly from the snout back over the eye and down to the hind legs. Other spotting or stripes are usually a mix of vibrant green and copper. The back feet are webbed, making them excellent swimmers, and they spend a lot of time in the water. The GBF will breed in temperatures around 25°C. Females seek out the calling males, who will be floating in the water. The males will use their nuptial

Ranoidea aurea, xanthic golden bell frog
Photo: Joel Knight

pads on their front thumbs to grip onto the females, squeezing the eggs out during amplexus (the mating posture of frogs and toads). The male will fertilise the eggs, which initially float and then sink after 10 - 12 hours.

The southern brown tree frog – *Litoria ewingii* is seasonally found near ponds and, unusually, this species will breed on the coldest nights of winter. Seemingly the cold temperatures spur on the males to croak and in turn the females respond, waiting for the male that can call the longest, proving his dominance over other males in the area. I have even observed



that on nights dropping below zero the southern brown tree frog will lay eggs, even if the pond surface has frozen over by morning. Astonishing! At other times of the year the southern brown tree frog seeks areas of vegetation, utilising their long legs made for climbing. This species has been recorded having a wide range of habitat. They are commonly found in Dunedin and Christchurch of the South Island and the Taranaki ports, along the west coast North Island (huge populations in Horowhenua/Manawatu) and even stretch their distribution into native bush and high altitudes / foot-hills of the Tararua Ranges. This is the smallest species of introduced frog, reaching a maximum of 45mm. Colour varies from a rich orangey brown, to a pale

Litoria ewingii southern brown tree frog
Photo: Joel Knight

cream/grey. Although in their native origins from Tasmania there are green colour variants, these have not been recorded in NZ. The thighs exhibit flash markings of orange or yellow.

The keeping of these species ranges by species, but as with all pet keeping, you should replicate the conditions the animal would have in the wild.

In the next issue I will look at what you need to do to keep these introduced frog species in captivity.

Joel Knight

Reference:
<http://www.nzfrogs.org/NZ+Frogs/Introduced+frogs.html>

FIRE BELLIED NEWTS

MARK PATERSON



The 2 species found in New Zealand are the Japanese *Cynops pyrrhogaster* and the Chinese fire-bellied newt *Cynops orientalis*.

Fire bellied newts are usually dark brown to black on top with red or orange undersides, hence the name fire-bellied. The Japanese species is larger than the Chinese species and tends to have a red speckled belly, rough skin, and grows to about 9-12 cm, whereas Chinese newts have smooth skin and a speckled orange or yellow underside and grow to 6-10 cm. Both types can live up to 30 years with good care but average at about 10-15 years in captivity.

In the wild fire-bellied newts live in slow moving streams and rivers but also venture into ponds, lakes and ditches. They are largely aquatic, so spend the majority of their time in cool, still waters.

Japanese fire bellied newt *Cynops pyrrhogaster*
Photo: Mark Paterson

Captive Care

Housing

An aquarium or glass terrarium will be needed to house your fire-bellied newts and as they are good escape artists care should be taken to ensure your tank has a tight fitting lid. Fire-bellied newts are semi-aquatic and need a 70/30 split within their tank, with 30% being land based, while the other being a water area. Alternatively, you could have a fully aquatic set-up, with floating islands of cork bark or large rocks protruding out of the water to give your newts a place to rest and bask.

Substrate

A rocky slope may be all that is necessary for the land area of your terrarium, but if you would like



to divide your tank with a glass panel, then you can fill the land side with a burrowing substrate like sandy top soil or potting mix (without fertilisers), orchid bark chips, sphagnum moss or peat. Logs, live mosses and a selection of bog plants can be added to create a natural environment.

Gravel is a good under water substrate for the water side of your tank, which can also be decorated with aquatic plants.

Most of the terrarium should be dedicated to providing adequate water for your newts with the water at a depth of approximately 25cm. A small sponge filter or airstone is adequate to stop the water becoming stagnant.

Like most amphibians, newts are sensitive to various chemicals, as they can absorb them through their skin. They cannot handle water

Chinese fire bellied newt *Cynops orientalis*
Photo: Mark Paterson

with chlorine and chloramines in it so letting tapwater stand for a few days before using in their tanks helps.

It is necessary to ensure the humidity is kept up with regular misting with de-chlorinated water from a spray bottle but care should be taken to ensure that this soil area does not become water logged.

The ideal temperature for your fire-bellied newt is around 17-21°C. Never use heat lamps or basking lamps for amphibians, as these can cause them to dehydrate.

The terrarium should be kept out of direct sunlight, but with a 12 hours light to 12 hours dark cycle. Natural sunlight should suffice



during the summer months, but a bulb may be required to keep this cycle during the winter. Newts do not need additional UV, so a normal energy saving light bulb should be fine at 6500k minimum, although you may find that any live plants in your terrarium may need a fluorescent UVB tube as it won't give out any heat and will help the plants thrive.

Feeding

Fire-bellied newts should be fed 2-3 times a week with a varied diet of appropriately sized prey items. Bloodworms, earthworms, maggots, white worms, etc. are suitable prey items for adult fire-bellied newts whereas young can be fed wingless fruit flies or white worms.

Japanese fire bellied newts *Cynops pyrrhogaster*
Photo: Mark Paterson

Pre-morphed larvae are entirely aquatic and do well on mosquito wrigglers, daphnia and *Artemia nauplii* (brine shrimp).

Handling

Fire-bellied newts have delicate skin and like most amphibians can absorb chemicals that may be on your hands, such as washing up liquid, soap residue, hand cream, etc. so handling is not recommended, but if it is necessary wear gloves. This will protect both you and your newts as they can secrete a toxin from the poison glands on the side of their heads that can be an irritant to your skin. 🌿



Chinese fire bellied newt *Cynops orientalis*

Photo: By [Kennyannydenny](#)

Chinese Algae Eater

FISH MINI PROFILE



The Chinese algae eater *Gyrinocheilus aymonieri* is a popular aquarium species and is available in a range of colours including wild type (pictured), gold, marble, albino, and leucistic. In the wild Chinese algae eaters are found in small streams to large rivers over large parts of South-east Asia. They are generally found in flowing water attached to flat surfaces, such as rocks, with their sucker-like mouths. They are hardy and are suited to temperatures from 24-27°C and pH values of 6.5 to 7.5. However Chinese algae eaters are not a great choice for community aquaria. While young fish are generally peaceful and are great algae and detritus eaters, as they grow larger they become more territorial, prefer a meatier diet, and they are often aggressive toward others tank mates. In the wild they can grow to 28 cm but in aquaria they seldom exceed 15 cm.

Umbrella Sedge

Cyperus eragrostis



by Caryl Simpson

Cyperus eragrostis (Umbrella Sedge)

Cyperus is from the ancient Greek name for sedge, kypeiros and agrostis, meaning grass.

Common names: Umbrella sedge, tall flatsedge, nutgrass, tall nutgrass, chufa, Earth almond, zula nuts, edible galingale and pale galingale.

Maori Name: puketangata

This plant originated in North America but has become naturalised across Europe, and parts of South America, Australia and NZ. It is found throughout NZ in swamps, ditches and the banks of rivers and streams (or, as Mrs Hyacinth Bucket would say – riparian areas). DOC class it as an invasive Class C weed, this means it is potentially troublesome and

Cyperus eragrostis at pond edge
Photo: Caryl Simpson

should not be spread around and you should remove small infestations. Despite this, it is a popular ornamental pond plant – possibly the reason it was introduced in the first place.

Cyperus eragrostis is a tufted, leafy, perennial grass with tall, triangular stems that grow 25 -90cm. The long, thin, pointed leaves are arranged in threes, each with a group of 5 – 7 yellow-green, round flowerheads within tough, rounded, greenish-yellow or beige spikelets. It flowers and fruits summer to autumn.

Umbrella sedge reproduces by seeds and rhizomes. Its seeds can be spread by contaminated machinery but the plant can be



Photo by Phil Bendle

Cyperus eragrostis mature seed

Photo: Phil Bendle

controlled manually, mechanically or with the use of herbicides, depending on the situation.

The photos of the plant in my pond were taken in autumn so it was not at its best. Note the smaller plants coming up along the pond edge, spreading out from the main plant.

Caryl Simpson

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<http://www.doc.govt.nz>



Photo by Phil Bendle

Cyperus eragrostis flower heads

Photo: Phil Bendle

Congo Fern

Bolbitis heudelotii

by Darren Stevens

Congo fern or African water fern (*Bolbitis heudelotii*) is a subtropical to tropical fern native to Africa where it is found from Senegal east to Ethiopia and south to northern South Africa. In the wild it grows submerged in fast-flowing waterways over sandy or rocky substrates. The water is very clean and slightly acidic and the plant clings to rocks and the sandy substrate with its fine rootlets. Not surprisingly Congo fern does well in flowing water.

Photo: Ziare



Photo: Darren Stevens

Congo fern does best in temperatures of 22-28°C and a pH of 5.8 to 7.0. It is best grown attached to bogwood or rocks. Plants can be tied on with cotton or fishing nylon, or you can use cable ties, rubber bands, or lead weights to hold it in place. Be careful when you are tying the plant on that there aren't any free loops as your fish can become caught in it. Once the plant is established and firmly anchored it pays to remove the cotton or other attachment system. Seachem Flourish Glue is a great alternative as it eliminates the need for a visible attachment system and the glue can be used underwater.

Congo fern grows from a creeping rhizome and can be propagated by

division or rhizome cuttings. It is a fairly slow growing plant and it is regarded as easy to demanding to keep depending on who you speak to or what you read.

I keep my Congo Fern in a 200 litre planted tank. The temperature is 27°C, pH 7.0, and the conductivity is about 80 $\mu\text{S}/\text{cm}$. The tank is stocked with a few small tetras and barbs, and a colony of Colombian zebra plecos (L129's). I tied my original small plant to the end of a bog wood branch with black cotton and then inserted the branch upright so that the Congo fern was just below the surface. Since then my original plant has thrived and it now covers much of the end of the branch. The tank is lit by a single 39 watt T5 fluorescent tube. It is a double light unit but I found the *anubias* did better with a single tube and I had fewer problems with algae. The tank is filtered by a Fluval 205 and the outlet nozzle is facing the plant but the current is not strong. I use Flourish Excel occasionally and JBL fertiliser balls in the substrate (for the *barclaya*).

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AQUARIUM WATER MOVEMENT AND FISH HEALTH

JIM SYTEMA

There is a constant balancing act going on in your aquarium that affects the general health of your aquarium and its inhabitants and it is mainly controlled by the movement of the water within the tank. The plants, fish, invertebrates and even the bacteria that control the fish waste in your tank all require oxygen to survive and it is water movement that ensures there is an abundance of this. Like

a fresh breeze in a stuffy room it breathes life into the aquarium so water movement could be viewed as the lungs of your system. Proper water motion is essential for supplementing filtration and imparting physical and mental stimulation for aquarium inhabitants. Without it your tank would not survive and quickly turn into a stagnant mess.

When you feed your fish they digest their food and produce waste which is then metabolised by different bacteria into carbon dioxide, nitrogen, and methane. These gases accumulate in the water and are transported by water movement to the surface where they are released to the air. Water movement also allows gases like oxygen to enter the water. If there is no water movement then surface tension can stop the gases from escaping. A typical sign of this is the fish hanging at the top of the aquarium and showing rapid gill movements.

Water motion is necessary for filtration to work properly. Mechanical, chemical and biological filtration all need water movement to function as they require flow to ensure that particles and waste are carried to the filter. Moving water helps keep waste suspended in the water column and prevents it from settling into hard-to-reach areas, as larger particulates and debris are easily trapped. Dissolved waste materials are successfully eliminated with the aid of chemical filter media by having the tank water passed over or through them. Oxygen-rich water achieved through water movement provides a regular supply of oxygen for organic filtration.

Proper water movement is essential in marine reef filtration. Corals and different sessile organisms depend on water movement to physically wash away and export waste materials. Without good water flow metabolic waste, toxins, mucus, and other organic chemicals can accumulate on or around corals and cause their death. Even the most state-of-the-art reef filtration systems require water movement to function properly.

As a closed and surprisingly small environment, most domestic aquariums do not have adequate room to promote natural swimming motions but these can be enhanced

and help exercise the fish by adding flow to the water. By swimming in opposition to, or with, water flow your fish receive physical benefits for ideal growth and muscle development. The resistance offered by water movement may additionally aid fish digestion and metabolism and other benefits of bodily activity. Aquarium fish originating from fast-moving streams and rivers are adapted to water flow so recreating comparable water movement in your aquarium can motivate the display of natural behaviour, stimulate breeding, and even enhance colouration.

Some nuisance algae can increase in 'dead spots' - areas with little or no water movement, as debris often settles and accumulates in these spots. If left unchecked algae can grow aggressively in these areas to create an eyesore in your aquarium. Increasing water movement in your aquarium with a powerhead and a wave maker or Switching Current Water Director (SCWD) can help in controlling algal growth.

Jim Sytema

Powerhead used to create water movement in marine or freshwater tanks
Photo: Diane Wilkie



A Stunning Goby





The strikingly patterned bumblebee goby *Brachygnathus dorsalis* is a small species (to about 3.5 cm) found off the western part of Borneo (Malaysia) and off the coast of the Natuna Islands (Indonesia), where they are generally found in estuaries, tidal streams, and mangrove swamps. They are best kept in a species only, brackish water, tank with at least 6 individuals. Bumblebee gobies prefer live food and their tank should have plenty of cover and minimal water movement. They are cave spawners with the male guarding and rearing the young.

Photo Robert Beke



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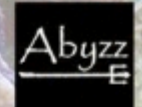
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SCHOOLING BANNERFISH

Heniochus diphreutes
by Adrienne Dodge



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Often referred to as the poor man's Moorish idol or false Moorish idol, the schooling bannerfish *Heniochus diphreutes* is a butterflyfish from the Indo-Pacific. This fish bears a striking resemblance to the Moorish idol and is almost identical to the black and white *Heniochus* butterflyfish *Heniochus acuminatus*. The most distinguishing feature of the schooling bannerfish is its rounder breast and less protruding

Schooling bannerfish off Waikiki *Heniochis diphreutes*
Photo: Mike Miller

snout, but it is not easy to tell the difference unless the two fish are side by side. The body is compressed laterally and the first rays of the dorsal fin stretch in a long white filament which, when the fish is swimming, looks like a banner blowing in the wind - hence the nickname 'bannerfish'. Beyond the



second stripe the dorsal, caudal and pectoral fins are yellow. The head is white, the eyes black and the eyes are linked together by a black to grey band. The snout is short and spotted with black to grey and the mouth is small and can extend out to capture prey.

In the aquarium trade this fish is often sold as a cheaper, and easier to care for, alternative to the Moorish idol.

Distribution: *Heniochus diphreutes* is widespread throughout the tropical, sub-tropical and temperate waters of the Indo-Pacific from the eastern coast of Africa, including the Red Sea, to Polynesia and Hawaii, and from south

Schooling bannerfish *Heniochis diphreutes*
Photo: Arthur Koch

Japan to New Zealand's Kermadec Islands.

Habitat: The schooling bannerfish prefers external reef slopes and channels. It is normally observed between 5 - 30m deep but may reach 210 meters. As its name indicates, it lives in large groups.

Maximum Length: 18cm

Life Span: Up to 10 years

Aquarium Size: *Heniochus diphreutes* can live in a 200 litre or larger aquarium

(particularly if you want to keep a school).

Maintenance: Schooling bannerfish have very few requirements but prefer to have a few large hiding places and a lot of open space to swim. They do well in reef aquariums and are considered reef safe when well fed otherwise they may nibble on soft corals and LPS. Good circulation and lighting is preferred.

Water Conditions:

Temperature: 22 - 26 degrees Celsius

pH: 8.1 - 8.4

Specific Gravity: 1.020 - 1.025

dKH: 8 - 12

Diet: In the wild the schooling bannerfish feeds on zooplankton in the open water and juveniles may also act as cleaner fish. In an aquarium this fish readily accepts standard aquarium food and takes little coaxing to get it to eat. They will accept any small meaty foods - small crustaceans (krill, mysis, *Artemia*) larger crustaceans (shrimp, crabs) and will even take dry pellets and flakes. Some greens should also be offered.

Behaviour and Compatibility:

Compatible with other peaceful fish and those of the same species if they are all introduced to the tank at the same time. This fish can be the target of harassment by more aggressive species i.e. angels and triggers, therefore it is best to add the bannerfish before adding these species. Schooling bannerfish are able to remove parasites

Schooling bannerfish *Heniochis diphreutes*

Photo: Cliff

from fish but they do not have a great impact on a large outbreak of marine ich.

Reproduction: There are no external dimorphisms that can be used for sexing schooling bannerfish. They have not been bred in aquariums and little is known about how this species spawn in the wild. The theory is that they form a dominance hierarchy and are egg scatters that spawn in schools, releasing eggs into the water column. Most bannerfish are seasonal spawners and it is likely that a trigger is required to breed this species.

Adrienne Dodge

www.aquaticcommunity.com

www.theaquariumwiki.com/Heniochus_diphreutes

www.liveaquaria.com



A New Zealand Reef Keeper's Journey Adrienne Dodge



14 July 2014 – the day that our first marine tank arrived in the shop. A Red Sea MAX C-250, the first of the C range to land in NZ, and I think one of the few that have actually been sold in the country.

My husband had been wanting a marine tank for several years, spurred on by the image of the beautiful Red Sea 250 in a local shop, and finally I relented - knowing that I knew next to nothing about the marine side of fish keeping. In fact, I had been actively avoiding the topic, having observed the extra work, skill, and cost involved. We had intended to purchase the older style 250 tank – however once we discovered the older style was no longer in stock and was being replaced with a newer model - the C-250 - in January 2014 we ordered the C-250

with its improved skimmer and power centre, better lighting specs, a different tank shape, and with a due arrival date between late January and April 2014.

However, once the tank was ordered I did spend the waiting time purchasing some of equipment we were going to need – refractometer (for testing salinity), TDS meter (testing total dissolved solids/metals in the tap water), RO (reverse osmosis unit), pumps, hosing, salt (water changes), storage barrels (RO water) and more. I also purchased some rock and first cooked it, then set it off on a cycle in preparation for the day, guided by FNZAS President Mark Paterson.

Owning a smallish sedan we borrowed a van – the tank box is actually quite

large and very heavy – and headed off to begin our journey into the unknown (and I admit 24 months later still partly unknown) world of marine fish, corals and their ecosystem.

The tank and cabinet sat in the lounge in their boxes for three days waiting for the weekend. The night before my husband and I put the cabinet together I came across Roy Page's C-250 videos on YouTube which are a detailed assembly guide and more, and these gave me way more information than the instructions that came with the cabinet.

Construction of the cabinet took the two of us around two hours and then we placed the tank on top. Over several days I placed all the equipment into the tank

and that was when I struck problems. The tank was the first C-250 set up in New Zealand so no actual tried and true information was available. With no idea about the skimmer assembly I found the instruction manual seriously lacking. The LFS and wholesalers were unable to answer my questions so on to Google I went. I was fortunate to find an overseas forum where I found out I was not alone in my trying to work the skimmer construction out. With the tanks having been available overseas for some time the answer to my question was there and I moved on with the layout and filling of the tank.

25kg of partially cycled rock and 18kg of Red Sea sand (pink) was used in the scape.





The tank was switched on and apart from one of the circulation pumps being faulty, the tank was GO!

Twenty hours after the first fill the tank was relatively clear but after twenty four hours there were micro bubbles everywhere causing cloudiness. Turning down the air intake on the skimmer reduced the micro bubbles which eventually stopped – this seems to be a feature of the skimmers on the majority of Red Sea MAX tanks in that they produce large amounts of micro bubbles for the first few weeks until they break in.

Then the wait for the tank to cycle began – there is no speeding this up and patience is the key. If you rush a marine

Red Sea



tank you will find yourself in trouble. Daily testing of the temperature, salinity, ammonia, nitrite, nitrate and pH was carried out. During this period it became clear that the Red Sea heater supplied with the tank was unable to get the tank to 26°C and I decided to ditch it and replace it with a 200 Watt Jager heater instead.

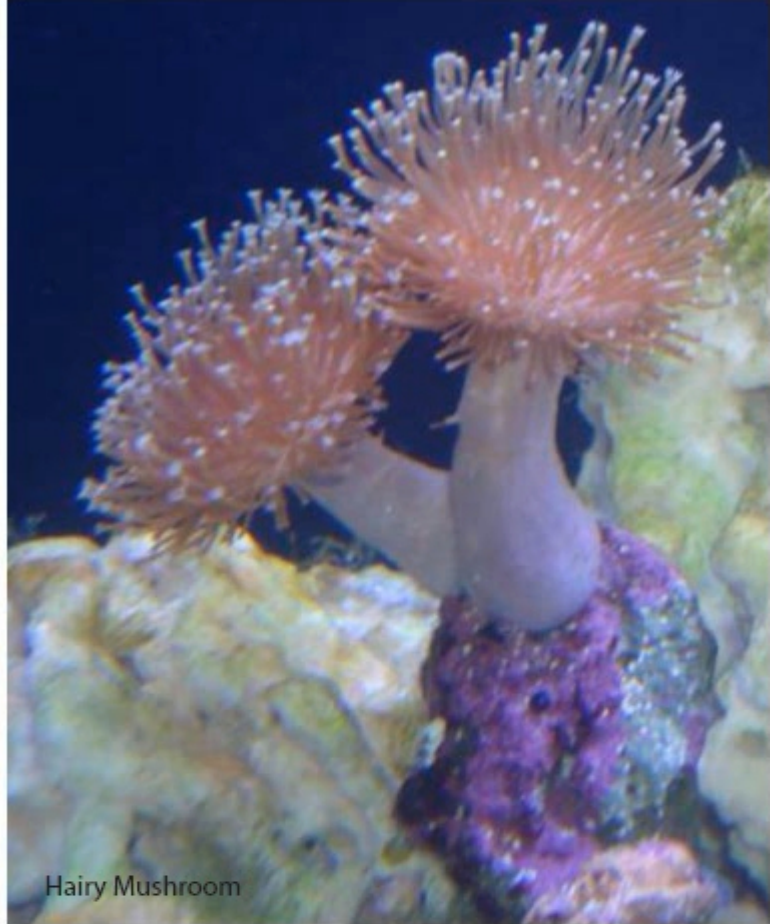
Day 9 and the rock was beginning to change colour – it was turning pink! Day 14 and my tank's cycle was complete. Fourteen days was very very quick for a cycle on the tank however the rock I added was partially cycled and the sand was 'live'.

By this time I was beginning to become rather more interested in this new tank and excited to see what was happening.

I decided, due to losing around 4 litres of water a day to evaporation and having to remember to top up the tank each day, that it was time to purchase an ATO or automatic top off/top up unit. I searched on the internet and purchased a unit from the US which took less than a week to arrive. To get this working it was necessary to drill a hole through the rear of the cabinet and feed the wiring through it – not a difficult job. I then discovered that not all C-250 cabinets were created equal – I have a cut out panel at the rear on one side, some cabinets have one on each side.

Day 17, and off to the LFS I went to get a couple of small pieces of live rock with some coralline algae on it and my first coral – a hairy mushroom.

Three weeks in and the first fish we added to the tank was a pajama cardinal – a nocturnal fish – and I began to look



Hairy Mushroom

around for a CUC or cleanup crew for the inevitable algae outbreak that most tanks experience.

After another week four turbo snails and a *Caulastrea* coral were added.

With the warmer spring weather, living in Auckland, and the fact our house is very warm even in cooler weather, it became apparent that we were going to need



Pajama Cardinal



a chiller if we wanted to stop the tank temperature climbing to over 28°C on a regular basis. We purchased a Hailea A300 and installed it in the left hand side of the cabinet – the side with the power board and the cut out rear panel. It was set to come on at 27°C, however this has been since lowered to 26°C.

Week five brought the onset of green algae – ugly, green of course, and thick. This algae was to become the bane of my life for the next six months. Even purchasing another six snails had little effect on the algae growth.

Mid September came along and one night, while peering into the tank with a small torch looking for any life, I noticed we had a crab. Tucked in the middle of a piece of coral rock it looked pretty harmless so I decided to leave it, despite advice that I should really work out what type of crab it was, as not all crabs are desirable.

By the middle of October the tank seemed to be fairly settled and a few more small corals had been added, so off to Tauranga we drove to pick up a pair of young picasso clowns from Nathan Coker. Nathan and his father were breeding a number of different clownfish. They did ship but given that these small fish would have had to spend the night in transit we decided to spare them the stress.

November and we added a skunk cleaner shrimp to the tank and what a fascinating shrimp he is. Friendly, he comes out to not only clean the fish in the tank but also my fingernails, and to take food out of my hands.

A copperband butterfly fish and a target mandarin were the next fish added. Both of these fish rate highly in the difficulty scale when it comes to fish keeping with copperbands being very difficult fish to get to take dried or frozen food.

Target mandarins are not recommended to be kept in an immature tank as they require live copepods to survive.

Adding these two fish to the tank presented me with a huge challenge and one that I took on board. Initially I hatched BBS for the mandarin and continued to do so for eighteen months until the copepod population in the tank could maintain the numbers required.

I was fortunate that the copperband took a particular liking to one of the frozen fish food mixes commercially available. It now feeds out of my hands at night, but will still not touch dried foods. It also likes frozen deli prawns and devours thawed out cockles.

These were the last fish I added to the tank for a number of months but I did continue to collect and add corals. By the time the tank was eight months old the

corals were growing well and beginning to take over the tank.

By 10 months old the number of corals in it had expanded with the addition of a bubble coral, an elegance coral and a torch coral.

Just before it was 12 months old I purchased my first anemone – anemones require established tanks and 12 months is really the minimum they can handle. I am pleased to say that the anemone is now thriving, in fact I have two courtesy of it splitting.

At the beginning of 2016 I added my final fish to the tank – a foxface rabbitfish *Lo.* Small he was at the time, and very thin. This fish turned out to have a ravenous appetite, devouring every last scrap of algae in the tank and eating anything added to feed the other species of fish.





Bubble tip anemone



Zoanthids

During the year my corals have continued to thrive and grow. Many have been fragged and passed on to other fish keepers.

My tank is now over two years old, the fish are all still in it and are all healthy. My clowns continue to refuse to host the anemones, much preferring the frogspawn as their home. I still perform 10% water changes every week on the tank and now have my daughter well trained in doing the same in my absences.

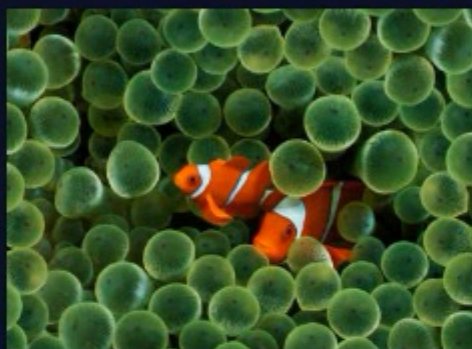
Early this year I started up a custom build 450 litre tank with a 70 litre sump. A number of corals in the C-250 tank are going to be moved into the new tank and replaced by more zoas. The rabbitfish has more than doubled in size and it, along with its best friend the copperband butterflyfish, is shortly to be moved into the new tank as well. My intention is to replace them with azure damselfish and some smaller gobies.

Adrienne Dodge



Tank at 10 months

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HOW TO

FRAG SOFT CORALS

BY LISA WALKER





It is rare for corals to spawn in the reef aquarium but they also are able to asexually reproduce and hobbyists can utilise this ability to create more corals. The most common forms of asexual reproduction for corals is where an offshoot forms from the parent coral or a coral divides itself, as some anemones do. The home aquarist can replicate these themselves using a few simple tools. As you are dealing with a fragment of the parent colony it is usually called 'fragging'. Fragging is a cost effective way of getting more corals for your aquarium, while also helping alleviate the harvesting of corals collected from the ocean.

It is best to start with the easy to keep soft corals such as finger leathers, mushrooms, toadstools and zooanthids. Stony corals require cutting the growing tips or cutting the coral itself into smaller pieces and then mounting them to a substrate.

Materials needed for fragging soft corals

- A sharp blade such as a craft knife, scalpel, or a pair of stainless steel scissors
- A clean, small plastic or glass container
- Manufactured 'discs' or pieces of rock or coral rubble
- Cable tie, rubber band, or cotton thread
- Piece of net curtain type material

I always remove the coral from the tank into a bucket of tank water to remove pieces for fragging as then any possible toxins given off by the coral once cut are not in the main system. Using a sharp blade, cut a branch or piece off the coral. Fill the small container about halfway with tank water, add pieces of rubble to cover the bottom, and then add your frag with cut end down onto the rubble. Cover the container with a piece of the netting and then secure it with a rubber band, or wind a length of cotton thread around and around the coral and the rubble.

Then slowly submerge the container back into the tank trying not to disturb the frag.

Another method with larger frags is to secure them (cut end down) onto a piece of rubble with a rubber band or a small cable tie. If the ties are too tight they will cut off the frag and it will float free.

Some people have success using Super glue Gel to attach frags. To do this, dry off the end of the frag, place a blob of the gel onto the rock and then attach the frag. Wait a few seconds for the gel to set a bit then put it all back into the tank or small container.

Don't try and glue soft corals (like mushrooms or leather corals) as the contact makes them slime and the glue cannot hold to this. Using the container and netting method allows the frag a bit of time to attach without being knocked around by flow or fish in the aquarium.

Methods for fragging common soft corals

Mushrooms: *Discosoma* sp

I detach the mushrooms from the rock by cutting the head off the stalk, as the stalk will grow and form a new head. I then cut through the centre of the disc making sure to get a piece of its mouth in each part otherwise they will not grow again. I then use the container method described above and place back in the tank.



Leathers: *Sacrophyton* and *Lobophytum*

Both of these leathers may be propagated the same way. Care must be taken to wash these corals in saltwater before placing them back in the tank as the slime produced can be toxic to other corals. I usually use a sharp pair of stainless steel scissors to cut around the disc leaving a symmetrical piece on the stalk to grow back again. The cut off material is then cut down to square shaped bits as large as the end of my thumb. I use bits of coral rubble and wind a rubber band around each one twice. I then place a piece of leather under each rubber band polyp side up. You could use cotton instead to tie each piece on. Ensure the rubber band (or cotton) is not too tight as it will cut the frag in pieces and it will float away. After washing place each piece back in the tank. It takes up to four weeks for the frags to attach to the substrate and the branching type of leathers can be pruned much like taking a branch off a tree.

Zoanthids, Polyps, and *Xenias*

These encrusting types of soft corals can be divided by using bone cutters to cut pieces off the rock they are attached to and then placing them onto larger rocks.





Another method is to place smaller rocks next to the colony and let it grow onto them, then separating the smaller rocks and coral with a sharp blade or scissors. Some of these soft corals grow on a colonial mat that can often be lifted and trimmed off, then attached to another rock using rubber bands. Remember to ensure the rubber bands are not too tight.

Once the coral has attached

Some corals, like zoas, attach very quickly, others make take up to a month. Regularly check the frag by gently moving it against its plug or the rubble you've attached it to. Once the attachment seems firm, gently cut the rubber band, cable tie or thread and remove it from the coral. Try to get all of it as it can annoy the tissue, although the hardier corals will simply grow over it.

Keep an eye on your new frag after removing the ties to make sure it remains steady. If you notice it coming loose, simply retie it and leave it for a little longer.

How fast do they grow?

All corals grow. However, some do grow faster than others. You will notice significant growth in a leather or a toadstool within a couple of

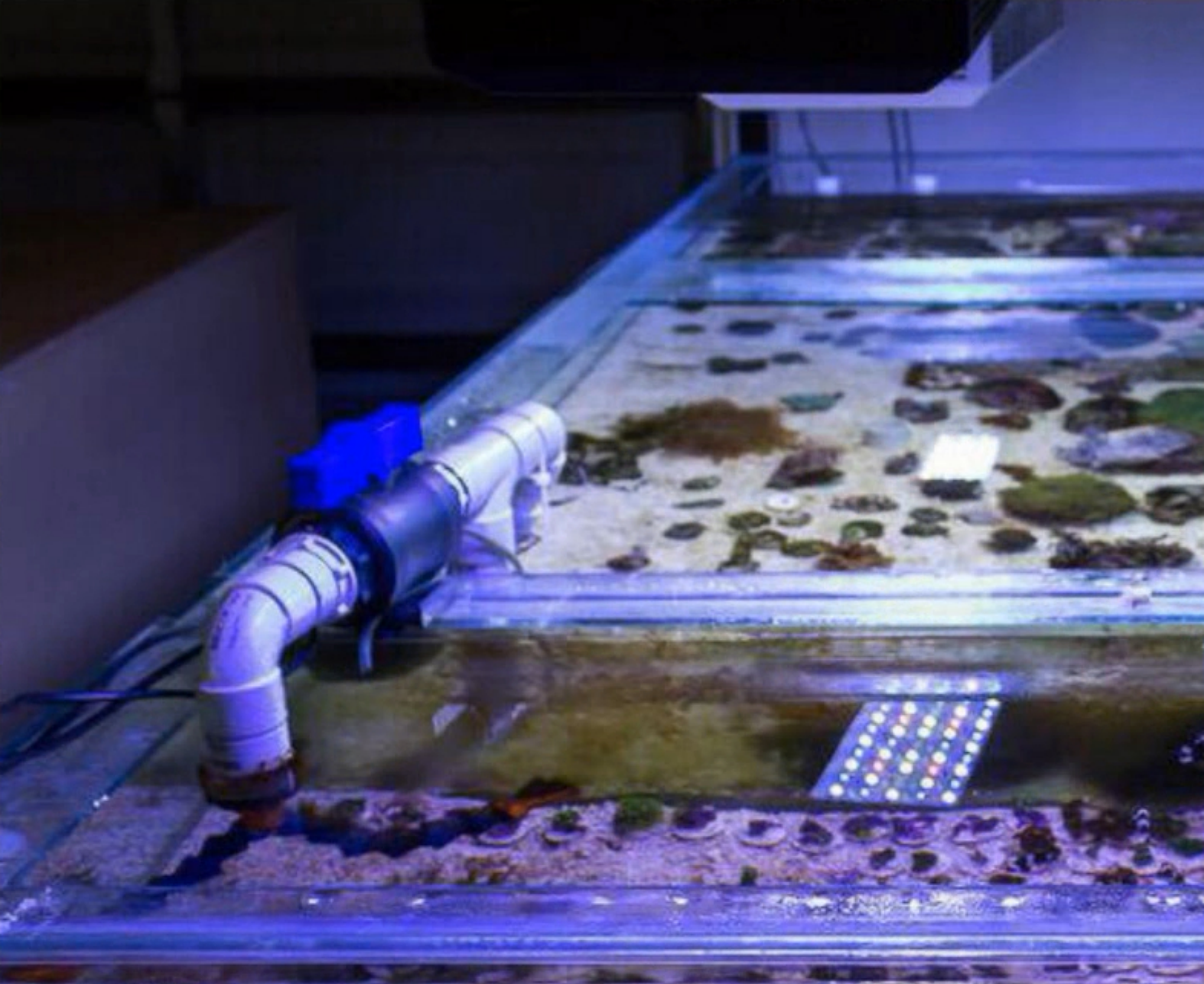
months. Most mushrooms you'd expect to see another head or two within the same timeframe. However some varieties are slow growers and may take longer - they're often the prettiest ones and worth waiting for. There is no answer to "how big will it grow?" because corals just keep growing to fill the available space.

Happy fragging!

If you'd like a look at my tank and the frags/ corals I have available, go to www.facebook.com/fragitnz. I look forward to hearing from you!

Lisa Walker (Fragitnz)







INTERESTING IMPORTS



Dwarf Gourami - standard colouration
Photo: Robert Beke

For those of us with smaller tanks and budget there are plenty of popular community fish on the importers' lists and a few that are a little different.

Guppies are always popular and males are available in a wide range of colours and patterns, including exotic sounding strains such as blue cobra, golden dragon, pink tuxedo, red leopard, and snow flower. Check with your LFS as fancy females and pairs are sometimes available. Platys also come in a great range of varieties including bumble bee, hi fin sunset, red Mickey Mouse, silver moon, and snow coral.

Dwarf gourami are a great little fish and males are available in standard, cobalt, neon, neon royal red, and sunset colour varieties. If you are planning on a breeding project female dwarf gourami are available. Honey gourami are another great option and males are available in standard, golden, and red colour varieties.

On the cichlid front there are a few relatively peaceful small species on the importers' lists including golden and standard kribensis, *Apistogramma agassizii* and *A. trifasciata*, Bolivian dwarf rams, and blue rams (*Mikrogeophagus ramirezi*) in standard and



Red mickey mouse platy
Photo: WhiskeyCoffee



Bolivian ram
Photo: Adrienne Dodge



Electric blue ram
Photo: Liam Winterton

electric blue colour varieties. If you after something a little different blue rams are also available in gold balloon and veiltail varieties.

For catfish fans it's hard to go past corys and there are plenty of options including pygmy, Rio Salinas, pandas, gold leopards, elegant, tailspot, and adolfi. *Otocinclus* and hara hara cats are also great options. On the pleco front, clowns plecocs are also a nice option, and if you have a large budget zebra plecocs are on the importers' lists.

For nano tank fans, why not try a school of small rasbora (dwarf, mosquito, and neon

blue rasbora are all available), emerald dwarf rasbora (actually a danio), or a scarlet badis (*Dario dario*) in a well planted tank. If you don't want to use a heater, white cloud mountain minnows (standard, longfin and golden varieties) are great. Just keep them above 7°C and don't mix them with gold fish as they might become a tasty snack.

As with any new fish species it pays to do your research. Some of these species have particular requirements, such as a well planted tank or peaceful tankmates while others have a little bit more of an attitude.

The editorial team

Pygmy cory
Photo: Robert Beke



Scarlet badis
Photo: Robert Beke





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Living Reef is currently New Zealand's only dedicated store specialising in reef aquaria.

Owner Nic Hoogervorst and employee Simon Fitt have 30 years reefkeeping experience

between them. They are both friendly and knowledgeable about all aspects of reefkeeping. First impression when you walk into the shop is wow! You are greeted by a darkened room with a 10 foot display reef aquarium. Fully stocked and well maintained, I think most of us could spend hours watching this tank and still find something new.

Past this room and into the shop, the retail area is well lit and well organised, with everything a marine enthusiast or somebody new to the hobby could need.

Living Reef are exclusive distributors in New Zealand for EcoTech Marine, Aqua Illumination, Deltec, Dupla Marin and Giesemann products providing a significant range of high quality LED



10 ft 2000 litre marine display tank

lighting, skimmers, pumps and consumables. They provide competitive prices (even when you compare to overseas online companies) and have great after sales support and warranties.

Some stand out products I noticed were, the Fiji reefrock2.1, which is handmade not sourced from reefs making it environmentally responsible. It has an awesome purple colour to mimic coralline algae (beneficial algae in a reef





tank). Also they sell their own line of artificial salt mix, (Living Reef SPS Salt & Living Reef Salt) which is a very good price. Living Reef have found it so good they use it on every tank in the shop and the tanks they service.

Living Reef stock a good selection of aquariums to suit different budgets, some tanks are rebranded Living Reef and upgraded to a better specification, with Deltec skimmers and Aqua Illumination LEDs. They also design and custom





Banana wrasse, naso tang and orange shoulder tang

build bigger reef systems and offer an aquarium maintenance service. Nic and Simon are happy to talk you through setting up your first reef aquarium and both are great to talk to for any reef related advice.

Out the back of the shop, is the livestock area. They stock a good range of marine fish, live coral, frags and other invertebrates. Because of their high standards of marine livestock husbandry practices they offer a 'live shipping guarantee'





Moorish idol

taking the risk away for their customers ordering livestock on their web site. The retail tanks are serviced by an impressively large, British built filtration system, complete with UV sterilisation. Also there's a few display tanks with some large and more unusual fish, the big Moorish idol is one of my favourites.

Living Reef is well worth a visit, even if you don't currently keep a marine aquarium (they may be able to convince you to give it a go!)

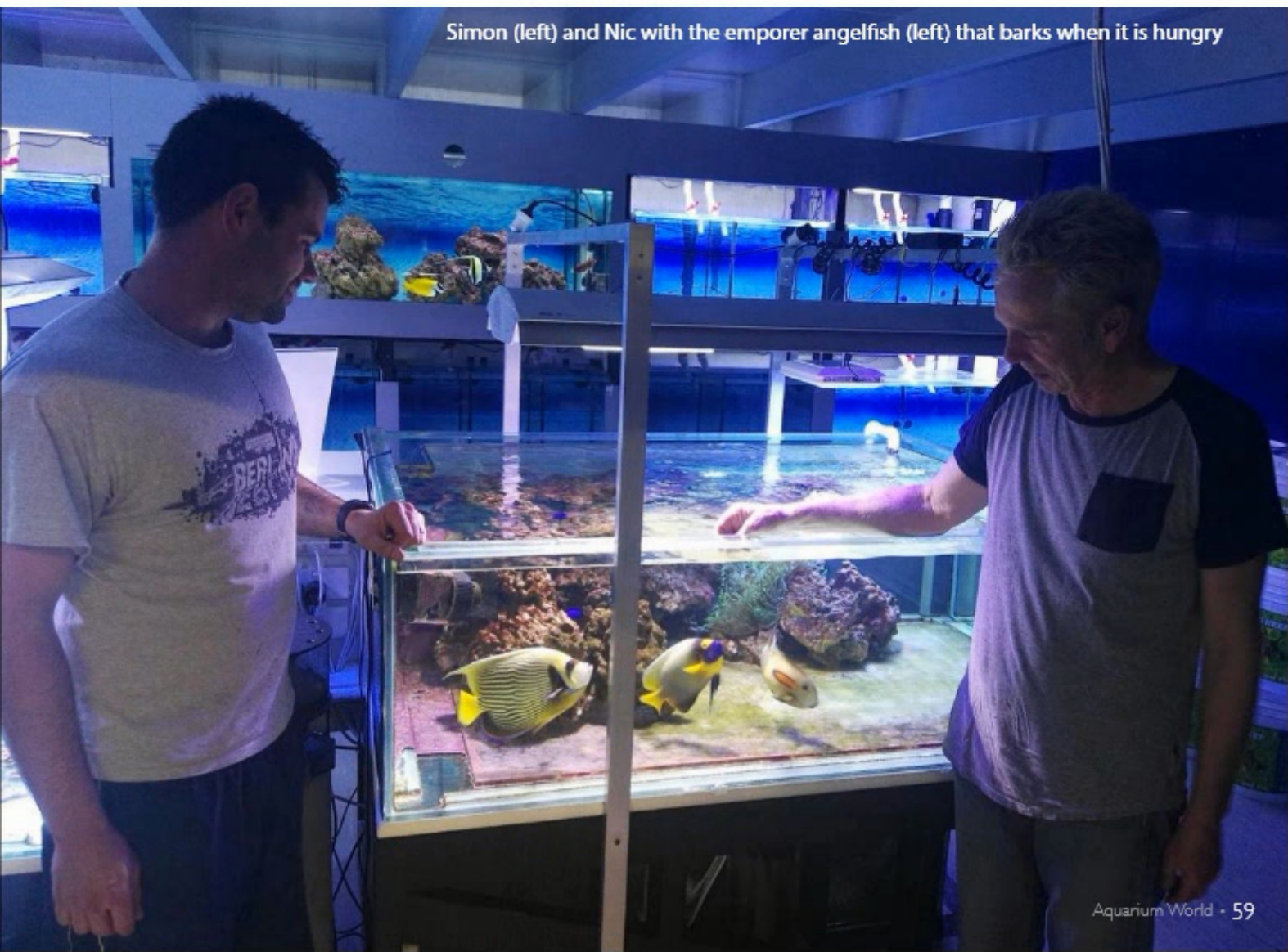
Photos and tour by Tim Kurth



Orange shoulder tang and banana wrasse



Zebrasoma - yellow tang



Simon (left) and Nic with the emperor angelfish (left) that barks when it is hungry

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**Albany Branch - Albany Trade Centre 10/2 Tawa Drive
09 415 4157**

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The Federation of New Zealand Aquatic Societies is a group of aquarists dedicated to supporting and promoting fishkeeping as a hobby, both in our local communities and globally with regard to conservation of aquatic species and their environments. The organisation is dedicated to the improvement of the aquarium and fishkeeping hobby and it has a 60 year history of representing aquarium societies in New Zealand.

There are currently 12 affiliated aquarium clubs around New Zealand:

AUCKLAND FISHKEEPERS ASSOCIATION

Contact: Alex Fleming aucklandfishkeepers@hotmail.com

BAY FISH & REPTILE CLUB

Contact: Jim Sytema sytema@vodafone.co.nz

CHRISTCHURCH TOTALLY TANKED

Contact: James Butler muh47_6@hotmail.com

DUNEDIN AQUARIUM AND POND SOCIETY

CONTACT: Nic Smith dapsdunedin@gmail.com

HAWKE'S BAY AQUARIUM SOCIETY INCORPORATED

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

UPPER HUTT AQUARIUM SOCIETY

Contact: Maxine Lynch uhaquariumsociety@gmail.com

WAIKATO AQUARIUM SOCIETY

Contact: Danielle Wall waikatoaquariumsociety@gmail.com

The following businesses offer discounts to our members, remember to ask politely, this is a privilege not a right. You must show your current FNZAS Membership card at the time of purchase.

AUCKLAND

Hollywood Fish Farm - 10% discount on selected non-sale items

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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

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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

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

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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 Thorndon Quay, Pipitea 6011, 282 0199

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Federation of New Zealand Aquatic Societies Organization

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